Low volume manufacturers generally submit two copies of their petitions for alternative corporate average fuel economy (CAFE) standards to NHTSA, one with confidential business information (CBI), and one without. CBI includes information like projected sales volumes for each vehicle, planned future technology application, and future vehicle models.

Under NHTSA's CBI regulations at 49 CFR part 512, manufacturers making a claim for confidential treatment must submit (1) a complete copy of the submission, and (2) a copy of the submission containing only the portions for which no claim of confidential treatment is made from which those portions for which confidential treatment is claimed has been redacted, and (3) either a second complete copy of the submission or, alternatively, those portions of the submission containing the material for which confidential treatment is claimed and any additional information the submitter deems important to [NHTSA's] consideration of the claim. See 49 CFR 512.5.

The petitions presented below only include non-CBI materials because even though some model years (MYs) have passed (and some MY-specific information like actual production volumes ceases to be CBI after the MY has passed and that information becomes knowable), information may still be pertinent to future product plans or confidential sales strategy may have remained the same over time. However, some manufacturers did not submit a non-CBI version of their petition; where NHTSA did or could not obtain a redacted or non-CBI version of a petition, for example in cases where the company no longer exists in its past form, NHTSA redacted the portions of the petition which the manufacturer claimed confidentiality.

PETITION OF ASTON MARTIN LAGONDA LIMITED
FOR EXEMPTION FROM
CORPORATE AVERAGE FUEL ECONOMY STANDARDS
AND FOR ESTABLISHMENT OF
ALTERNATE FUEL ECONOMY STANDARDS
FOR MODEL YEARS 2008, 2009 and 2010

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (Aston Martin) is a UK company located at Gaydon, Warwickshire, England. Aston Martin is one of the world's leading sports car manufacturers. Founded in 1914, the company has produced some of the most evocative automobiles of all time.

See, www.astonmartin.com.

ALTERNATE STANDARDS REQUESTED

Aston Martin requests alternate standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510(c)[1]
2008	18.6 mpg
2009	18.1 mpg
2010	18.0 mpg

CAFE CALCULATION

Model	2008 MY		2009 MY		2010 MY	
	Actual Fuel Economy (mpg)[2]	Projected Sales	Projected Fuel Economy (mpg)[2]	Projected Sales	Projected Fuel Economy (mpg)[2]	Projected Sales
DB9 Coupe & Convertible 6 speed ***automatic*** trans	16.98	Δ	16.98	Δ	16.98	Δ
DB9 Coupe & Convertible 6 speed ***manual*** trans	15.63	Δ	15.63	Δ	15.63	Δ
Δ	-	-	Δ	Δ	Δ	Δ
DBS Coupe Δ 6 speed ***manual*** trans	-	-	16.72	Δ	16.72	Δ
V8 Vantage Hatchback & Convertible 6 speed ***semi-automatic*** trans	19.85	Δ	19.85	Δ	19.85	Δ
V8 Vantage Hatchback & Convertible 6 speed ***manual*** trans	18.62	Δ	18.62	Δ	18.62	Δ
Rapide Coupe Δ	-	-	Δ	Δ	Δ	Δ

	2008 MY	2009 MY	2010 MY
CAFE[3] =	18.8	18.3	18.2

Δ = Information subject to confidential treatment under Part 512.

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2 mpg less than that forecasted in order to allow for potential development and production variation. The decrease in mpg over the three year period is due to the introduction of a higher performance model and a 4-door model.

[2] Calculated per Part 525 under 40 CFR 600.506(a)(2)

[3] Calculated per Part 525 under 40 CFR 600.510(e)

I.
BACKGROUND

History of Aston Martin

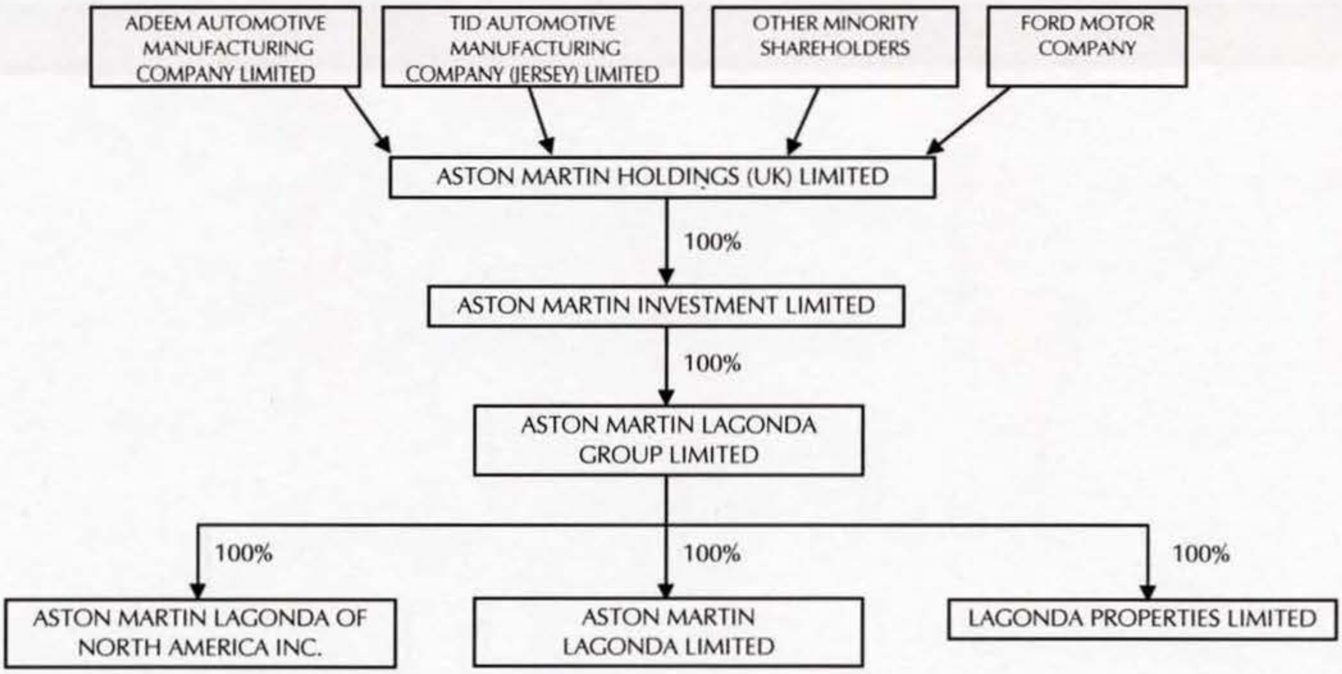
1914 Bamford and Martin Limited founded in London
1914 Aston Martin name is born following success at Aston Hill Climb
1928 First entry at the Le Mans 24-hour race
1947 David Brown buys Aston Martin Motors Limited and Lagonda
1953 DB2/4 goes into production –the first 2+2 seater
1954 David Brown buys Tickford and moves production to Newport Pagnell
1957 DB Mk III goes into production
1958 DB4 goes into production
1963 DB5 goes into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 goes into production
1969 DBSV8 goes into production
1977 V8 Vantage goes into production
1980 Lagonda goes into production
1981 Victor Gauntlett and Pace Petroleum acquire Aston Martin
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in Aston Martin
1990 Virage goes into production
1993 V8 Vantage goes into production
1994 Ford Motor Company acquires 100% holding in Aston Martin
1994 DB7 goes into production
1999 DB7 Vantage goes into production
2001 V12 Vanquish goes into production
2003 Gaydon manufacturing facility is opened, it is the first purpose built factory in Aston Martin's history.
2004 The DB9 goes into production at Gaydon
2004 V12 Vanquish S goes into production
2005 Aston Martin returns to racing
2005 V8 Vantage goes into production
2007 Ford Sells

March 12, 2007: Aston Martin announce the signing of a contract to sell the company to a consortium led by David Richards, consisting of Investment Dar, Adeem Investment, and certain other minority shareholders, ending almost twenty years as part of Ford Motor Company.

May 31st Handover of Company to new owners.

2007+
Aston Martin will remain at its high tech production facility at Gaydon, a purpose-built facility with a skilled workforce of 1800 employees. Aston Martin has a dealership network of 126 dealers in 27 countries.

Ownership structure - at December 19th, 2007.



Shareholdings in Aston Martin Holdings (UK) Limited at December 19th, 2007.

Shareholder	Number of Shares Held	Percentage of Voting Shares in Issue
TID	752,000 ordinary shares of £0.001 each	72.1%
Adeem	236,000 ordinary shares of £0.001 each	22.6%
Other Minority Shareholders	54,285 ordinary shares of £0.001 each	5.2%
Ford	40,000,000 non-voting preference shares* of £1 each	0%
TOTAL	1,042,285 ordinary shares and 40,000,000 non-voting preference shares	100%

* Preference shares are entitled to a fixed preferential dividend at an annual rate (excluding the amount of associated tax credit) of 7% on the nominal amount of the shares up to and including the 5th anniversary of the first allotment of the preference shares, and thereafter the annual rate (excluding the amount of an associated tax credit) of 8% on the nominal amount. Preference shares are not entitled to vote.

II.
ASTON MARTIN IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year. Aston Martin meets this test (see Table 1 below). Ford owns only non-voting preference shares in Aston Martin's ultimate parent company.
The new owners of Aston Martin do not have control of and are not controlled by another motor vehicle manufacturer. Aston Martin is therefore eligible to request the exemption and alternate standards.[4]

Table 1 indicates Aston Martin's actual and projected world-wide production figures for the period 2004 to 2010.

Table 1: Actual and Projected World-Wide Combined Aston Martin Passenger Automobile Production and Capacity

Calendar Year	Total World-Wide Production & Capacity
2004	2016
2005	4513
2006	7097
2007*	Δ
2008*	Δ
2009*	Δ
2010*	Δ

Note: * = projected

Δ = Information subject to confidential treatment under Part 512.

III.
TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. But late filings are permitted if good cause is shown. 49 CFR 525.6. Good cause exists in this case because the sale of Aston Martin was not completed until May 31st 2007 and final agreement on the first full model year to which the sales transaction would apply and the allocation of credits between Ford and Aston Martin was not reached until 10th December 2007. This petition could not have been filed until (a) completion because it was not known whether transfer would occur and whether and when the company would be eligible for an alternative CAFE standard, and (b) agreement had been reached on the first full model year to which the transaction would apply because Aston Martin could not know what model years would be eligible for alternative standards on the basis of Aston Martin's status as a low volume manufacturer.

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[4] During the 20 years that AML was controlled by Ford, AML was by law included in the Ford CAFE fleet (see 49 USC 32901 et seq). Under the CAFE legislation, the two companies were "in essence the same manufacturer for purposes of CAFE standards" (see 56 FR 31459, July 10, 1991, discussing Ferrari and Fiat), and AML was not permitted to have an independent CAFE value. Instead, Ford and AML (and the other manufacturers in the Ford group) shared a CAFE value based on the total volume of cars of those companies. Upon Ford's sale of AML, AML became eligible for a small volume alternative standard.

Aston Martin has therefore acted as expeditiously as possible, given a situation which was not within its control. There is NHTSA precedent finding "good cause" under 49 CFR 525.6 under just this type of circumstances. In February 1994, Lamborghini was divested by Chrysler and then filed in August 1995 –18 months later – a petition requesting a CAFE exemption for MY 1995-1997. NHTSA granted the request, finding good cause for the late filing, 61 FR 39429 (July 29, 1996); 61 FR 67491 (December 23, 1996). For the same reasons that NHTSA found "good cause" when there was an 18 month gap between divestiture and filing in the Lamborghini case, the agency should likewise find good cause for the late filing here, where the time span between the final determination of the first full model year to which a sales transaction would apply and filing is less than two weeks (and time span between divestiture and filing is only 6½ months).

Accordingly, this petition should be considered timely.

IV.
ASTON MARTIN VEHICLE LINES UNDER THIS PETITION

DB9 Model Line[5]

The DB9 is Aston Martin's top-of-the-line luxury performance sports car. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to Aston Martin, has given the DB9 one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle (see below), allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large disc brakes - 355 mm diameter discs at the front, and 330 mm at the rear - are ventilated and grooved, to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

The DB9 has many design and engineering innovations, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays.
Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

In its manufacturing process, the DB9 has pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.

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[5] The DBS is a high performance version of the DB9 with, among other things, 510 horsepower versus 450.

The DB9's structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.

The lightweight, rigid body structure and tuned suspension and steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBA sensors detect when maximum braking is required and automatically apply the appropriate force.

MSRP = $175,000-179,000. See Table 2 for vehicle specifications.

V8 Vantage Model Line

The V8 Vantage is smaller (4.38 metres long) and less expensive than the DB9, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The V8 Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The V8 Vantage, as with DB9, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent wheel slippage or loss of traction, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

Headlamps feature innovative LED (light emitting diode) indicators and side lights, and optional xenon dipped beam headlights are available. The rear lamps employ 360 LEDs for lights, brake and indicators. As a result, they illuminate 200 milliseconds faster than conventional brake lights, providing an additional full car length of stopping distance at 100 km/h (62 mph) for the following car.

MSRP = $120,000-124,000. See Table 2 for vehicle specifications.

Rapide Model Line[6]

The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume,

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[6] The Rapide is still a concept vehicle at the time this petition is written, but the assumption is being made that it will go forward into production.

high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martins. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the Rapide's key qualities. The Rapide is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for interior options

Aston Martin has a tradition of high-speed touring cars. The four-door, four-seater saloon displayed at the 1927 Olympia Motor Show began a long tradition of cars that combined elegance, style and power with usability. Four years later another four-door saloon was exhibited, with an aluminium-panelled body by Bertelli, finely engineered, detailed and upholstered throughout, with touches like the roof-mounted opening glass panel above the rear passenger compartment. Experimentation and innovation continued. The 'Atom' project began in 1939 as a response to materials shortages, packaging design and post-war needs.
A four-door saloon, the Atom was built around a steel tube chassis, upon which the bodywork was mounted. The geometrical bodywork drew upon the new science of streamlining, and the car was smaller and lighter than what had gone before, with an innovative chassis design that ensured the company retained its image as a technical leader. In the decades following the war, Aston Martin accommodated numerous customer requests, including four-door variants of the V8 and Virage models.

Like all Aston Martins, the Rapide is a performance car. Powered by the V12 engine from the DB9 and mated to a ZF Touchtronic (automatic) gearbox, the car has performance similar to the DB9.

V.
THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT ASTON MARTIN CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that Aston Martin can achieve for the model years at issue.

A. ASTON MARTIN IS ADOPTING ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an Aston Martin alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to Aston Martin during the model years at issue. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of Aston Martin's product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, Aston Martin cannot change this performance-oriented nature of its cars. Aston Martin is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant Aston Martin fuel economy facts are as follows:

- The Aston Martin models, while high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB9 (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that DB9 is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement.

- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front wings, tailgate and sills are produced from advanced composites.

- Aston Martin has designed aerodynamic cars -- with drag coefficients as follows:

DB9	V8 Vantage	DBS
0.340	0.336	0.376

- The weight/horsepower ratios are as favorable as:

DB9	V8 Vantage	DBS
3880/450 8.6:1	3594/380 9.5:1	3738/510 7.3:1

Complete descriptions of the vehicle configurations are set forth in Table 2, in accordance with the requirements of 525.7(e-g).

Table 2: Vehicle Specifications

Vehicle	Model Lines			
Description	**DB9**	**V8 Vantage**	**DBS**	**Rapide**
Body Variants	2dr Coupe 2dr Convertible	2dr Hatchback 2dr Convertible	2dr Coupe Δ	4dr Coupe
Frontal area (ft^2)	22.0	21.8	22.3	Δ
Dimensions (inches) Height Width Length	50 74 185	50 73.5 172.5	50 75 185.5	Δ Δ Δ
Curb Weight (lbs)	3880 - 4090	3594 – 3770	3738	Δ
Equivalent Test Weight (lbs)	4500	4000	4500	Δ
Seating Positions	4	2	2	Δ
Interior Volume Index (ft^3)	78	N/A	N/A	Δ
Engine Type	V12	V8	V12	Δ
Working Principle	Four stroke, Otto cycle, naturally aspirated			
Engine Displacement (Litres)	5.9	4.3 – 4.7	5.9	Δ
Engine Max Power (hp)	450	380	510	Δ
Fuel Metering System	Electronic multipoint fuel injection			
Transmission	6 speed manual or 6 speed automatic	6 speed manual or 6 speed semi-auto	6 speed manual Δ	Δ
Final Drive Ratio	manual: 3.54 auto: 3.15	manual: 3.91 semi-auto: 3.91	manual: 3.70 Δ	Δ
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors, air injection & EGR.	Three-way catalysts heated O2 sensors.	Δ
Road Load Horsepower†	16.6	13.3	15.3	Δ
Radial Tires (std) Brand Size – Front Size – Rear	Bridgestone 235/40 R19 275/35 R19	Bridgestone 235/45 R18 275/40 R18	Pirelli 245/35 R20 295/30 R20	Δ
Low Friction Lubricants (Type)	Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270	Engine: Castrol RS 10W60 Manual/Semi-Auto Transaxle: Castrol BOT270	Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270	Δ
N/V	manual: 34.9 auto: 28.6	manual: 38.6 semi-auto: 38.6	manual: 36.0 Δ	Δ
Fuel Economy Values	manual: 15.63 auto: 16.98	manual: 18.62 semi-auto: 19.85	manual: 16.72 Δ	Δ

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

Δ = Information subject to confidential treatment under Part 512.

B. THE ASTON MARTIN REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

1. Aston Martin Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy

Aston Martin produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V12 or V8 power plants. It does not have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles simply cannot be incorporated into the Aston Martin business plan, given the nature of Aston

Martin's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

Aston's V12 and V8 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different prices). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment. We note nonetheless that V8 sales are expected to exceed V12 sales.

Aston Martin is therefore not in a position to manipulate model mix because the company exists to sell a limited number of high performance automobiles and there is no opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible.

The projected US sales mix of the Aston Martin models for MY 2008-2010 is set forth below in Table 3, which shows the most fuel efficient mix that Aston Martin can sell in the US market in the model years at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of Aston Martin automobiles produced or planned for the US market from 2004 to 2010, by model:

Model Year	US Product Mix				
	Vanquish	DB9	V8 Vantage	DBS	Rapide
2004	78	-	-	-	-
2005	165	896	-	-	-
2006	161	1084	476	-	-
2007	-	755	1495	-	-
2008*	-	Δ	Δ	-	-
2009*	-	Δ	Δ	Δ	Δ
2010*	-	Δ	Δ	Δ	Δ

Note: * = projected

Δ = Information subject to confidential treatment under Part 512.

2. Further Fuel Efficiency Improvements That Are Compatible With Basic *Design Concept* of Aston Martin Vehicles Are Not Possible

As NHTSA has acknowledged, "making some of ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to Aston Martin.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are Aston Martin's financial resources and whether Aston Martin has adopted (or will adopt) fuel economy improvements that are compatible with the basic design concept of Aston Martin automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given Aston's pursuit of light weight and aerodynamics, it has taken all steps possible to maximize fuel economy. Aston Martin cannot make further FE improvements and still produce a product that is compatible with the company's basic vehicle design concept of a high performance sports car.

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were <u>not</u> compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.
Further evidence that Aston Martin has done as much as possible is the fact that the Aston Martin mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

DB9: 12 mpg city and 19 mpg highway (for MY 2007, coupe automatic)

2007 Model	City mpg*	Highway mpg*
MB SL600	13	19
Bentley Continental GT	12	19
Maserati QP	13	18
BMW M6	12	18
Ferrari 599 GTB	11	15
Lambo Murcielago	10	16

*Source: 2007 EPA FE Guide

V8 Vantage: 14 mpg city and 20 mpg highway (for MY 2007, coupe manual)

2007 Model	City mpg*	Highway mpg*
Cadillac XLR	15	22
Ferrari F430	12	17
Lamborghini Gallardo	12	18

*Source: 2007 EPA FE Guide

Rapide : Δ

Δ = Information subject to confidential treatment under Part 512.

The Vanquish was a very limited production V12 sports car that ceased production for the US market in CY 2006. The fuel economy of the US specification Vanquish was approximately 3% less than the V12 DB9 and 11% less than the anticipated DBS. The ceasing of the US Vanquish was therefore a model year step taken by Aston Martin that increased the US fleet fuel economy.

VI.
OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

Smaller companies with limited resources must give priority to compliance with safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 upgrade, which is effective September 2008. Other upcoming FMVSS rulemakings that will also have potential adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements and upgraded FMVSS 216 roof crush requirements.

VII.
THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

Aston Martin recognizes America's need to conserve energy, especially today. However, because Aston Martin will sell such an extremely low volume of cars in the US each year, and because the vehicles tend to be used infrequently (as a second or third car), the granting of this petition will not negatively impact US energy conservation. The extremely low volume of Aston Martin's sales in the US results in virtually no measurable effect on US energy consumption.

Since Aston Martin cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

VIII.
CONCLUSION

Based upon the foregoing, Aston Martin respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2008, 2009 and 2010.

Respectfully submitted,

J. Carling

Jonathan Carling
Chief Operating Officer
Aston Martin Lagonda Limited

DEC 19 2007
Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2011

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

March 6th, 2009

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Founded in 1914, the company has produced some of the most iconic automobiles of all time.

See manufacturers website located at www.astonmartin.com

CONTENTS

ALTERNATIVE STANDARDS REQUESTED

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510(c) [1]
2011	18.2 mpg

This requested standard is 0.2 mpg more stringent than the requested standard for MY 2010.

CAFE CALCULATION

2011 Model Year Aston Martin Model	Actual MPG	Projected USA Sales	Drive System	Transmission Class	Curb Weight	Test Weight	CAFE Calculation
DB9 Coupe & Convertible	18.8	[redacted]	RWD	6 Speed Automatic	3880 – 4000	4500	[redacted]
DB9 Coupe & Convertible	17.0	[redacted]	RWD	6 Speed Manual	3970 – 4090	4500	[redacted]
DBS Coupe & Convertible	17.7	[redacted]	RWD	6 Speed Automatic	3730 – 3980	4500	[redacted]
DBS Coupe & Convertible	16.7	[redacted]	RWD	6 Speed Manual	3830 – 4070	4500	[redacted]
Vantage Hatchback & Convertible	19.5	[redacted]	RWD	6 Speed Semi Automatic	3594 – 3770	4000	[redacted]
Vantage Hatchback & Convertible	18.4	[redacted]	RWD	6 Speed Manual	3594 – 3770	4000	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rapide Coupe	18.5	[redacted]	RWD	6 Speed Automatic	4300	4500	[redacted]
		[redacted]					[redacted]
						CAFE =	**18.6**

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.4 mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial issues facing the auto industry, as well as to allow for consideration of what the MY 2011+ CAFE standards will be when promulgated in April 2009 per the Presidential memorandum of January 26, 2009.

I. BACKGROUND

History of AML

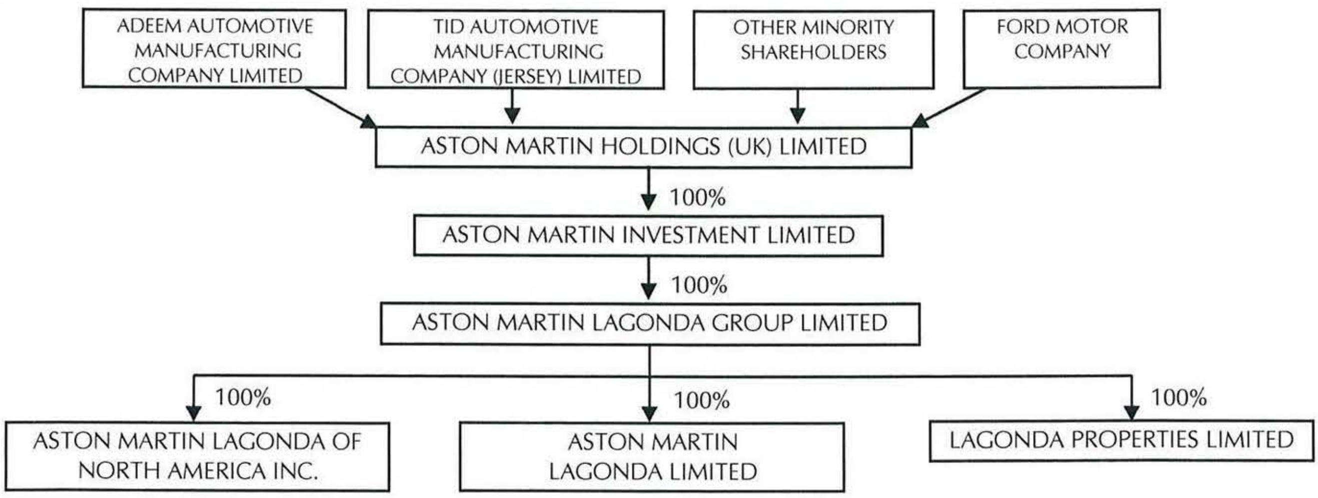
1913	Bamford and Martin Limited founded in London.
1914	Aston Martin name is born following success at Aston Hill Climb.
1915	First Aston Martin is registered.
1926	Aston Martin Motors Limited is formed and sets up in Feltham.
1928	First entry at the Le Mans 24-hour race.
1937	140 cars built – the highest pre-war production figure.
1947	David Brown buys Aston Martin Motors Limited and Lagonda.
1953	DB2/4 goes into production – the first 2+2 seater.
1954	David Brown buys Tickford and moves production to Newport Pagnell.
1955	DB2/4 Mk II goes into production.
1957	DB Mk III goes into production
1958	DB4 goes into production
1959	Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963	DB5 goes into production
1964	DB5 appears with James Bond in *Goldfinger*
1965	DB6 goes into production
1969	DBSV8 goes into production
1977	V8 Vantage goes into production
1980	Lagonda goes into production
1981	Victor Gauntlett and Pace Petroleum acquire AML
1983	Victor Gauntlett is backed financially by the Livanos shipping family
1987	Ford Motor Company acquires a 75% shareholding in AML
1990	Virage model goes into production
1993	V8 (Virage) Vantage goes into production
1994	Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996	DB7 Volante goes into production at Bloxham.
1999	The V8 (Virage) Vantage Le Mans goes into production. The DB7 Vantage goes into production at Bloxham.
2001	V12 Vanquish goes into production.
2002	After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003	Production of DB7 model finishes. AML Bloxham factory closes. AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004	The DB9 Coupe goes into production at Gaydon. V12 Vanquish S goes into production at Newport Pagnell.
2005	AML returns to racing in GT events in Europe and USA. The DB9 Volante goes into production at Gaydon. Vantage (V8 4.3L engine) goes into production at Gaydon.
2006	AML unveils the Rapide four door concept car at the Detroit Motor Show. The 30,000th Aston Martin rolls of the production line at Gaydon. The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007	Vantage Roadster goes into production at Gaydon. Ford sells AML to an investment consortium led by David Richards. Production of V12 Vanquish finishes and AML Newport Pagnell factory closes. **December 2007 AML submit a petition for exemption from Corporate Average Fuel Economy Standards and for establishment of Alternate Fuel Economy Standards for Model Years 2008, 2009 and 2010. NHTSA decision not known as of the date of this petition.**
2008	DBS goes into production at Gaydon. Vantage models get the 4.7L V8 engine. AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.

II. AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model years for which exemption is requested and for the preceding model years. The AML owners do not have control of and are not controlled by another motor vehicle manufacturer (see *Ownership Structure and Shareholdings* below). Note that whilst Ford has retained ~~an~~ noncontrolling interest in AML, their holding is only in the form of non-voting preference shares in AML's ultimate parent company. AML is therefore eligible to request the exemption and alternate standards [2].

Ownership structure at March 6th, 2009.



Shareholdings in Aston Martin Holdings (UK) Limited at March 6th, 2009.

Shareholder	Number of Shares Held	Percentage of Voting Shares in Issue
TID	720,997 ordinary shares of £0.001 each	63.36%
Adeem	362,578 ordinary shares of £0.001 each	31.86%
Other Minority Shareholders	54,285 ordinary shares of £0.001 each	4.78%
Ford	40,000,000 non-voting preference shares* of £1 each	0%
TOTAL	1,042,285 ordinary shares and 40,000,000 non-voting preference shares	100%

* Preference shares are entitled to a fixed preferential dividend at an annual rate (excluding the amount of associated tax credit) of 7% on the nominal amount of the shares up to and including the 5th anniversary of the first allotment of the preference shares, and thereafter the annual rate (excluding the amount of an associated tax credit) of 8% on the nominal amount. Preference shares are not entitled to vote.

[2] This position is consistent with that illustrated in the AML CAFE exemption petition for model years 2008, 2009 & 2010.

Table 1 indicates AML's actual and projected world-wide production figures for the period 2007 to 2011.

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2007	7426
2008	6487
2009	[redacted]
2010	[redacted]
2011	[redacted]

Note: * = projected

III. TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6.

This petition is being filed in a timely manner, or in the alternative, good cause exists for any late filing. In October 2008, AML contacted NHTSA and enquired about the status of its MY 2008-2010 CAFE petition, explaining that the company wanted to have feedback on that petition prior to filing a petition for subsequent model years. AML was told that until NHTSA completed the MY 2011+ passenger car CAFE rulemaking, it would not publish any Federal Register notices as regards CAFE exemptions and that as a result, that AML should refrain from making further model year filing.

In late January 2009, after NHTSA announced a delay of the MY 2011+ CAFE rulemaking, AML again contacted NHTSA but was not able to obtain guidance. At this point, AML decided to file this petition. Under these facts, this petition is timely.

IV. VEHICLE LINES UNDER THIS PETITION

Reference AML company website - http://www.astonmartin.com/eng/thecars
See below table 2a and 2b for vehicle specifications.

A. ASTON MARTIN DB9

The DB9 is a thoroughbred sports car with GT levels of comfort and refinement. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to AML, has given the DB9 one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large disc brakes - 355 mm diameter discs at the front, and 330 mm at the rear - are ventilated and grooved, to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

The DB9 has many design and engineering innovations, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays.
Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

In its manufacturing process, the DB9 has pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.

The DB9's structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.

The lightweight, rigid body structure and tuned suspension and hydraulic 'Servotronic' speed-sensitive power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

The DB9 is available in Coupe or soft top Convertible bodystyles with a six-speed manual gearbox or a 'Touchtronic' six-speed automatic gearbox.

MSRP = $182,450 – 199,950 (MY 2009).

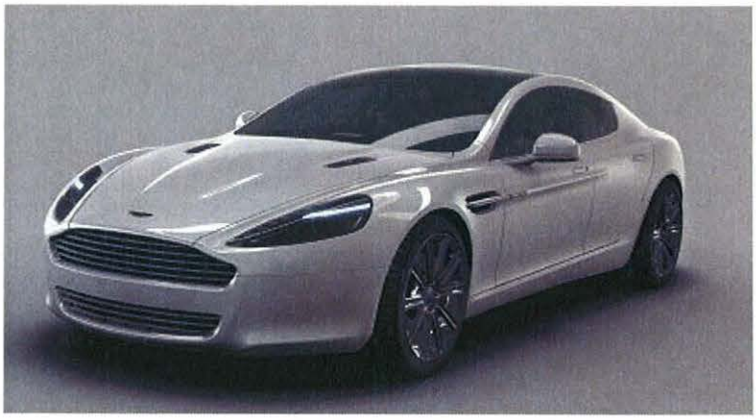
B. ASTON MARTIN DBS

Based on the architecture introduced with the DB9, the DBS has been designed as the ultimate driving experience, bridging the gap between road and track – DB9 and DBR9. Equally at home on a twisting mountain circuit as on the open road. The DBS was developed as the ultimate expression of AML's engineering and technical ability. The need for high-performance stability, handling ability and low kerb weight defined the car's form and construction. The DBS is the first production Aston Martin to make extensive use of ultra-light carbon-fibre body panels and carbon ceramic brake technology.

The DBS is available as a coupe 2 seater body-style with a six-speed manual gearbox or a 'Touchtronic' six-speed automatic gearbox. A soft top Convertible 2+2 seater variant of the DBS model will be available mid CY 2009.

MSRP = $269,000 – 273,000 (MY2009).

C. ASTON MARTIN RAPIDE



The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martins. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the Rapide's key qualities. The Rapide is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for interior options.

Like all Aston Martins, the Rapide is a performance car. Powered by the V12 engine from the DB9 and mated to a ZF Touchtronic (automatic) gearbox, the car has performance similar to the DB9.

MSRP = Not yet determined.

D. ASTON MARTIN VANTAGE

The Vantage is smaller (4.38 metres long) and less expensive than the DB9, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The Vantage, as with DB9, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent loss of traction and directional stability, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

The Vantage is available in hatchback or soft top roadster bodystyles with a six-speed manual gearbox or a 'Sportshift' automated six-speed manual gearbox coupled to the 4.7 L V8 engine.

[redacted]

MSRP = $119,500 – 136,500.

V. THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the model years at issue.

A. AML IS ADOPTING ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the model year at issue. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB9 (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that DB9 is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The DBS takes the lightweight theme even further with the use of carbon fibre in body panels and carbon ceramic brakes.

- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front wings, tailgate and sills are produced from advanced composites.

- AML has designed aerodynamic cars -- with drag coefficients as follows:

DB9	Rapide	DBS	Vantage
0.33	0.36	0.36	0.34

- The weight/horsepower ratios are as favorable as:

DB9	Rapide	DBS	Vantage
3880/470 8.6:1	4300/470 9.15:1	3738/510 7.3:1	3594/380 9.5:1

- The use of technology like partial hydraulic/electric or full electric power-assist steering has been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform (2002), on the basis that it provided the best steering feel and performance. All appropriate alternatives will be considered for new models.

- The use of low friction lubricants in the V8 engine has been considered and subsequently rejected on the basis that 10W60 oil provides an oil film thickness retention needed to protect the lead-free main bearings at elevated engine speeds.

[redacted]

[redacted]

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial crisis affecting the automobile industry and specifically affecting AML. Falling sales have led AML to layoff close to 600 employees and contractors in the 4th Quarter 2008 and 1st Quarter 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd).

To quantify the falling sales, the company has experienced a 17% DECREASE [3] in CY 2008 compared to CY 2007 [redacted] This substantial decrease in sales volume, revenue and profits has a direct impact on the capability of the company to make investment in new fuel economy technology.

[3] Comparing 4th Quarter US Sales for CY 2008 versus 4th Quarter CY 2007, AML experienced a fall of 52%.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 525.7(e-g).

Table 2a: Vehicle Specifications – DB9, DBS & Rapide

Vehicle	Model Line		
Description	**DB9**	**DBS**	**Rapide**
Body Variants	2dr Coupe 2dr Convertible	2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft^2)	22.0	22.3	23.1
Dimensions (inches) Height	50.0	50.0	53.5
Width	73.8	75.0	76.0
Length	185.4	185.4	197.6
Wheelbase	107.9	107.9	117.7
Front Track	61.8	62.6	62.6
Rear Track	61.4	62.9	63.6
Curb Weight (lbs)	3880 – 4090	3730 – 3980	4300
Equivalent Test Weight (lbs)	4500	4500	4500
Seating Positions	4	2 or 4	4
Interior Volume Index (ft^3)	78	N/A or 78	85
Engine Type	V12	V12	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated		
Engine Displacement (Litres)	5.9	5.9	5.9
Engine Max Power (hp)	470	510	470
Fuel Metering System	Electronic multipoint fuel injection		
Transmission	6 spd automatic or 6 spd manual	6 spd automatic or 6 spd manual	6 spd automatic
Final Drive Ratio	auto: 3.15 manual: 3.54	auto: 3.46 manual: 3.70	auto: 3.15
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower†	16.6	15.3	16.0
Radial Tires (std) Brand	Bridgestone	Pirelli	Pirelli
Size – Front	235/40 R19	245/35 R20	245/40 R20
Size – Rear	275/35 R19	295/30 R20	295/35 R20
Low Friction Lubricants (Type)	Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270	Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270	Engine: Mobil 1 0W40
N/V	6 spd auto: 28.6 6 spd manual: 34.9	6 spd auto: 28.6 6 spd manual: 36.0	6 spd auto: 28.6
Fuel Economy Values	6 spd auto: 18.8 6 spd manual: 17.0	6 spd auto:17.7 6 spd manual: 16.7	6 spd auto: 18.5

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

Table 2b: Vehicle Specifications -Vantage

Vehicle	Model Line	
Description	**Vantage**	[redacted]
Body Variants	2dr Hatchback 2dr Convertible	[redacted]
Frontal area (ft^2)	21.8	[redacted]
Dimensions (inches) Height	50	[redacted]
Width	73.5	[redacted]
Length	172.5	[redacted]
Wheelbase	102.4	[redacted]
Front Track	61.8	[redacted]
Rear Track	61.4	[redacted]
Curb Weight (lbs)	3594 – 3770	[redacted]
Equivalent Test Weight (lbs)	4000	[redacted]
Seating Positions	2	[redacted]
Interior Volume Index (ft^3)	N/A	[redacted]
Engine Type	V8	[redacted]
Working Principle	Four stroke, Otto cycle, naturally aspirated	[redacted]
Engine Displacement (Litres)	4.7	[redacted]
Engine Max Power (hp)	420	[redacted]
Fuel Metering System	Electronic multipoint fuel injection	[redacted]
Transmission	6 spd semi-auto or 6 spd manual	[redacted]
Final Drive Ratio	6 spd semi-auto: 3.91 6 spd manual: 3.91	[redacted]
Emission Control System	Three-way catalysts heated O2 sensors, air injection & EGR	[redacted]
Road Load Horsepower†	13.3	[redacted]
Radial Tires (std) Brand	Bridgestone	[redacted]
Size – Front	235/40 R19	[redacted]
Size – Rear	275/35 R19	[redacted]
Low Friction Lubricants (Type)	Engine: Castrol RS 10W60 Manual/Semi-Auto Transaxle: Castrol BOT270	[redacted]
N/V	6 spd semi-auto: 38.6 6 spd manual: 38.6	[redacted]
Fuel Economy Values	6 spd semi-auto: 19.5 6 spd manual: 18.4	[redacted]

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

B. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicality" -- that the ability of a small volume manufacturer to make investment in fuel economy improvement must be considered in the context of the global financial crisis affecting the automobile industry and specifically affecting AML.

1. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V12 or V8 power plants. It does not have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles have not been incorporated into the AML business plan, given the nature of AML's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML's V12 and V8 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different prices). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment.

Moreover, contrary to expectations, V8 sales have <u>not</u> exceeded V12 sales. Sales of the V8 model for the CY 2008 period have shown a less than forecasted demand for this model, negatively impacting the AML CAFE (V12 and V8 sales have been split about 50-50). Indeed, as the <u>total volume</u> of AML sales shrinks with the economic recession, the greater the loss of V8 sales as a percentage of total sales, the worse the impact on CAFE.

AML is therefore not in a position to manipulate model mix. There is no opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

The projected US sales mix of the Aston Martin models for MY 2011 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model years at issue. The projections in Table 3 are based on anticipated consumer demand.

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[4] The decision to proceed with a V12 Rapide vehicle was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

Table 3: The number of AML automobiles produced or projected for the US market from 2007 to 2011, by model.

Model Year	US Sales Mix			
	DB9	DBS	Rapide	Vantage
2007	688	-	-	1474
2008	323	-	-	1047
2009	[redacted]	[redacted]	-	[redacted]
2010	[redacted]	[redacted]	[redacted]	[redacted]
2011	[redacted]	[redacted]	[redacted]	[redacted]

Note: * = projected

2. **Further Fuel Efficiency Improvements That Are Compatible With Basic *Design Concept* of Aston Martin Vehicles Are Not Possible**

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are AML's financial resources and whether AML has adopted (or will adopt) fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's current financial position -- shared with the rest of the global auto industry – it has taken all steps possible to maximize fuel economy. AML cannot make further FE improvements and still produce a product that is compatible with the company's basic vehicle design concept of a high performance sports car.

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB9:** 12 mpg city and 19 mpg highway (for MY 2009, coupe automatic)

2009 Model	City mpg*	Highway mpg*
Mercedes Benz SL600	11	18
Bentley Continental GT	10	17
Maserati GT	12	19
BMW M6	11	17
~~Lamboghini~~Lamborghini Murcielago	9	14

- **DBS:** 12 mpg city and 18 mpg highway (for MY 2009, coupe automatic)

2009 Model	City mpg*	Highway mpg*
Ferrari 599 GTB	11	15
Mercedes Benz SLR	12	16

- **Rapide:** 12 mpg city and 19 mpg highway (estimate for coupe automatic)

2009 Model	City mpg*	Highway mpg*
Mercedes Benz CLS 63	12	18
Maserati QP	12	18
Ferrari 612	9	16
Bentley Continental Flying Spur	10	17

- **Vantage:** 13 mpg city and 19 mpg highway (for MY 2009, hatchback semi-automatic)

2009 Model	City mpg*	Highway mpg*
Audi R8	13	18
Ferrari F430	11	16
Lamborghini Gallardo	14	20

*Source: 2009 EPA FE Guide

VI. OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements and upgraded FMVSS 216 roof crush requirements. These standards require increased mass to body and frame structures which translates into additional weight.

VII. THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year to a clientele that buy cars for reasons other than fuel economy. There is a demand for cars in this market segment, and they will be sold irrespective of CAFE issues. But the impact on energy consumption is negligible because the vehicles tend to be used very infrequently (as a second or third car). In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

VIII. CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for model year 2011.

Respectfully submitted,

J. Carling

Jonathan Carling
Chief Operating Officer
Aston Martin Lagonda Limited

March 6th 2009.
Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2012

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

May 10th, 2010

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Founded in 1914, the company has produced some of the most iconic automobiles of all time.

See manufacturers website located at www.astonmartin.com

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ALTERNATIVE STANDARDS REQUESTED

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510(c) [1]
2012	18.4 mpg

This requested standard shows a projected improvement of 0.2 mpg on the requested standard for MY 2011.

CAFE CALCULATION

MY 2012

Model	Year	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	CAFE Calculation
DB9 Coupe & Convertible	2012	IP	19.72	[redacted]	RWD	6 Speed Automatic	3880-4090	4500	[redacted]
DB9 Coupe & Convertible	2012	IP	16.99	[redacted]	RWD	6 Speed Manual	3880-4090	4500	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
DBS Coupe & Convertible	2012	IP	17.73	[redacted]	RWD	6 Speed Automatic	3738	4500	[redacted]
DBS Coupe & Convertible	2012	IP	16.72	[redacted]	RWD	6 Speed Manual	3738	4500	[redacted]
V8 Vantage Hatchback & Convertible	2012	IP	20.25	[redacted]	RWD	6 Speed Semi Automatic	3594-3770	4000	[redacted]
V8 Vantage Hatchback & Convertible	2012	IP	18.00	[redacted]	RWD	6 Speed Manual	3594-3770	4000	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rapide	2012	IP	19.20	[redacted]	RWD	6 Speed Automatic	4387	4750	[redacted]
V12 Vantage	2012	IP	16.72	[redacted]	FWD	6 Speed Manual	3738	4500	[redacted]
			Sales Total	[redacted]				**MH**	[redacted]
								CAFE =	**18.830**

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.4 mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that continues for the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2012	35.95	27.95	0.0005308	0.006057

Model	Average Track		Wheelbase		x Footprint
	mm	feet	mm	feet	$feet^2$
DB9	1565.00	5.13	2740.00	8.99	46.2
V8 Vantage	1572.50	5.16	2600.00	8.53	44.0
DBS	1585.00	5.20	2740.00	8.99	46.7
Rapide	1602.00	5.26	2989.00	9.81	51.5
V12 Vantage	1572.50	5.16	2600.00	8.53	44.0

Volumes		2012
N_{DB9}	DB9 Total	[redacted]
$N_{vantage}$	V8 Vantage Total	[redacted]
N_{DBS}	DBS Total	[redacted]
N_{rapide}	Rapide Total	[redacted]
$N_{v12vantage}$	V12 Vantage Total	[redacted]
N	Total Vehicles	[redacted]

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Target				
DB9	V8 Vantage	DBS	Rapide	V12 Vantage
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2012 Aston Martin Fleet Standard	31.94 mpg

I. BACKGROUND

History of AML

1913	Bamford and Martin Limited founded in London.
1914	Aston Martin name is born following success at Aston Hill Climb.
1915	First Aston Martin is registered.
1926	Aston Martin Motors Limited is formed and sets up in Feltham.
1928	First entry at the Le Mans 24-hour race.
1937	140 cars built – the highest pre-war production figure.
1947	David Brown buys Aston Martin Motors Limited and Lagonda.
1953	DB2/4 goes into production – the first 2+2 seater.
1954	David Brown buys Tickford and moves production to Newport Pagnell.
1955	DB2/4 Mk II goes into production.
1957	DB Mk III goes into production
1958	DB4 goes into production
1959	Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963	DB5 goes into production
1964	DB5 appears with James Bond in *Goldfinger*
1965	DB6 goes into production
1969	DBSV8 goes into production
1977	V8 Vantage goes into production
1980	Lagonda goes into production
1981	Victor Gauntlett and Pace Petroleum acquire AML
1983	Victor Gauntlett is backed financially by the Livanos shipping family
1987	Ford Motor Company acquires a 75% shareholding in AML
1990	Virage model goes into production
1993	V8 (Virage) Vantage goes into production
1994	Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996	DB7 Volante goes into production at Bloxham.
1999	The V8 (Virage) Vantage Le Mans goes into production. The DB7 Vantage goes into production at Bloxham.
2001	V12 Vanquish goes into production.
2002	After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003	Production of DB7 model finishes. AML Bloxham factory closes. AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004	The DB9 Coupe goes into production at Gaydon. V12 Vanquish S goes into production at Newport Pagnell.
2005	AML returns to racing in GT events in Europe and USA. The DB9 Volante goes into production at Gaydon. Vantage (V8 4.3L engine) goes into production at Gaydon.
2006	AML unveils the Rapide four door concept car at the Detroit Motor Show. The 30,000th Aston Martin rolls of the production line at Gaydon. The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007	Vantage Roadster goes into production at Gaydon. Ford sells AML to an investment consortium led by David Richards. Production of V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008	DBS goes into production at Gaydon. Vantage models get the 4.7L V8 engine. AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009	DBS Volante goes into production at Gaydon. Vantage coupe model with V12 engine launched into Europe.

II. AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles. Note that Ford has retained a noncontrolling interest in AML, their holding is only in the form of non-voting preference shares. AML is therefore eligible to request the exemption and alternate standard[2].

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2008	6487
2009	2572
2010	[redacted]
2011	[redacted]
2012	[redacted]

Note: * = projected

III. TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6.

AML has deliberately held the release of this petition until after the April 1st 2010 publication of the joint rulemaking of EPA and NHTSA which established GHG emissions standards and CAFE standards for MY 2012 through to 2016. AML reasoned that prior to the publication of this rule (and subsequent analysis by AML) it could not feasibly petition for an exemption to a standard that had not been confirmed. AML also reasoned that prior to the publication of the GHG rule it could not be certain that adequate provision would exist to allow it to certify vehicles in MY 2012.

Whilst the filing of this petition is less than 24 months before the beginning of the affected MY, AML requests that it be regarded as timely or alternatively, good cause exists for lateness.

[2] This position is consistent with that illustrated in the AML CAFE exemption petition for model years 2008, 2009, 2010 & 2011.

IV. VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

A. ASTON MARTIN DB9 MSRP = $183,070 – 200,170 (MY2010).

The DB9 is a thoroughbred sports car with GT levels of comfort and refinement. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to AML, has given the DB9 one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large disc brakes - 355 mm diameter discs at the front, and 330 mm at the rear - are ventilated and grooved, to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

The DB9 introduced many design and engineering innovations, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

In its manufacturing process, the DB9 pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.

The DB9's structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.

The lightweight, rigid body structure and tuned suspension and hydraulic 'Servotronic' speed-sensitive power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

The DB9 is available in Coupe or soft top Convertible bodystyles with a six-speed manual gearbox or a 'Touchtronic' six-speed automatic gearbox.

[redacted]

B. ASTON MARTIN DBS MSRP = $269,000 – 286,500 (MY2010)

Based on the architecture introduced with the DB9, the DBS has been designed as the ultimate driving experience, bridging the gap between road and track – DB9 and DBR9. Equally at home on a twisting mountain circuit as on the open road. The DBS was developed as the ultimate expression of AML's engineering and technical ability. The need for high-performance stability, handling ability and low kerb weight defined the car's form and construction. The DBS is the first production Aston Martin to make extensive use of ultra-light carbon-fibre body panels and carbon ceramic brake technology.

The DBS is available as a coupe or a soft top convertible body-style with a six-speed manual gearbox or a 'Touchtronic' six-speed automatic gearbox.

C. ASTON MARTIN RAPIDE MSRP = $199,950 (MY2010)

The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martins. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the Rapide's key qualities. The Rapide is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for interior options.

Like all Aston Martins, the Rapide is a performance car. Powered by the V12 engine from the DB9 and mated to a ZF Touchtronic (automatic) gearbox, the car has performance similar to the DB9.

D. ASTON MARTIN VANTAGE MSRP = $120,750 – 137,750 (MY2010)

The Vantage is smaller (4.38 metres long) and less expensive than the DB9, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The Vantage, as with DB9, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent loss of traction and directional stability, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

The Vantage is available in hatchback or soft top roadster bodystyles with a six-speed manual gearbox or a 'Sportshift' automated six-speed manual gearbox coupled to the 4.7 L V8 engine.

[redacted]

V12 Vantage - The V12 high-performance (manual transmission only) derivative of the V8 Vantage, was not originally planned for sale in the US. However, due to interest from the US market this vehicle is planned to be made available in limited numbers, for introduction in late 2010.

V. THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the model years at issue.

A. AML IS ADOPTING ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the model year at issue. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB9 (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that DB9 is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The DBS takes the lightweight theme even further with the use of carbon fibre in body panels and carbon ceramic brakes.

- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front wings, tailgate and sills are produced from advanced composites.

- AML has designed aerodynamic cars -- with drag coefficients as follows:

DB9	Rapide	DBS	Vantage
0.33	0.36	0.36	0.34

- The weight/horsepower ratios are as favorable as:

DB9	Rapide	DBS	Vantage
3880/470 8.26:1	4300/470 9.15:1	3738/510 7.3:1	3594/380 9.5:1

- The use of technology like partial hydraulic/electric or full electric power-assist steering has been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform (2002), on the basis that it provided the best steering feel and performance. All appropriate alternatives will be considered for new models.

- The use of low friction lubricants in the V8 engine has been considered and subsequently rejected on the basis that 10W60 oil provides an oil-film thickness retention needed to protect the lead-free main bearings at elevated engine speeds.

- For MY 2010, with its work to optimize the DB9 automatic transmission shift point calibration, AML has been able to introduce an improvement of nearly 1 mpg in fuel economy. (19.72 mpg versus 18.77 mpg in MY 2009).

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected the automobile industry since 2008. The financial crisis resulted in AML reducing production[3] to counter a significant fall in sales. This in turn led AML to layoff a total of 600 employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd. This substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make investment in new fuel economy technology.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 525.7(e-g).

Table 2a: Vehicle Specifications – DB9, DBS & Rapide

Vehicle	Model Line				
Description	**DB9**	**DBS**			**Rapide**
Body Variants	2dr Coupe 2dr Convertible	2dr Coupe 2dr Convertible			4dr Coupe
Frontal area (ft^2)	22.0	22.3			23.1
Dimensions (inches) Height	50.0	50.0			53.5
Width	73.8	75.0			76.0
Length	185.4	185.4			197.6
Wheelbase	107.9	107.9			117.7
Front Track	61.8	62.6			62.6
Rear Track	61.4	62.9			63.6
Curb Weight (lbs)	3880 – 4090	3730 – 3980			4300
Equivalent Test Weight (lbs)	4500	4500			4500
Seating Positions	2 or 4	2 or 4			4
Interior Volume Index (ft^3)	N/A or 78	N/A or 78			85
Engine Type	V12	V12			V12
Working Principle	Four stroke, Otto cycle, naturally aspirated				
Engine Displacement (Litres)	5.9	5.9			5.9
Engine Max Power (hp)	470	510			470
Fuel Metering System	Electronic multipoint fuel injection				
Transmission	6 spd automatic or 6 spd manual	6 spd automatic or 6 spd manual			6 spd automatic
Final Drive Ratio	auto: 3.15 manual: 3.54	auto: 3.46 manual: 3.70			auto: 3.15
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.			Three-way catalysts heated O2 sensors.
Road Load Horsepower†	16.6	15.3			16.0
Radial Tires (std) Brand	Bridgestone	Pirelli			Pirelli
Size – Front	235/40 R19	245/35 R20			245/40 R20
Size – Rear	275/35 R19	295/30 R20			295/35 R20
Low Friction Lubricants (Type)	Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270	Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270			Engine: Mobil 1 0W40
N/V	auto: 28.6 manual: 34.9	auto: 28.6 manual: 36.0			auto: 28.6
Fuel Economy Values	auto: 19.72 manual: 16.99	auto:17.73 manual: 16.72			auto: 18.5

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

[3] 2009 production cut by 60%, as compared to 2008 production.

Table 2b: Vehicle Specifications -Vantage

Vehicle	Model Line			
Description	**Vantage**			**V12 Vantage**
Body Variants	2dr Hatchback 2dr Convertible			2dr Hatchback
Frontal area (ft^2)	21.8			21.8
Dimensions (inches) Height	50			49
Width	73.5			73.5
Length	172.5			172.5
Wheelbase	102.4			102.4
Front Track	61.8			61.8
Rear Track	62.0			62.0
Curb Weight (lbs)	3594 – 3770			3704
Equivalent Test Weight (lbs)	4000			4500
Seating Positions	2			2
Interior Volume Index (ft^3)	N/A			N/A
Engine Type	V8			V12
Working Principle	Four stroke, Otto cycle, naturally aspirated			
Engine Displacement (Litres)	4.7			5.9
Engine Max Power (hp)	420			510
Fuel Metering System	Electronic multipoint fuel injection			
Transmission	6 spd semi-auto or 6 spd manual			6 spd manual
Final Drive Ratio	semi-auto: 3.91 manual: 3.91			manual: 3.7
Emission Control System	Three-way catalysts heated O2 sensors, air injection & EGR			Three-way catalysts heated O2 sensors
Road Load Horsepower†	13.3			15.3
Radial Tires (std) Brand	Bridgestone			Pirelli
Size – Front	235/40 R19			255/35 R19
Size – Rear	275/35 R19			295/30 R19
Low Friction Lubricants (Type)	Engine: Castrol RS 10W60 Manual/Semi-Auto Transaxle: Castrol BOT270			Engine: Mobil 1 0W40 Manual Transaxle: Castrol BOT270
N/V	semi-auto: 38.6 manual: 38.6			manual: 37.26
Fuel Economy Values	semi-auto: 20.25 manual: 18.0			manual: 16.72

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

B. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicality" -- that the ability of a small volume manufacturer to make investment in fuel economy improvement must be considered in the context of the global financial crisis affecting the automobile industry and specifically affecting AML.

1. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V12 or V8 power plants. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, whilst being contemplated by AML, represents considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML's V12 and V8 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different prices). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment.

Moreover, contrary to expectations, V8 sales have not exceeded V12 sales. Sales of the V8 model in recent MYs have shown a less than forecasted demand for this model, negatively impacting the AML CAFE (V12 and V8 sales have been split about 50-50). Indeed, as the total volume of AML sales shrinks with the economic recession, the greater the loss of V8 sales as a percentage of total sales, the worse the impact on CAFE.

AML is therefore not in a position to manipulate model mix. There is no opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

The projected US sales mix of the Aston Martin models for MY 2012 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model years at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2008 to 2012, by model.

Model Year	US Sales Mix					
	DB9	[redacted]	DBS	Rapide	Vantage	V12 Vantage
2008	323	-	-	-	1047	-
2009	432	-	309	-	578	-
2010*	[redacted]	-	[redacted]	[redacted]	[redacted]	-
2011*	[redacted]	-	[redacted]	[redacted]	[redacted]	[redacted]
2012*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: * = projected

2. Further Fuel Efficiency Improvements That Are Compatible With Basic *Design Concept* of Aston Martin Vehicles Are Not Possible

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted (or will adopt) fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position following the global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML cannot make further fuel economy improvements and still produce a product that is compatible with the company's basic vehicle design concept of a high performance sports car. However, in an effort to engage with fuel efficiency concepts, AML is contemplating the introduction of an innovative luxury commuter car in MY 2013 (at the earliest).
(Cygnet Concept – see http://www.astonmartin.com/eng/thecars/cygnet).

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

[4] The decision to proceed with a V12 Rapide vehicle was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB9:** **13** mpg city and **20** mpg highway (for MY 2010, coupe automatic)

	City mpg*	Highway mpg*
Mercedes Benz SL600	11	18
Bentley Continental GT	10	17
Maserati GranTurismo	12	19
BMW M6	11	17
Ferrari California	13	19

- **DBS:** **12** mpg city and **18** mpg highway (for MY 2010, coupe automatic)

	City mpg*	Highway mpg*
Ferrari 599 GTB	11	15
Mercedes Benz SLR	12	16
Lamborghini Murcielago	9	14

- **Rapide:** **13** mpg city and **19** mpg highway (for MY 2010, automatic)

	City mpg*	Highway mpg*
Mercedes Benz CLS 63	12	18
Maserati Quattroporte	11	17
Ferrari 612 Scaglietti	9	16
Bentley Continental Flying Spur	10	17

- **V8 Vantage:** **14** mpg city and **20** mpg highway (for MY 2010, hatchback semi-automatic)

	City mpg*	Highway mpg*
Audi R8	13	18
Ferrari F430	11	16
Lamborghini Gallardo	14	20

*Source: EPA FE Guide

VI. OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased mass to body and frame structures which translate into additional weight.

VII. THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year to a clientele that buy cars for reasons other than fuel economy. There is a demand for cars in this market segment, and they will be sold irrespective of CAFE issues. But the impact on energy consumption is negligible because the vehicles tend to be used very infrequently (as a second or third car). In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

VIII. CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2012.

Respectfully submitted,

J. Carling

5/10/2010

Jonathan Carling
Chief Operating Officer
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2013

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

Feb 24th, 2011

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Founded in 1914, the company has produced some of the most iconic automobiles of all time.

See manufacturers website located at www.astonmartin.com

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ALTERNATIVE STANDARDS REQUESTED

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510(c) [1]
2013	**19.2 mpg**

This requested standard shows a projected improvement of 0.8 mpg on the requested standard for MY 2012.

CAFE CALCULATION

MY 2013

Model	Year	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	CAFE Calculation
Virage Coupe & Convertible [redacted]	2013	IP	20	[redacted]	RWD	6 Speed Automatic	3880-4090	4500	15
DBS Coupe & Convertible [redacted]	2013	IP	19	[redacted]	RWD	6 Speed Automatic	3738-3940	4500	18.42105263
V8 Vantage Hatchback & Convertible [redacted]	2013	IP	20.58	[redacted]	RWD	7 Speed Semi Automatic	3594-3770	4000	4.859086492
V8 Vantage Hatchback & Convertible [redacted]	2013	IP	19.49	[redacted]	RWD	6 Speed Manual	3594-3770	4000	1.539250898
V12 Vantage Hatchback [redacted]	2013	IP	19	[redacted]	RWD	[redacted]	3594-3770	4500	5.263157895
[redacted]	2013	IP	18	[redacted]	RWD	[redacted]	3594-3770	4500	1.666666667
[redacted]	2013	IP	19	[redacted]	RWD	[redacted]	3740	4500	3.684210526
Rapide	2013	IP	20	[redacted]	RWD	6 Speed Automatic	4387	4750	25
			Sales Total	[redacted]				**MH**	75.43342511
								CAFE =	**19.620**

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.4 mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that continues for the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2013	36.80	28.46	0.0005308	0.00541

Model	Average Track		Wheelbase		x Footprint
	mm	feet	mm	feet	$feet^2$
Virage	1585.00	5.20	2740.00	8.99	46.7
V8 Vantage	1572.50	5.16	2600.00	8.53	44.0
DBS	1585.00	5.20	2740.00	8.99	46.7
Rapide	1602.00	5.26	2989.00	9.81	51.5
V12 Vantage	1572.50	5.16	2600.00	8.53	44.0

Volumes		2013
N_{DB9}	Virage Total	[redacted]
$N_{vantage}$	V8 Vantage Total	[redacted]
N_{DBS}	DBS Total	[redacted]
N_{rapide}	Rapide Total	[redacted]
$N_{v12vantage}$	V12 Vantage Total	[redacted]
N	Total Vehicles	[redacted]

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Target				
Virage	V8 Vantage	DBS	Rapide	V12 Vantage
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2013 Aston Martin Fleet Standard	32.74 mpg

I. BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 goes into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II goes into production.
1957 DB Mk III goes into production
1958 DB4 goes into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 goes into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 goes into production
1969 DBSV8 goes into production
1977 V8 Vantage goes into production
1980 Lagonda goes into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model goes into production
1993 V8 (Virage) Vantage goes into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante goes into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans goes into production.
The DB7 Vantage goes into production at Bloxham.
2001 V12 Vanquish goes into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe goes into production at Gaydon. V12 Vanquish S goes into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante goes into production at Gaydon.
Vantage (V8 4.3L engine) goes into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards.
Production of V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get the 4.7L V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon

II. AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles. [2]

AML is therefore eligible to request the exemption and alternate standard[3].

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2008	6487
2009	2572
2010	4160
2011*	[redacted]
2012*	[redacted]
2013*	[redacted]

Note: * = projected

III. TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6.

Whilst the filing of this petition is less than 24 months before the beginning of the affected MY, AML requests that it be regarded as timely or alternatively, good cause exists for lateness. Moreover, AML delayed the current petition for an additional period, hoping to receive feedback from NHTSA on AML's pending 2008-2012 CAFÉ petitions. Once January 1, 2011 arrived, however, AML decided it was compelled to file the 2013 petition, even though no feedback on the prior applications had been received.

[2] Ford Motor Company owns £40 million of cumulative redeemable nonvoting preference shares in Aston Martin Holdings (UK) Limited. These were issued on 31 May 2007, must be redeemed by 31 May 2017, and are recorded as subordinated debt in the Company's accounts.

[3] This position is consistent with that illustrated in the AML CAFE exemption petition for model years 2008, 2009, 2010 , 2011 & 2012.

IV. VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

A. ASTON MARTIN VIRAGE estimated: MSRP = $225,000 (MY2012).

Virage is based on the DB9 vehicle introduced in 2004 but takes elements from the Rapide and DBS to provide a thoroughbred sports car with GT levels of comfort and refinement. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to AML, gave the DB9, and now the Virage, one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large carbon composite disc brakes are ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

Virage has adopted many of the design and engineering innovations introduced on DB9, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

[redacted]

The vehicles' structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.

The lightweight, rigid body structure and tuned suspension and hydraulic 'Servotronic' speed-sensitive power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

The Virage is available in Coupe or soft top Convertible bodystyles with a 'Touchtronic' six-speed automatic gearbox.

B. ASTON MARTIN DBS MSRP = $271,660 – 289,339 (MY2011)

Based on the architecture introduced with the DB9, the DBS has been designed as the ultimate driving experience, bridging the gap between road and track – DB9 and DBR9. Equally at home on a twisting mountain circuit as on the open road. The DBS was developed as the ultimate expression of AML's engineering and technical ability. The need for high-performance stability, handling ability and low kerb weight defined the car's form and construction. The DBS is the first production Aston Martin to make extensive use of ultra-light carbon-fibre body panels and carbon ceramic brake technology.

The DBS is available as a coupe or a soft top convertible body-style with a 'Touchtronic' six-speed automatic gearbox.

C. ASTON MARTIN RAPIDE MSRP = $209,995 – 228,950 (MY2011)

The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martins. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the Rapide's key qualities. The Rapide is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for interior options.

Like all Aston Martins, the Rapide is a performance car. Powered by [redacted] the V12 engine from the Virage and mated to a ZF Touchtronic (automatic) gearbox, the car has performance similar to Virage despite being a four seater vehicle.

D. ASTON MARTIN V8 VANTAGE MSRP = $120,750 – 137,750 (MY2010)

The Vantage is smaller (4.38 metres long) and less expensive than the Virage, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The Vantage, as with Virage, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent loss of traction and directional stability, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

The Vantage is available in hatchback or soft top roadster bodystyles with a six-speed manual gearbox or a 'Sportshift' automated seven-speed manual gearbox coupled to the 4.7 L V8 engine.

E. ASTON MARTIN V12 VANTAGE

The V12 high-performance derivative of the V8 Vantage, was not originally planned for sale in the US. However, due to interest from the US market this vehicle was made available in limited numbers from 2011MY.

V. THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the model years at issue.

A. AML IS ADOPTING ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the model year at issue. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the Virage (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that Virage is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The DBS takes the lightweight theme even further with the use of carbon fibre in body panels and carbon ceramic brakes.

- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front wings, tailgate and sills are produced from advanced composites.

- AML has designed aerodynamic cars -- with drag coefficients as follows:

Virage	Rapide	DBS	Vantage
0.34	0.36	0.36	0.34

- The weight/horsepower ratios are as favorable as:

Virage	Rapide	DBS/V12 Vantage	Vantage
3880/[redacted]	4300/[redacted]	3738/[redacted]	3594/[redacted]

- The use of technology like partial hydraulic/electric or full electric power-assist steering has been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform (2002), on the basis that it provided the best steering feel and performance. All appropriate alternatives will be considered for new models.

- The use of low friction lubricants in the V8 engine has been considered and subsequently rejected on the basis that 10W60 oil provides an oil-film thickness retention needed to protect the lead-free main bearings at elevated engine speeds.

- From MY 2010, AML worked to optimize the ZF automatic transmission shift point calibration which resulted in an improvement of nearly 1 mpg in fuel economy for vehicle derivatives where this calibration is employed – Virage, Rapide and DBS.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected the automobile industry since 2008. The financial crisis resulted in AML reducing production[4] to counter a significant fall in sales. This in turn led AML to layoff a total of 600 employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd. This substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make investment in new fuel economy technology.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 525.7(e-g).

Table 2a: Vehicle Specifications – Virage, DBS & Rapide

Vehicle	Model Line		
Description	**Virage**	**DBS**	**Rapide**
Body Variants	2dr Coupe 2dr Convertible	2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft^2)	22.3	22.3	23.1
Dimensions (inches) Height	50.0	50.0	53.5
Width	75.0	75.0	76.0
Length	185.4	185.4	197.6
Wheelbase	107.9	107.9	117.7
Front Track	62.6	62.6	62.6
Rear Track	62.9	62.9	63.6
Curb Weight (lbs)	3880 – 4090	3730 – 3980	4300
Equivalent Test Weight (lbs)	4500	4500	4500
Seating Positions	2 or 4	2 or 4	4
Interior Volume Index (ft^3)	N/A or 78	N/A or 78	85
Engine Type	V12	V12	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated		
Engine Displacement (Litres)	5.9	5.9	5.9
Engine Max Power (hp)	[redacted]	[redacted]	[redacted]
Fuel Metering System	Electronically controlled sequential fuel injection		
Transmission	6 spd automatic	6 spd automatic	6 spd automatic
Final Drive Ratio	auto: 3.15	auto: 3.46	auto: 3.46
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower†	15.7	15.7	16.3
Radial Tires (std) Brand	Pirelli	Pirelli	Bridgestone
Size – Front	245/35 R20	[redacted]	245/40 R20
Size – Rear	295/30 R20		295/35 R20
Low Friction Lubricants (Type)	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1
N/V	29.9	29.9	28.6
Fuel Economy Values	20	19	20

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

4 2009 production cut by 60%, as compared to 2008 production.

Table 2b: Vehicle Specifications –V8 Vantage & V12 Vantage

Vehicle	Model Line		
Description	**V8 Vantage**	**V12 Vantage**	[redacted]
Body Variants	2dr Hatchback 2dr Convertible	2dr Hatchback	[redacted]
Frontal area (ft^2)	21.8	21.8	[redacted]
Dimensions (inches) Height	50	50	[redacted]
Width	73.5	73.5	
Length	172.5	172.5	
Wheelbase	102.4	102.4	
Front Track	61.8	61.8	
Rear Track	62.0	62.0	
Curb Weight (lbs)	3594 – 3770	3594 – 3770	[redacted]
Equivalent Test Weight (lbs)	4000	4500	[redacted]
Seating Positions	2	2	[redacted]
Interior Volume Index (ft^3)	N/A	N/A	[redacted]
Engine Type	V8	V12	[redacted]
Working Principle	Four stroke, Otto cycle, naturally aspirated		
Engine Displacement (Litres)	4.7	[redacted]	[redacted]
Engine Max Power (hp)	[redacted]	[redacted]	[redacted]
Fuel Metering System	Electronically controlled sequential fuel injection		
Transmission	7 spd semi-auto or 6 spd manual	[redacted]	[redacted]
Final Drive Ratio	semi-auto: 4.18 manual: 3.91	[redacted]	[redacted]
Emission Control System	Three-way catalysts heated O2 sensors, air injection & EGR	[redacted]	[redacted]
Road Load Horsepower[†]	14.7	[redacted]	[redacted]
Radial Tires (std) Brand Size – Front Size – Rear	[redacted]	[redacted]	[redacted]
Low Friction Lubricants (Type)	Engine: Castrol RS 10W60 Transaxle: Castrol BOT270	[redacted]	[redacted]
N/V	semi-auto: 38.6 manual: 38.6	[redacted]	[redacted]
Fuel Economy Values	semi-auto: 20.58 manual: 19.49	[redacted]	[redacted]

NOTE: [†]Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

B. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicality" -- that the ability of a small volume manufacturer to make investment in fuel economy improvement must be considered in the context of the global financial crisis affecting the automobile industry and specifically affecting AML.

1. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V12 or V8 power plants. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, whilst being contemplated by AML, represents considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML's V12 and V8 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different prices). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment.

Moreover, contrary to expectations, V8 sales have not exceeded V12 sales. Sales of the V8 model in recent MYs have shown a less than forecasted demand for this model, negatively impacting the AML CAFE (V12 and V8 sales have been split about 50-50). Indeed, as the total volume of AML sales shrinks with the economic recession, the greater the loss of V8 sales as a percentage of total sales, the worse the impact on CAFE.

AML is therefore not in a position to manipulate model mix. There is no opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [5]

The projected US sales mix of the Aston Martin models for MY 2013 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model years at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2008 to 2013, by model.

Model Year	US Sales Mix					
	DB9	Virage	DBS	Rapide	Vantage	V12 Vantage
2008	323	-	-	-	1047	-
2009	432	-	309	-	578	-
2010	68	-	169	135	229	-
2011*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2012*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2013*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: * = projected

2. Further Fuel Efficiency Improvements That Are Compatible With Basic *Design Concept* of Aston Martin Vehicles Are Not Possible

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted (or will adopt) fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position following the global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML cannot make further fuel economy improvements and still produce a product that is compatible with the company's basic vehicle design concept of a high performance sports car.

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be

[5] The decision to proceed with a V12 Rapide vehicle was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB9/Virage:** **13** mpg city and **20** mpg highway (for MY 2011, coupe automatic)

	City mpg*	Highway mpg*
Mercedes Benz SL63	12	19
Bentley Continental GT	11	18
Maserati GranTurismo	12	19
BMW M6	11	17
Ferrari California	13	19

- **DBS:** **12** mpg city and **18** mpg highway (for MY 2011, coupe automatic)

	City mpg*	Highway mpg*
Ferrari 599 GTB	11	15
Mercedes Benz SL65	12	18
Lamborghini Murcielago	9	14

- **Rapide:** **13** mpg city and **19** mpg highway (for MY 2011, automatic)

	City mpg*	Highway mpg*
Mercedes Benz CLS 63	12	18
Maserati Quattroporte	12	19
Ferrari 612 Scaglietti	9	16
Bentley Continental Flying Spur	11	18

- **V8 Vantage:** **14** mpg city and **21** mpg highway (for MY 2011, Vantage S)

	City mpg*	Highway mpg*
Audi R8	13	21
Ferrari F430	11	16
Lamborghini Gallardo	13	20

*Source: EPA FE Guide

VI. OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

VI. OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased mass to body and frame structures which translate into additional weight.

VII. THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year to a clientele that buy cars for reasons other than fuel economy. There is a demand for cars in this market segment, and they will be sold irrespective of CAFE issues. But the impact on energy consumption is negligible because the vehicles tend to be used very infrequently (as a second or third car). In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

VIII. CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2013.

Respectfully submitted,

Ian Minards 03/02/11

Ian Minards
Product Development Director
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2014

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

September 26th, 2011

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Founded in 1914, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

<u>**CONTENTS**</u>

ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2014	19.5mpg

This requested standard shows a projected improvement of 0.1 mpg on the requested standard for MY 2013.

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2014

Model	Year	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	CAFE Calculation
Virage Coupe & Convertible	2014	IP	[redacted]	[redacted]	RWD	6 Speed Automatic	3880-4090	4500	[redacted]
DBS Coupe & Convertible	2014	IP	[redacted]	[redacted]	RWD	6 Speed Automatic	3738-3940	4500	[redacted]
V8 Vantage Hatchback & Convertible	2014	IP	20.58	[redacted]	RWD	7 Speed Semi Automatic	3594-3770	4000	[redacted]
V8 Vantage Hatchback & Convertible	2014	IP	19.49	[redacted]	RWD	6 Speed Manual	3594-3770	4000	[redacted]
V12 Vantage Hatchback & Convertible	2014	IP	[redacted]	[redacted]	RWD	[redacted]	3740	4500	[redacted]
Rapide	2014	IP	[redacted]	[redacted]	RWD	6 Speed Automatic	4387	4750	[redacted]
			Sales Total	[redacted]				**MH**	[redacted]
								CAFE =	[redacted]

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2014	37.75	29.03	0.0005308	0.004725

Model	Average Track		Wheelbase		x Footprint
	mm	feet	mm	feet	$feet^2$
Virage	1585.00	5.20	2740.00	8.99	46.7
V8 Vantage	1572.50	5.16	2600.00	8.53	44.0
DBS	1585.00	5.20	2740.00	8.99	46.7
Rapide	1602.00	5.26	2989.00	9.81	51.5
V12 Vantage	1572.50	5.16	2600.00	8.53	44.0

Volumes		2014
N_{DB9}	Virage Total	[redacted]
$N_{vantage}$	V8 Vantage Total	[redacted]
N_{DBS}	DBS Total	[redacted]
N_{rapide}	Rapide Total	[redacted]
$N_{v12vantage}$	V12 Vantage Total	[redacted]
N	Total Vehicles	[redacted]

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Target				
Virage	V8 Vantage	DBS	Rapide	V12 Vantage
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2014 Aston Martin Fleet Standard	[redacted]

(A) BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 goes into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II goes into production.
1957 DB Mk III goes into production
1958 DB4 goes into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 goes into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 goes into production
1969 DBSV8 goes into production
1977 V8 Vantage goes into production
1980 Lagonda goes into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model goes into production
1993 V8 (Virage) Vantage goes into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante goes into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans goes into production.
The DB7 Vantage goes into production at Bloxham.
2001 V12 Vanquish goes into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe goes into production at Gaydon. V12 Vanquish S goes into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante goes into production at Gaydon.
Vantage (V8 4.3L engine) goes into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get the 4.7L V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon
2012 Rapide Production transfers to Gaydon from Magna Steyr

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles.[2] (ref 49 CFR Part 525.7(b))

AML is therefore eligible to request the exemption and alternate standard[3]. (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2009	2572
2010	4160
2011	[redacted]
2012	[redacted]
2013	[redacted]
2014	[redacted]

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2014MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is noted that all prior petitions back to 2008MY are still pending.

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[2] The Ford Motor Company owned £40 million of cumulative redeemable nonvoting preference shares in Aston Martin Holdings (UK) Limited, that were issued on 31 May 2007, were redeemed on June 28th, 2011 as part of a companywide financial consolidation effort.

[3] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2009, 2010, 2011, 2012 & 2013.

(D) <u>VEHICLE LINES UNDER THIS PETITION</u>

See below table 2a and 2b for vehicle specifications.

<u>1. ASTON MARTIN VIRAGE</u> estimated: MSRP = $225,000 (MY2012).

Virage is based on the DB9 vehicle introduced in 2004 but takes elements from the Rapide and DBS to provide a thoroughbred sports car with GT levels of comfort and refinement. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to AML, gave the DB9, and now the Virage, one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large carbon composite disc brakes are ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

Virage has adopted many of the design and engineering innovations introduced on DB9, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

[In its manufacturing process, Aston Martin pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.]

The vehicles' structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.
The lightweight, rigid body structure and tuned suspension and hydraulic 'Servotronic' speed-sensitive power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

2. ASTON MARTIN DBS MSRP = $271,660 – 289,339 (MY2011)

Based on the architecture introduced with the DB9, the DBS has been designed as the ultimate driving experience, bridging the gap between road and track – DB9 and DBR9. Equally at home on a twisting mountain circuit as on the open road. The DBS was developed as the ultimate expression of AML's engineering and technical ability. The need for high-performance stability, handling ability and low kerb weight defined the car's form and construction. The DBS is the first production Aston Martin to make extensive use of ultra-light carbon-fibre body panels and carbon ceramic brake technology.

The DBS is available as a coupe or a soft top convertible body-style with a 'Touchtronic' six-speed automatic gearbox.

3. ASTON MARTIN RAPIDE MSRP = $209,995 – 228,950 (MY2011)

The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martins. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the Rapide's key qualities. The Rapide is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for interior options.

[Like all Aston Martins, the Rapide is a performance car. Powered by the [redacted] engine from the Virage and mated to a ZF Touchtronic (automatic) gearbox, the car has performance similar to Virage despite being a four seater vehicle.]

<u>4. ASTON MARTIN V8 VANTAGE</u> MSRP = $120,750 – 137,750 (MY2010)

The Vantage is smaller (4.38 metres long) and less expensive than the Virage, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The Vantage, as with Virage, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent loss of traction and directional stability, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

[The Vantage is available in hatchback or soft top roadster bodystyles with a six-speed manual gearbox or a ‘Sportshift II’ automated seven-speed manual gearbox coupled to the 4.7 L V8 engine.]

<u>5. ASTON MARTIN V12 VANTAGE</u>

The V12 high-performance derivative of the V8 Vantage, was not originally planned for sale in the US. However, due to interest from the US market this vehicle was made available in limited numbers from 2011MY.
[This vehicle is available as a hatchback body style only with the [redacted]

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).
The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the Virage (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that Virage is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The DBS takes the lightweight theme even further with the use of carbon fibre in body panels and carbon ceramic brakes.
- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front wings, tailgate and sills are produced from advanced composites.
- AML has designed aerodynamic cars -- with drag coefficients as follows:

Virage	Rapide	DBS	Vantage
0.34	0.36	0.36	0.34

- The weight/horsepower ratios are as favorable as:

Virage	Rapide	DBS/V12 Vantage	Vantage
[redacted]	[redacted]	[redacted]	[redacted]

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. All appropriate alternatives will be considered for new models – please refer to Section (E)2.c. for a proposal on steering systems.
- The use of low friction lubricants in the V8 engine has been considered and subsequently rejected on the basis that 10W60 oil provides an oil-film thickness retention needed to protect the lead-free main bearings at elevated engine speeds.

- From MY 2010, AML worked to optimize the ZF automatic transmission shift point calibration which resulted in an improvement of nearly 1 mpg in fuel economy for vehicle derivatives where this calibration is employed – Virage, Rapide and DBS.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected the automobile industry since 2008. The financial crisis resulted in AML reducing production[4] to counter a significant fall in sales. This in turn led AML to layoff a total of 600 employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make investment in new fuel economy technology.
As of the date of this petition the high luxury sector continues to see considerably reduced sales volumes and requires significantly increased sales effort.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

[Table 2a: Vehicle Specifications – Virage, DBS & Rapide

Vehicle	**Model Line**		
Description	**Virage**	**DBS**	**Rapide**
Body Variants	2dr Coupe 2dr Convertible	2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft^2)	22.3	22.3	23.1
Dimensions (inches) Height	50.0	50.0	53.5
Width	75.0	75.0	76.0
Length	185.4	185.4	197.6
Wheelbase	107.9	107.9	117.7
Front Track	62.6	62.6	62.6
Rear Track	62.9	62.9	63.6
Curb Weight (lbs)	3880 – 4090	3730 – 3980	4300
Equivalent Test Weight (lbs)	4500	4500	4500
Seating Positions	2 or 4	2 or 4	4
Interior Volume Index (ft^3)	N/A or 78	N/A or 78	85
Engine Type	V12	V12	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated		
Engine Displacement (Litres)	5.9	5.9	5.9
Engine Max Power (hp)	[redacted]	[redacted]	[redacted]
Fuel Metering System	Electronically controlled sequential fuel injection		
Transmission	6 spd automatic	6 spd automatic	6 spd automatic
Final Drive Ratio	auto: 3.46	auto: 3.46	auto: 3.46
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower†	15.7	15.7	16.3
Radial Tires (std) Brand	Pirelli	[redacted]	Bridgestone
Size – Front	245/35 R20		245/40 R20
Size – Rear	295/30 R20		295/35 R20
Low Friction Lubricants (Type)	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1
N/V	30.7	29.1	29.4
Fuel Economy Values	[redacted]	[redacted]	[redacted]

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

4 2009 production cut by 60%, as compared to 2008 production.

[Table 2b: Vehicle Specifications –V8 Vantage & V12 Vantage

Vehicle	Model Line	
Description	**V8 Vantage**	**V12 Vantage**
Body Variants	2dr Hatchback 2dr Convertible	2dr Hatchback
Frontal area (ft^2)	21.8	21.8
Dimensions (inches) Height Width Length Wheelbase Front Track Rear Track	50 73.5 172.5 102.4 61.8 62.0	50 73.5 172.5 102.4 61.8 62.0
Curb Weight (lbs)	3594 – 3770	3704
Equivalent Test Weight (lbs)	4000	4500
Seating Positions	2	2
Interior Volume Index (ft^3)	N/A	N/A
Engine Type	V8	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated	
Engine Displacement (Litres)	4.7	5.9
Engine Max Power (hp)	[redacted]	[redacted]
Fuel Metering System	Electronically controlled sequential fuel injection	
Transmission	6 spd manual or 7 spd semi-auto	[redacted]
Final Drive Ratio	semi-auto: 4.18 manual: 3.91	[redacted]
Emission Control System	Three-way catalysts heated O2 sensors, air injection & EGR	Three-way catalysts heated O2 sensors
Road Load Horsepower†	14.7	15.7
Radial Tires (std) Brand Size – Front Size – Rear	Bridgestone 255/40 R19 285/35 R19	Bridgestone 255/35 R19 295/30 R19
Low Friction Lubricants (Type)	Engine: Castrol RS 10W60 Transaxle: Castrol BOT270	Engine: 0W40 Mobil 1 Transaxle: Castrol BOT270
N/V	manual: 38 6 semi-auto: 36.4	37.7
Fuel Economy Values	manual: 19.49 semi-auto: 20.58	[redacted]

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V8 or V12 power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, whilst being contemplated by AML, represents considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models … is not possible since … the unique market sector served by [the manufacturer] preclude significant changes …." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML's V8 and V12 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different pricing). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment.

Moreover, contrary to expectations, V8 sales continue to decline compared to V12 sales. Sales of the V8 model in recent MYs have shown a less than forecasted demand for this model, negatively impacting the AML CAFE (V12 and V8 sales had previously been split about 50-50). Indeed, as the total volume of AML sales shrinks under the influence of market economic instability, the loss of V8 sales as a percentage of total sales, increases the negative impact on CAFE.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [5]

The projected US sales mix of the Aston Martin models for MY 2014 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model years at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2009 to 2014, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9	Virage	DBS	Rapide	V8 Vantage	V12 Vantage	Production Capacity
2009	432	-	309	-	578	-	Up to 10000
2010	68	-	169	135	229	-	Up to 12500
2011#	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2012*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2013*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2014*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: * = projected
= to be confirmed

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy despite the already mentioned decrease in sales of its smaller engine V8 Vantage models, whilst retaining its core vehicle capabilities.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

[5] The decision to proceed with a V12 Rapide vehicle was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **Virage:** **13** mpg city and **18** mpg highway (for MY 2012, coupe automatic)

	City mpg*	Highway mpg*
Mercedes Benz SL63	12	19
Bentley Continental GT	12	19
Maserati GranTurismo	12	19
Ferrari California	13	19

- **DBS:** **12** mpg city and **18** mpg highway (for MY 2012, coupe automatic)

	City mpg*	Highway mpg*
Ferrari 599 GTB	11	15
Mercedes Benz SL65	12	18
Lamborghini Aventador	11	17

- **Rapide:** **13** mpg city and **19** mpg highway (for MY 2012, automatic)

	City mpg*	Highway mpg*
Mercedes Benz CLS 63	12	18
Maserati Quattroporte	12	19
Ferrari 612 Scaglietti	9	16
Bentley Continental Flying Spur	11	19

- **V8 Vantage:** **14** mpg city and **21** mpg highway (for MY 2012, Vantage S)

	City mpg*	Highway mpg*
Audi R8 V8	13	21
Ferrari 458	12	18
Lamborghini Gallardo	13	20

*Source: EPA FE Guide

c. Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))

[redacted]

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE</u>

Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased mass to body and frame structures which translate into additional weight.

(G) <u>THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED</u>

AML recognizes the world’s need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year to a clientele that buy cars for reasons other than fuel economy. There is a demand for cars in this market segment, and they will be sold irrespective of CAFE issues. The impact on energy consumption is negligible because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low yearly mileage accumulation. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML’s sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2014.

Respectfully submitted,

I. Minards

September 26, 2011

Ian Minards
Product Development Director
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

ASTON MARTIN

By Courier and email

Administrator
National Highway Traffic Safety Administration
1200 New Jersey Ave SE
Washington DC 20590
USA

Feb 25, 2014

Dear Administrator,

Ref: The original 2015MY Aston Martin Lagonda Ltd CAFE Alternative Standard petition dated August 31st, 2012 signed by Michael Marecki, General Counsel and Company Secretary.

Re-submittal of the PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS FOR MODEL YEAR 2015

At the request of NHTSA CAFE Program Office Aston Martin Lagonda Ltd today re-submits three copies of the CAFE Exemption Petition for MY 2015 pursuant to 49 CFR part 525, seeking an alternative standard under the CAFE statute and regulations. Please note that the enclosed is the NON-CONFIDENTIAL version of the petition. The re-submitted confidential version has been sent directly to the Chief Counsel's Office under separate cover.

Respectfully submitted,

JCE Yarrow

Jon C Yarrow
Powertrain Certification
Aston Martin Lagonda Ltd

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2015

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

August 31, 2012
This revision dated Feb 24, 2014

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Founded in 1914, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

CONTENTS

ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2015	□

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2015

Model	Year	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	MAFE Calculation
DB9 – 510hp	2015	IP	19.5	□	RWD	□	3880-4090	4500	□
Vanquish – 565hp	2015	IP	□	□	RWD	□	3738-3940	4500	□
V8 Vantage – ASM7	2015	IP	20.7	□	RWD	□	3594-3770	4000	□
V8 Vantage - Manual	2015	IP	19.6	□	RWD	6 Speed Manual	3594-3770	4000	□
V12 Vantage - 565hp	2015	IP	18.3	□	RWD	□	3740	4500	□
Rapide – 550hp	2015	IP	□	□	RWD	□	4387	4750	□
			Sales Total	□				ΣMAFE	□
								CAFE =	□

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2015	39.24	29.9	0.0005308	0.003719

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	feet ^{2}
DB9	1595	62.8	2740	107.9	47.1
V8 Vantage	1580	62.2	2600	102.4	44.2
Vanquish	1595	62.8	2740	107.9	47.1
Rapide	1610	63.4	2990	117.7	51.8
V12 Vantage	1572.50	61.9	2600	102.4	44.0

Volumes		2015
N_{DB9}	DB9 Total	□
$N_{vantage}$	V8 Vantage Total	□
$N_{Vanquish}$	Vanquish Total	□
N_{rapide}	Rapide Total	□
$N_{v12vantage}$	V12 Vantage Total	□
N	Total Vehicles	□

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT - d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Target				
DB9	V8 Vantage	Vanquish	Rapide	V12 Vantage
34.82	36.79	34.82	32.04	36.94

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2015 Aston Martin Fleet Standard	□ mpg

(A) BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 goes into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II goes into production.
1957 DB Mk III goes into production
1958 DB4 goes into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 goes into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 goes into production
1969 DBSV8 goes into production
1977 V8 Vantage goes into production
1980 Lagonda goes into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model goes into production
1993 V8 (Virage) Vantage goes into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante goes into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans goes into production.
The DB7 Vantage goes into production at Bloxham.
2001 V12 Vanquish goes into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe goes into production at Gaydon. V12 Vanquish S goes into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante goes into production at Gaydon.
Vantage (V8 4.3L engine) goes into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get the 4.7L V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon
2012 Rapide Production transfers to Gaydon from Magna Steyr and Vanquish introduced to replace DBS

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles.[2] (ref 49 CFR Part 525.7(b))

AML is therefore eligible to request the exemption and alternate standard[3]. (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2009	2572
2010	4160
2011	3760
2012	□
2013	□
2014	□
2015	□

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2015MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is noted that all prior petitions back to 2008MY are still pending.

[2] The Ford Motor Company owned £40 million of cumulative redeemable nonvoting preference shares in Aston Martin Holdings (UK) Limited, that were issued on 31 May 2007, and were subsequently redeemed on June 28th, 2011 as part of a companywide financial consolidation effort.

[3] This position is consistent with that

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

1. ASTON MARTIN DB9 estimated: MSRP = (2014MY).

This revised and updated version of the DB9 nameplate is largely based on the Virage vehicle from 2012MY. It takes most of its design from Virage but is updated with the latest version of the Aston Martin V12 engine , now featuring Inlet and Exhaust Cam Phasing for lower emissions and better fueling control. The DB9 name was introduced in 2004 and was synonymous with providing a thoroughbred sports car with GT levels of comfort and refinement. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to AML, gives this latest version of the DB9 one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large carbon composite disc brakes are ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

This latest version of DB9 continues to use the innovations introduced on the original DB9, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

In its manufacturing process, Aston Martin pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy. The vehicles' structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.

The lightweight, rigid body structure and tuned suspension and hydraulic 'Servotronic' speed-sensitive power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

DB9 is available in Coupe or soft top Convertible body-style and utilizes a 510hp version of the V12 engine and the .

2. ASTON MARTIN Vanquish MSRP = (est. 2014MY)

Introduced for 2014MY and based on the architecture introduced with the DB9 and subsequently the DBS, the Vanquish has been designed as an evolutionary update of the DBS concept while retaining the 'ultimate driving experience' designation. The Vanquish was developed to demonstrate that some of the unique technologies employed on the acclaimed One-77 supercar were transferable to a mainstream vehicle. Vanquish retains the VH passenger tub constructed of bonded and riveted aluminum components, but adds a complete carbon fiber composite bodyshell. Vanquish takes the touch screen controls with haptic feedback from One-77 for its heater, trip computer and in car entertainment functions. As with the DBS the need for high-performance stability, handling ability and low kerb weight defined the car's form and construction. Vanquish is fitted with carbon composite disc brakes and all the safety features noted in the DB9 description above. Vanquish also has a revised form of the LED rear lamp units that emulate the two halves of the Aston Martin wings badge.

The Vanquish is available as coupe and convertible body-styles utilizing a 565hp version of the V12 engine

3. ASTON MARTIN RAPIDE MSRP = (2014MY)

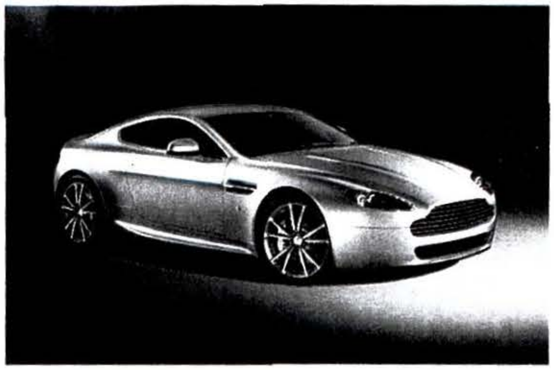
The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

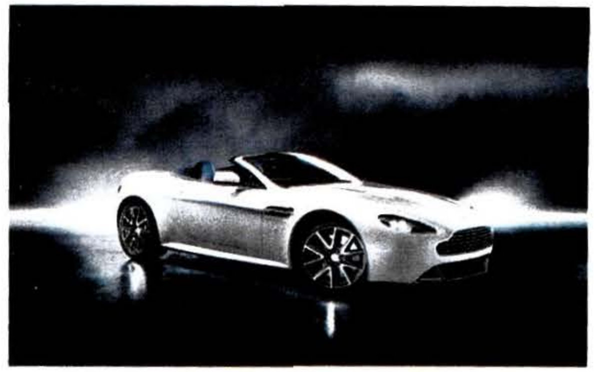
Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martins. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the Rapide's key qualities. The Rapide is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for interior options.

Like all Aston Martins, the Rapide is a performance car. Powered by a 550hp version of the V12 engine also fitted to DB9 and Vanquish , the car has performance similar to DB9 despite being a four seater vehicle.

4. ASTON MARTIN V8 VANTAGE MSRP = (2014MY)





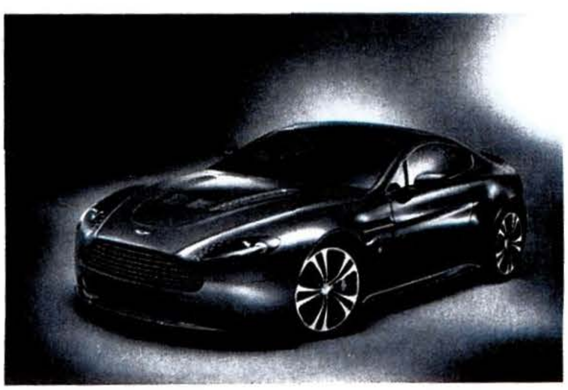
The Vantage is smaller (4.38 metres long) and less expensive than the DB9, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The Vantage, as with DB9, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent loss of traction and directional stability, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

The Vantage is available in hatchback or soft top roadster bodystyles with a six-speed manual gearbox or a 'Sportshift II' automated seven-speed manual gearbox coupled to the 4.7 L V8 engine.

5. ASTON MARTIN V12 VANTAGE MSRP (2014MY)



The V12 high-performance derivative of the V8 Vantage, was not originally planned for sale in the US. However, due to interest from the US market this vehicle was made available in limited numbers from 2011MY.
This vehicle is available as a hatchback body style only with the 565hp V12 engine

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).
The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB9 (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that DB9 is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The Vanquish takes the lightweight theme even further with the use of carbon fiber in the production of all it's body panels. Carbon ceramic composite brakes feature on both DB9 and Vanquish.
- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.
- AML has designed aerodynamic cars -- with drag coefficients as follows:

DB9	Rapide	Vanquish & V12 Vantage	Vantage
0.34	0.36	0.36	0.34

- The weight/horsepower ratios are as favorable as:

DB9	Rapide	Vanquish & V12 Vantage	Vantage
□	□	□	□

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. All appropriate alternatives will be considered for new models – please refer to Section (E)2.c. for a proposal on steering systems.
- The use of low friction lubricants in the V8 engine has been considered and subsequently rejected on the basis that 10W60 oil provides an retained oil-film thickness needed to protect the lead-free main bearings at elevated engine speeds.

- From 2014 CY, AML □ of the □ into it's V12 engined vehicles. This transmission allows for □ .
- From 2013CY, AML □. The previous □ system was reaching the limits of its capability. An agreement was signed with Bosch to provide all engine management functionality going forward from 2014MY. This allowed us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected the automobile industry since 2008. The financial crisis resulted in AML reducing production[4] to counter a significant fall in sales. This in turn led AML to layoff a total of 600 employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make investment in new fuel economy technology. Since the reduction in the number of manufactured vehicles in 2009, Aston Martin has not seen a return to the pre 2009 sales levels up to the end of 2012MY, when this petition was written.
It follows that the high luxury sector (HLS) has continued to see considerably reduced sales volumes and therefore requires HLS manufacturers to significantly increase their sales effort to maintain market position.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

[Table 2a: Vehicle Specifications – DB9, Vanquish & Rapide

Vehicle	Model Line		
Description	**DB9**	**Vanquish**	**Rapide**
Body Variants	2dr Coupe 2dr Convertible	2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft²)	22.3	22.3	23.1
Dimensions (inches) Height	50.0	50.0	53.5
Width	75.0	75.0	76.0
Length	185.4	185.4	197.6
Wheelbase	107.9	107.9	117.7
Front Track	62.6	62.6	62.6
Rear Track	62.9	62.9	63.6
Curb Weight (lbs)	3880 – 4090	3730 – 3980	4300
Equivalent Test Weight (lbs)	4500	4500	4500
Seating Positions	2 or 4	2 or 4	4
Interior Volume Index (ft³)	N/A or 78	N/A or 78	85
Engine Type	V12	V12	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated		
Engine Displacement (Litres)	5.9	5.9	5.9
Engine Max Power (hp)	510	565	550
Fuel Metering System	Electronically controlled sequential fuel injection		
Transmission	□	□	□
Final Drive Ratio	□	□	□
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower[†]	16.2	16.2	16.3
Radial Tires (std) Brand	Pirelli	Pirelli	Bridgestone
Size – Front	245/35 R20	255/35 R20	245/40 R20
Size – Rear	295/30 R20	305/30 R20	295/35 R20
Low Friction Lubricants (Type)	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1
N/V	30.7	□	□
Fuel Economy Values	19.5	□	□

NOTE: [†]Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

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4 2009 production cut by 60%, as compared to 2008 production.

[Table 2b: Vehicle Specifications –V8 Vantage & V12 Vantage

Vehicle	Model Line	
Description	**V8 Vantage**	**V12 Vantage**
Body Variants	2dr Hatchback 2dr Convertible	2dr Hatchback 2dr Convertible
Frontal area (ft^2)	21.8	21.8
Dimensions (inches) Height	50	50
Width	73.5	73.5
Length	172.5	172.5
Wheelbase	102.4	102.4
Front Track	61.8	61.8
Rear Track	62.0	62.0
Curb Weight (lbs)	3594 – 3770	3704
Equivalent Test Weight (lbs)	4000	4500
Seating Positions	2	2
Interior Volume Index (ft^3)	N/A	N/A
Engine Type	V8	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated	
Engine Displacement (Litres)	4.7	5.9
Engine Max Power (hp)	420 or 430	565
Fuel Metering System	Electronically controlled sequential fuel injection	
Transmission	6 spd manual or 7 spd semi-auto	[ ]
Final Drive Ratio	semi-auto: 4.18 manual: 3.91	[ ]
Emission Control System	Three-way catalysts heated O2 sensors, air injection & EGR	Three-way catalysts heated O2 sensors
Road Load Horsepower†	13.3	16.2
Radial Tires (std) Brand	Bridgestone	Bridgestone
Size – Front	255/40 R19	255/35 R19
Size – Rear	285/35 R19	295/30 R19
Low Friction Lubricants (Type)	Engine: Castrol RS 10W60 Transaxle: Castrol BOT270	Engine: 0W40 Mobil 1 Transaxle: Castrol BOT270
N/V	manual: 38.6 semi-auto: 36.4	[ ]
Fuel Economy Values	manual: 19.6 semi-auto: 20.7	18.3

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V8 or V12 power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, whilst being contemplated by AML, represents considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML's V8 and V12 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different pricing). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment.

Moreover, contrary to expectations, V8 sales continue to decline compared to V12 sales. Sales of the V8 model in recent MYs have shown a less than forecasted demand for this model, negatively impacting the AML CAFE (V12 and V8 sales had previously been split about 50-50). Indeed, as the total volume of AML sales shrinks under the influence of market economic instability, the loss of V8 sales as a percentage of total sales, increases the negative impact on CAFE.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [5]

The projected US sales mix of the Aston Martin models for MY 2015 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2010 to 2015, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 (Virage)	Vanquish	DBS	Rapide	V8 Vantage	V12 Vantage	Production Capacity
2010	68	-	169	135	229	-	Up to 12500
2011	86	-	104	317	259	108	Up to 15000
2012#	□	□	□	□	□	□	Up to 15000
2013*	□	□	□	□	□	□	Up to 12500
2014*	□	□	□	□	□	□	Up to 12500
2015*	□	□	□	□	□	□	Up to 12500

Note: * = projected
= to be confirmed

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy despite the already mentioned decrease in sales of its smaller engine V8 Vantage models, whilst retaining its core vehicle capabilities.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

[5] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay. Producing a

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB9:** **13** mpg city and **19** mpg highway (for MY 2014, coupe automatic)

	City mpg*	Highway mpg*
Mercedes Benz SL63	12	19
Bentley Continental GT	12	19
Maserati GT	13	21
Ferrari California	13	19

- **Vanquish:** **13** mpg city and **19** mpg highway (for MY 2014, coupe automatic)

	City mpg*	Highway mpg*
Ferrari 458 Italia	13	17
Mercedes Benz SLS Coupe	13	18
Lamborghini Aventador	11	18

- **Rapide:** **13** mpg city and **19** mpg highway (for MY 2012, automatic)

	City mpg*	Highway mpg*
Mercedes Benz S65	12	19
Maserati Quattroporte	12	18
Ferrari FF	11	16
Bentley Continental Flying Spur	11	19

- **V8 Vantage:** **14** mpg city and **21** mpg highway (for MY 2014, Vantage S)

	City mpg*	Highway mpg*
Audi R8 V8	13	21
Lamborghini Gallardo	13	20
Mclaren MP4-12C	15	22

*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect we are progressively introducing a starting in 2015MY that is planned to on all V12 engined models. The approximately 4 year lead time to introduce such a change for Aston Martin is principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities.

We are also planning to roll out a . This will allow us to realize CO2 reductions through use of other technology enablers such as The introduction of a provides significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years.

The V12 engine is due to benefit from a package of improvements to support a likely reduction in fuel use of c.10%. As part of this package items such as reduced exhaust backpressure, stop-start, electric thermostat and a load managed power steering system are being investigated. While tooling costs are significant Aston Martin is committed to providing continuous fuel economy improvement from its volume sales products with powertrain improvements such as these becoming necessary to maintain this performance. The likely timeframe for introduction is 2016MY.

Lastly, we are always investigating powerunit sourcing opportunities in order to increase our vehicle efficiency, again these are very long lead time changes due to contractual agreements with suppliers and vehicle architecture modification requirements. As with other major vehicle changes the decision to invest is a carefully considered one given the economic climate situation.
We expect to be able to improve our fleet fuel economy from making major powerunit sourcing decisions in the 2017MY timeframe.

(F) OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

1. Starting with MY 15, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFÉ procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased mass to body and frame structures which translate into additional weight.

(G) THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low yearly mileage accumulation. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2015.

Respectfully submitted,

I Minards

August 31, 2012
This version dated Feb 25, 2014

Ian Minards
Product Development Director
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2016

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

September 6, 2013

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

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ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2016	**X**

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2016

Model	Year	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	MAFE Calculation
DB9 – 510hp	2016	IP	19.5	**X**	RWD	6 Speed Automatic	3880-4090	4500	**X**
Vanquish – 565hp	2016	IP	**X**	**X**	RWD	**X**	3738-3940	4500	**X**
V8 Vantage – ASM7	2016	IP	20.7	**X**	RWD	7 Speed Semi Automatic	3594-3770	4000	**X**
V8 Vantage - Manual	2016	IP	19.6	**X**	RWD	6 Speed Manual	3594-3770	4000	**X**
V12 Vantage S - 565hp	2016	IP	**X**	**X**	RWD	7 Speed Semi Automatic	3740	4250	**X**
Rapide S – 550hp	2016	IP	**X**	**X**	RWD	**X**	4387	4750	**X**
			Sales Total	**X**				**ΣMAFE**	**X**
								CAFE =	**X**

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2016	41.09	30.96	0.0005308	0.002573

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	$feet^2$
DB9	1595	62.8	2740	107.9	47.1
V8 Vantage	1580	62.2	2600	102.4	44.2
Vanquish	1595	62.8	2740	107.9	47.1
Rapide S	1610	63.4	2990	117.7	51.8
V12 Vantage S	1572.50	61.9	2600	102.4	44.0

Volumes		2016
N_{DB9}	DB9 Total	**X**
$N_{vantage}$	V8 Vantage Total	**X**
$N_{Vanquish}$	Vanquish Total	**X**
N_{rapide}	Rapide S Total	**X**
$N_{v12vantage}$	V12 Vantage S Total	**X**
N	Total Vehicles	**X**

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Target				
DB9	V8 Vantage	Vanquish	Rapide S	V12 Vantage S
36.27	38.41	36.27	32.04	38.57

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2016 Aston Martin Fleet Standard	**X**

(A) BACKGROUND

History of AML

1913	Bamford and Martin Limited founded in London.
1914	Aston Martin name is born following success at Aston Hill Climb.
1915	First Aston Martin is registered.
1926	Aston Martin Motors Limited is formed and sets up in Feltham.
1928	First entry at the Le Mans 24-hour race.
1937	140 cars built – the highest pre-war production figure.
1947	David Brown buys Aston Martin Motors Limited and Lagonda.
1953	DB2/4 into production – the first 2+2 seater.
1954	David Brown buys Tickford and moves production to Newport Pagnell.
1955	DB2/4 Mk II into production.
1957	DB Mk III into production
1958	DB4 into production
1959	Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963	DB5 into production
1964	DB5 appears with James Bond in *Goldfinger*
1965	DB6 into production
1969	DBSV8 into production
1977	V8 Vantage into production
1980	Lagonda into production
1981	Victor Gauntlett and Pace Petroleum acquire AML
1983	Victor Gauntlett is backed financially by the Livanos shipping family
1987	Ford Motor Company acquires a 75% shareholding in AML
1990	Virage model into production
1993	V8 (Virage) Vantage into production
1994	Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996	DB7 Volante into production at Bloxham.
1999	The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001	V12 Vanquish into production.
2002	After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003	Production of DB7 model finishes. AML Bloxham factory closes. AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004	The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005	AML returns to racing in GT events in Europe and USA. The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006	AML unveils the Rapide four door concept car at the Detroit Motor Show. The 30,000th Aston Martin rolls of the production line at Gaydon. The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007	Vantage Roadster into production at Gaydon. Ford sells AML to an investment consortium led by David Richards. Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008	DBS into production at Gaydon. Vantage models get the 4.7L V8 engine. AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009	DBS Volante into production at Gaydon. Vantage coupe model with V12 engine launched into Europe.
2010	Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011	V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012	Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013	InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business.

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternate fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles.[2] (ref 49 CFR Part 525.7(b))

AML is therefore eligible to request the exemption and alternate standard[3]. (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2010	2703
2011	3589
2012	3330
2013	**X**
2014	**X**
2015	**X**
2016	**X**

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2016MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is noted that all prior petitions back to 2008MY are still pending.

[2] The Ford Motor Company owned £40 million of cumulative redeemable nonvoting preference shares in Aston Martin Holdings (UK) Limited, that were issued on 31 May 2007, and were subsequently redeemed on June 28th, 2011 as part of a companywide financial consolidation effort.

[3] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2015.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN DB9 estimated: MSRP = $201,000 (2014MY).

This revised and updated version of the DB9 nameplate is largely based on the Virage vehicle from 2012MY. It takes most of its design from Virage but is updated with the latest version of the Aston Martin V12 engine , now featuring Inlet and Exhaust Cam Phasing for lower emissions and better fueling control. The DB9 name was introduced in 2004 and was synonymous with providing a thoroughbred sports car with GT levels of comfort and refinement. It was developed with a light, strong, aerospace-specification bonded aluminium structure. This 'VH' (Vertical/Horizontal) architecture, which is unique to AML, gives this latest version of the DB9 one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminium structure is the reason for DB9's nimbleness and responsiveness.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminium V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminium transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fibre prop-shaft, housed in a cast aluminium torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

The large carbon composite disc brakes are ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

This latest version of DB9 continues to use the innovations introduced on the original DB9, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking.

In its manufacturing process, Aston Martin pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.

The vehicles' structure is designed to provide a robust passenger cell, and occupants are further protected by extruded aluminium crumple zones front and rear. Dual-stage driver and passenger airbags, seat-mounted side airbags and seat belt pretensioners offer further protection.

The lightweight, rigid body structure and tuned suspension and hydraulic 'Servotronic' speed-sensitive power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation ABS brakes which, should the system detect loss of grip, combine to help keep the car stable and balanced.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

DB9 is available in Coupe or soft top Convertible body-style and utilizes a 510hp version of the V12 engine and the

X

ASTON MARTIN Vanquish

Model initially on sale as a 2014MY during January 2013.
Vanquish is largely based on the original DB9 vehicle introduced in 2004. For 2008 DBS built on this but made use of Carbon Fiber Composite in the construction of some of the body structure. Vanquish adopts an all carbon fiber panel and upper body design to be able to realize the designs' features. The chassis 'Tub' or body frame makes use of the unique aerospace-specification bonded aluminum structure, known as the 'VH' (Vertical/Horizontal) architecture, which is unique to AML. This provides one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminum structure is the reason for the responsive nature and nimbleness of Vanquish and indeed all AML models that employ this system.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminum V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminum transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fiber prop-shaft, housed in a cast aluminum torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

Vanquish has adopted many of the design and engineering innovations used on all AML models, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking. Vanquish also has a unique center console containing touch sensitive controls for HVAC, audio and driver information with haptic feedback included.

In its manufacturing process, Aston Martin pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.

The lightweight, rigid body structure, tuned suspension and hydraulic 'Servotronic' speed-sensitive hydraulic power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation large carbon composite disc brakes, ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.
Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

The Vanquish is available in Coupe or soft top Convertible bodystyles, with 2+0 or 2+2 seating configurations.

2014MY MSRP:	\$185,000 – 270,000
Vehicle Curb mass:	3910lbs
Powertrain:	6.0 liter V12 with **X** 565hp

ASTON MARTIN Rapide S

Model initially on sale as 2010MY Rapide during late 2009. Updated to Rapide S for 2014MY.
The Aston Martin Rapide is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martin vehicles. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the key qualities of the Rapide S. The Rapide S is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for expanded interior options.

2014MY MSRP:	$220,000 – 245,000
Vehicle Curb mass:	4388lb
Powertrain:	6.0 liter V12 with **X**

ASTON MARTIN V8 VANTAGE

The Vantage is smaller (4.38 metres long) and less expensive than the DB9, but still a pure sports car. Aston Martin's priority from the outset was to focus on light weight, compact size, agility and power.

The Vantage has an all-alloy structure ('VH' architecture shared with DB9) and a resultant strong passenger cell. Further protection is offered by deformable front and rear crumple zones, which absorb crash energy. Excellent side impact protection is also provided by the large sills, strong roof pillars, door impact beams, and the substantial dashboard and footwell structures. The fuel tank is mounted amidship – good not only for safety but also for balance and handling – and encased in its own aluminium compartment. Both driver and passenger benefit from dual-stage airbags and side airbags.

The Vantage, as with DB9, incorporates a host of electronics to help avoid accidents. These include Dynamic Stability Control (DSC) to prevent loss of traction and directional stability, Electronic Brakeforce Distribution (EBD) to achieve optimal braking balance, and Emergency Brake Assist (EBA) which automatically applies full braking power when the driver brakes in an emergency. Positive Torque Control (PTC) also acts to help prevent the rear wheels from locking in an engine braking situation.

The Vantage is available in hatchback or soft top roadster bodystyles with a six-speed manual gearbox or a 'Sportshift II' automated seven-speed manual gearbox coupled to the 4.7 L V8 engine.

2014MY MSRP: c.$122,000-$155,000 (2014MY)

ASTON MARTIN V12 VANTAGE S

The V12 high-performance derivative of the V8 Vantage, was not originally planned for sale in the US. However, due to interest from the US market this vehicle was made available in limited numbers from 2011MY.
The car benefitted from an upgrade to its engine management system in 2015MY, in fact being the first application of **X** for Aston Martin. There were some trim specification changes at this time in addition to a change of title to V12 Vantage S.
This vehicle is available as a hatchback or as a convertible.

2015MY MSRP:	c. $200,000
Vehicle Curb mass:	3725lbs
Powertrain:	6.0 liter V12 with 7 speed Sportshift auto shift manual transmission – 565hp

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB9 and Vanquish (weight = 3880-4090 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that both DB9 and Vanquish are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The Vanquish takes the lightweight theme even further with the use of carbon fiber in the production of all it's body panels. Carbon ceramic composite brakes feature on both DB9 and Vanquish.
- As regards the V8 Vantage (weight = 3594 - 3770 lbs), an all-alloy underbody structure – derived from aerospace technology – incorporates bonded aluminium extrusions and castings for superb rigidity and minimal weight. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.
- AML has designed aerodynamic cars -- with drag coefficients as follows:

DB9	Rapide S	Vanquish & V12 Vantage	Vantage
0.34	0.36	0.36	0.34

- The weight/horsepower ratios are as favorable as:

DB9	Rapide S	Vanquish & V12 Vantage S	Vantage
3880/510 7.6:1	4300/550 7.8:1	3738/565 6.6:1	3594/430 8.4:1

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. All appropriate alternatives will be considered for new models – please refer to Section (E)2.c. for a proposal on steering systems.
- The use of low friction lubricants in the V8 engine has been considered and subsequently rejected on the basis that 10W60 oil provides an retained oil-film thickness needed to protect the lead-free main bearings at elevated engine speeds.

- Starting 2014 CY, AML intends to phase introduction of the **X** automatic transmission into it's V12 engined vehicles. This transmission allows for engine downspeeding opportunities and optimized gear choice for given road speed.
- Starting 2013CY, AML started to phase in a replacement engine management system. The previous Visteon supplied system was reaching the limits of its capability. An agreement was signed with Bosch to provide all engine management functionality going forward from 2014MY. This allowed us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected the automobile industry since 2008. The financial crisis resulted in AML reducing production[4] to counter a significant fall in sales. This in turn led AML to layoff a total of 600 employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make investment in new fuel economy technology. Since the reduction in the number of manufactured vehicles in 2009, Aston Martin has seen only a small improvement in sales levels up to the end of 2013MY, when this petition was written.

It follows that the high luxury sector (HLS) has continued to see considerably reduced sales volumes and therefore requires HLS manufacturers to significantly increase their sales effort to maintain market position.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

[Table 2a: Vehicle Specifications – DB9, Vanquish & Rapide

Vehicle		Model Line		
Description		**DB9**	**Vanquish**	**Rapide S**
Body Variants		2dr Coupe 2dr Convertible	2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft²)		22.3	22.3	23.1
Dimensions (inches)	Height	50.0	50.0	53.5
	Width	75.0	75.0	76.0
	Length	185.4	185.4	197.6
	Wheelbase	107.9	107.9	117.7
	Front Track	62.6	62.6	62.6
	Rear Track	62.9	62.9	63.6
Curb Weight (lbs)		3880 – 4090	3730 – 3980	4300
Equivalent Test Weight (lbs)		4500	4500	4750
Seating Positions		2 or 4	2 or 4	4
Interior Volume Index (ft³)		N/A or 78	N/A or 78	85
Engine Type		V12	V12	V12
Working Principle		Four stroke, Otto cycle, naturally aspirated		
Engine Displacement (Litres)		5.9	5.9	5.9
Engine Max Power (hp)		510	565	550
Fuel Metering System		Electronically controlled sequential fuel injection		
Transmission		**X**	**X**	**X**
Final Drive Ratio		**X**	**X**	**X**
Emission Control System		Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower†		16.2	16.2	16.3
Radial Tires (std)	Brand	Pirelli	Pirelli	Bridgestone
	Size – Front	245/35 R20	255/35 R20	245/40 R20
	Size – Rear	295/30 R20	305/30 R20	295/35 R20
Low Friction Lubricants (Type)		Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1
N/V		**X**	**X**	**X**
Fuel Economy Values		19.5	**X**	**X**

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

4 2009 production cut by 60%, as compared to 2008 production.

[Table 2b: Vehicle Specifications –V8 Vantage & V12 Vantage

Vehicle	Model Line	
Description	**V8 Vantage**	**V12 Vantage S**
Body Variants	2dr Hatchback 2dr Convertible	2dr Hatchback 2dr Convertible
Frontal area (ft^2)	21.8	21.8
Dimensions (inches) Height	50	50
Width	73.5	73.5
Length	172.5	172.5
Wheelbase	102.4	102.4
Front Track	61.8	61.8
Rear Track	62.0	62.0
Curb Weight (lbs)	3594 – 3770	3704
Equivalent Test Weight (lbs)	4000	4250
Seating Positions	2	2
Interior Volume Index (ft^3)	N/A	N/A
Engine Type	V8	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated	
Engine Displacement (Litres)	4.7	5.9
Engine Max Power (hp)	420 or 430	565
Fuel Metering System	Electronically controlled sequential fuel injection	
Transmission	6 spd manual or 7 spd semi-auto	7 spd semi-auto
Final Drive Ratio	semi-auto: 4.18 manual: 3.91	semi-auto: 3.70
Emission Control System	Three-way catalysts heated O2 sensors, air injection	Three-way catalysts heated O2 sensors
Road Load Horsepower†	13.3	11.2
Radial Tires (std) Brand	Bridgestone	Pirelli
Size – Front	245/40 R19	255/35 R19
Size – Rear	285/35 R19	295/30 R19
Low Friction Lubricants (Type)	Engine: Castrol RS 10W60 Transaxle: Castrol BOT270	Engine: 0W40 Mobil 1 Transaxle: Castrol BOT270
N/V	manual: 38.6 semi-auto: 36.4	**X**
Fuel Economy Values	manual: 19.6 semi-auto: 20.7	**X**

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with V8 or V12 power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, whilst being contemplated by AML, represents considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML's V8 and V12 vehicles appeal to different market segments, each of which is distinct (and the V8 and V12 vehicles as a result have significantly different pricing). Attempting to force greater sales of the smaller V8 is not feasible because the V8 market segment is finite and has little overlap with the V12 segment.

Moreover, contrary to expectations, V8 sales continue to decline compared to V12 sales. Sales of the V8 model in recent MYs have shown a less than forecasted demand for this model, negatively impacting the AML CAFE (V12 and V8 sales had previously been split about 50-50). Indeed, as the total volume of AML sales shrinks under the influence of market economic instability, the loss of V8 sales as a percentage of total sales, increases the negative impact on CAFE.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [5]

The projected US sales mix of the Aston Martin models for MY 2016 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2011 to 2016, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 (Virage)	Vanquish	DBS	Rapide	V8 Vantage	V12 Vantage	Production Capacity
2011	86	-	104	317	259	108	Up to 12500
2012	36(221)	-	93	149	267	53	Up to 15000
2013#	126	-	-	-	220	-	Up to 15000
2014*	X	X	-	X	X	-	Up to 12500
2015*	X	X	-	X	X	X	Up to 12500
2016*	X	X	-	X	X	X	Up to 12500

Note: * = projected
= to be confirmed

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy despite the already mentioned decrease in sales of its smaller engine V8 Vantage models, whilst retaining its core vehicle capabilities.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

[5] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay. Producing a significantly more fuel efficient vehicle

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB9:** **13** mpg city and **19** mpg highway (for MY 2014, coupe automatic)

	City mpg*	Highway mpg*
Mercedes Benz SL63	12	19
Bentley Continental GT	12	19
Maserati GT	13	21
Ferrari California	13	19

- **Vanquish:** **13** mpg city and **19** mpg highway (for MY 2014, coupe automatic)

	City mpg*	Highway mpg*
Ferrari 458 Italia	13	17
Mercedes Benz SLS Coupe	13	18
Lamborghini Aventador	11	18

- **Rapide:** **13** mpg city and **19** mpg highway (for MY 2014, automatic)

	City mpg*	Highway mpg*
Mercedes Benz S65	12	19
Maserati Quattroporte	12	18
Ferrari FF	11	16
Bentley Continental Flying Spur	11	19

- **V8 Vantage:** **14** mpg city and **21** mpg highway (for MY 2014, Vantage S)

	City mpg*	Highway mpg*
Audi R8 V8	13	21
Lamborghini Gallardo	13	20
Mclaren MP4-12C	15	22

*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

X

X

X

X

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE</u>

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased mass to body and frame structures which translate into additional weight.

(G) <u>THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED</u>

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low yearly mileage accumulation. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2016.

Respectfully submitted,

September 6th, 2013

Ian Minards
Product Development Director
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2017

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

September 2014

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

CONTENTS

ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2017	**X**

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2017

Model	Year	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	MAFE Calculation
X	2017	IP	**X**	**X**	RWD	8 Speed Automatic	**X**	4500	**X**
Vanquish – 568hp	2017	IP	20.6	**X**	RWD	8 Speed Automatic	3910-4080	4500	**X**
Rapide S – 552hp	2017	IP	21.5	**X**	RWD	8 Speed Automatic	4388	4750	**X**
V12 Vantage S - 565hp	2017	IP	18.3	**X**	RWD	7 Speed Semi Automatic	3725	4250	**X**
			Sales Total	**X**				**ΣMAFE**	**X**
								CAFE =	**X**

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2017	43.61	32.65	0.0005131	0.001896

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	feet ^{2}
X	X	X	X	X	X
Vanquish	1595	62.8	2740	107.9	47.1
Rapide S	1610	63.4	2990	117.7	51.8
V12 Vantage S	1572.50	61.9	2600	102.4	44.0

Volumes		2017
X	X	X
$N_{Vanquish}$	Vanquish Total	X
$N_{rapideS}$	Rapide S Total	X
$N_{v12vantageS}$	V12 Vantage S Total	X
N	Total Vehicles	X

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Targets			
X	Vanquish	Rapide S	V12 Vantage S
X	38.37	35.12	40.86

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2017 Aston Martin Fleet Standard	X

(A) BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production
1993 V8 (Virage) Vantage into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

X

AML is therefore eligible to request the exemption and alternate standard. [2] (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2010	2703
2011	3589
2012	3330
2013	3750
2014	**X**
2015	**X**
2016	**X**
2017	**X**

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2017MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is noted that all prior petitions back to 2008MY remain unanswered.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2016.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN Vanquish

Model initially on sale as a 2014MY during January 2013.
Vanquish is largely based on the original DB9 vehicle introduced in 2004. For 2008 DBS built on this but made use of Carbon Fiber Composite in the construction of some of the body structure. Vanquish adopts an all carbon fiber panel and upper body design to be able to realize the designs' features. The chassis 'Tub' or body frame makes use of the unique aerospace-specification bonded aluminum structure, known as the 'VH' (Vertical/Horizontal) architecture, which is unique to AML. This provides one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminum structure is the reason for the responsive nature and nimbleness of Vanquish and indeed all AML models that employ this system.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminum V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminum transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fiber prop-shaft, housed in a cast aluminum torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

Vanquish has adopted many of the design and engineering innovations used on all AML models, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking. Vanquish also has a unique center console containing touch sensitive controls for HVAC, audio and driver information with haptic feedback included.

In its manufacturing process, Aston Martin pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.
The lightweight, rigid body structure, tuned suspension and hydraulic 'Servotronic' speed-sensitive hydraulic power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation large carbon composite disc brakes, ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.
Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

The Vanquish is available in Coupe or soft top Convertible bodystyles, with 2+0 or 2+2 seating configurations.

2015MY MSRP:	$285,000 – 303,000
Vehicle Curb mass:	3910-4080lbs
Powertrain:	6.0 liter V12 with 8 speed auto transmission – 568hp

ASTON MARTIN Rapide S

Model on sale as Rapide S from 2014MY.
The Aston Martin Rapide S is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide S is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martin vehicles. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the key qualities of the Rapide S. The Rapide S is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for expanded interior options.

2015MY MSRP:	$205,000
Vehicle Curb mass:	4388lb
Powertrain:	6.0 liter V12 with 8 speed auto transmission – 552hp

ASTON MARTIN V12 VANTAGE S

The V12 high-performance derivative of the V8 Vantage, was not originally planned for sale in the US. However, due to interest from the US market this vehicle was made available in limited numbers from 2011MY starting with the Coupe model and from 2015MY as a convertible (Roadster) version.
The car benefitted from an upgrade to its engine management system in 2015MY, in fact being the first application of a Bosch EMS for Aston Martin. There were some trim specification changes at this time in addition to a change of title to V12 Vantage S.

2015MY MSRP:	c. $185,000 - 200,000
Vehicle Curb mass:	3725lbs
Powertrain:	6.0 liter V12 with 7 speed Sportshift auto shift manual transmission – 565hp

X – this whole page redacted

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; recent grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).
The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further significant fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- The AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the Vanquish (weight = 3910-4080 lbs), all major body and mechanical components are either aluminium, magnesium alloy, or advanced light weight composite materials. These include the aluminium V12 engine and transmission, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that Vanquish is up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The Vanquish takes the lightweight theme even further with the use of carbon fiber in the production of all its body panels. Carbon ceramic composite brakes feature on both V12 Vantage S and Vanquish as a standard fitment.
- Rapide S and V12 Vantage S incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminium extrusions and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.

- AML has designed aerodynamic cars -- with drag coefficients as follows:

X	Rapide S	Vanquish	V12 Vantage S
X	0.36	0.36	0.35

- The weight/horsepower ratios are as favorable as:

X	Rapide S	Vanquish	V12 Vantage S
X	4300/552 7.8:1	3910/568 6.9:1	3738/565 6.6:1

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has always been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. **X**
  – please refer to Section (E)2.c. for the proposal on steering systems.

- The use of 0W-40 low friction lubricant in the 6.0 liter NA V12 engine goes back to its introduction in 2004. **X**

- Starting 2014 CY, AML phased introduction of the 8 speed ZF automatic transmission into it's V12 engined vehicles. This transmission allows for some engine downspeeding opportunities and optimized gear choice for given road speed. **X**

- Starting 2013CY, AML phased in a replacement engine management system. The previous Visteon supplied system was reaching the limits of its capability. An agreement was signed with Bosch to provide all engine management functionality going forward from 2014MY. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected the automobile industry since 2008. The financial crisis resulted in AML reducing production[3] to counter a significant fall in sales. This in turn led AML to layoff a total of 600 employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 (from a total workforce of approximately 1800, a reduction of 1/3rd. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make or attract investment in new fuel economy technology. Since the reduction in the number of manufactured vehicles in 2009, Aston Martin has seen only a small improvement in sales levels up to the end of 2013 and 2014 model years. It is reasonable to conclude that the economic downturn continues to affect sales, coupled with an aging product line only serves to make it increasingly difficult to invest in product improvement and replacement.
It follows that the high luxury sector (HLS) has seen considerably reduced sales volumes, with some improvement recently, and therefore it requires HLS manufacturers to significantly increase their sales effort to maintain market position.

[3] 2009 production cut by 60%, as compared to 2008 production.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

[Table 2a: Vehicle Specifications – Vanquish & Rapide S

Vehicle		**Model Line**	
Description		**Vanquish**	**Rapide S**
Body Variants		2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft^2)		22.3	23.1
Dimensions (inches)	Height	50.0	53.5
	Width	75.0	76.0
	Length	185.4	197.6
	Wheelbase	107.9	117.7
	Front Track	62.6	62.6
	Rear Track	62.9	63.6
Curb Weight (lbs)		3910 – 4080	4388
Equivalent Test Weight (lbs)		4500	4750
Seating Positions		2 or 4	4
Interior Volume Index (ft^3)		N/A or 85	97
Engine Type		V12	V12
Working Principle		Four stroke, Otto cycle, naturally aspirated	
Engine Displacement (Litres)		6.0	6.0
Engine Max Power (hp)		568	552
Fuel Metering System		Electronically controlled sequential fuel injection	
Transmission		8 speed automatic	8 speed automatic
Final Drive Ratio		auto: 2.73	auto: 2.73
Emission Control System		Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower†		16.2	15.0
Radial Tires (std)	Brand	Pirelli	Bridgestone
	Size – Front	255/35 R20	245/40 R20
	Size – Rear	305/30 R20	295/35 R20
Low Friction Lubricants (Type)		Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1
N/V		23.2	22.5
Fuel Economy Values		20.6	21.5

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

[Table 2b: Vehicle Specifications – V12 Vantage S and VH500

Vehicle	Model Line	
Description	**V12 Vantage S**	**X**
Body Variants	2dr Hatchback 2dr Convertible	**X**
Frontal area (ft^2)	21.8	**X**
Dimensions (inches) Height Width Length Wheelbase Front Track Rear Track	50 73.5 172.5 102.4 61.8 62.0	**X**
Curb Weight (lbs)	3725	**X**
Equivalent Test Weight (lbs)	4250	**X**
Seating Positions	2	**X**
Interior Volume Index (ft^3)	N/A	**X**
Engine Type	V12	**X**
Working Principle	Four stroke, Otto cycle, naturally aspirated	**X**
Engine Displacement (Litres)	6.0	**X**
Engine Max Power (hp)	565	**X**
Fuel Metering System	Electronically controlled sequential fuel injection	
Transmission	7 spd semi-auto	**X**
Final Drive Ratio	semi-auto: 3.73	**X**
Emission Control System	Three-way catalysts heated O2 sensors	**X**
Road Load Horsepower†	16.0	**X**
Radial Tires (std) Brand Size – Front Size – Rear	Pirelli 255/35 R19 295/30 R19	**X**
Low Friction Lubricants (Type)	Engine: 0W40 Mobil 1 Transaxle: Castrol BOT270	**X**
N/V	33.6	**X**
Fuel Economy Values	18.3	**X**

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. Starting in 2014CY with the actions designed for introduction in 2017MY, AML is making a significant investment in new product and new powertrain technology. The economic practicabilities are such that making this investment is now necessary to move forward with technologies in Aston Martin products that are industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. **X.**

It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, represented considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As such AML did not move forward with any new market area other than the market area AML knows best. NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale also applies in this case.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

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[4] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

The projected US sales mix of the Aston Martin models for MY 2017 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2013 to 2017, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 **	Vanquish	X	Rapide S	V8 Vantage**	V12 Vantage S	Production Capacity
2013	128	-		-	236	-	Up to 15000
2014	335	480		235	222	-	Up to 12500
2015*	X	X	X	X	X	X	Up to 12500
2016*	X	X	X	X	X	X	Up to 12500
2017*	X	X	X	X	X	X	Up to 12500

Note: * = projected
= to be confirmed

** 2015 and 2016MY volumes subject to the outcome of AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with recent changes to engine management and transmission technology has realized a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were <u>not</u> compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **X**

	City mpg*	Highway mpg*
Mercedes Benz SL65	14	21
Bentley Continental GT	12	21
Maserati GT	13	21
Ferrari F12	11	16

- **Vanquish:** **13** mpg city and **21** mpg highway (for MY 2015, coupe 8 speed automatic)

	City mpg*	Highway mpg*
Ferrari 458 Italia	13	17
Mercedes Benz SLS Coupe	13	19
Lamborghini Huracan	14	20

- **Rapide S:** **14** mpg city and **22** mpg highway (for MY 2015, 8 speed automatic)

	City mpg*	Highway mpg*
Mercedes Benz S65 AMG	13	20
Maserati Quattroporte GTS	13	22
Ferrari FF	11	16
Bentley Flying Spur	12	20

The comparison data tables shown above (based on a comparison of 2015MY vehicles) indicate that Aston Martin is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect Aston Martin progressively introduced a ZF 8 speed automatic transmission starting in 2015MY that was planned to replace the 6 speed ZF on all V12 engined models apart from DB9. The approximately 4 year lead time to introduce such a change for Aston Martin was principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities. The 8 speed transmission is fitted to Vanquish, Rapide S **X**.

Starting 2014MY Aston Martin rolled out a new engine management system (EMS). This will allow us to realize CO2 reductions through use of other technology enablers such as stop-start and potential hybridization. The introduction of a new EMS provides significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years. All models benefit from the fitment of Bosch EMS.

X.

X

X.

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE</u>

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased mass to body and frame structures which translate into additional weight.

(G) <u>THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED</u>

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low yearly mileage accumulation. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2017.

Respectfully submitted,

I. Minards

September 5th, 2014

Ian Minards
Product Development Director
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2018

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

July 2015

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

CONTENTS

ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2018	**X**

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2018

Model	Certified in MY	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	MAFE Calculation
X	2017	IP	**X**	**X**	RWD	8 Speed Automatic	**X**	**X**	**X**
X	2018	IP	**X**	**X**	RWD	8 Speed Automatic	**X**	**X**	**X**
Vanquish	2015	IP	20.6	**X**	RWD	8 Speed Automatic	3738-3940	4500	**X**
Rapide S	2015	IP	21.5	**X**	RWD	8 Speed Automatic	4387	4750	**X**
			Sales Total	**X**				**ΣMAFE**	**X**
								CAFE =	**X**

Note: Items in **red bold** are estimated values

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

Data

Constants				
MY	a	b	c	d
2018	45.21	33.84	0.0004954	0.001811

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	$feet^2$
X	X	X	X	X	X
X	X	X	X	X	X
Vanquish	1595	62.8	2740	107.9	47.1
Rapide S	1610	63.4	2990	117.7	51.8

Volumes		2018
N_{AM5V12}	X	X
N_{AM5V8}	X	X
$N_{Vanquish}$	Vanquish Total	X
$N_{RapideS}$	Rapide S Total	X
N	Total Vehicles	X

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Targets			
X	X	Vanquish	Rapide S
X	X	39.77	36.40

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2018 Aston Martin Fleet Standard	37.68 mpg

(A) BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production
1993 V8 (Virage) Vantage into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business. Retirement of CEO Dr Ulrich Bez.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S. Appointment of new CEO Dr Andrew Palmer.
2015 Confirmation of the 2nd Century Aston Martin Product Plan by Dr Palmer. The latest Bond film 'Spectre' includes a special Bond vehicle in the form of DB10. (a concept car designed for this film)

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

December 2013 - Daimler AG, Aston Martin Holdings (UK) Ltd (AMH) and our shareholders entered into an Umbrella Agreement. This agreement describes the terms under which Daimler subscribed for a new class of D shares representing up to 5% of the equity of AML. Daimler currently holds 5% of these non voting D shares.

Daimler is only represented on the AMH board by an observer. **X**

AML is therefore eligible to request the exemption and alternate standard.[2] (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2010	2703
2011	3589
2012	3330
2013	3750
2014	3970
2015*	**X**
2016*	**X**
2017*	**X**
2018*	**X**

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2018MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is noted that all prior petitions back to 2008MY remain unanswered.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2016.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN Vanquish

Model initially on sale as a 2014MY during January 2013.

Vanquish is largely based on the original DB9 vehicle introduced in 2004. For 2008 DBS built on this but made use of Carbon Fiber Composite in the construction of some of the body structure. Vanquish adopts an all carbon fiber panel and upper body design to be able to realize the designs' features. The chassis 'Tub' or body frame makes use of the unique aerospace-specification bonded aluminum structure, known as the 'VH' (Vertical/Horizontal) architecture, which is unique to AML. This provides one of the most structurally efficient body frames in the car industry. Its rigidity aids handling, driver feedback and safety. More than any other single component, the advanced aluminum structure is the reason for the responsive nature and nimbleness of Vanquish and indeed all AML models that employ this system.

The light weight of the vehicle, allied to structural rigidity, contributes to improved acceleration, agility, steering response and braking. The front-to-rear weight distribution has 85 percent of the car's mass sited between the front and rear axles. The aluminum V12 engine is mounted as far back as possible in a 'front mid-engined' layout. The compact aluminum transaxle housing the gearbox and final drive is positioned at the rear, forward of the rear axle. A lightweight and rigid carbon fiber prop-shaft, housed in a cast aluminum torque tube, transfers torque from the front-mid engine to the rear-mid transmission.

Vanquish has adopted many of the design and engineering innovations used on all AML models, including the Organic Electro Luminescent (OEL) displays in the instrument pack and center console. These provide higher resolution, and improved clarity, compared with conventional electronic displays. Other innovations include LED (Light Emitting Diode) rear lamps that project through a reflector, dispensing light more evenly than other LED systems. They also react more quickly, giving earlier warning to following drivers when braking. Vanquish also has a unique center console containing touch sensitive controls for HVAC, audio and driver information with haptic feedback included.

In its manufacturing process, Aston Martin pioneered the use of ultrasonic welding, which is 90 per cent stronger than conventional spot welding, and results in a better finish, yet uses only 5 per cent of the energy.

The lightweight, rigid body structure, tuned suspension and hydraulic 'Servotronic' speed-sensitive hydraulic power-assisted steering are further aided by a host of advanced electronics. These include Dynamic Stability Control (DSC) and the latest-generation large carbon composite disc brakes, ventilated to aid cooling and boost braking performance. Radially mounted four-piston monobloc calipers provide excellent stopping power.

Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA) are also standard. EBD balances the front-to-rear braking bias, to give optimal braking performance. In an emergency, EBD sensors detect when maximum braking is required and automatically apply the appropriate force.

For the 2015MY Vanquish was upgraded with Bosch engine management and an 8 speed ZF auto transmission.

The Vanquish is available in Coupe or soft top Convertible bodystyles, with 2+0 or 2+2 seating configurations.

2016MY MSRP:	$290,000 – 310,000
Vehicle Curb mass:	3910-4080lbs
Powertrain:	6.0 liter V12 with 8 speed auto transmission – 568hp

ASTON MARTIN Rapide S

Model on sale as Rapide S from 2014MY.
The Aston Martin Rapide S is a four-door, high performance coupé based on Aston Martin's unique VH (Vertical/Horizontal) architecture. The Rapide S is indicative of Aston Martin's low-volume, high-technology approach, the combination of modern methods and materials with traditional skills.

Aston Martin's VH low-mass architecture forms the backbone of the current generation of Aston Martin vehicles. The extruded aluminium construction of the VH architecture can be modified in both length and width, providing packaging options, and the chemically-bonded structure (using glues derived from aircraft manufacture) is mated with bodywork that mixes aluminium and composite materials. Aston Martin's traditional hand-finishing, craft skills and attention to detail operate side by side on the ultra-modern production line.

Practicality and power are the key qualities of the Rapide S. The Rapide S is a performance car with comfortable carrying capacity. Providing accommodation for four passengers in such a sporty coupé presented a formidable packaging challenge. The rear luggage compartment is accessed via a hatchback, a practical feature shared with the Vantage and the pioneering DB2/4 of 1952. In addition, each rear seat folds down individually, allowing for expanded interior options.

As with the Vanquish model, Rapide S benefitted from the inclusion of Bosch engine management and an 8 speed ZF auto transmission in the 2015MY.

2016MY MSRP:	$220,000
Vehicle Curb mass:	4388lb
Powertrain:	6.0 liter V12 with 8 speed auto transmission – 552hp

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(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; the grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is nonetheless producing innovative sports cars using state-of-the-art design and equipment. Further <u>significant</u> fuel economy improvement, however, is not possible.

Significant AML fuel economy facts are as follows:

- AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the Vanquish and **X**, all major body and mechanical components are either aluminium, magnesium alloy, or advanced lightweight composite materials. These include the aluminium V12 and V8 powertrains, forged aluminium suspension, and aluminium-bodied dampers. Even the windscreen surround is cast aluminium, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that these cars are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fibre for lightness and improved transmission refinement. The Vanquish takes the lightweight theme even further with the use of carbon fiber in the production of all its body panels. Carbon ceramic composite brakes feature on the Vanquish model as a standard fitment.
- All AML models incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminium extrusions and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9 in 2004. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.

- AML has designed aerodynamic cars -- with drag coefficients as follows:

X	Rapide S	Vanquish
X	0.36	0.36

- The weight/horsepower ratios are as favorable as:

X	Rapide S	Vanquish
X	4300/552 7.8:1	3910/568 6.9:1

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has always been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. **X**

- **X**
- Starting 2014 CY, AML phased introduction of the 8 speed ZF automatic transmission into it's V12 engined vehicles. This transmission allows for some engine downspeeding opportunities and optimized gear choice for given road speed. The AM5 product will use an enhanced version of this 8 speed transmission coupled to a low loss higher ratio final drive to enable further downspeeding of the V12 engine, thereby enhancing its fuel economy capability.
- Starting 2013CY, AML phased in a replacement engine management system. The previous Visteon supplied system was reaching the limits of its capability. An agreement was signed with Bosch to provide all engine management functionality going forward from 2014MY. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected (and continues to affect) the automobile industry since 2008. The financial crisis resulted in AML reducing production[3] to counter a significant fall in sales. This in turn led AML to reduce its number of employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 by around 600 (from a total workforce of approximately 1800), a reduction of 1/3rd. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make or attract investment in new fuel economy technology. Since the reduction in the number of manufactured vehicles in 2009, Aston Martin has seen only a small improvement in sales levels up to the end of 2013 and 2014 model years. It is reasonable to conclude that the economic downturn continues to affect sales, this, coupled with an aging product line only serves to make it increasingly difficult to invest in product improvement and replacement.
It follows that the high luxury sector (HLS) has seen considerably reduced sales volumes, with some improvement recently, and therefore it requires HLS manufacturers to significantly increase their sales effort to maintain market position.

AML has recently entered a period where a renewed effort to significantly replace our product line is underway. This is being managed by AML's new CEO Dr Andrew Palmer, who has been in office since October 2014. This renewal is seen as absolutely essential for the survival of Aston Martin and relies upon a program of new product deliveries starting late 2016CY. It also foresees an amount of product diversification as an enabler to meeting market demand for ever reducing fossil fuel usage in motor vehicles. The expected result of this diversification is AML becoming financially sustainable without outside assistance in the medium term leading to a long term capability to renew product on a more timely basis than has been the case in the past decade.

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[3] 2009 production cut by 60%, as compared to 2008 production.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

[Table 2a: Vehicle Specifications – Vanquish & Rapide S

Vehicle	Model Line	
Description	**Vanquish**	**Rapide S**
Body Variants	2dr Coupe 2dr Convertible	4dr Coupe
Frontal area (ft^2)	22.3	23.1
Dimensions (inches) Height	50.0	53.5
Width	75.0	76.0
Length	185.4	197.6
Wheelbase	107.9	117.7
Front Track	62.6	62.6
Rear Track	62.9	63.6
Curb Weight (lbs)	3910 – 4080	4388
Equivalent Test Weight (lbs)	4500	4750
Seating Positions	2 or 4	4
Interior Volume Index (ft^3)	N/A or 85	97
Engine Type	V12	V12
Working Principle	Four stroke, Otto cycle, naturally aspirated	
Engine Displacement (Litres)	6.0	6.0
Engine Max Power (hp)	568	552
Fuel Metering System	Electronically controlled sequential fuel injection	
Transmission	8 speed automatic	8 speed automatic
Final Drive Ratio	2.73	2.73
Emission Control System	Three-way catalysts heated O2 sensors.	Three-way catalysts heated O2 sensors.
Road Load Horsepower†	16.2	15.0
Radial Tires (std) Brand	Pirelli	Bridgestone
Size – Front	255/35 R20	245/40 R20
Size – Rear	305/30 R20	295/35 R20
Low Friction Lubricants (Type)	Engine: 0W40 Mobil 1	Engine: 0W40 Mobil 1
N/V	23.2	22.5
Fuel Economy Values	20.6	21.5

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

[Table 2b: Vehicle Specifications - **X**

Vehicle	Model Line	
Description	**X**	**X**
Body Variants	**X**	**X**
Frontal area (ft^2)	**X**	**X**
Dimensions (inches) Height Width Length Wheelbase Front Track Rear Track	**X**	**X**
Curb Weight (lbs)	**X**	**X**
Equivalent Test Weight (lbs)	**X**	**X**
Seating Positions	**X**	**X**
Interior Volume Index (ft^3)	**X**	**X**
Engine Type	**X**	**X**
Working Principle	**X**	**X**
Engine Displacement (Litres)	**X**	**X**
Engine Max Power (hp)	**X**	**X**
Fuel Metering System	**X**	
Transmission	**X**	**X**
Final Drive Ratio	**X**	**X**
Emission Control System	**X**	**X**
Road Load Horsepower†	**X**	**X**
Radial Tires (std) Brand Size – Front Size – Rear	**X**	**X**
Low Friction Lubricants (Type)	**X**	**X**
N/V	**X**	**X**
Fuel Economy Values	**X**	**X**

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. Starting in 2014CY with the actions designed for introduction in 2017MY, AML is making a significant investment in new product and new powertrain technology. The economic practicabilities are such that making this investment is now necessary to move forward with technologies (in Aston Martin products) that are industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with multi-cylinder large capacity power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, represented considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As such AML did not move forward with any new market area other than the market area AML is most well known for and the area it understands. NHTSA has recognized in the past, "producing additional models ... is not possible since ... the unique market sector served by [the manufacturer] preclude significant changes ...." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale continues to apply.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

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[4] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

The projected US sales mix of the Aston Martin models for MY 2018 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2013 to 2018, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 **	Vanquish	X	Rapide S	V8 Vantage**	V12 Vantage S**	Production Capacity
2013	128	-	X	-	236	-	Up to 15000
2014	335	480	X	235	222	-	Up to 12500
2015#	X	X	X	X	X	X	Up to 12500
2016*	X	X	X	X	X	X	Up to 12500
2017*	X	X	X	X	X	X	Up to 12500
2018*	X	X	X	X	X	X	

Note: * = projected
= to be confirmed

** 2015 and 2016MY are volumes subject to the sales limits contained in the AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with recent changes to engine management and transmission technology realizing a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here. However in common with Ferrari, Rolls Royce, Mclaren etc, **X**

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This fact is supported by the fact that the AML's mpg Fuel Economy *label* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume – upper price range).

X

	City mpg*	Highway mpg*
Mercedes Benz SL65	14	21
Bentley Continental GT	12	21
Maserati GT	13	21
Ferrari F12	11	16

- **Vanquish:** **13** mpg city and **21** mpg highway (for MY 2016, coupe 8 speed automatic)

	City mpg*	Highway mpg*
Ferrari 458 Italia	13	17
Mercedes Benz SLS Coupe	13	19
Lamborghini Huracan	14	20

- **Rapide S:** **14** mpg city and **22** mpg highway (for MY 2016, 8 speed automatic)

	City mpg*	Highway mpg*
Mercedes Benz S65 AMG	13	20
Maserati Quattroporte GTS	13	22
Ferrari FF	11	16
Bentley Flying Spur	12	20

The comparison data tables shown above (based on a comparison of 2016MY vehicles) indicate that Aston Martin is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

X

Lastly, we are always investigating powerunit sourcing opportunities in order to increase our vehicle efficiency, again these are very long lead time changes due to contractual agreements with suppliers and vehicle architecture modification requirements. As with other major vehicle changes the decision to invest is a carefully considered one given the economic climate situation.

We expect to be able to improve our fleet fuel economy from making major powerunit sourcing decisions in the 2018/19MY timeframe.

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE</u>

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemaking that affected fuel economy was the FMVSS 301 rear impact upgrade, which was effective September 2008. Other upcoming FMVSS rulemakings that will also have potentially adverse impacts on fuel economy include upgraded FMVSS 214 side impact requirements, upgraded FMVSS 216 roof crush requirements, FMVSS 226 Occupant ejection mitigation requirements and Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. These standards require increased deformation resistance to body and frame structures which translate into additional weight.

(G) <u>THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED</u>

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low yearly mileage accumulation. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2018.

Respectfully submitted,

I. Minards

July 22, 2015

Ian Minards
Product Development Director
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2019

Aston Martin Lagonda Limited
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England

September 2016

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

CONTENTS

ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2019	XXXXX

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2019

Model	Certified in MY	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	MAFE Calculation
DB11 V12 Coupe	2017	IP	**22.5**	**xx**	RWD	8 Speed Automatic	**4150**	**4500**	
XXXXXX	2018	IP	**XX**	**XX**	RWD		**XXX**	**XXX**	
XXXXXXX	2019	IP	**XX**	**XX**	RWD				
XXXXXXX	2019	IP	**XX**	**XX**	RWD				
XXXXXXX	2019	IP	**XX**	**XX**	RWD				
XXXXXXX	2019	IP	**XX**	**XX**	RWD				
			Sales Total	**xxxx**				**ΣMAFE**	
								CAFE =	

Note: Items in **red bold** are estimated values

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2019	46.87	35.07	0.0004783	0.001729

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	feet ^{2}
DB11 V12 Coupe	1654.5	65.1	2805	110.4	49.9

Predicted Sales Volumes	2019
DB11 V12	
Total Vehicles	

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Targets			
DB11 V12			
39.07			

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2019 Aston Martin Fleet Standard	

(A) BACKGROUND

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production
1993 V8 (Virage) Vantage into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DBAR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business. Retirement of CEO Dr Ulrich Bez.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S. Appointment of new CEO Dr Andrew Palmer.
2015 Confirmation of the 2nd Century Aston Martin Product Plan by Dr Palmer. The latest Bond film 'Spectre' includes a special Bond vehicle in the form of DB10. (a concept car designed for this film)
2016 Launch of DB11, the successor to DB9 and the first of a line of new products as part of the 2nd Century plan

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the preceding model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

December 2013 - Daimler AG, Aston Martin Holdings (UK) Ltd (AMH) and our shareholders entered into an Umbrella Agreement. This agreement describes the terms under which Daimler subscribed for a new class of D shares representing up to 5% of the equity of AML. Daimler currently holds 5% of these non voting D shares. Daimler is only represented on the AMH board by an observer. The Operational Agreements between Daimler and AML cover a future V8 engine and electrical and electronic components. As of the date of this petition the agreement with Daimler is extant and operating correctly for both parties.

AML is therefore eligible to request the exemption and alternate standard. [2] (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2011	3875
2012	3497
2013	3731
2014	3956
2015	3175
2016	
2017	
2018	
2019	

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2019MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is noted that all prior petitions back to 2008MY remain unanswered/unresolved.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2016.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN DB11 XXXXXXX

This is the logical development, the Evolution, of current Aston Martin thinking.
This vehicle is designed to replace the outgoing DB9 model.
The vehicle builds on the VH architecture already proven with current Aston Martin vehicles and evolves it to provide new technical features, including performance and drivability improvements, space and comfort improvements and critical market positioning/customer perception improvements.

The platform of DB11 will form the backbone of all future models with the inclusion of revised and new powertrain and transmission options with increased performance in all respects. Improved environmental performance and a notable shift in fuel economy is part of this program, while at the same time maintaining the GT positioning of this car. Features planned include electric power steering (EPAS), electronically controlled thermostat, intelligent charging, variable duty oil pump, stop start and cylinder de-activation. Extended use of LED technology for lighting coupled with system efficiency improvements all add to vehicle fuel economy capability both on and off cycle.

Initially in 2017MY a single engine option will be available based on the current V12 6.0 liter engine but downsized to 5.2 liters and with the addition of mild turbocharging to achieve a significant uplift in torque coupled with a small power increase. This enables AML to realize a marked downspeeding of the engine while maintaining the GT performance and drivability aspects expected of a car in this segment.

XXXXXX.

Both derivatives are available in a 2 door Coupe style, with the V8 also available as a convertible.

2019MY MSRP:	XXXXX
Vehicle Curb mass:	XXX
Powertrain:	5.2 liter V12 turbo with 8 speed Auto Transmission
	XXXXX

ASTON MARTIN

XXXXXXX

ASTON MARTIN

XXXXXXX

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; the grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is now producing innovative sports cars using state-of-the-art design, powertrains and equipment. Further significant fuel economy improvement, however, is not possible, but AML recognizes the need to show continuous improvement in its fleet average fuel economy.

Significant AML fuel economy facts are as follows:

- AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB11 and xxxxxxxxxxx, all major body and mechanical components are either aluminum, magnesium alloy, or advanced lightweight composite materials. These include the aluminum V12 xxxxxxx powertrains, forged aluminum suspension, and aluminum-bodied dampers. Even the windscreen surround is cast aluminum, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that these cars are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fiber for lightness and improved transmission refinement. Xxxxxxx
- All AML models incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminum extrusions, flow formed panels and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9 in 2004. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.

- AML has designed distinctive high performance sports cars requiring significant aerodynamic features for effective downforce and high speed stability -- our drag coefficients reflect this which are as follows:

DB11		

- The weight (lbs)/horsepower ratios are as favorable as:

	DB11 V12		
	4150/600 6.9:1		

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has always been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. However for the DB11 and all subsequent models an EPAS system is to be used as the development of a suitably performance oriented design removes the need for continued usage of an hydraulic set up – please refer to Section (E)2.c. for the proposal on steering systems.

- XXXXX.
- Starting 2014 CY, AML phased introduction of the 8 speed ZF automatic transmission into it's V12 engined vehicles. This transmission allows for some significant engine downspeeding opportunities and optimized gear choice for given road speed. The DB11 uses an enhanced version of this 8 speed transmission coupled to a low loss higher ratio final drive to enable further downspeeding of the V12 engine, thereby enhancing its fuel economy capability. Both the XXX and the XXX will use versions of the 8 speed ZF transmission to continue this pattern of low engine speed for a given road speed.
- From 2013CY, AML phased in a replacement engine management system. The previous Visteon supplied system was reaching the limits of its capability. An agreement was signed with Bosch to provide all engine management functionality going forward from 2014MY. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement. All products in 2019MY make use of this Bosch engine management system.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected (and continues to affect) the automobile industry since 2008. The financial crisis resulted in AML reducing production[3] to counter a significant fall in sales. This in turn led AML to reduce its number of employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 by around 600 (from a total workforce of approximately 1800), a reduction of 1/3rd. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make or attract investment in new fuel economy technology. Since the reduction in the number of manufactured vehicles in 2009, Aston Martin has seen levels of sales remain at around this 2009 figure for some time. It is reasonable to conclude that the economic downturn continues to affect sales, this, coupled with an aging product line only serves to make it increasingly difficult to invest in product improvement and replacement.
Notably, as of the date of this petition the workforce is approaching 1800 again following significant investment input in support of the AML second century plan.

It is clear that that the high luxury sector (HLS) has seen considerably reduced sales volumes, with some improvement in recent years, but it still requires HLS manufacturers to significantly increase their sales effort to maintain market position.

AML is now firmly in its second century plan period where a renewed effort to significantly replace our product line is underway. This is being managed by AML's new CEO Dr Andrew Palmer, who has been in office since October 2014. This renewal is seen as absolutely essential for the survival of Aston Martin and relies upon a program of new product deliveries starting late 2016CY. It also foresees an amount of product diversification as an enabler to meeting market demand for ever reducing fossil fuel usage in motor vehicles. The expected result of this diversification is AML becoming financially sustainable without outside assistance in the medium term leading to a long term capability to renew product on a more timely basis than has been the case in the past decade.

[3] 2009 production cut by 60%, as compared to 2008 production.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

Table 2a: Vehicle Specifications – DB11 V12 xx

Vehicle	Model Line	
Description	***DB11 V12***	
Body Variants	*2dr Coupe*	
Frontal area (ft^2)	***21.8***	
Dimensions (inches) Height	*50*	
Width	*85*	
Length	*186.6*	
Wheelbase	*110.4*	
Front Track	*65.5*	
Rear Track	*64.8*	
Curb Weight (lbs)	***4150***	
Equivalent Test Weight (lbs)	***4500***	
Seating Positions	*2 or 2+2*	
Interior Volume Index (ft^3)	***81***	
Engine Type	*V12 T*	
Working Principle	*Four stroke, Otto cycle, turbocharged*	
Engine Displacement (Litres)	*5.2*	
Engine Max Power (hp)	*600*	
Fuel Metering System		
Transmission	*8 speed automatic*	
Final Drive Ratio	*2.703*	
Emission Control System	*Three-way catalysts heated O2 sensors, secondary air*	
Road Load Horsepower†	*14.6*	
Radial Tires (std) Brand	*Bridgestone*	
Size – Front	*255/40 R20*	
Size – Rear	*295/35 R20*	
Low Friction Lubricants (Type)	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	
N/V	*22.2*	
Fuel Economy Values	***22.5***	

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

Table 2b: Vehicle Specifications – xxxxxxx

Vehicle	Model Line	
Description		
Body Variants		
Frontal area (ft^2)		
Dimensions (inches) Height Width Length Wheelbase Front Track Rear Track		
Curb Weight (lbs)		
Equivalent Test Weight (lbs)		
Seating Positions		
Interior Volume Index (ft^3)		
Engine Type		
Working Principle		
Engine Displacement (Litres)		
Engine Max Power (hp)		
Fuel Metering System		
Transmission		
Final Drive Ratio		
Emission Control System		
Road Load Horsepower[†]		
Radial Tires (std) Brand Size – Front Size – Rear		
Low Friction Lubricants (Type)		
N/V		
Fuel Economy Values		

NOTE: [†]Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. Starting in 2014CY with the actions designed for introduction in 2017MY, AML is making a significant investment in new product and new powertrain technology. The economic practicabilities are such that making this investment is now necessary to move forward with technologies (in Aston Martin products) that are industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with multi-cylinder large capacity power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, represented considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As such AML did not move forward with any new market area other than the market area AML is most well known for and the area it understands. NHTSA has recognized in the past, "producing additional models … is not possible since … the unique market sector served by [the manufacturer] preclude significant changes …." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale continues to apply.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

[4] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

The projected US sales mix of the Aston Martin models for MY 2018 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2013 to 2019, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 **	Vanquish/ xxxx	DB11 V12 xxxx	Rapide S	V8 Vantage**/ xxxx	V12 Vantage S**	Production Capacity $
2013	128	-		-	236	-	Up to 15000
2014	335	480		235	222	-	Up to 10000
2015	270	163		138	319	229	Up to 10000
xx							Up to 10000
xx							Up to 10000
xx							Up to 10000
xx							Up to 10000

Note: * = projected
= to be confirmed

** 2015 and 2016MY are volumes subject to the sales limits contained in the AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032

$ - correction over previous petitions, the Gaydon site has a 10000 unit p.a. planning limit

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some … configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). Once again this analysis applies to AML.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global recession, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with recent changes to engine management and transmission technology realizing a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here. However in common with Ferrari, Rolls Royce, Mclaren etc, Aston Martin is now moving toward downsizing and pressure charging to maintain the performance car aspect and the feature levels expected of our customer base, while creating the ability to significantly improve our fleet fuel economy.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were <u>not</u> compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This is supported by the fact that AML's mpg Fuel Economy *<u>label</u>* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB11 V12 T:** projected 15 mpg city and 22 mpg highway
  xxxx

	City mpg*	Highway mpg*
Mercedes Benz SL65	13	22
Bentley Continental GT	12	21
Ferrari F12	12	16

- **DB11 xxx** projected 16 mpg city and 22 mpg highway

	City mpg*	Highway mpg*
Ferrari California T	16	23
Mercedes Benz SL63	16	25
Lamborghini Huracan	14	21

- **xxxxxx:** projected 16 mpg city and 22 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz AMG GT S	16	22
Lamborghini Huracan	14	21
Ferrari 488	15	22
Porsche 911 Turbo	19	24

The comparison data tables shown above (based on a comparison of 2017MY vehicles) indicate that Aston Martin is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect Aston Martin progressively introduced a ZF 8 speed automatic transmission starting in 2015MY that was planned to replace the 6 speed ZF on all V12 engined models apart from DB9. The approximately 4 year lead time to introduce such a change for Aston Martin was principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities. xxxxxxxx

Starting 2014MY Aston Martin rolled out a new engine management system (EMS). This allowed AML to realize CO2 reductions through use of other technology enablers such as stop-start and potential hybridization. The introduction of a new EMS provided significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years. All models now benefit from the fitment of Bosch EMS.

The DB11 V12 models benefit from a package of significant changes to the V12 engine fitted to this car that support a reduction in fuel use of c.10%. As part of this package the engine is downsized to 5.2 liters coupled with pressure charging, reduced exhaust backpressure, stop-start, cylinder de-activation, electric thermostat with coolant flow management and a change to electric/hydraulic power steering being included. While tooling costs are significant Aston Martin is committed to providing continuous fuel economy improvement from its volume sales products with powertrain improvements such as these becoming necessary to maintain this performance.

Xxxxxxxxx

Lastly, we are always investigating powerunit sourcing opportunities in order to increase our vehicle efficiency, again these are very long lead time changes due to contractual agreements with suppliers and vehicle architecture modification requirements. As with other major vehicle changes the decision to invest is a carefully considered one given the economic climate situation.
We expect to be able to improve our fleet fuel economy from making major powerunit sourcing decisions in the 2019MY timeframe.

(F) OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemakings that affected fuel economy are the FMVSS 214 side impact requirement, FMVSS 216 roof crush, FMVSS 226 Occupant Ejection Mitigation requirements and also Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. that must be considered as standard fit due to the economics of scale. These standards require increased deformation resistance to body and frame structures which translate into additional weight.

(G) THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low VMT (vehicle miles travelled) value per annum. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2019.

Respectfully submitted,

September 1st, 2016

Nick Lines
Vice President/Chief Planning Officer
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARD AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2020

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
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May 2 2017

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

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CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

MY 2020

Model	Certified in MY	Fleet	ActualMPG	Projected Sales	Drive System	TransClass	CurbWeight	Test Weight	MAFE Calculation
DB11 V12 Coupe	2017	IP	**22.8**		RWD	8 Speed Automatic	**4134**	**4500**	
	2018	IP			RWD	8 Speed Automatic			
	2019	IP			RWD	8 Speed Automatic			
	2019	IP			RWD	8 Speed Automatic			
	2019	IP			RWD				
	2019	IP			RWD				
			Sales Total					**ΣMAFE**	
								CAFE =	

Note: Items in **red bold** are estimated values

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants				
MY	a	b	c	d
2020	48.74	36.47	0.0004603	0.001643

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	feet ^{2}
DB11 V12 Coupe	1654.5	65.1	2805	110.4	49.9

Predicted Sales Volumes	2020
DB11 V12	
Total Vehicles	

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Individual Model CAFE Targets			
DB11 V12			
40.63			

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2020 Aston Martin Fleet Standard	xxxx

(A) **BACKGROUND**

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production
1993 V8 (Virage) Vantage into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DB_AR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards of Prodrive.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business. Retirement of CEO Dr Ulrich Bez.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S. Appointment of new CEO Dr Andrew Palmer.
2015 Confirmation of the 2nd Century Aston Martin Product Plan by Dr Palmer. The latest Bond film 'Spectre' includes a special Bond vehicle in the form of DB10. (a concept car designed for this film)
2016 Launch of DB11, the successor to DB9 and the first of a line of new products as part of the 2nd Century plan
2017 XXXXXXXXX. Aston Martin takes possession of its second production facility at St Athan.

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger cars in the second model year preceding this model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the second model year preceding this model year.

The AML total world-wide production (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. AML does not own, is not controlled by and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

December 2013 - Daimler AG, Aston Martin Holdings (UK) Ltd (AMH) and our shareholders entered into an Umbrella Agreement. This agreement describes the terms under which Daimler subscribed for a new class of D shares representing up to 5% of the equity of AML. As of the date of this petition Daimler holds 6% of these non voting D shares. Daimler is only represented on the AMH board by an observer. The Operational Agreements between Daimler and AML cover a future V8 engine and electrical and electronic components. As of the date of this petition the agreement with Daimler is extant and operating correctly for both parties.

AML is therefore eligible to request the exemption and alternate standard. [2] (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Production
2011	3875
2012	3497
2013	3731
2014	3956
2015	3175
2016	2952
2017	X
2018	X
2019	X
2020	X

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2020MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is to be noted that all prior petitions back to 2008MY remain unanswered/unresolved.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2016.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN DB11 Coupe xxxx

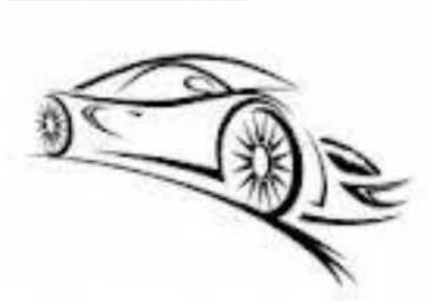
This is the logical development, the Evolution, of current Aston Martin thinking.
This vehicle was designed to replace the outgoing DB9 model.
The vehicle builds on the VH architecture already proven with current Aston Martin vehicles and evolves it to provide new technical features, including performance and drivability improvements, space and comfort improvements and critical market positioning/customer perception improvements.

The platform of DB11 forms the backbone of all future models with the inclusion of revised and new powertrain and transmission options with increased performance in all respects. Improved environmental performance and a notable shift in fuel economy is part of this program, while at the same time maintaining the GT positioning of this car. Features planned include electric power steering (EPAS), electronically controlled thermostat, intelligent charging, variable duty oil pump, stop start and cylinder de-activation. Extended use of LED technology for lighting coupled with system efficiency improvements all add to vehicle fuel economy capability both on and off cycle.

Initially in 2017MY a single engine option will be available based on the current V12 6.0 liter engine but downsized to 5.2 liters and with the addition of mild turbocharging to achieve a significant uplift in torque coupled with a small power increase. This enables AML to realize a marked downspeeding of the engine while maintaining the GT performance and drivability aspects expected of a car in this segment.
Xxxx

2020MY MSRP:	$195,000-235,000
Vehicle Curb mass:	3900 - 4150lbs (target)
Powertrain:	5.2 liter V12 turbo with 8 speed Auto Transmission
	xxxxx

ASTON MARTIN xxxxx



Xxxxx

ASTON MARTIN xxxx

Xxxxxx

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; the grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).
The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is now producing innovative sports cars using state-of-the-art design, powertrains and equipment. Further significant fuel economy improvement, however, is not possible, but AML recognizes the need to show continuous improvement in its fleet average fuel economy.

Significant AML fuel economy facts are as follows:

- AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB11 xxxxxx, all major body and mechanical components are either aluminum, magnesium alloy, or advanced lightweight composite materials. These include the aluminum xxxx powertrains, forged aluminum suspension, and aluminum-bodied dampers. Even the windscreen surround is cast aluminum, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that these cars are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fiber for lightness and improved transmission refinement. The xxxx will follow on from the Vanquish model it replaces by making extensive use of carbon fiber composite material in the production of all its body panels. Carbon ceramic composite brakes will again feature on xxxx as a standard fitment, and as an option xxxxx
- All AML models incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminum extrusions, flow formed panels and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9 in 2004. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.

- AML has designed distinctive high performance sports cars requiring significant aerodynamic features for effective downforce and high speed stability -- our drag coefficients reflect this which are as follows:

DB11		
0.37		

- The weight (lbs)/horsepower ratios are as favorable as:

	DB11 V12		
	4150/600 6.9:1		

- The use of technology like partial hydraulic/electric or full electric power-assisted steering has always been rejected for existing model lines due to the scale of development needed for introduction. Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. However for the DB11 and all subsequent models an EPAS system is to be used as the development of a suitably performance oriented design removes the need for continued usage of an hydraulic set up – please refer to Section (E)2.c. for the proposal on steering systems.

- The 5.2 liter V12 and the xxxx will make use of friction modified engine oils, a 0W20 rating in the V12 and xxxxxx is utilised. This type of oil is fast becoming the industry standard. Further reductions in viscosity are under investigation with 0W-00 being a possibility in the next few years. The previous Aston Martin xx xxxx made use of a 10W60 synthetic oil, so the change to a 0W40 oil for the xxxxxx is a significant change to leverage fleet fuel economy improvements.
- Starting 2014 CY, AML phased introduction of the 8 speed ZF automatic transmission into it's V12 engined vehicles. This transmission allows for some significant engine downspeeding opportunities and optimized gear choice for given road speed. The DB11 uses an enhanced version of this 8 speed transmission coupled to a low loss higher ratio final drive to enable further downspeeding of the V12 engine, thereby enhancing its fuel economy capability. Both xxxxx will use versions of the 8 speed ZF transmission to continue this pattern of low engine speed for a given road speed.
- From 2013CY, AML phased in a replacement engine management system. The previous Visteon supplied system was reaching the limits of its capability. An agreement was signed with Bosch to provide all engine management functionality going forward from 2014MY. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement. All products in 2020MY make use of this Bosch engine management system.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial uncertainty that has affected (and continues to affect) the automobile industry since 2008. The financial crisis resulted in AML reducing production[3] to counter a significant fall in sales. This in turn led AML to reduce its number of employees and contractors in the 4th Quarter of 2008 and 1st Quarter of 2009 by around 600 (from a total workforce of approximately 1800), a reduction of 1/3rd.. The substantial decrease in sales, revenue and profits has had a direct impact on the capability of the company to make or attract investment in new fuel economy technology. Since the reduction in the number of manufactured vehicles in 2009, Aston Martin has seen levels of sales remain at around this 2009 figure for some time. It is reasonable to conclude that the economic downturn continues to affect sales, this, coupled with an aging product line only serves to make it increasingly difficult to invest in product improvement and replacement.
Notably, as of the date of this petition the workforce is approaching 1800 again following significant investment input in support of the AML second century plan.

It is clear that that the high luxury sector (HLS) has seen considerably reduced sales volumes, with some improvement in recent years, but it still requires HLS manufacturers to significantly increase their sales effort to maintain market position.

AML is now firmly in its second century plan period where a renewed effort to significantly replace our product line is underway. This is being managed by AML's new CEO Dr Andrew Palmer, who has been in office since October 2014. This renewal is seen as absolutely essential for the survival of Aston Martin and relies upon a program of new product deliveries starting late 2016CY. It also foresees an amount of product diversification as an enabler to meeting market demand for ever reducing fossil fuel usage in motor vehicles. The expected result of this diversification is AML becoming financially sustainable without outside assistance in the medium term leading to a long term capability to renew product on a more timely basis than has been the case in the past decade.

[3] 2009 production cut by 60%, as compared to 2008 production.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

Table 2a: Vehicle Specifications – DB11 V12 xxx

Vehicle	Model Line	
Description	***DB11 V12***	
Body Variants	*2dr Coupe*	
Frontal area (ft^2)	*21.8*	
Dimensions (inches) Height Width Length Wheelbase Front Track Rear Track	*50* *85* *186.6* *110.4* *65.5* *64.8*	
Curb Weight (lbs)	*4150*	
Equivalent Test Weight (lbs)	*4500*	
Seating Positions	*2+2*	
Interior Volume Index (ft^3)	*81*	
Engine Type	*V12 T*	
Working Principle	*Four stroke, Otto cycle, turbocharged*	
Engine Displacement (Litres)	*5.2*	
Engine Max Power (hp)	*600*	
Fuel Metering System		
Transmission	*8 speed automatic*	
Final Drive Ratio	*2.703*	
Emission Control System	*Three-way catalysts with heated O2 sensors, secondary air*	
Road Load Horsepower†	*14.6*	
Radial Tires (std) Brand Size – Front Size – Rear	*Bridgestone* *255/40 R20* *295/35 R20*	
Low Friction Lubricants (Type)	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	
N/V	*22.2*	
Fuel Economy Values	*22.8*	

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

[Table 2b: Vehicle Specifications xxxx

Vehicle	Model Line	
Description		
Body Variants		
Frontal area (ft^2)		
Dimensions (inches) Height Width Length Wheelbase Front Track Rear Track		
Curb Weight (lbs)		
Equivalent Test Weight (lbs)		
Seating Positions		
Interior Volume Index (ft^3)		
Engine Type		
Working Principle		
Engine Displacement (Litres)		
Engine Max Power (hp)		
Fuel Metering System		
Transmission		
Final Drive Ratio		
Emission Control System		
Road Load Horsepower†		
Radial Tires (std) Brand Size – Front Size – Rear		
Low Friction Lubricants (Type)		
N/V		
Fuel Economy Values		

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. Starting in 2014CY with the actions designed for introduction in 2017MY, AML is making a significant investment in new product and new powertrain technology. The economic practicabilities are such that making this investment is now necessary to move forward with technologies (in Aston Martin products) that are industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with multi-cylinder large capacity power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, represented considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As such AML did not move forward with any new market area other than the market area AML is most well known for and the area it understands. NHTSA has recognized in the past, "producing additional models … is not possible since … the unique market sector served by [the manufacturer] preclude significant changes …." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale continues to apply.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

[4] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

The projected US sales mix of the Aston Martin models for MY 2020 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2013 to 2020, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 **	Vanquish/ xxx (2019)	DB11 V12 xxxx	Rapide S	V8 Vantage**/ xxxxx (2019)	V12 Vantage S**	Production Capacity $
2013	128	-		-	236	-	Up to 15000
2014	335	480		235	222	-	Up to 10000
2015	270	163		138	319	229	Up to 10000
2016	181	172		102	204	19	Up to 10000
2017*							Up to 10000
2018*							Up to 10000
2019*							Up to 10000
2020*							XXX

Note: * = projected
= to be confirmed

** 2015 and 2016MY were volumes subject to the sales limits contained in the AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032
$ - correction over previous petitions, the Gaydon site has a 10000 unit p.a. planning limit

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some … configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This analysis continues to apply to AML as we pursue high luxury sector opportunities .

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global instability, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with recent changes to engine management and transmission technology realizing a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here. However in common with Ferrari, Rolls Royce, Mclaren etc, Aston Martin is now moving toward downsizing and pressure charging to maintain the performance aspects of our car designs and the feature levels expected of our customer base, while creating the ability to significantly improve our fleet fuel economy.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This is supported by the fact that AML's mpg Fuel Economy *label* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB11 V12 T:** projected 15 mpg city and 21 mpg highway
  xxxxx

	City mpg*	Highway mpg*
Mercedes Benz SL65	13	22
Bentley Continental GT	12	21
Ferrari F12	12	16

- **xxxxxxxx:** projected 16 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Ferrari California T	16	23
Mercedes Benz SL63	16	25
Lamborghini Huracan	14	21

- **xxxxxxxxx:** projected 16 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz AMG GT S	16	22
Audi R8 V10 S	14	22
Ferrari 488	15	22
Porsche 911 Turbo	19	24

- **xxxxxxxx:** projected 15 mpg city and 21 mpg highway

	City mpg*	Highway mpg*
xx	12	19
x	15	21
xxxx	14	21

The comparison data tables shown above (based on a comparison of 2017MY vehicles) indicate that Aston Martin is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect Aston Martin progressively introduced a ZF 8 speed automatic transmission starting in 2015MY that was planned to replace the 6 speed ZF on all V12 engined models apart from DB9. The approximately 4 year lead time to introduce such a change for Aston Martin was principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities. From 2019MY the 8 speed transmission is fitted to all DB11 derivatives, xxxxxx.

Starting 2014MY Aston Martin rolled out a new engine management system (EMS). This allowed AML to realize CO2 reductions through use of other technology enablers such as stop-start and potential hybridization. The introduction of a new EMS provided significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years. All models now benefit from the fitment of Bosch EMS.

The DB11 V12 T models benefit from a package of significant changes to the V12 engine fitted to this car that support a reduction in fuel use of c.10%. As part of this package the engine is downsized to 5.2 liters coupled with pressure charging, reduced exhaust backpressure, stop-start, cylinder de-activation, electric thermostat with coolant flow management and a change to electric/hydraulic power steering being included. While tooling costs are significant Aston Martin is committed to providing continuous fuel economy improvement from its volume sales products with powertrain improvements such as these becoming necessary to maintain this performance.

Xxxxx

Lastly, we are always investigating powerunit sourcing opportunities in order to increase our vehicle efficiency, again these are very long lead time changes due to contractual agreements with suppliers and vehicle architecture modification requirements. As with other major vehicle changes the decision to invest is a carefully considered one given the economic climate situation.
We expect to be able to improve our fleet fuel economy from making major powerunit sourcing decisions in the 2019MY timeframe.

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE</u>

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemakings that affected fuel economy are the FMVSS 214 side impact requirement, FMVSS 216 roof crush, FMVSS 226 Occupant Ejection Mitigation requirements and also Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. that must be considered as standard fit due to the economics of scale. These standards require increased deformation resistance to body and frame structures which translate into additional weight.

(G) THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is therefore minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low VMT (vehicle miles travelled) value per annum. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2020

Respectfully submitted,

May 2, 2017

Nick Lines
Vice President/Chief Planning Officer
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARDS AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2021 PASSENGER AUTOMOBILES

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

June 2018

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

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ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Passenger Car Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2021	xxx

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

2021MY CAFE									
Model	Year	Fleet	ActualMPG	Projected Sales	DriveSystem	TransClass	CurbWeight	TestWeight	MAFE Calculation
DB11 V12 Coupe	2017	IP	**22.8**	**xxx**	RWD	8 Speed Automatic	4150	4500	#VALUE!
DB11 V8 Coupe	2018	IP	**26.6**	**xxx**	RWD	8 Speed Automatic	3900	4250	#VALUE!
DB11 V8 Volante	2019	IP	**26.6**	**xxx**	RWD	8 Speed Automatic	4150	4500	#VALUE!
Vantage	2019	IP	**27.4**	**xxx**	RWD	8 Speed Automatic	3740	4000	#VALUE!
DBS HP Coupe	2019	IP	**xxx**	**xxx**	RWD	8 Speed Automatic	4150	4500	#VALUE!
DBS HP Volante	2021	IP	**xxx**	**xxx**	RWD	8 Speed Automatic	4400	4750	#VALUE!
			Sales Total	**xxx**				ΣMAFE	
								CAFE =	
2021MY Notes:									
**** Figures in red are estimates***							CAFE Request =		
This version dated May 2018									
**** No 'c' factor included***									

Note: Items in **red bold** are estimated values

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants								
MY	a	b	c	d	e	f	g	h
2021 PC	50.83	38.02	0.0004419	0.001555				

Model	Average Track		Wheelbase		x
					Footprint
	mm	inch	mm	inch	$feet^2$
DB11 V12 Coupe	1654.5	65.1	2805	110.4	50
DB11 V8 Coupe	1654.5	65.1	2805	110.4	50
DB11 V8 Volante	1654.5	65.1	2805	110.4	50
All Vantage	1654.5	65.1	2705	106.5	48.1
DBS HP Coupe/xxx	1654.5	65.1	2805	110.4	50

Predicted Sales Volumes	2021
DB11 V12	Xxx
All DB11 V8	xxx
All Vantage	Xxx
DBS HP Coupe	xxx
Total Vehicles	xxx

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

PC Calculation

Individual Model CAFE Targets				
DB11 V12	DB11 V8	Vantage	DBS	
x	x	x	x	

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2021 Aston Martin Passenger Car Fleet Standard	xxx

(A) BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production
1993 V8 (Virage) Vantage into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DB_AR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards of Prodrive.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business. Retirement of CEO Dr Ulrich Bez.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S. Appointment of new CEO Dr Andrew Palmer.
2015 Confirmation of the 2nd Century Aston Martin Product Plan by Dr Palmer. The latest Bond film 'Spectre' includes a special Bond vehicle in the form of DB10. (a concept car designed for this film)
2016 Launch of DB11, the successor to DB9 and the first of a line of new products as part of the 2nd Century plan
2017 Launch of the V8 engined version of DB11. Aston Martin takes possession of its second production facility at St Athan.
2018 Launch of New Vantage and DBS Superleggera models

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger automobiles in the second model year preceding this model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the second model year preceding this model year.

xxxxx
The AML total world-wide production of passenger automobiles (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. At the date of this petition AML does not own, is not controlled by, and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

December 2013 - Daimler AG, Aston Martin Holdings (UK) Ltd (AMH) and our shareholders entered into an Umbrella Agreement. This agreement describes the terms under which Daimler subscribed for a new class of D shares representing up to 5% of the equity of AML. As of the date of this petition Daimler holds 6% of these non voting D shares. Daimler is only represented on the AMH board by an observer. The Operational Agreements between Daimler and AML cover a future V8 engine and electrical and electronic components. As of the date of this petition the agreement with Daimler is extant and operating correctly for both parties.

AML is therefore eligible to request the exemption and alternate standard. [2] (ref. 49 CFR Part 525.7(c))

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Passenger Automobile Production
2011	3875
2012	3497
2013	3731
2014	3956
2015	3275
2016	3700
2017	5200
2018	X
2019	X
2020	X
2021	x

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2021MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is to be noted that all prior petitions back to 2008MY remain unanswered/unresolved.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2018.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN DB11 Coupe and Volante

This is the logical development, the Evolution, of current Aston Martin thinking.
This vehicle was designed to replace the outgoing DB9 model.
The vehicle builds on the VH architecture already proven with current Aston Martin vehicles and evolves it to provide new technical features, including performance and drivability improvements, space and comfort improvements and critical market positioning/customer perception improvements.

The platform of DB11 forms the backbone of all future models with the inclusion of revised and new powertrain and transmission options with increased performance in all respects. Improved environmental performance and a notable shift in fuel economy is part of this program, while at the same time maintaining the GT positioning of this car. Features planned include electric power steering (EPAS), electronically controlled thermostat, intelligent charging, variable duty oil pump, stop start and cylinder de-activation. Extended use of LED technology for lighting coupled with system efficiency improvements all add to vehicle fuel economy capability both on and off cycle.

Initially in 2017MY a single engine option will be available based on the current V12 6.0 liter engine but downsized to 5.2 liters and with the addition of mild turbocharging to achieve a significant uplift in torque coupled with a small power increase. This enables AML to realize a marked downspeeding of the engine while maintaining the GT performance and drivability aspects expected of a car in this segment.

For 2018MY DB11 added a smaller engined derivative. This is sourced from our technical partner and is an In-Vee ('hot vee') turbocharged V8 engine that is sub 4 liters in capacity. Its potential fuel economy is similar to that of the highly developed V12 sister engine while delivering a spirited driving proposition and using the same 8 speed auto transmission.
For 2019MY the DB11 gained a convertible version. This is available with the base V8 engine and transmission but has a folding soft top to create a true convertible – described as a 'Volante' in Aston Martin speak.

Both derivatives are available in a 2 door Coupe style, with the V8 also available as a convertible.

2021MY MSRP:	xxxx
Vehicle Curb mass:	3900 - 4150lbs (target)
Powertrain:	5.2 liter V12 turbo with 8 speed Auto Transmission
	4.0 liter V8 Turbo with 8 speed Auto Transmission

ASTON MARTIN New Vantage V8

This vehicle is designed to replace the V8 Vantage model that was available up to 2016MY.
The architecture designed for the DB11 model is utilized here with a shorter wheelbase to create a two seater sports car with a unique style that is a more focused sports car than DB11.
The powertrain uses the V8 engine sourced from our technical partner together with either the proven ZF 8 speed automatic transmission xxxxxx.
The vehicle makes use of the features designed into DB11 such as electric power steering (EPAS), electronically controlled thermostat, intelligent charging and stop start.

Available in a 2 door Coupe body style xxxxx

2021MY MSRP:	xxx
Vehicle Curb mass:	3850-4050lbs (target)
Powertrain:	4.0 liter V8 Turbo with 8 speed Auto xxxxxx

ASTON MARTIN DBS HP Coupe

This vehicle is designed as a successor to the Vanquish and Vanquish S models from 2017MY. It carries the name Superleggera which is a name which means 'Superlight' and has been used historically with AML products.
The architecture designed for the DB11 model is utilized here to create a performance version with admittedly a limited market appeal. Similar in many ways to DB11 but with a more aggressive aerodynamic profile but with similar wheelbase and interior package. There is an intent to include more carbon fiber composite in the vehicle structure with the aim to produce a lighter vehicle than DB11.
The powertrain uses the Twin Turbo V12 5.2 liter engine from DB11 but with a more aggressive calibration to provide more power and torque. This will be coupled with an uprated ZF 8 speed auto transmission with lightly amended gearing when compared to DB11 with the aim of remaining close to the DB11 fuel economy capability but coupled with a greater performance potential.
The vehicle makes use of the features designed into DB11 such as electric power steering (EPAS), electronically controlled thermostat, intelligent charging, stop start and cylinder de-activation.

Available in a 2 door Coupe xxxxxxxxx

2021MY MSRP:	xxxxxx
Vehicle Curb mass:	4150-4350lbs (target)
Powertrain:	5.2 liter V12 Turbo with 8 speed Auto

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; the grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).
The high-performance nature of AML product-lines and the resultant high-displacement engines generally limit what technology is available to improve fuel economy. In the short term, AML cannot change this performance-oriented nature of its cars. AML is now producing innovative sports cars using state-of-the-art design, powertrains and equipment. Further significant fuel economy improvement, however, is not possible, but AML recognizes the need to show continuous improvement in its fleet average fuel economy.

Significant AML fuel economy facts are as follows:

- AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB11 and the related New Vantage and DBS models, all major body and mechanical components are either aluminum, magnesium alloy, or advanced lightweight composite materials. These include the aluminum V12 and V8 powertrains, forged aluminum suspension, and aluminum-bodied dampers. Even the windscreen surround is cast aluminum, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that these cars are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fiber for lightness and improved transmission refinement. The DBS Coupe will follow on from the Vanquish model it replaces by making extensive use of carbon fiber composite material in the production of all its body panels. Carbon ceramic composite brakes will again feature on DBS models as a standard fitment, and as an option on New Vantage V8.
- All AML models incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminum extrusions, flow formed panels and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9 in 2004. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.

- AML has designed distinctive high performance sports cars requiring significant aerodynamic features for effective downforce and high speed stability -- our drag coefficients reflect this which are as follows:

DB11	New Vantage	DBS Coupe
xxx	xxx	xxx

- The weight (lbs)/horsepower ratios are as favorable as:

DBS Coupe	DB11 V12	New Vantage	DB11 V8
xxx	xxx	xxx	xxx

- Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. However for the DB11 and all subsequent models from 2017 an EPAS system is to be used as the development of a suitably performance oriented design removes the need for continued usage of an hydraulic set up – please refer to Section (E)2.c. for the proposal on steering systems.

- The 5.2 liter V12 and the 4.0 liter V8 Turbocharged engines will make use of friction modified engine oils, a 0W20 rating in the V12 and a 5W40 rating in the V8 is utilised. This type of oil is fast becoming the industry standard. Further reductions in viscosity are under investigation with 0W-00 being a possibility in the next few years. The previous Aston Martin V8 Vantage made use of a 10W60 synthetic oil, so the change to a 5W40 oil for the DB11 V8 and New Vantage V8 Turbo engine is a significant change to leverage fleet fuel economy improvements.
- Starting 2014 CY, AML phased introduction of the 8 speed ZF automatic transmission into it's V12 engined vehicles. This transmission allows for some significant engine downspeeding opportunities and optimized gear choice for given road speed. The DB11 uses an enhanced version of this 8 speed transmission coupled to a low loss higher ratio final drive to enable further downspeeding of the V12 engine, thereby enhancing its fuel economy capability. Both the New Vantage and the DBS Coupe will use versions of the 8 speed ZF transmission to continue this pattern of low engine speed for a given road speed.
- AML continues in its agreement with Bosch to provide all engine management functionality going forward from 2014MY. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement. All products in 2021MY make use of this Bosch engine management system.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of the global financial and technical uncertainty that has affected (and continues to affect) the automobile industry since 2008. During the financial crisis AML reduced production[3] and employee levels to counter the significant fall in sales. AML maintained its production levels for a number of years at around 3500 units but since the AML second century plan introduction those levels have started to climb but will peak at under 8000 units in 2021 due to factory capacity limits. Today the emissions issues surrounding some diesel vehicles from large volume manufacturers has created uncertainty in the marketplace, with some knock on effect to all car producers.
AML will pursue its second century plan regardless in order to maintain our market position.

Xxxxxx

As discussed, AML is now firmly in its second century plan period where a powerful effort to significantly replace our product line is nearing completion. This is being managed by AML's CEO Dr Andrew Palmer, who has been in office since October 2014. This renewal is seen as absolutely essential for the survival of Aston Martin and relies upon a program of new product deliveries which started late 2016CY. An amount of product diversification will be the enabler to meeting market demand for ever reducing fossil fuel usage in motor vehicles. The expected result of this diversification is AML becoming financially sustainable without outside assistance in the medium term leading to a long term capability to renew product on a more timely basis than has been the case in the past decade.

[3] 2009 production cut by 60%, as compared to 2008 production.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

Table 2a: Vehicle Specifications – DB11 V12 and V8

Vehicle	Model Line	
Description	***DB11 V12***	***DB11 V8***
Body Variants	*2dr Coupe*	*2dr Coupe/ 2dr Convertible*
Frontal area (ft^2)	*23.2*	*22.9*
Dimensions (inches) Height	*50*	*50*
Width	*85*	*85*
Length	*186.6*	*186.6*
Wheelbase	*110.4*	*110.4*
Front Track	*65.5*	*65.5*
Rear Track	*64.8*	*64.8*
Curb Weight (lbs)	*4150*	*3900-4150*
Equivalent Test Weight (lbs)	*4500*	*4250/4500*
Seating Positions	*2+2*	*2+2*
Interior Volume Index (ft^3)	*81*	*81*
Engine Type	*V12 T*	*V8 T*
Working Principle	*Four stroke, Otto cycle, turbocharged*	*Four stroke, Otto cycle, turbocharged*
Engine Displacement (Litres)	*5.2*	*4.0*
Engine Max Power (hp)	*640*	*503*
Fuel Metering System	*Electronically controlled sequential fuel injection*	
Transmission	*8 speed automatic*	*8 speed automatic*
Final Drive Ratio	*2.703*	*2.703*
Emission Control System	*Three-way catalysts with heated O2 sensors, secondary air*	*Three-way catalysts with heated O2 sensors*
Road Load Horsepower†	*14.6*	*14.6*
Radial Tires (std) Brand	*Bridgestone*	*Bridgestone*
Size – Front	*255/40 R20*	*255/40 R20*
Size – Rear	*295/35 R20*	*295/35 R20*
Low Friction Lubricants (Type)	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	*Engine: 5W40 Petronas Syntium 7000 or Mobil 1*
N/V	*22.2*	*22.2*
Fuel Economy Values	*22.8*	*26.6*

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

[Table 2b: Vehicle Specifications – New Vantage V8 and DBS HP

Vehicle	Model Line	
Description	***Vantage V8***	***DBS HP***
Body Variants	*2dr Coupe xxx*	*2dr Coupe xxxx*
Frontal area (ft^2)	*23.1*	*23.2*
Dimensions (inches) Height	*50*	*50*
Width	*85*	*85*
Length	*180*	*186.6*
Wheelbase	*106.5*	*110.4*
Front Track	*65.5*	*65.5*
Rear Track	*64.8*	*64.8*
Curb Weight (lbs)	*3850*	*4150*
Equivalent Test Weight (lbs)	*4000*	*4500*
Seating Positions	*2*	*2 or 2+2*
Interior Volume Index (ft^3)	*N/A*	*81*
Engine Type	*V8 T*	*V12 T*
Working Principle	*Four stroke, Otto cycle, turbocharged*	*Four stroke, Otto cycle, turbocharged*
Engine Displacement (Litres)	*4.0*	*5.2*
Engine Max Power (hp)	*503*	*715*
Fuel Metering System	*Electronically controlled sequential fuel injection*	
Transmission	*8 speed automatic/7 speed manual*	*8 speed automatic*
Final Drive Ratio	*2.93*	*2.93*
Emission Control System	*Three-way catalysts heated O2 sensors*	*Three-way catalysts heated O2 sensors/secondary air*
Road Load Horsepower†	*14.6*	*14.6*
Radial Tires (std) Brand	*Pirelli*	*Pirelli*
Size – Front	*255/40 R20*	*265/35 R21*
Size – Rear	*295/35 R20*	*305/30 R21*
Low Friction Lubricants (Type)	*Engine: 5W40 Petronas Syntium 7000 or Mobil 1*	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*
N/V	*24.1*	*23*
Fuel Economy Values	*27.4/**xxx/xxx***	***xxx***

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. Starting in 2014CY with the actions designed for introduction from 2017MY, AML is making a significant investment in new product and new powertrain technology. The economic practicabilities are such that making this investment is now necessary to move forward with technologies (in Aston Martin products) that are industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with multi-cylinder large capacity power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, represented considerable uncertainty given the nature of AML's brand, history and extremely low production volumes. As such AML did not move forward with any new market area other than the market area AML is most well known for and the area it understands. NHTSA has recognized in the past, "producing additional models … is not possible since … the unique market sector served by [the manufacturer] preclude significant changes …." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale continues to apply.

AML is therefore not in a position to manipulate model mix. There is very limited opportunity for CAFE changes based upon marketing actions. Producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. [4]

[4] One such marketing action was the decision to proceed with a V12 Rapide vehicle. This was in very large part based on the fact that by starting with the V12 DB9 platform, it could be transformed into a four door vehicle without enormous development outlay.

The projected US sales mix of the Aston Martin models for MY 2021 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2013 to 2020, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 **	Vanquish/ DBS HP (2019)	DB11 V12 and V8	Rapide S	V8 Vantage**/ New Vantage (2019)	V12 Vantage S**	Production Capacity $
2013	128	-		-	236	-	Up to 8000
2014	335	480		235	222	-	Up to 8000
2015	270	163		138	319	229	Up to 8000
2016	181	172		102	204	19	Up to 8000
2017	-	54	700	79	-	147	Up to 8000
2018*	-					-	Up to 8000
2019*	-					-	Up to 8000
2020*							Up to 8000
2021*							Up to 8000

Note: * = projected
= to be confirmed

** 2015 and 2016MY were volumes subject to the sales limits contained in the AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032
$ - correction over previous petitions, the Gaydon site has an 8000 unit p.a. planning limit (declared Jan 2018)

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some … configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This analysis continues to apply to AML as we pursue high luxury sector opportunities .

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global instability, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with recent changes to engine management and transmission technology realizing a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here. However in common with Ferrari, Rolls Royce, Mclaren etc, Aston Martin is now moving toward downsizing and pressure charging to maintain the performance aspects of our car designs and the feature levels expected of our customer base, while creating the ability to significantly improve our fleet fuel economy.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This is supported by the fact that AML's mpg Fuel Economy *label* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB11 V12 T: & DBS HP** 15 mpg city and 21 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz SL65	13	22
Bentley Continental GT	12	21
Ferrari 812 Superfast	12	16

- **DB11 V8 T:** 18 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Ferrari Portofino	16	22
Mercedes Benz SL63	16	25
Lamborghini Huracan	14	21

- **Vantage V8:** 18 mpg city and 25 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz AMG GT S	16	22
Lamborghini Huracan	14	21
Ferrari 488	15	22
Porsche 911 Turbo	19	24

The comparison data tables shown above (based on a comparison of 2018/19MY vehicles) indicate that Aston Martin is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))**

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect Aston Martin progressively introduced a ZF 8 speed automatic transmission starting in 2015MY that was planned to replace the 6 speed ZF on all V12 engined models apart from DB9. The approximately 4 year lead time to introduce such a change for Aston Martin was principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities. From 2019MY the 8 speed transmission is fitted to all DB11 derivatives, New Vantage V8 and DBS HP models.

Starting 2014MY Aston Martin rolled out a new engine management system (EMS). This allowed AML to realize CO2 reductions through use of other technology enablers such as stop-start and potential hybridization. The introduction of a new EMS provided significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years. All models now benefit from the fitment of Bosch EMS.

The DB11 V12 T models benefit from a package of significant changes to the V12 engine fitted to this car that support a reduction in fuel use of c.14%. As part of this package the engine is downsized to 5.2 liters coupled with pressure charging, reduced exhaust backpressure, stop-start, cylinder de-activation, electric thermostat with coolant flow management and a change to electric/hydraulic power steering being included. While tooling costs are significant Aston Martin is committed to providing continuous fuel economy improvement from its volume sales products with powertrain improvements such as these becoming necessary to maintain this performance.

The DB11 V8 T and Vantage models make use of a 4.0 liter V8 pressure charged engine supplied by our technical partner and includes features that make it a mark of efficiency in much the same way as the V12 T. Features such as the hot vee turbocharger configuration, specific power output (this engine replaces a powerunit much larger in swept volume) and the in vehicle package demonstrates this efficiency. Despite its increased power over the previous AML V8 this vehicle is also capable of delivering a c.20% fuel economy improvement. From its introduction date at 2018MY this vehicle is fitted with a ZF 8 speed automatic transmission.

Lastly, we are always investigating powerunit sourcing opportunities in order to increase our vehicle efficiency, again these are very long lead time changes due to contractual agreements with suppliers and vehicle architecture modification requirements. As with other major vehicle changes the decision to invest is a carefully considered one given the economic climate situation.
We expect to be able to improve our fleet fuel economy from making major powerunit sourcing decisions in the 2019MY- 2022MY timeframe.

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE</u>

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemakings that affected fuel economy are the FMVSS 214 side impact requirement, FMVSS 216 roof crush, FMVSS 226 Occupant Ejection Mitigation requirements and also Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. that must be considered as standard fit due to the economics of scale. These standards require increased deformation resistance to body and frame structures which translate into additional weight.

(G) THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is therefore minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low VMT (vehicle miles travelled) value per annum. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2021

Respectfully submitted,

June 25, 2018

Nick Lines
Vice President/Chief Planning Officer
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARDS AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2022 PASSENGER AUTOMOBILES

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

May 2019

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

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ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Passenger Car Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE [1]
2022	XXXmpg

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

2022MY CAFE									
Model	Year	Fleet	ActualMPG	Projected Sales	DriveSystem	TransClass	CurbWeight	TestWeight	MAFE Calculation
DB11 V12 AMR	2022	IP			RWD	8 Speed Automatic	4150	4500	
DB11 V8 Coupe	2022	IP			RWD	8 Speed Automatic	3900	4500	
DB11 V8 Volante	2022	IP			RWD	8 Speed Automatic	4150	4500	
Vantage	2022	IP			RWD	8 Speed Automatic	3740	4000	
Vantage Roadster	2022	IP			RWD	8 Speed Automatic	3950	4250	
	2022	IP			RWD		3740	4000	
	2022	IP			RWD		3950	4250	
DBS Coupe	2022	IP			RWD	8 Speed Automatic	4150	4500	
DBS Volante	2022	IP			RWD	8 Speed Automatic	4300	4500	
XXX	2022	IP							
			Sales Total	**XXX**				ΣMAFE	
								CAFE =	**XXX**
2022MY Notes:									
**** Figures in red are estimates***							CAFE Request =	XXX	
This version dated April 2019									
**** No 'c' factor included***									

Note: Items in **red bold** are estimated values

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants								
MY	a	b	c	d	e	f	g	h
2022 PC	53.21	39.79	0.0004227	0.001463				

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	feet ^{2}
DB11 V12 AMR	1654.5	65.1	2805	110.4	50
DB11 V8 Coupe	1654.5	65.1	2805	110.4	50
DB11 V8 Volante	1654.5	65.1	2805	110.4	50
All Vantage	1654.5	65.1	2705	106.5	48.2
DBS Coupe/Volante	1654.5	65.1	2805	110.4	50
XXX	XXX	XXX	XXX	XXX	XXX

Predicted Sales Volumes	2022
DB11 V12 AMR	
All DB11 V8	
All Vantage	
All DBS Coupe	
RB003	
Total Vehicles	XXX

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Passenger Automobile Calculation

Individual Model CAFE Targets				
DB11 V12 AMR	All DB11 V8	All Vantage	All DBS	XXX
44.25	44.25	45.88	44.25	XXX

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2022 Aston Martin Passenger Car Fleet Standard	XXX mpg

(A) **BACKGROUND**

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981 Victor Gauntlett and Pace Petroleum acquire AML
1983 Victor Gauntlett is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production
1993 V8 (Virage) Vantage into production
1994 Ford Motor Company acquires 100% shareholding. DB7 goes into production at Bloxham.
1996 DB7 Volante into production at Bloxham.
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DB_AR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards of Prodrive.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business. Retirement of CEO Dr Ulrich Bez.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S. Appointment of new CEO Dr Andrew Palmer.
2015 Confirmation of the 2nd Century Aston Martin Product Plan by Dr Palmer. The latest Bond film 'Spectre' includes a special Bond vehicle in the form of DB10. (a concept car designed for this film)
2016 Launch of DB11, the successor to DB9 and the first of a line of new products as part of the 2nd Century plan
2017 Launch of the V8 engined version of DB11. Aston Martin takes possession of its second production facility at St Athan.
2018 Launch of New Vantage and DBS Superleggera models, AML becomes a publicly traded company.

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger automobiles in the second model year preceding this model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the second model year preceding this model year.

AML is therefore eligible to request the exemption and alternate standard. [2] (ref. 49 CFR Part 525.7(c))

Of note: AML will be producing an LDT2 vehicle from the middle of 2020CY. This vehicle is not classified as a passenger automobile according to the wording contained in Part 525.5 'Limitation on Eligibility' and is therefore not able to be included in this petition or the produced volumes of this LDT2 being included in the AML passenger automobile production volumes.
Separately, this LDT2 vehicle will be subject to the applicable CAFE standard for the category of vehicle and its footprint without the possibility of exemption petition, and subsequently will become eligible for CAFE fines if standards are not met.

The AML total world-wide production of passenger automobiles (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. At the date of this petition AML does not own, is not controlled by, and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

December 2013 - Daimler AG, Aston Martin Holdings (UK) Ltd (AMH) and our shareholders entered into an Umbrella Agreement. Under this agreement Daimler agreed to supply engine and electrical materiel to AML, this in turn gave them subscription to D class shares representing up to 5% of the equity of AML. Daimler was only represented on the AMH board by an observer.
October 2018 – following the issuance of public shares the Daimler AG subscription changed to 4.18% in Ordinary shares in the newly formed Aston Martin Lagonda Global Holdings plc. This gives them voting rights in Aston Martin Lagonda Global Holdings plc operating decisions.
Aston Martin Lagonda Ltd is wholly owned by Aston Martin Lagonda Global Holdings plc.

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Passenger Automobile Production
2011	3875
2012	3497
2013	3731
2014	3956
2015	3275
2016	3700
2017	5211
2018	6385
2019	
2020	
2021	
2022	

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).

This 2022MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is to be noted that all prior petitions back to 2008MY remain unanswered/unresolved.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2021.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN DB11 AMR V12, V8 Coupe and V8 Volante

As part of the Aston Martin Second Century Plan this platform provided an entirely new base for a range of vehicles, the first of which was DB11. For this model year the DB11 V12 gains a developed version of the 5.2 liter V12 to enable the car to meet the Tier 3 and LEV 3 emissions regulations.
DB11 was designed to replace the outgoing DB9 model.
The vehicle built on the VH architecture already proven with previous DB9 Aston Martin vehicles and evolved it to provide new technical features, including performance and drivability improvements, space and comfort improvements and critical market positioning/customer perception improvements.

As noted this platform forms the backbone of all future models with the inclusion of revised and new powertrain and transmission options with increased performance in all respects. Improved environmental performance and a notable shift in fuel economy is part of this program, while at the same time maintaining the GT positioning of this car. Features planned include electric power steering (EPAS), electronically controlled thermostat, intelligent charging, variable duty oil pump, stop start and cylinder de-activation. Extended use of LED technology for lighting coupled with system efficiency improvements all add to vehicle fuel economy capability both on and off cycle.

Initially in 2017MY a single engine option was available for this car, ased on the previous 6.0 liter V12 engine but downsized to 5.2 liters and with the addition of mild turbocharging to achieve a significant uplift in torque coupled with a small power increase. This enables AML to realize a marked downspeeding of the engine while maintaining the GT performance and drivability aspects expected of a car in this segment.

For 2018MY DB11 added a smaller engined derivative. This was sourced from our technical partner and is an In-Vee ('hot vee') turbocharged V8 engine that is sub 4 liters in capacity. Its potential fuel economy is improved over that of the highly developed V12 sister engine while delivering a spirited driving proposition and using the same 8 speed auto transmission.
For 2019MY the DB11 gained a convertible version. This is available with the base V8 engine and transmission but has a folding soft top to create a true convertible – described as a 'Volante' in Aston Martin speak.

Now in 2022MY DB11 XXX to provide capability against Tier 3 and LEV 3 emissions standards with potential for further fuel economy gains.

Both derivatives are available in a 2 door Coupe style, with the V8 also available as a convertible.

2022MY MSRP:	$XXX
Vehicle Curb mass:	3900 - 4150lbs
Powertrain:	5.2 liter V12 turbo with 8 speed Auto Transmission
	4.0 liter V8 Turbo with 8 speed Auto Transmission

ASTON MARTIN Vantage V8

This vehicle was designed to replace the previous V8 Vantage model that was available up to 2016MY.
The architecture designed for the DB11 model is utilized here with a shorter wheelbase to create a two seater sports car with a unique style that is a more focused sports car than DB11.
The powertrain used the V8 engine sourced from our technical partner together with either the proven ZF 8 speed automatic transmission or a 7 speed twin clutch manual transmission.
The vehicle made use of the features designed into DB11 such as electric power steering (EPAS), electronically controlled thermostat, intelligent charging and stop start.

Available in a 2 door Coupe body style plus a convertible (known as 'Roadster')

2022MY MSRP:	$XXX
Vehicle Curb mass:	3850-4050lbs (target)
Powertrain:	4.0 liter V8 Turbo with 8 speed XXX

ASTON MARTIN DBS Superlegerra

This vehicle is designed as a successor to the Vanquish S models from 2017MY. It carries the name Superleggera, a name which means 'Superlight' and has been used historically with AML products.
Again the DB11 platform used here created a performance version with admittedly a limited market appeal. Similar in many ways to DB11 with a more aggressive aerodynamic profile but with similar wheelbase and interior package. The body structure incorporates more carbon fiber composite than in DB11 with the aim of producing a lighter vehicle than DB11.
The powertrain used the Twin Turbo V12 5.2 liter engine from DB11 but with a more aggressive calibration to provide more power and torque. This will be coupled with an uprated ZF 8 speed auto transmission with lightly amended gearing when compared to DB11 with the aim of remaining close to the DB11 fuel economy capability but coupled with a greater performance potential.

The vehicle makes use of the features designed into DB11 such as electric power steering (EPAS), electronically controlled thermostat, intelligent charging, stop start and cylinder de-activation.

Available in a 2 door Coupe and Convertible ' Volante' body styles.

2022MY MSRP:	$XXX
Vehicle Curb mass:	4150-4350lbs (target)
Powertrain:	5.2 liter V12 Turbo with 8 speed Auto

ASTON MARTIN XXX

Xxxx

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; the grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant use of high capacity engines generally limit what technology is available to improve fuel economy. AML cannot change the performance-oriented DNA of its product offerings. AML continues to produce innovative sports cars using state-of-the-art design, powertrains and equipment. Further <u>significant</u> fuel economy improvement using high capacity gasoline powertrains is not possible without a shift to hybridization and/or a supplement to its fleet of full battery electric vehicle carlines. AML recognizes the need to show continuous improvement in its fleet average fuel economy and must therefore, in the medium term, adopt these new technologies.
AML will move with the market for high luxury sector (HLS) automobiles and develop levels of electrification and hybridization in existing models as well as dedicated new models with these technologies but is ultimately limited by access to technology at reasonable cost.

Significant AML fuel economy facts are as follows:

- AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB11 and the related Vantage and DBS models, all major body and mechanical components are either aluminum, magnesium alloy, or advanced lightweight composite materials. These include the aluminum V12 and V8 powertrains, forged aluminum suspension, and aluminum-bodied dampers. Even the windscreen surround is cast aluminum, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that these cars are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fiber for lightness and improved transmission refinement. The DBS Coupe will follow on from the Vanquish model it replaces by making extensive use of carbon fiber composite material in the production of all its body panels. Carbon ceramic composite brakes will again feature on DBS models as a standard fitment, and as an option on New Vantage V8.
- All AML models incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminum extrusions, flow formed panels and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9 in 2004. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.
- XXX
  XXX
- AML has designed distinctive high performance sports cars requiring significant aerodynamic features for effective downforce and high speed stability -- our drag coefficients reflect this which are as follows:

DB11	Vantage	DBS	XXX
0.37	0.36	0.36	tba

-
- The weight (lbs)/horsepower ratios are as favorable as:

DBS	DB11 AMR V12	Vantage	DB11 V8	XXX

- Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. However for the DB11 platform models from 2017 an EPAS system was used as the development of a suitably performance oriented design removed the need for continued usage of an hydraulic set up – please refer to Section (E)2.c. for the proposal on steering systems.
- The 5.2 liter V12 and the 4.0 liter V8 Turbocharged engines make use of friction modified engine oils, a 0W20 rating in the V12 and a 0W40 rating in the V8 is utilised. This type of oil is fast becoming the industry standard. Further reductions in viscosity are under investigation with 0W-00 being a possibility. The previous Aston Martin V8 Vantage made use of a 10W60 synthetic oil, so the change to a 0W40 oil for the DB11 V8 and Vantage V8 Turbo engine is a significant change to leverage fleet fuel economy improvements.
- Starting 2014 CY, AML phased introduction of the 8 speed ZF automatic transmission into it's V12 engined vehicles. This transmission allows for some significant engine downspeeding opportunities and optimized gear choice for given road speed. The DB11 platform vehicles use an enhanced version of this 8 speed transmission coupled to a low loss higher ratio final drive to enable further downspeeding of the V12 engine, thereby enhancing its fuel economy capability. Both the Vantage and the DBS carlines use versions of the 8 speed ZF transmission to continue this pattern of low engine speed for a given road speed.
- AML continues in its agreement with Bosch to provide all engine management functionality going forward. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement. All products in 2022MY make use of this Bosch engine management system.
- XXX
-

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of global financial and technical uncertainty that has affected (and continues to affect) the automobile industry. During the financial crisis through 2008 AML reduced production[3] and employee levels to counter the significant fall in sales. AML maintained its passenger automobile production levels for a number of years at around 3500 units, but since the AML second century plan was introduced those levels have started to climb but will peak at under 8000 units in 2022 due to factory capacity limits. Today the emissions issues surrounding some diesel vehicles from large volume manufacturers has created uncertainty in the marketplace, with some knock on effect to all car producers.
AML will pursue its second century plan regardless in order to maintain its market position.
As of the date of this petition there are proposals for the introduction of UK-US tariffs on completed vehicle imports that would affect the attractiveness of AML vehicles produced for sale in the USA. The levels of tariff in discussion are likely to have to be passed on in part or whole to the end customer and therefore produce uncertainty with regard to competitiveness in market.

AML will start to produce an LDT vehicle (which is outside of this petition) in 2020CY at a separate manufacturing facility in order to further diversify its offering, but also to meet customer expectation of this part of the high luxury sector for such a vehicle type. This is essential if AML are to compete with the other HLS manufacturers who are currently offering an SUV.

As discussed, AML is now firmly in its second century plan period where a powerful effort to significantly replace our product line is nearing completion. This is being managed by AML's CEO Dr Andrew Palmer, who has been in office since October 2014. This renewal is seen as absolutely essential for the survival of Aston Martin and relies upon a program of new product deliveries which started late 2016CY. An amount of product diversification will be the enabler to meeting market demand for ever reducing fossil fuel usage in motor vehicles. The expected result of this diversification is AML becoming financially sustainable without outside assistance in the medium term leading to a long term capability to renew product on a more timely basis than has been the case in the past decade.

[3] 2009 production cut by 60%, as compared to 2008 production.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

Table 2a: Vehicle Specifications – DB11 V12 and V8

Vehicle	Model Line	
Description	***DB11 AMR V12***	***DB11 V8***
Body Variants	*2dr Coupe*	*2dr Coupe/ 2dr Convertible*
Frontal area (ft^2)	*23.2*	*22.9*
Dimensions (inches) Height	*50*	*50*
Width	*85*	*85*
Length	*186.6*	*186.6*
Wheelbase	*110.4*	*110.4*
Front Track	*65.5*	*65.5*
Rear Track	*64.8*	*64.8*
Curb Weight (lbs)	*4150*	*3900-4150*
Equivalent Test Weight (lbs)	*4500*	*4500*
Seating Positions	*2+2*	*2+2*
Interior Volume Index (ft^3)	*81*	*81*
Engine Type	*V12 T*	*V8 T*
Working Principle	*Four stroke, Otto cycle, turbocharged*	*Four stroke, Otto cycle, turbocharged*
Engine Displacement (Litres)	*5.2*	*4.0*
Engine Max Power (hp)	*XXX*	*XXX*
Fuel Metering System	*Electronically controlled sequential fuel injection*	
Transmission	*8 speed automatic*	*8 speed automatic*
Final Drive Ratio	*2.703*	*2.703*
Emission Control System	*Three-way catalysts with heated O2 sensors, secondary air*	*Three-way catalysts with heated O2 sensors*
Road Load Horsepower†	*14.6*	*14.6*
Radial Tires (std) Brand	*Bridgestone*	*Bridgestone*
Size – Front	*255/40 R20*	*255/40 R20*
Size – Rear	*295/35 R20*	*295/35 R20*
Low Friction Lubricants (Type)	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	*Engine: 0W40 Petronas Syntium 7000*
N/V	*22.2*	*22.2*
Fuel Economy Values	*XXX*	*XXX*

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

[Table 2b: Vehicle Specifications – New Vantage V8 and DBS HP

Vehicle	Model Line		
Description	***Vantage V8***	***DBS***	***XXX***
Body Variants	*2dr Coupe/Roadster*	*2dr Coupe/Volante*	*XXX*
Frontal area (ft^2)	*23.1*	*23.2*	
Dimensions (inches) Height	*50*	*50*	
Width	*85*	*85*	
Length	*180*	*186.6*	
Wheelbase	*106.5*	*110.4*	
Front Track	*65.5*	*65.5*	
Rear Track	*64.8*	*64.8*	
Curb Weight (lbs)	*3850*	*4150*	
Equivalent Test Weight (lbs)	*4000/4250*	*4500*	
Seating Positions	*2*	*2 or 2+2*	
Interior Volume Index (ft^3)	*N/A*	*81*	
Engine Type	*V8 T*	*V12 T*	
Working Principle	*Four stroke, Otto cycle, turbocharged*	*Four stroke, Otto cycle, turbocharged*	
Engine Displacement (Litres)	*4.0*	*5.2*	
Engine Max Power (hp)	*XXX*	*XXX*	
Fuel Metering System	*Electronically controlled sequential fuel injection*		
Transmission	*8 speed automatic/7 speed manual*	*8 speed automatic*	
Final Drive Ratio	*2.93*	*2.93*	
Emission Control System	*Three-way catalysts heated O2 sensors*	*Three-way catalysts heated O2 sensors/secondary air*	
Road Load Horsepower†	*14.6*	*14.6*	
Radial Tires (std) Brand	*Pirelli*	*Pirelli*	
Size – Front	*255/40 R20*	*265/35 R21*	
Size – Rear	*295/35 R20*	*305/30 R21*	
Low Friction Lubricants (Type)	*Engine: 0W40 Petronas Syntium 7000*	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	
N/V	*24.1*	*23*	
Fuel Economy Values	***XXX***	***XXX***	

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. AML is now well into its second century product plan. Stage 1 has been completed where the product portfolio is stabilized. Stage 2 is the renewal plan followed by the expansion of the brand into an SUV and the move towards electrification. AML is making a significant investment in new product with new technologies, including new powertrain technologies. The economic practicabilities are such that making this investment is now necessary to move forward with technologies (in Aston Martin products) that are largely becoming industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with multi-cylinder medium/large capacity power units. It does not yet have a low-powered vehicle whose sales could offset those of the high performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, would also represent a move into considerably uncertain territory, given the nature of AML's brand, history and extremely low production volumes. As such AML has not moved forward with any new market area other than the market area AML is most well known for and the area it understands. NHTSA has recognized in the past, "producing additional models … is not possible since … the unique market sector served by [the manufacturer] preclude significant changes …." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale continues to apply.

AML is therefore not in a position to manipulate model mix through marketing actions. Producing more fuel efficient models using new technologies and not trying to make existing configurations significantly more fuel efficient is the way forward for AML.

The projected US sales mix of the Aston Martin models for MY 2022 is set forth below in Table 3, which shows the most fuel efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2015 to 2022, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand						
	DB9 **	Vanquish/ DBS HP (2019)	DB11 V12 and V8	Rapide S	V8 Vantage**/ New Vantage (2019)	V12 Vantage S**/ XXX	Production Capacity $
2015	270	163		138	319	229	Up to 8000
2016	181	172		102	204	19	Up to 8000
2017	-	54	700	79	-	147	Up to 8000
2018	-	172	566	0	-	-	Up to 8000
2019*	-	260	1075	-	740	-	Up to 8000
2020*		80	560		1320		Up to 8000
2021*		345	640		1340		Up to 8000
2022*		225	635		980	100	Up to 8000

Note: * = projected
= to be confirmed

** 2015 and 2016MY were volumes subject to the sales limits contained in the AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032

$ - correction over previous petitions, the Gaydon site has an 8000 unit p.a. planning limit (declared Jan 2018)

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of Aston Martin Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This analysis continues to apply to AML as we pursue high luxury sector opportunities .

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global instability, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with changes to engine management and transmission technology realizing a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here. However in common with Ferrari, Rolls Royce, Mclaren etc, Aston Martin is now moving toward downsizing and pressure charging to maintain the performance aspects of our car designs and the feature levels expected of our customer base, while creating the ability to significantly improve our fleet fuel economy.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This is supported by the fact that AML's mpg Fuel Economy *label* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB11 V12 T: & DBS** 14/15 mpg city and 22 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz S65 Coupe	13	21
Rolls Royce Wraith	12	18
Ferrari 812 Superfast	12	16

- **DB11 V8 T:** 18 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Ferrari Portofino	16	22
Mercedes Benz SL63	15	23
Lamborghini Huracan	13	18

- **Vantage V8:** 18 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz AMG GT S	16	22
Ferrari 488	15	22
Porsche 911 Turbo	19	24

The comparison data tables shown above (based on a comparison of 2018/19MY vehicles) indicate that Aston Martin is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Martin Vehicles (per 49 CFR 525.7(g)(5))

Aston Martin is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect Aston Martin progressively introduced a ZF 8 speed automatic transmission starting in 2015MY that was planned to replace the 6 speed ZF on all V12 engined models apart from DB9. The approximately 4 year lead time to introduce such a change for Aston Martin was principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities. From 2019MY the 8 speed transmission is fitted to all DB11 derivatives, New Vantage V8 and DBS models.

Starting 2014MY Aston Martin rolled out a new engine management system (EMS). This allowed AML to realize CO2 reductions through use of other technology enablers such as stop-start and potential hybridization. The introduction of a new EMS provided significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years. All models now benefit from the fitment of Bosch EMS.

The DB11 V12 T models benefit from a package of significant changes to the V12 engine fitted to this car that support a reduction in fuel use of c.14%. As part of this package the engine is downsized to 5.2 liters coupled with pressure charging, reduced exhaust backpressure, stop-start, cylinder de-activation, electric thermostat with coolant flow management and a change to electric/hydraulic power steering being included. While tooling costs are significant Aston Martin is committed to providing continuous fuel economy improvement from its volume sales products with powertrain improvements such as these becoming necessary to maintain this performance.

The DB11 V8 T and Vantage models make use of a 4.0 liter V8 pressure charged engine supplied by our technical partner and includes features that make it a mark of efficiency in much the same way as the V12 T. Features such as the hot vee turbocharger configuration, specific power output (this engine replaces a powerunit much larger in swept volume) and the in vehicle package demonstrates this efficiency. Despite its increased power over the previous AML V8 this vehicle is also capable of delivering a c.20% fuel economy improvement. From its introduction date at 2018MY this vehicle was fitted with a ZF 8 speed automatic transmission.

XXXXXXXX

(F) OTHER FEDERAL STANDARDS THAT RESTRICT ASTON MARTIN'S MAXIMUM FEASIBLE CAFE

1. Starting with MY 2015, AML will be filing a petition with EPA requesting **a company-specific GHG standard**. This new EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemakings that affected fuel economy are the FMVSS 214 side impact requirement, FMVSS 216 roof crush, FMVSS 226 Occupant Ejection Mitigation requirements and also Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. that must be considered as standard fit due to the economics of scale. These standards require increased deformation resistance to body and frame structures which translate into additional weight.

(G) THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is therefore minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low VMT (vehicle miles travelled) value per annum. AMLs current understanding is that VMT is in the order of 2500 miles per annum. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2022

Respectfully submitted,

May 15, 2019

Nikki Rimmington
Vice President/Chief Planning Officer
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

PETITION OF ASTON MARTIN LAGONDA LIMITED FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY (CAFE) STANDARDS AND FOR ESTABLISHMENT OF AN ALTERNATIVE FUEL ECONOMY STANDARD FOR MODEL YEAR 2023 PASSENGER AUTOMOBILES

ASTON MARTIN

Aston Martin Lagonda Limited
Banbury Road
Gaydon
Warwickshire
CV35 0DB
England

August 2020

THE APPLICANT

ASTON MARTIN LAGONDA LIMITED (hereafter referred to as AML) is a UK company located at Gaydon, Warwickshire, England. AML is one of the world's leading sports car & SUV manufacturers. Aston Martin was founded by Robert Bamford and Lionel Martin over 100 years ago, the company has produced some of the most iconic automobiles of all time. It does not control and is not under common control with another motor vehicle manufacturer.

See manufacturers website located at www.astonmartin.com

CONTENTS

ALTERNATIVE STANDARDS REQUESTED (ref. 49 CFR Part 525.7(g)

AML requests alternative standards equal to the average fuel economies set forth below:

Model Year	Passenger Car Standard Requested (Unadjusted AFE under 40 CFR 600.510CAFE) [1]
2023	XXXmpg

CAFE CALCULATIONS (ref. 49 CFR Part 525.7(f)

2023MY CAFE									
Model	Year	Fleet	ActualMPG	Projected Sales	DriveSystem	TransClass	CurbWeight	TestWeight	MAFE Calculation
DB11 V12 AMR	2023	IP			RWD	8 Speed Automatic	4150	4500	#DIV/0!
DB11 V8 Coupe	2023	IP			RWD	8 Speed Automatic	3900	4500	#DIV/0!
DB11 V8 Volante	2023	IP			RWD	8 Speed Automatic	4150	4500	#DIV/0!
Vantage	2023	IP			RWD	8 Speed Automatic	3740	4000	#DIV/0!
Vantage Roadster	2023	IP			RWD	8 Speed Automatic	3850	4250	#DIV/0!
Vantage Man	2023	IP			RWD	7 Speed Manual	3580	3875	#DIV/0!
DBS Coupe	2022	IP			RWD	8 Speed Automatic	4150	4500	#DIV/0!
DBS Volante	2022	IP			RWD	8 Speed Automatic	4300	4500	#DIV/0!
			Sales Total	**0**				ΣMAFE	#DIV/0!
								CAFE =	**#DIV/0!**
2023MY Notes:									
**** Figures in red are estimates***							CAFE Request =		
This version dated July 2020									
**** No 'c' factor included***									

Note: Items in **red bold** are estimated values

[1] The requested standard is unadjusted AFE. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.2mpg less than that forecasted in order to allow for potential development and production variation – something particularly difficult to forecast given the financial uncertainty that persists within the auto industry.

AML CALCULATED CAFE STANDARD

Data

Constants								
MY	a	b	c	d	e	f	g	h
2023 PC	55.71	41.64	0.0004043	0.001375				

Model	Average Track		Wheelbase		x Footprint
	mm	inch	mm	inch	feet²
All DB11 & DBS models	1654.5	65.1	2805	110.4	50
All Vantage models	1654.5	65.1	2705	106.5	48.2

Predicted Sales Volumes	2023
DB11 V12 AMR	
All DB11 V8	
All Vantage	
All DBS	
Total Vehicles	xxxx

Calculation

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Passenger Automobile Calculation

Individual Model CAFE Footprint based Targets				
All DB11 and DBS models	All Vantage models			
46.32	48.03			

$$CAFE_{required} = \frac{\sum_i SALES_i}{\sum_i \frac{SALES_i}{TARGET_i}}$$

MY 2023 Aston Martin Passenger Car Fleet CAFE Required Value	xxxxx mpg

(A) BACKGROUND

History of AML

1913 Bamford and Martin Limited founded in London.
1914 Aston Martin name is born following success at Aston Hill Climb.
1915 First Aston Martin is registered.
1926 Aston Martin Motors Limited is formed and sets up in Feltham.
1928 First entry at the Le Mans 24-hour race.
1937 140 cars built – the highest pre-war production figure.
1947 David Brown buys Aston Martin Motors Limited and Lagonda.
1953 DB2/4 into production – the first 2+2 seater.
1954 David Brown buys Tickford and moves production to Newport Pagnell.
1955 DB2/4 Mk II into production.
1957 DB Mk III into production
1958 DB4 into production
1959 Aston Martin wins world Sportscar Championship in the DBR1 following wins at the 1000km at the Nurburgring, Le Mans and the RAC Tourist Trophy.
1963 DB5 into production
1964 DB5 appears with James Bond in *Goldfinger*
1965 DB6 into production
1969 DBSV8 into production
1977 V8 Vantage into production
1980 Lagonda into production
1981-1983 Victor Gauntlett and Pace Petroleum acquire AML in 1983 is backed financially by the Livanos shipping family
1987 Ford Motor Company acquires a 75% shareholding in AML
1990 Virage model into production, followed by the Vantage V8 version in 1993
1994 Ford Motor Company acquires 100% shareholding. DB7 into production at Bloxham, Volante version follows in 1996
1999 The V8 (Virage) Vantage Le Mans into production. The DB7 Vantage into production at Bloxham.
2001 V12 Vanquish into production.
2002 After almost 15 years, Aston Martin renews its relationship with Italian coachbuilders Zagato to produce the limited edition DB7 Zagato Coupe and DB_AR1 Roadster.
2003 Production of DB7 model finishes. AML Bloxham factory closes.
AML moves its headquarters to a purpose built design, engineering and manufacturing facility at Gaydon.
2004 The DB9 Coupe into production at Gaydon. V12 Vanquish S into production at Newport Pagnell.
2005 AML returns to racing in GT events in Europe and USA.
The DB9 Volante into production at Gaydon. Vantage (V8 4.3L engine) into production at Gaydon.
2006 AML unveils the Rapide four door concept car at the Detroit Motor Show.
The 30,000th Aston Martin rolls of the production line at Gaydon.
The new Aston Martin DBS seen for the first time in the James Bond film *Casino Royale*
2007 Vantage Roadster into production at Gaydon.
Ford sells AML to an investment consortium led by David Richards of Prodrive.
Production of the V12 Vanquish finishes and AML Newport Pagnell factory closes.
2008 DBS into production at Gaydon.
Vantage models get a 4.7L version of the current V8 engine.
AML announces Magna Steyr (Austria) as assembly partner for the 4-door Rapide model.
2009 DBS Volante into production at Gaydon.
Vantage coupe model with V12 engine launched into Europe.
2010 Rapide into Production at Magna Steyr in Austria, One-77 very limited availability (77 cars) Supercar produced in special 'Craft build' facility at Gaydon.
2011 V12 Vantage available in the USA, V8 Vantage S and Virage into production at Gaydon, Zagato version of V12 Vantage available from the Gaydon craft build facility, again, limited to under 100 vehicles.
2012 Rapide Production transfers to Gaydon from Magna Steyr and introduction of Vanquish as a replacement for DBS
2013 InvestIndustrial completes its plan to gain part ownership in Aston Martin Holdings Ltd, while also confirming a financial input to the business. Retirement of CEO Dr Ulrich Bez.
2014 Daimler AG confirms supply and technology sharing agreement with AML. Introduction of Bosch engine management and 8 speed transmissions to Vanquish and Rapide S. Appointment of new CEO Dr Andrew Palmer.
2015 Confirmation of the 2nd Century Aston Martin Product Plan by Dr Palmer. The latest Bond film 'Spectre' includes a special Bond vehicle in the form of DB10. (a concept car designed for this film)
2016 Launch of DB11, the successor to DB9 and the first of a line of new products as part of the 2nd Century plan
2017 Launch of the V8 engined version of DB11. AML takes possession of its second production facility at St Athan.
2018 Launch of New Vantage and DBS Superleggera models, AML becomes a publicly traded company.
2020 Change in company management with new Chairman Lawrence Stroll (Yew Tree Consortium) and new CEO Tobias Moers. The Coronavirus halted production for a period of 3 months, following which the DBX SUV started production in June at the new St Athan plant in Wales with Gaydon production recommencing in August.

(B) AML IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATIVE STANDARD

Under Part 525, petitions for alternative fuel economy standards are limited to manufacturers that produce, world-wide, fewer than 10,000 passenger automobiles in the second model year preceding this model year. The law requires that the total world-wide production of a petitioner when added together with the world-wide annual production of any manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the second model year preceding this model year.

AML is therefore eligible to request the exemption and alternate standard. [2] (ref. 49 CFR Part 525.7(c))

Of note: AML is producing a Light Truck from the middle of 2020CY. This vehicle is classified as a non-passenger automobile as defined in Part 523.5, and is therefore not included in this petition. Similarly, the produced volumes of this vehicle are not included in the AML passenger automobile production totals.
Separately, this Light Truck will be subject to the applicable CAFE standard for this category of vehicle.

The AML total world-wide production of passenger automobiles (see *Table 1* below) is predicted to be fewer than 10,000 in the model year for which exemption is requested and for the preceding model years. At the date of this petition AML does not own, is not controlled by, and is not under common control with any other manufacturer of passenger automobiles. (ref 49 CFR Part 525.7(b))

Mercedes Benz AG currently owns only 2.61% of the issued share capital of AML and there has never been a control relationship between the two companies.

Table 1: Actual and Projected World-Wide Combined AML Passenger Automobile Production

Calendar Year	Total World-Wide Passenger Automobile Production
2011	3875
2012	3497
2013	3731
2014	3956
2015	3275
2016	3700
2017	5211
2018	6385
2019	
2020	
2021	
2022	
2023	

Note: * = projected

(C) TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year (MY). But late filings are permitted if good cause is shown. 49 CFR 525.6 (b).
This 2023MY petition can be regarded as timely due to it being filed 24 months prior to the introduction of the affected model year.

It is to be noted that all prior petitions back to 2008MY remain unanswered/unresolved.

[2] This position is consistent with that illustrated in the AML CAFE exemption petitions for model years 2010 thru 2021.

(D) VEHICLE LINES UNDER THIS PETITION

See below table 2a and 2b for vehicle specifications.

ASTON MARTIN DB11 AMR V12, V8 Coupe and V8 Volante

As part of the AML Second Century Plan this platform provided an entirely new base for a range of vehicles, the first of which was DB11. From 2022MY the DB11 V12 gained a developed version of the 5.2 liter V12 to enable the car to meet the Tier 3 and LEV 3 emissions regulations.

This vehicle built on the VH architecture already proven with previous DB9 Aston Martin vehicles, evolved to provide new technical features, including performance and drivability improvements, space and comfort improvements and critical market positioning/customer perception improvements.

As noted this platform forms the backbone of all future models with the inclusion of revised and new powertrain and transmission options with increased performance in all respects. Improved environmental performance and a notable shift in fuel economy is part of this program, while at the same time maintaining the GT positioning of this car. Features include electric power steering (EPAS), electronically controlled thermostat, intelligent charging, variable duty oil pump, stop start and cylinder de-activation. Extended use of LED technology for lighting coupled with system efficiency improvements all add to vehicle fuel economy capability both on and off cycle.

Initially in 2017MY a single engine option was available for this car, based on the previous 6.0 liter V12 engine but downsized to 5.2 liters and with the addition of mild turbocharging to achieve a significant uplift in torque coupled with a small power increase. This enables AML to realize a marked downspeeding of the engine while maintaining the GT performance and drivability aspects expected of a car in this segment.

For 2018MY DB11 added a smaller engined derivative. This was sourced from our technical partner and is an In-Vee ('hot vee') turbocharged V8 engine that is sub 4 liters in capacity. Its potential fuel economy is improved over that of the highly developed V12 sister engine while delivering a spirited driving proposition and using the same 8 speed auto transmission.
For 2019MY the DB11 gained a convertible version. This is available with the base V8 engine and transmission but has a folding soft top to create a true convertible – described as a 'Volante' in AML speak.

From 2022MY DB11 features revised V12 and V8 engines to provide capability against Tier 3 and LEV 3 emissions standards with potential for further fuel economy gains.

Both derivatives are available in a 2 door Coupe style, with the V8 also available as a convertible.

2023MY MSRP:	$xxx
Vehicle Curb mass:	3900 - 4150lbs
Powertrain:	5.2 liter V12 turbo with 8 speed Auto Transmission
	4.0 liter V8 Turbo with 8 speed Auto Transmission

ASTON MARTIN Vantage V8

This vehicle was designed to replace the previous V8 Vantage model that was available up to 2016MY.
The architecture designed for the DB11 model is utilized here with a shorter wheelbase to create a two seater sports car with a unique style that is a more focused sports car than DB11.
The powertrain used the V8 engine sourced from our technical partner together with either the proven ZF 8 speed automatic transmission or a 7 speed manual transmission.
The vehicle made use of the features designed into DB11 such as electric power steering (EPAS), electronically controlled thermostat, intelligent charging and stop start.

Available in a 2 door Coupe body style plus a convertible (known as 'Roadster')

2023MY MSRP:	$xxx
Vehicle Curb mass:	3850-4050lbs (target)
Powertrain:	4.0 liter V8 Turbo with 8 speed Auto or 7 speed manual Transmission

ASTON MARTIN DBS Superlegerra

This vehicle is designed as a successor to the Vanquish S models from 2017MY. It carries the name Superleggera, a name which means 'Superlight' and has been used historically with AML products.
Again the DB11 platform used here created a performance version with admittedly a limited market appeal. Similar in many ways to DB11 with a more aggressive aerodynamic profile but with the same wheelbase and a similar interior package. The body structure incorporates more carbon fiber composite than in DB11 with the aim of producing a lighter vehicle than DB11.
The powertrain used the Twin Turbo V12 5.2 liter engine from DB11 but with a more aggressive calibration to provide more power and torque. This is coupled with an uprated ZF 8 speed auto transmission with lightly amended gearing when compared to DB11 with the aim of remaining close to the DB11 fuel economy capability but coupled with a greater performance potential.

The vehicle makes use of the features designed into DB11 such as electric power steering (EPAS), electronically controlled thermostat, intelligent charging, stop start and cylinder de-activation.

Available in a 2 door Coupe and Convertible ' Volante' body styles.

2023MY MSRP:	$xxx
Vehicle Curb mass:	4150-4350lbs (target)
Powertrain:	5.2 liter V12 Turbo with 8 speed Auto

(E) THE REQUESTED ALTERNATIVE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT AML CAN ACHIEVE

The fuel economy values requested in this petition are reasonable and represent the maximum feasible CAFE that AML can achieve for the affected model year. Ref. 49 CFR Part 525.7 (d)(3) and (h)

1. AML HAS MADE SIGNIFICANT EFFORTS TO IMPLEMENT ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set an AML alternative standard, it is necessary to consider vehicle improvements that are "technologically feasible" – improvements that will improve fuel economy based on technology available to AML during the affected model year. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999; the grant of exemption to Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006); 72 FR 28619 (May 22, 2007).

The high-performance nature of AML product-lines and the resultant use of high capacity engines generally limit what technology is available to improve fuel economy. AML cannot change the performance-oriented DNA of its product offerings. AML continues to produce innovative sports cars using state-of-the-art design, powertrains and equipment. Further significant fuel economy improvement using high capacity gasoline powertrains is not possible without a shift to hybridization and/or a supplement to its fleet of full battery electric vehicle carlines. AML recognizes the need to show continuous improvement in its fleet average fuel economy and must therefore, in the medium term, adopt these new technologies.
AML will move with the market for high luxury sector (HLS) automobiles and develop levels of electrification and hybridization in existing models as well as dedicated new models with these technologies but is ultimately limited by access to technology at reasonable cost.

Significant AML fuel economy facts are as follows:

- AML models, while being high performance vehicles, are lightweight, a significant factor when considering fuel economy. As regards the DB11 and the related Vantage and DBS models, all major body and mechanical components are either aluminum, magnesium alloy, or advanced lightweight composite materials. These include the aluminum V12 and V8 powertrains, forged aluminum suspension, and aluminum-bodied dampers. Even the windscreen surround is cast aluminum, while the door frames and inner panels, steering column and gear change paddles are magnesium. The result is that these cars are up to 600 kg leaner than other GTs. The prop-shaft is particularly innovative: it is manufactured from carbon fiber for lightness and improved transmission refinement. The DBS Coupe follows on from the Vanquish model it replaced by making extensive use of carbon fiber composite material in the production of all its body panels. Carbon ceramic composite brakes again feature on DBS models as a standard fitment, and as an option on New Vantage V8.
- All AML models incorporate an all-alloy underbody structure – derived from aerospace technology – with bonded aluminum extrusions, flow formed panels and castings for superb rigidity and minimal weight. This follows the design philosophy used since the introduction of the V8 Vantage and the DB9 in 2004. The bonnet and roof are also constructed from lightweight alloy, while the front fenders, tailgate and sills are produced from advanced composites.

- AML has designed distinctive high performance sports cars requiring significant aerodynamic features for effective downforce and high speed stability -- our drag coefficients reflect this which are as follows:

DB11	Vantage	DBS	
0.37	0.36	0.36	

- The weight (lbs)/horsepower ratios are as favorable as:

DBS	DB11 AMR V12	Vantage	DB11 V8	
xx	xx	xx	xx	

- Hydraulic power-assist steering was selected at the beginning of the VH platform program (2002), on the basis that it provided the best steering feel and performance. However for the DB11 platform models from 2017 an EPAS system was used as the development of a suitably performance oriented design removed the need for continued usage of an hydraulic set up – please refer to Section (E)2.c. for the proposal on steering systems.
- The 5.2 liter V12 and the 4.0 liter V8 Turbocharged engines make use of friction modified engine oils, a 0W20 rating in the V12 and a 0W40 rating in the V8 is utilised. This type of oil is fast becoming the industry standard. Further reductions in viscosity are under investigation with 0W-00 being a possibility. The previous Aston Martin V8 Vantage made use of a 10W60 synthetic oil, so the change to a 0W40 oil for the DB11 V8 and Vantage V8 Turbo engine is a significant change to leverage fleet fuel economy improvements.
- AML now uses the range of 8 speed ZF automatic transmissions across all its sportscar models. This transmission allows for some significant engine downspeeding opportunities and optimized gear choice for given road speed. This transmission is coupled with a low frictional loss higher ratio final drive to enable further downspeeding, thereby enhancing fuel economy capability. Vantage is also offered with a 7 speed manual transmission to cater for the limited demand for such a feature.
- AML continues in its agreement with Bosch to provide all engine management functionality going forward. This allows us to keep pace with OBD monitoring requirements and also build on engine control functionality for emissions and fuel economy improvement. All products in 2023MY make use of this Bosch engine management system.

The ability of a small volume manufacturer to make investment in technological improvements must be considered in the context of global financial and technical uncertainty that has affected (and continues to affect) the automobile industry. During the financial crisis through 2008 AML reduced production and employee levels to counter the significant fall in sales. AML maintained its passenger automobile production levels for a number of years following at around 3500 units, but since the AML second century plan was introduced those levels have started to climb and were due to peak at around 7000 units in 2022.

There are a number of current situations that are adversely affecting AMLs business:

- At the point of the production of this petition In July 2020, the world is in the grip of a Virus Pandemic. AML stopped production for a period of 5 months at Gaydon during the lockdown/shelter in place recommendations.
- The emissions issues surrounding the capability of some diesel vehicles from large volume manufacturers has created uncertainty in the marketplace, with a knock on effect to all car producers.
- AML has gone through a public offering as an indication of the strength of its business, unfortunately market conditions damaged the success of this action resulting in a recent change in management of the business. This will impact, in a positive way, the direction and look of the business going forward, but by design does create further uncertainty.
- AML is therefore now entering a period of re-organisation and renewal, initially with a view to building the business but longer term looking to be able to invest in new technologies.

As of the date of this petition there are still proposals for the introduction of UK-US tariffs on completed vehicle imports that would affect the attractiveness of AML vehicles produced for sale in the USA. The levels of tariff in discussion are likely to have to be passed on in part or whole to the end customer and therefore produce uncertainty with regard to competitiveness in market.

AML will start to produce an Light Truck (which is outside of this petition) in 2020CY at a separate manufacturing facility in order to further diversify its offering, but also to meet customer expectation of this part of the high luxury sector for such a vehicle type. This is essential if AML are to compete with the other HLS manufacturers who are currently offering an SUV.

The AML second century plan period where a powerful effort to significantly replace our product line is nearing completion. While this is now under a new management structure this renewal is seen as absolutely essential for the survival of AML and relies upon a program of new product deliveries which started late 2016CY. An amount of product diversification will be the enabler to meeting market demand for ever reducing fossil fuel usage in motor vehicles. The expected result of this diversification is AML becoming financially sustainable without outside assistance in the medium term leading to a long-term capability to renew product on a more timely basis than has been the case in the past decade.

Complete descriptions of the vehicle configurations are set forth in Table 2a & 2b, in accordance with the requirements of 49 CFR Part 525.7(e).

Table 2a: Vehicle Specifications – DB11 V12 and V8

Vehicle	Model Line	
Description	***DB11 AMR V12***	***DB11 V8***
Body Variants	*2dr Coupe*	*2dr Coupe/ 2dr Convertible*
Frontal area (ft^2)	*23.2*	*22.9*
Dimensions (inches) Height	*50*	*50*
Width	*85*	*85*
Length	*186.6*	*186.6*
Wheelbase	*110.4*	*110.4*
Front Track	*65.5*	*65.5*
Rear Track	*64.8*	*64.8*
Curb Weight (lbs)	*4150*	*3900-4150*
Equivalent Test Weight (lbs)	*4500*	*4500*
Seating Positions	*2+2*	*2+2*
Interior Volume Index (ft^3)	*81*	*81*
Engine Type	*V12 T*	*V8 T*
Working Principle	*Four stroke, Otto cycle, turbocharged*	*Four stroke, Otto cycle, turbocharged*
Engine Displacement (Litres)	*5.2*	*4.0*
Engine Max Power (hp)	*xxx*	*xxx*
Fuel Metering System	*Electronically controlled sequential fuel injection*	
Transmission	*8 speed automatic*	*8 speed automatic*
Final Drive Ratio	*2.703*	*2.703*
Emission Control System	*Three-way catalysts with heated O2 sensors, secondary air*	*Three-way catalysts with heated O2 sensors*
Road Load Horsepower†	*14.6*	*14.6*
Radial Tires (std) Brand	*Bridgestone*	*Bridgestone*
Size – Front	*255/40 R20*	*255/40 R20*
Size – Rear	*295/35 R20*	*295/35 R20*
Low Friction Lubricants (Type)	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	*Engine: 0W40 Petronas Syntium 7000*
N/V	*22.2*	*22.2*
Fuel Economy Values	*xxx*	*xxx*

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

- Information in red are estimates based on current understanding

[Table 2b: Vehicle Specifications – Vantage V8 and DBS

Vehicle	Model Line		
Description	***Vantage V8***	***DBS***	
Body Variants	*2dr Coupe/Roadster*	*2dr Coupe/Volante*	
Frontal area (ft^2)	*23.1*	*23.2*	
Dimensions (inches) Height	*50*	*50*	
Width	*85*	*85*	
Length	*180*	*186.6*	
Wheelbase	*106.5*	*110.4*	
Front Track	*65.5*	*65.5*	
Rear Track	*64.8*	*64.8*	
Curb Weight (lbs)	*3850*	*4150*	
Equivalent Test Weight (lbs)	*4000/4250*	*4500*	
Seating Positions	*2*	*2 or 2+2*	
Interior Volume Index (ft^3)	*N/A – 2 seater*	*81*	
Engine Type	*V8 T*	*V12 T*	
Working Principle	*Four stroke, Otto cycle, turbocharged*	*Four stroke, Otto cycle, turbocharged*	
Engine Displacement (Litres)	*4.0*	*5.2*	
Engine Max Power (hp)	*xxx*	*xxx*	
Fuel Metering System	*Electronically controlled sequential fuel injection*		
Transmission	*8 speed automatic/7 speed manual*	*8 speed automatic*	
Final Drive Ratio	*2.93*	*2.93*	
Emission Control System	*Three-way catalysts heated O2 sensors*	*Three-way catalysts heated O2 sensors/secondary air*	
Road Load Horsepower†	*14.6*	*14.6*	
Radial Tires (std) Brand	*Pirelli*	*Pirelli*	
Size – Front	*255/40 R20*	*265/35 R21*	
Size – Rear	*295/35 R20*	*305/30 R21*	
Low Friction Lubricants (Type)	*Engine: 0W40 Petronas Syntium 7000*	*Engine: 0W20 Castrol Edge Professional GF5 or Total GF5 equivalent*	
N/V	*24.1/31*	*23*	
Fuel Economy Values	***xxx***	***xxx***	

NOTE: †Method used to determine setting: coast down; adjusted to account for presence of air conditioning; setting based on use of radial tires.

- Information in red are estimates based on current understanding

2. THE AML REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

It is necessary to repeat again – under the heading of "economic practicability" -- that the ability of a small volume manufacturer to make investment in fuel economy improvements must be considered in the context of the global financial situation that continues to affect the automobile industry and specifically AML. AML is now well into its second century product plan. Stage 1 has been completed where the product portfolio is stabilized. Stage 2 is the renewal plan followed by the expansion of the brand into an SUV and the move towards electrification. AML is making a significant investment in new product with new technologies, including new powertrain technologies. The economic practicalities are such that making this investment is now necessary to move forward with technologies (in AML products) that are largely becoming industry mainstream today.

a. AML Cannot Alter Its *Sales Mix* So As To Improve Fuel Economy (49 CFR 525.7(d)

AML produces essentially one "type" of car – high performance / limited production. The company therefore has no opportunity to improve fuel economy by changing its model mix since it only sells vehicles with multi-cylinder medium/large capacity power units. It does not yet have a low-powered vehicle whose sales could offset those of the high-performance models. Moreover, production of low-powered vehicles, products contemplated by AML for the US market, would also represent a move into considerably uncertain territory, given the nature of AML's brand, history and extremely low production volumes. As such AML has not moved forward with any new market area other than the market area AML is most well-known for and the area it understands. NHTSA has recognized in the past, "producing additional models … is not possible since … the unique market sector served by [the manufacturer] preclude significant changes …." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This rationale continues to apply.

AML is therefore not in a position to manipulate model mix through marketing actions. Producing more fuel-efficient models using new technologies and not trying to make existing configurations significantly more fuel efficient is the strategy for AML.

The projected US sales mix of the AML models for MY 2022 is set forth below in Table 3, which shows the most fuel-efficient mix that AML can sell in the US market in the model year at issue. The projections in Table 3 are based on anticipated consumer demand.

Table 3: The number of AML automobiles produced or projected for the US market from 2015 to 2023, by model.

Model Year	US Sales Mix based on Historic and Anticipated US Demand					
	DB9 **	Vanquish/ DBS Superlegerra (2019)	DB11 V12 and V8	Rapide S	V8 Vantage**/ New Vantage (2019)	V12 Vantage S**/	Production Capacity $
2015	270	163		138	319	229	Up to 8000
2016	181	172		102	204	19	Up to 8000
2017	-	54	700	79	-	147	Up to 8000
2018	-	172	566	0	-	-	Up to 8000
2019	-	287	885	-	848	-	Up to 8000
2020*		Xx	Xx		Xx		Up to 8000
2021*		Xx	Xx		Xx		Up to 8000
2022*		Xx	Xx		Xx	-	Up to 8000
2023*		Xx	xx		xx	-	Up to 8000

Note: * = projected
= to be confirmed

** 2015 and 2016MY were volumes subject to the sales limits contained in the AML petition for exemption from FMVSS214 ref. NHTSA-2014-0032
$ - correction over previous petitions, the Gaydon site has an 8000 unit p.a. planning limit (declared Jan 2018)

b. Further Fuel Efficiency Improvements That Are Compatible With the Basic *Design Concept* of AML Vehicles Are Not Possible (49 CFR 525.7(h)(4)

As NHTSA has acknowledged, "making some ... configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by [the manufacturer] preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). This analysis continues to apply to AML as we pursue high luxury sector opportunities.

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are for AML's financial resources and whether AML has adopted fuel economy improvements that are compatible with the basic design concept of AML automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Given AML's financial position during the continuing global instability, it has taken all possible steps to maximize fuel economy with its existing vehicle range. AML has continued to improve its fleet fuel economy, with changes to engine management and transmission technology realizing a further improvement in the fleet fuel economy.

Please refer to Section (E).2.c. (following) for an explanation of Plans for Further Fuel Efficiency Improvements that meet the intent of the requirement shown in 49 CFR 525.7(g)(5)

With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. The same approach must be applied here. However in common with Ferrari, Rolls Royce, Mclaren etc, AML has moved toward downsizing and pressure charging to maintain the performance aspects of our car designs and the feature levels expected of our customer base, while creating the ability to significantly improve our fleet fuel economy. AML is moving towards increased electrification of future models.

The reasoning behind NHTSA's "basic design concept" approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

Given AML's pursuit of lightweight and aerodynamic characteristics, it has done as much as possible to improve fuel economy. This is supported by the fact that AML's mpg Fuel Economy *label* values are similar or better to the results of other manufacturers of vehicles with similar design concepts (high performance – low volume -- upper price range).

- **DB11 V12 T: & DBS** 14/15 mpg city and 22 mpg highway

	City mpg*	Highway mpg*
Ferrari GTC Lusso	13	21
Bentley Continental GT W12	12	20
Ferrari 812 Superfast	12	16

- **DB11 V8 T:** 18 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Ferrari Portofino/Roma	16	22
Bentley Continental GT V8	16	26
Maserati Gran Turismo MC	13	20

- **Vantage V8:** 18 mpg city and 24 mpg highway

	City mpg*	Highway mpg*
Mercedes Benz AMG GT S	16	22
Ferrari 488	15	22
Porsche 911 Turbo	19	24

The comparison data tables shown above (based on a comparison of 2019/20MY vehicles) indicate that AML is capable of producing vehicles that are competitive with the mainstream large volume manufacturers while maintaining our small volume capabilities.
*Source: EPA FE Guide

c. **Plans for Further Fuel Efficiency Improvements that are Compatible with the *Basic Design Concept* of Aston Lagonda Martin Vehicles (per 49 CFR 525.7(g)(5))**

AML is always looking at ways to improve its fleet fuel economy while retaining its *basic design concept* of building high performance sports cars.

In this respect AML progressively introduced a ZF 8 speed automatic transmission starting in 2015MY that was planned to replace the 6 speed ZF on all V12 engined models apart from DB9. The approximately 4 year lead time to introduce such a change for AML was principally driven by the need for new tooled parts and a heavily revised engine and gearbox calibration and limited by the cost of such activities. From 2019MY the 8 speed transmission is fitted to all DB11 derivatives, New Vantage V8 and DBS models.

Starting 2014MY AML rolled out a new engine management system (EMS). This allowed AML to realize CO2 reductions through use of other technology enablers such as stop-start and potential hybridization. The introduction of a new EMS provided significant opportunities while requiring a substantial level of investment, but due to the size of our company and our economic position the full effects and application of the enabled technologies will be over an extended period of up to three or more years. All models now benefit from the fitment of Bosch EMS.

The DB11 V12 T models benefit from a package of significant changes to the V12 engine fitted to this car that support a reduction in fuel use of c.14%. As part of this package the engine is downsized to 5.2 liters coupled with pressure charging, reduced exhaust backpressure, stop-start, cylinder de-activation, electric thermostat with coolant flow management and a change to electric/hydraulic power steering being included. While tooling costs are significant AML is committed to providing continuous fuel economy improvement from its volume sales products with powertrain improvements such as these becoming necessary to maintain this performance.

The DB11 V8 T and Vantage models make use of a 4.0 liter V8 pressure charged engine supplied by our technical partner and includes features that make it a mark of efficiency in much the same way as the V12 T. Features such as the hot vee turbocharger configuration, specific power output (this engine replaces a power unit much larger in swept volume) and the in vehicle package demonstrates this efficiency. Despite its increased power over the previous AML V8 this vehicle is also capable of delivering a c.20% fuel economy improvement. From its introduction date at 2018MY this vehicle was fitted with a ZF 8 speed automatic transmission.

(F) <u>OTHER FEDERAL STANDARDS THAT RESTRICT AML'S MAXIMUM FEASIBLE CAFE</u>

1. Starting with MY 2015, AML filed a petition with EPA requesting a company specific GHG standard. The first application covered the model years 2017 through 2021. This set of alternative standards, that include a carry back of the agreed 2017MY fleet average into 2015 and 2016MYs, were accepted and published in the Federal Register under reference 85 FR 39561 on July 1st 2020. This EPA procedure is consistent with the NHTSA small volume alternative CAFE procedure in that it allows the manufacturer to predict its capability given the best technologies and likely sales mix that would be available for any particular model year.
2. Smaller companies with limited resources can be compelled to make fuel economy sacrifices in order to comply with mandatory safety standards. See, 58 Fed. Reg. 41228, August 3, 1993. The latest safety standard rulemakings that affected fuel economy are the FMVSS 214 side impact requirement, FMVSS 216 roof crush, FMVSS 226 Occupant Ejection Mitigation requirements and also Pedestrian Protection requirements as proposed in the UN ECE Global Technical Regulation No.9. that must be considered as standard fit due to the economics of scale. These standards require increased deformation resistance to body and frame structures which translate into additional weight.

G) THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

AML recognizes the world's need to conserve energy, especially today. However, AML will sell an extremely low volume of cars in the US each year. The impact on energy consumption is therefore minuscule – de minimis -- not only because of the tiny volume of cars, but also because the vehicles tend to be used very infrequently (as a second or third car) and therefore have a very low VMT (vehicle miles travelled) value per annum. AML's current understanding is that VMT is in the order of 2500 miles per annum. In short, granting of this petition will not negatively impact US energy consumption or conservation. AML's sales in the US result in virtually no measurable effect on US energy usage.

Since AML cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies that have asked for and received CAFE exemptions in the past. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See eg, 51 Fed. Reg. 44492, December 10, 1986.

(H) CONCLUSION

Based upon the foregoing, AML respectfully requests that NHTSA grant this petition for an alternative CAFE standard as set forth above for MY 2023

Respectfully submitted,

August 14, 2020

Nick Lines
Vice President & Chief Technical Officer
Aston Martin Lagonda Limited

Date (Month/Day/Year)

Cc: Lance Tunick

Ferrari

Att:
The Honorable Heidi King
Acting Administrator
National Highway Traffic Safety Administration
U.S. Department of Transportation
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Re: Petition for Exemption from Average Fuel Economy Standards 49 CFR 525 – Ferrari N.V.

Maranello, 13 December 2017

Dear Acting Administrator King,

Ferrari N.V. (Ferrari) hereby submits this Petition for Exemption from Average Fuel Economy Standards (Petition) pursuant to 49 CFR 525 for Model Years 2016, 2017 and 2018. Ferrari previously submitted a petition to cover Model Years 2017, 2018 and 2019 on September 28, 2016. This petition modifies that prior submission**.** Ferrari believes the alternative standards proposed in this Petition meet the statutory criteria for a small volume manufacturer with products in a niche segment of the vehicle market.

Throughout our history, Ferrari's annual vehicle production has never exceeded 10,000 vehicles globally. In 2016, global sales were 8,021. [redacted] For the Model Years covered in this Petition, Ferrari intends for global production and sales to remain below 10,000 vehicles per annum.

Since 1969, Ferrari's largest shareholder was Fiat S.p.A. (Fiat), which purchased 50% of the company's shares in 1969 and increased its shareholding to 90% in 1988. During the subsequent years, Fiat from time to time sold shares in Ferrari but always repurchased them after a time and always maintained a majority ownership interest. Piero Ferrari, son of the company's founder, owned 10% of Ferrari's shares throughout this time.

Since 2010 Fiat, and more recently its successor Fiat Chrysler Automobiles N.V. (FCA), has owned 90% of Ferrari's shares. FCA's ownership in Ferrari remained at 90% until the IPO and spin-off described below. Throughout the entire period of Fiat/FCA's ownership, Ferrari maintained operations that were completely separate from the parent. This included all research and design, product development, procurement, intellectual property, manufacturing and administration. Throughout its history, Ferrari has designed and produced its engines, transmissions and other powertrain components without assistance or direction from Fiat or FCA. Ferrari treated Fiat/FCA and Piero Ferrari as shareholders from time to time distributing its profits to the shareholders. In late 2014, FCA announced plans to spin off Ferrari. This was to be a phased process.

In October 2015, FCA completed an initial public offering in which 10% of its shares were sold to the public by FCA and listed on the New York Stock Exchange (NYSE). Prior to that time, FCA announced that a full spin-off of its ownership in Ferrari would occur in early 2016.

On January 4, 2016, FCA distributed its remaining 80% interest in Ferrari to existing FCA shareholders. Piero Ferrari retained his 10% interest in the new company. At the time of the spin-off, Ferrari N.V. was also listed on the Milan stock exchange (along with the existing New York Stock Exchange listing) and all Ferrari shares were available to be sold and bought without restriction. At the time of the initial public offering, Ferrari constituted a new Board of Directors consisting of a majority of independent directors and adopted a variety of other corporate governance protections consistent with the requirements of the Dutch Corporate Governance Code. In connection with the IPO and the subsequent spin-off, Ferrari also developed new internal control and disclosure control systems to meet the applicable corporate and accounting disclosure requirements in the three relevant jurisdictions (the U.S., Italy and the Netherlands). On April 15, 2016, Ferrari further expanded its board of directors and appointed a number of new independent directors. On May 2, 2016, Ferrari announced that its long time CEO, Amedeo Felisa, was retiring but would remain on the Board of Directors. [redacted]

On September 28, 2016 Ferrari submitted a Petition for Exemption from Average Fuel Economy Standards pursuant to 49 CFR 525 for Model Years 2017, 2018 and 2019 to be amended by this Petition.

Prior to and during this period of significant transition, Ferrari has been mindful of its obligations under both the CAFE program and EPA's greenhouse gas (GHG) requirements. Due to its prior status as a majority-owned subsidiary of Fiat/FCA, the U.S. Ferrari vehicle fleet has been aggregated with Fiat and FCA fleets under the CAFE program. [redacted]

[redacted] With regard to the EPA program, Ferrari obtained "Operational Independence" small volume manufacturer status pursuant to 40 CFR 86.1838.01(d) in June 2013, applicable to Model Year 2012. In June 2015, Ferrari petitioned EPA for alternative standards for Model Years 2017-2021 as a small volume manufacturer. [redacted]

[redacted]

What follows is a discussion of the relevant provisions of Part 525. As will be noted in certain sections below, additional reference and supporting materials are included in the attached document (Attachment).

§ 525.7(b): Control Relationship

Section 525(b) requests a discussion of whether the petitioner "controls, is controlled by, or is under common control with another manufacturer of automobiles..." After the spin-off of Ferrari from FCA on January 3, 2016, no manufacturer of automobiles owns Ferrari stock. FCA distributed all its shares of Ferrari to its shareholders. These shareholders are free to trade Ferrari shares and have done so. As a result of the spin-off, the current ownership of Ferrari-listed outstanding common shares is:

- Public shareholders, 57.4% of which 26.7% are held by U.S. shareholders;
- Exor, a publicly-traded investment company – approx. 23.5%;
- Piero Ferrari – approx. 10%; and
- T. Rowe Price Associates, Inc. - 9.1%.

The percentages of share capital set out here above are calculated as the ratio of (i) the aggregate number of outstanding common shares beneficially owned by the shareholder to (ii) the total number of outstanding common shares (net of treasury shares) of Ferrari. These percentages slightly differ from the Ferrari below percentages of share capital which include the treasury shares.

Exor N.V. (formerly Exor S.p.A.) is one of Europe's leading investment companies, with a net asset value of nearly €17 billion. Exor makes long-term investments focused on global companies in diversified sectors, primarily in Europe and the U.S. Its investments include reinsurance, industrial equipment, professional sports, transportation and media. Its investment portfolio and ownership stakes as of June 30, 2017, include:

- PartnerRe: 100%
- The Economist: 43.4%
- FCA: 29.23%
- Case New Holland Industrial (CNH): 26.90%
- Ferrari: 22.91%
- Juventus: 63.77%

Over the past few years, Exor has repositioned its portfolio of other major investments. For example, in June 2013, it sold its 15% stake in SGS, an inspection and testing firm, for $2.6 billion. It sold 75% of real estate firm Cushman & Wakefield in late 2015 for $2.0 billion. In 2015, Exor purchased an additional stake in the Economist for approximately $730 million and in March 2016, Exor finalized its acquisition of PartnerRe for $7 billion.

Due to this diversified portfolio, Exor has taken the position for financial reporting purposes that it has control of and consolidates the financial results of Ferrari and FCA under International Financial Reporting Standards (IFRS). [redacted]

Fortunately, NHTSA has provided some guidance as to the meaning of "control" in the CAFE context, by confirming that it is intended to be used in the manner under U.S. corporate law; see NHTSA letter to Tim Green of Ford Motor Corporation (September 19, 1996) (". . .the term when used in the CAFE context may have the same definition as it has when used in the corporate law context. . . . In the corporate law context, the issue of control is important for determining whether the controlling persons have violated any fiduciary duties to the corporation and other shareholders"); see also NHTSA letter to Lance Tunick re: Lotus/ Bugatti (May 9, 1994).

[redacted]

[redacted]

[redacted]

[redacted]

§ 525.7(c): Quantity of Cars Manufactured MY 2014 – MY 2016

Section 525.7(c) requests information regarding the total number of passenger automobiles manufactured worldwide in the two years preceding each affected model year. Ferrari is providing production data for Model Years 2014-2016 (so as to cover the Model Years covered in this Petition). Ferrari keeps records of both worldwide production and sales data on a calendar year (CY) basis, since the manufacturer's annual new model production is not identified by model year in all markets. For this reason, the global sales and production data are shown on a calendar year basis. As can be seen, the annual sales and production data are closely matched.

Total Global Production:

- Total Manufactured vehicles, CY 2014: 7,304
- Total Manufactured vehicles, CY 2015: 7,830
- Total Manufactured vehicles, CY 2016: 8,125

However, it can be stated that in none of these Model Years (or in any year since Ferrari's inception in 1947) did Ferrari's global production reach 10,000 vehicles. Indeed, the levels are well below this threshold. In addition, Ferrari will not reach 10,000 vehicles for the period covered by this Petition.

§ 525.7(d): MY 2016 – MY 2018 Projected Model Mix, Production History, Fuel Economy Compliance Efforts and Estimated U.S. Demand

Section 525.7(d) requests a description of the most fuel efficient model mix for each affected year, as well as information regarding the preceding four model years and anticipated consumer demand in the U.S. for our vehicles. [redacted]

§ 525.7(d)(1): Total Production and Model Mix for Four Model Years Prior to MY 2016 – MY 2018

The tables below provide production and model mix information for Calendar Years 2011-2015.[1] [redacted]

CY 2011 – CY 2015 Annual Total Production and Model Mix

[redacted]

[redacted]

CY 2016 – CY 2018 Real and Projected Total Production and Model Mix

[redacted]

§ 525.7(d)(2): MY2016-MY2018 Production Capacity

[redacted]

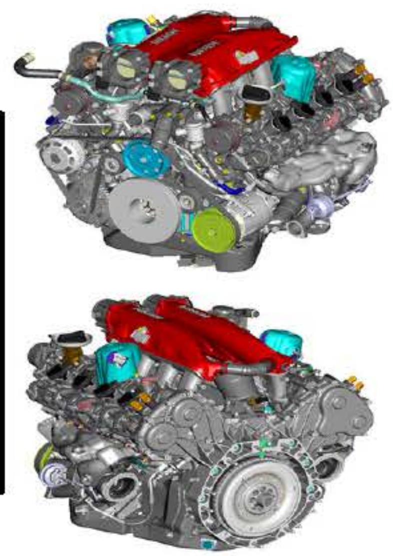
§ 525.7(d)(3): Efforts to Comply with MY 2016 – MY 2018 Fuel Economy Standards

Ferrari has had an aggressive program in place to increase fuel economy and reduce greenhouse gas emissions. For a small company such as Ferrari, that sells its limited production in approximately 60 nations, Ferrari must be mindful of the regulatory and legislative requirements that affect it. The data in the Attachment addresses the model mix and Ferrari's aggressive and challenging steps to improve fuel economy while keeping the essence of a Ferrari. As is addressed in the section of the Attachment and other sections as well, Ferrari has had and continues to have an aggressive research and development and engineering program. [redacted]

[redacted] New V8 Engine Family

- Turbocharged, gasoline direct injection
- < 4 liters
- Introduction: 2015MY (CaliforniaT)

[redacted]



[redacted]

§ 525.7(d)(4): MY2016-MY2018 Real and Anticipated U.S. Consumer Demand

The tables below provide Ferrari's best projection of anticipated U.S. demand. The tables also provide fuel economy levels for each model based on the use of EPA fuel economy test procedures.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

§ 525.7(e): MY 2016- MY 2018 Vehicle Specifications

Section 525.7(e) requests technical specifications for each model in each of the model years covered in the petition. This information is provided in the Attachment. Much of the data is taken from Ferrari's application for certification submitted to EPA.

§ 525.7(f): Fuel Economy Values for Model Configurations

Section 525.7(f) requests information for the fuel economy value of each vehicle configuration using calculations specified in 40 CFR Part 600. The tables below provide the fuel economy data for each model and configuration for each of the Model Years. [redacted]

[redacted]

MY 2016

[redacted]

MY 2017

[redacted]

MY 2018

[redacted]

§ 525.7(g): Projected Fuel Economy for MY 2016 – MY 2018 Fleet

Section 525.7(g) requests the petitioner to provide a projection of fuel economy for the affected model years based on the data provided under subsection (f). The charts below provide these estimates.

MY 2016

[redacted]

MY2017

[redacted]

MY 2018

[redacted]

[redacted]

Proposal for MY2016:

- Ferrari proposes a MY2016 alternative FE standard of 21.0 mpg.

Proposal for MY2017:

- Ferrari proposes a MY2017 alternative FE standard of 21.1 mpg.

Proposal for MY2018:

Ferrari proposes a MY2018 alternative FE standard of 21.5 mpg.

It is important to note that in both Model Years 2015 and 2016, Ferrari introduced downsized, down-speeded, turbocharged V8 engines into the GT and Sports models, respectively. [redacted]

As the charts above demonstrate, even with a limited model mix and the need to provide our customers with superior performance, handling and luxury, Ferrari is targeting an improvement of 17.4% for its Fleet Average Fuel Economy in MY 2018 compared to MY 2014.

[redacted]

§ 525.7(h): Support for Fuel Efficiency Determinations

Section 525.7(h) requests the information to support the projected fuel economy levels in subsection (g), as well as information regarding past and present plans to address fuel economy, the effect of other federal standards on Ferrari and technologies that were considered but not adopted by Ferrari. Each of these items will be addressed below. It is also important to note that FCA has not provided assistance with the technology developments described in this section. Ferrari does not contemplate any assistance from FCA or any other manufacturer in our efforts.

§ 525.7(h)(1) and (2): Chronological and Technical Support for Fuel Efficiency Determinations

At the outset, it must be noted that with the limited volume of vehicles Ferrari produces, moving from our internal R&D efforts to the production vehicles is dependent on suppliers. Ferrari's low volumes may cause delays or project cancellations due to the inability of suppliers to produce components in the timeframe needed.

[redacted]

[redacted]

[redacted]

[redacted].

[redacted]

[redacted]

§ 525.7(h)(3): Impact of Other Federal Motor Vehicle Standards on Fuel Efficiency

With regard to the impact of other standards on fuel economy, the federal "Tier 3" tailpipe and evaporative emission standards (as well as the California LEV 3 standards) are a major issue, particularly for a high-performance vehicle manufacturer. [redacted] Also, due to the engine design and other powertrain features, on-board diagnostics require a great deal of effort, particularly as the emission standards are being made more stringent.

New safety standards FMVSS 216(a) roof crush resistance, FMVSS 226 ejection mitigation and FMVSS 214 side impact protection affect vehicle weight, aerodynamics and other aspects of vehicle design. Ferrari understands the importance of these new standards, but they create design challenges to balance compliance with these new standards with fuel economy improvement.

§ 525.7(h)(4): Fuel Efficiency Technologies Rationale

In evaluating new technologies, Ferrari must consider a number of factors. These include maintaining the high performance and unique driving experience of a Ferrari, customer acceptance, and impact on overall vehicle design. [redacted]

§ 525.7(h)(5): Fuel Efficiency Improvements in MY 2017 and MY 2018

As shown above, Ferrari has implemented improving Fuel Economy technologies in order to enhance the fuel economy in the Model Years covered in this Petition and plans to continue to improve fuel economy in future Model Years. [redacted]

Conclusion

As stated at the outset, Ferrari believes the information provided in this Petition as well as the Attachment demonstrate that each of the requests in subsection 525.7 is fully addressed and that the alternative standards Ferrari requests are the maximum feasible standards that can be applied to a manufacturer with limited size and which competes in a small niche of the overall vehicle market. Ferrari has marked pages in the Attachment that contain confidential information with the designation "Confidential Business Information". A separate request for confidentiality pursuant to 49 CFR Part 512 is also attached. A redacted version of the attached document and supporting materials is also included.

Please contact [redacted] with any questions or if you or the Agency personnel would like to discuss any aspect of this Petition.

Sincerely,

[redacted]

FERRARI:
PETITION FOR ALTERNATIVE FUEL ECONOMY STANDARD FOR MY 2016, MY 2017 & MY 2018

Maranello, December 2017

PART I: PETITION FOR ALTERNATIVE FUEL ECONOMY STANDARD FOR MY 2016, MY 2017 & MY 2018

TABLE OF CONTENTS

49 CFR Part 525 – Exemption from Average Fuel Economy Standards

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(c):
Cars Manufactured
MY 2014 – MY 2016

PRODUCT PORTFOLIO

PRODUCT POSITIONING

FERRARI offers two **GT** & two **SPORTS** cars, with V8 & V12 engines

Addition to normal portfolio: limited series supercar (LaFerrari, LaFerrari Aperta, etc.)

MY 2014 - MY 2016 TOTAL NUMBER OF CARS MANUFACTURED

Applicant: Ferrari

- Since its creation, top level sports car manufacturer, with very small production volumes
- Started production in 1947, is present in US since more than 60 years
- High technology (8 & 12 cylinder GDI) sports and GT cars only (Global Sales ≈ 8000 / year)

Total Global Manufacture:

- Total Manufactured vehicles, CY 2014: 7304 cars
- Total Manufactured vehicles, CY 2015: 7830 cars
- Total Manufactured vehicles, CY 2016:

Total US Production:

- Total Manufactured vehicles for US, MY 2014: 2301 cars
- Total Manufactured vehicles for US, MY 2015: 2755 cars
- Total Manufactured vehicles for US, MY 2016:

INFORMATION REGARDING MY 2016, MY 2017, MY 2018 ➔ NEW MODELS

Ferrari portfolio:

- The recently introduced California T and 488GTB have downsized turbocharged V8 engines, instead of the V8 naturally aspirated / ultra high revving (9000 rpm) engines which were a strong feature of the earlier models.

Very high performance car market:

- Ferrari has a derogation in European Union for a fleet average of 290 g/km in 2016 on NEDC.

- Another manufacturer, currently offering V10 and V12 naturally aspirated high performance cars with midship engines, has just obtained a derogation for a fleet average of 304 g/km in 2019.

- Ferrari cars have to remain competitive on overall performance, and have to offer superior performance, even with a very ambitious strategy focused on fuel economy improvement.

INFORMATION REGARDING MY 2016, MY 2017, MY 2018

Ferrari components:

Ferrari portfolio:

- Ferrari portfolio has being revised drastically in order to address in the best way the fuel economy challenge.

Sales mix predictions:

Fleet average fuel economy predictions:

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(d)(1-4):
MY 2016 – MY 2018
Projected Production Mix

§525.7(d)(1): MY 2011 → MY 2015: GLOBAL MANUFACTURED VEHICLES & CORPORATE FUEL ECONOMY

§525.7(d)(1): MY 2011 ➔ MY 2015: US SALES & CORPORATE FUEL ECONOMY

§525.7(d)(1): MY 2016 → MY 2018: PROJECTED GLOBAL & US SALES & PRODUCTION MIX

Model mix variations strongly affect Ferrari fleet average fuel economy.

However, substantial fuel economy improvements are clearly evidenced in each of the four model categories.

§525.7(d)(2): MY 2016 – MY 2018 Production Capacity

GT & Sports cars portfolio:

Production volume:

Model Year	Launch
2014	
2015	
2016	
2017	
2018	

§525.7(d)(3): Efforts to Comply with MY 2016-MY 2018 CAFE Standards

- Additional information can be found later in this petition under §525.7(h)(1) and in the supplemental material.

§525.7(d)(4): MY 2016 – MY 2018 Anticipated US Demand

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(e)(1-9):
MY 2016 – MY 2018
Vehicle Specifications

FERRARI:

PETITION FOR ALTERNATIVE FUEL ECONOMY STANDARD

MY 2016 - 2018 PORTFOLIO

Vehicle data

Powertrain

Emissions

488 GTB

Vehicle data

Powertrain

Emissions

488 SPIDER

Vehicle data

Powertrain

Emissions

GTC4LUSSO

Vehicle data

Powertrain

Emissions

F12berlinetta

Vehicle data

Powertrain

Emissions

F60 America

Vehicle data

Powertrain

Emissions

F12tdf

Vehicle data

Powertrain

Emissions

Vehicle data

Hybrid Powertrain

Emissions

GTC4LUSSO T

Vehicle data

Powertrain

Emissions

812superfast

Vehicle data

Powertrain

Emissions

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(f) and (g):
MY2016-MY2018 Vehicle and Fleet
Projected Fuel Economy

MODEL YEAR 2014

V8GT «California»:

- Naturally aspirated V8 engine, 262 ci, gasoline direct injection, 360 kW
- 7 speed dual clutch transmission.
- Certified fuel economy: 19,8 mpg (20,1 mpg with HELE equipment)

V8 Sports «458 Italia»:

- Naturally aspirated V8 engine, 274 ci, gasoline direct injection, 416 kW
- 7 speed dual clutch transmission
- Certified fuel economy: 18,5 mpg (18,7 mpg with HELE equipment)

4 seater «FF»:

- Naturally aspirated V12 engine, 382 ci, gasoline direct injection, 486 kW
- All wheel drive, 7 speed dual clutch transmission
- Certified fuel economy: 16,3 mpg (16,6 mpg with HELE equipment)

MODEL YEAR 2014

V12 Sports «F12berlinetta»:

- Naturally aspirated V12 engine, 382 ci, gasoline direct injection, 541 kW
- 7 speed dual clutch transmission
- A/C system with HFO-1234yf refrigerant fluid
- Certified fuel economy: 16,7 mpg (17,0 mpg with HELE equipment)

V12 Limited Edition «LaFerrari»:

- Limited edition model with hybrid powertrain
- 585 kW internal combustion engine; 120 kW electric motor
- Lithium ion batteries
- Ultra lightweight car composite structure
- A/C system with HFO-1234yf refrigerant fluid
- Certified fuel economy: 17,6 mpg

MODEL YEAR 2014

MY 2014					
V8 GT			V12 GT		
Model	FE [mpg]	US Manuf.	Model	FE [mpg]	US Manuf.
California	19,8		FF	16,3	
California HELE	20,1		FF HELE	16,6	
V8 Sport			V12 Sport		
Model	FE [mpg]	US Manuf.	Model	FE [mpg]	US Manuf.
458 Italia	18,5		F12 Berlinetta	16,7	
458 Italia HELE	18,7		F12 Berlinetta HELE	17,0	
458 Spider	18,5		V12 Limited Edition		
458 Spider HELE	18,7		Model	FE [mpg]	US Manuf.
458 Speciale	18,5		LaFerrari	17,6	

MY 2014 Ferrari Fleet	2301	MY 2014 V12 Share [%]	
MY 2014 Ferrari Fleet Average Fuel Economy - Adjusted [mpg]			18,4

MODEL YEAR 2015

New V8GT «California T»:

- Downsized engine, 235 ci, gasoline direct injection, two turbochargers, 412 kW
- Downspeeding with higher gear spread of 7 gear dual clutch transmission.
- Certified fuel economy: 23,5 mpg (24,0 mpg with HELE equipment)
- Fuel economy improvement over previous V8GT: 18,7 %

V8 Sports, V12 4 seater, V12 Sports, V12 Limited edition:

- Same as MY 2014

MODEL YEAR 2015

MY 2015					
V8 GT			V12 GT		
Model	FE [mpg]	US Manuf.	Model	FE [mpg]	US Manuf.
California T	23,5		FF	16,3	
California T HELE	24,0		FF HELE	16,6	
V8 Sport			V12 Sport		
Model	FE [mpg]	US Manuf.	Model	FE [mpg]	US Manuf.
458 Italia	18,5		F12 Berlinetta	16,7	
458 Italia HELE	18,7		F12 Berlinetta HELE	17,0	
458 Spider	18,5		V12 Limited Edition		
458 Spider HELE	18,7		Model	FE [mpg]	US Manuf.
458 Speciale	18,5		LaFerrari	17,6	
458 Speciale A	18,5				
458 Speciale A HELE	18,7				

MY 2015 Ferrari Fleet	2755	MY 2015 V12 Share [%]	
MY 2015 Ferrari Fleet Average Fuel Economy – Adjusted [mpg]			19,5

MODEL YEAR 2016

MODEL YEAR 2016

MODEL YEAR 2017

MODEL YEAR 2017

MODEL YEAR 2018

MODEL YEAR 2018

FACTORS AFFECTING PREDICTED FLEET CAFE LEVELS

PROPOSAL FOR AN ALTERNATIVE AVERAGE FUEL ECONOMY STANDARDS FOR MY 2016, MY 2017, MY 2018

Proposal for MY 2016:

- Ferrari proposes a MY 2016 alternative FE standard of 21,0 mpg.

Proposal for MY 2017:

- Ferrari proposes a MY 2017 alternative FE standard of 21,1 mpg.

Proposal for MY 2018:

- Ferrari proposes a MY 2018 alternative FE standard of 21,5 mpg.

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(1-5):
Support for Fuel Efficiency Determinations

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(1) & (2):
Chronological and Technical Support for Fuel Efficiency Determinations

2015 – 2021: MAIN DEVELOPMENTS

Gasoline Direct Injection:

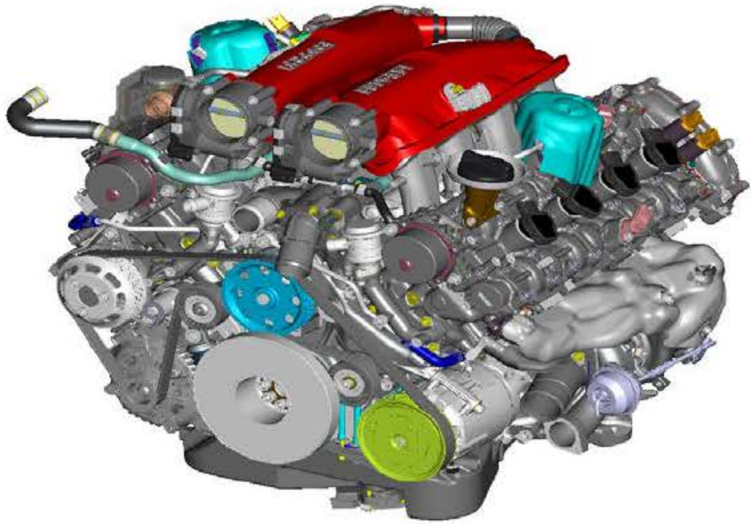
- Brand new combustion chamber design with new injector location, and new aerodynamics
- Main target: tailpipe emissions

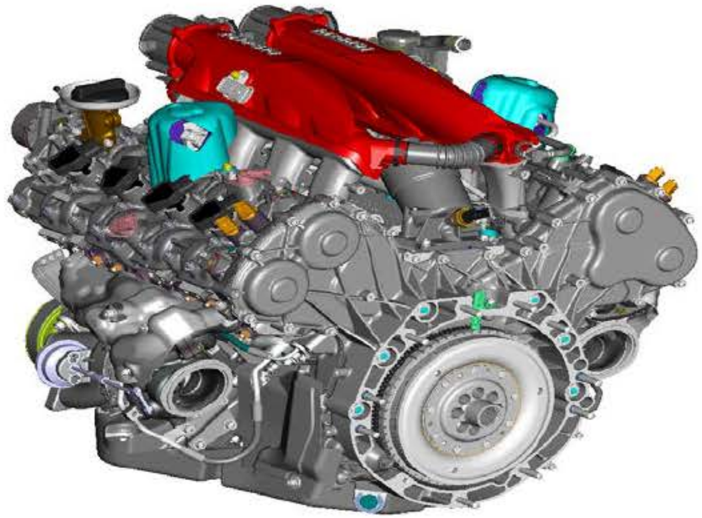
Downsizing:

- Development of a new turbocharged V8 engine family
- Starting with MY 2016, all V8 models fitted with new downsized/downspeeded engines
- Very high BMEP under investigation, time to torque issue addressed with electric assistance
- See specific information next page

NEW V8 ENGINE FAMILY

- Turbocharged, gasoline direct injection
- < 4 liters
- Introduction: MY 2015 (California T)





2015 – 2021: MAIN DEVELOPMENTS

FUEL ECONOMY ESTIMATES

Modeling:

- A virtual car has been built, using the best available estimate of each subsystem (engine / gearbox / vehicle weight / rolling resistance / aerodynamics), leading to performance and emissions estimates along any drive cycle.

Quality of the prediction:

- Virtual vehicle model is working properly and has been calibrated on current cars

FUEL ECONOMY ESTIMATES

Introduction of the improvements:

- Fuel consumption improvements may be delayed or cancelled according to availability from suppliers.

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(3):
Other Federal Motor Vehicle Standards
Impact on Fuel Efficiency

IMPACT OF OTHER US VEHICLE STANDARDS ON FUEL EFFICIENCY

- As a small volume manufacturer, Ferrari faces challenges regarding compliance with the federal and California "Tier 3" tailpipe and evaporative emission standards.

- Given the low volume of vehicles Ferrari produces and the unique design of our vehicles, obtaining components from suppliers is more difficult than for large companies. Also, Ferrari has not had any assistance regarding the components from Fiat or FCA.

- New safety standards, such as FMVSS 216a – Roof Crush Resistance, FMVSS 226 – Ejection Mitigation and FMVSS 214 – Side Impact Protection, also affect weight, aerodynamics and other aspects of vehicle design. Ferrari strongly supports these new safety requirements, anyway they do create design challenges to balance emission control, safety and fuel economy improvement.

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(4):
Fuel Efficiency
Technologies Rationale

DECIDING ON FUEL EFFICIENCY TECHNOLOGIES

DECIDING ON FUEL EFFICIENCY TECHNOLOGIES

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(5):
Fuel Economy Increases
In MY 2017 or MY 2018

§525.7(h)(5): FUEL ECONOMY INCREASES IN MY 2017 OR MY 2018

- As established in the preceding pages and throughout this presentation, Ferrari has demonstrated its efforts to improve fuel economy for its vehicle fleet for MY 2016, MY 2017, and MY 2018.

Ferrari

Attn:
The Honorable James C. Owens
Acting Administrator
National Highway Traffic Safety Administration
U.S. Department of Transportation
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Re: Petition for Exemption from Average Fuel Economy Standards 49 CFR 525 – Ferrari N.V.

Maranello, 15 July, 2020

Dear Acting Administrator Owens,

Ferrari N.V. (Ferrari) hereby submits this Petition for Exemption from Average Fuel Economy Standards (Petition) pursuant to 49 CFR 525 for Model Year 2020. Ferrari previously submitted a petition to cover Model Years 2017, 2018 and 2019 on September 28, 2016 and amended this Petition on December 13, 2017 to instead cover Model Years 2016, 2017 and 2018. Ferrari believes the alternative standard proposed in this Petition meet the statutory criteria for a small volume manufacturer with products in a niche segment of the vehicle market.

Throughout our history until 2019, Ferrari's annual vehicle production had always been less than 10,000 vehicles worldwide. [redacted]

Since 1969, Ferrari's largest shareholder was Fiat S.p.A. (Fiat), which purchased 50% of the company's shares in 1969 and increased its shareholding to 90% in 1988. During the subsequent years, Fiat from time to time sold shares in Ferrari but always repurchased them after a time and always maintained a majority ownership interest. Piero Ferrari, son of the company's founder, owned 10% of Ferrari's shares throughout this time.

Since 2010, Fiat, and more recently its successor Fiat Chrysler Automobiles N.V. (FCA), had owned 90% of Ferrari's shares. FCA's ownership in Ferrari remained at 90% until the IPO and spin-off described below. Throughout the entire period of Fiat/FCA's ownership, Ferrari maintained operations that were completely separate from the parent. This included all research and design, product development, procurement, intellectual property, manufacturing and administration. Throughout its history, Ferrari has designed and produced its engines, transmissions and other powertrain components without assistance or direction from Fiat or FCA. Ferrari treated Fiat/FCA and Piero Ferrari as shareholders from time to time distributing its profits to the shareholders. In late 2014, FCA announced plans to spin off Ferrari. This was to be a phased process.

In October 2015, FCA completed an initial public offering in which 10% of its shares were sold to the public by FCA and listed on the New York Stock Exchange (NYSE). Prior to that time, FCA announced that a full spin-off of its ownership in Ferrari would occur in early 2016.

On January 4, 2016, FCA distributed its remaining 80% interest in Ferrari to existing FCA shareholders. Piero Ferrari retained his 10% interest in the new company. At the time of the spin-off, Ferrari N.V. was also listed on the Milan stock exchange (along with the existing New York Stock Exchange listing) and all Ferrari shares were available to be sold and bought without restriction. At the time of the initial public offering, Ferrari constituted a new Board of Directors consisting of a majority of independent directors and adopted a variety of other corporate governance protections consistent with the requirements of the Dutch Corporate Governance Code. In connection with the IPO and the subsequent spin-off, Ferrari also developed new internal control and disclosure control systems to meet the applicable corporate and accounting disclosure requirements in the three relevant jurisdictions (the U.S., Italy and the Netherlands). On April 15, 2016, Ferrari further expanded its board of directors and appointed a number of new independent directors. On May 2, 2016, Ferrari announced that its long time CEO, Amedeo Felisa, was retiring but would remain on the Board of Directors. [redacted]

On September 28, 2016 Ferrari submitted a Petition for Exemption from Average Fuel Economy Standards pursuant to 49 CFR 525 for Model Years 2017, 2018 and 2019 and then on December 13, 2017 Ferrari submitted an Amendment to the Petition to instead include Model Years 2016, 2017 and 2018.

Prior to and during this period of significant transition, Ferrari has been mindful of its obligations under both the CAFE program and EPA's greenhouse gas (GHG) requirements. Due to its prior status as a majority-owned subsidiary of Fiat/FCA, the U.S.

Ferrari vehicle fleet had been aggregated with Fiat and FCA fleets under the CAFE program. [redacted] With regard to the EPA program, Ferrari obtained "Operational Independence" small volume manufacturer status pursuant to 40 CFR 86.1838.01(d) in June 2013, applicable to Model Year 2012. In June 2015, Ferrari petitioned EPA for alternative standards for Model Years 2017-2021 as a small volume manufacturer. EPA noticed an alternative GHG standard for Ferrari and other small volume manufacturers on July 31, 2019 (see Federal Register, Vol. 84, No. 147, July 31, 2019 at page 37277 et seq.). On July 1, 2020, EPA issued a final determination adopting alternative emission standards for Model Years 2017-2021 for Ferrari (and the other small volume manufacturers that also petitioned EPA. See Federal Register, Vol. 85, No. 127, July 1, 2020 at page 39561 et seq.).

Given the production changes that have occurred due to the COVID-19 pandemic, this Petition is being submitted as expeditiously as practicable after these events.

What follows is a discussion of the relevant provisions of Part 525. As will be noted in certain sections below, additional reference and supporting materials are included in the attached document (Attachment).

§ 525.7(b): Control Relationship

Section 525(b) requests a discussion of whether the petitioner "controls, is controlled by, or is under common control with another manufacturer of automobiles..." After the spin-off of Ferrari from FCA on January 3, 2016, no manufacturer of automobiles owns Ferrari stock. FCA distributed all its shares of Ferrari to its shareholders. These shareholders are free to trade Ferrari shares and have done so. As of February 7, 2020, the ownership of Ferrari-listed outstanding common shares is:

- Public shareholders – 55.0%;
- Exor, a publicly-traded investment company – approx. 24.0%;
- Piero Ferrari – approx. 10.2%;
- BlackRock, Inc. – 6.1%; and
- T. Rowe Price Associates, Inc. - 4.7%.

The percentages of share capital set out here above are calculated as the ratio of (i) the aggregate number of outstanding common shares beneficially owned by the shareholder to (ii) the total number of outstanding common shares (net of treasury shares) of Ferrari.

As of February 7, 2020, approximately 31.4 percent of the outstanding Ferrari common shares were held in the United States.

Exor N.V. is one of Europe's leading investment companies, with a net asset value of nearly $26 billion as of December 31, 2019. Exor makes long-term investments focused on global companies in diversified sectors, primarily in Europe and the U.S. Its investment portfolio and relevant economic rights as of February 29, 2020, include:

- PartnerRe: 100%
- The Economist: 43.40%
- FCA: 28.67%
- CNH Industrial: 26.89%
- Ferrari: 22.91%
- Juventus: 63.77%

The most significant event within Exor portfolio in 2019 was the announcement of the FCA-PSA merger. This merger will create the 3rd largest global car company by revenues and 4th largest by volume.

Due to this diversified portfolio, Exor has taken the position for financial reporting purposes that it has control of and consolidates the financial results of Ferrari and FCA under International Financial Reporting Standards (IFRS). [redacted] Fortunately, NHTSA has provided some guidance as to the meaning of "control" in the CAFE context, by confirming that it is intended to be used in the manner under U.S. corporate law; see NHTSA letter to Tim Green of Ford Motor Corporation (September 19, 1996) (". . .the term when used in the

CAFE context may have the same definition as it has when used in the corporate law context. . . . In the corporate law context, the issue of control is important for determining whether the controlling persons have violated any fiduciary duties to the corporation and other shareholders"); see also NHTSA letter to Lance Tunick re: Lotus/ Bugatti (May 9, 1994).

[redacted]

[redacted]

[redacted]

§ 525.7(c): Quantity of Cars Manufactured MY 2018 – MY 2019

Section 525.7(c) requests information regarding the total number of passenger automobiles manufactured worldwide in the two years preceding each affected model year. Ferrari is providing production data for Model Years 2018-2019. Ferrari keeps records of both worldwide production and sales data on a calendar year (CY) basis, since the manufacturer's annual new model production is not identified by model year in all markets. For this reason, the global sales and production data are shown on a calendar year basis. As can be seen, the annual sales and production data are closely matched.

Total Global Production:

- Total Manufactured vehicles, CY 2018: [redacted]
- Total Manufactured vehicles, CY 2019: [redacted]

[redacted]

§ 525.7(d): MY 2020 Projected Model Mix, Production History, Fuel Economy Compliance Efforts and Estimated U.S. Demand

Section 525.7(d) requests a description of the most fuel efficient model mix for each affected year, as well as information regarding the preceding four model years and anticipated consumer demand in the U.S. for our vehicles. [redacted]

§ 525.7(d)(1): Total Production and Model Mix for Four Model Years Prior to MY 2020

The tables below provide global production and model mix information for Calendar Years 2016-2019.[1] [redacted]

CY 2016 – CY 2019 Annual Total Production and Model Mix

CY 2020 Projected Total Production and Model Mix

[redacted]

[redacted].

§ 525.7(d)(2): MY2020 Production Capacity

[redacted]

§ 525.7(d)(3): Efforts to Comply with MY 2020 Fuel Economy Standards

Ferrari has had an aggressive program in place to increase fuel economy and reduce greenhouse gas emissions. For a small company such as Ferrari, that sells its limited production in approximately 60 nations, Ferrari must be mindful of the regulatory and legislative requirements that affect it. The data in the Attachment addresses the model mix and Ferrari's aggressive and challenging steps to improve fuel economy while keeping the essence of a Ferrari. As is addressed in the section of the Attachment and other sections as well, Ferrari has had and continues to have an aggressive research and development and engineering program. [redacted]

[redacted]

§ 525.7(d)(4): MY 2020 Anticipated U.S. Consumer Demand

The tables below provide Ferrari's best projection of anticipated U.S. demand. The tables also provide fuel economy levels for each model based on the use of EPA fuel economy test procedures.

§ 525.7(e): MY 2020 Vehicle Specifications

Section 525.7(e) requests technical specifications for each model in the model year covered in the petition. This information is provided in the Attachment. Much of the data is taken from Ferrari's application for certification submitted to EPA.

§ 525.7(f) and (g): Projected Fuel Economy Values for MY 2020 Model and Fleet Configurations

Section 525.7(f) requests information for the fuel economy value of each vehicle configuration using calculations specified in 40 CFR Part 600. Section 525.7(g) requests the petitioner to provide a projection of fuel economy for the affected model year based on the data provided under subsection (f). The table below provides the fuel economy data for each model and configuration for Model Year 2020 as well as the adjusted average fuel economy for the entire MY 2020 fleet. [redacted]

MY 2020

Proposal for MY 2020:

- Ferrari proposes a MY 2020 alternative FE standard of 21.0 mpg.

[redacted]

§ 525.7(h): Support for Fuel Efficiency Determinations

Section 525.7(h) requests the information to support the projected fuel economy levels in subsection (g), as well as information regarding past and present plans to address fuel economy, the effect of other federal standards on Ferrari and technologies that were considered but not adopted by Ferrari. Each of these items will be addressed below. Despite Exor's separate investments in FCA and Ferrari, it is important to note that FCA has not provided assistance with the technology developments described in this section. Ferrari does not contemplate any assistance from FCA or any other manufacturer in our efforts.

§ 525.7(h)(1) and (2): Chronological and Technical Support for Fuel Efficiency Determinations

At the outset, it must be noted that with the limited volume of vehicles Ferrari produces, moving from our internal R&D efforts to the production vehicles is dependent on suppliers. Ferrari's low volumes may cause delays or project cancellations due to the inability of suppliers to produce components in the timeframe needed.

[redacted]

[redacted]

[redacted]

[redacted]

§ 525.7(h)(3): Impact of Other Federal Motor Vehicle Standards on Fuel Efficiency

With regard to the impact of other standards on fuel economy, the federal "Tier 3" tailpipe and evaporative emission standards (as well as the California LEV 3 standards) are a major issue, particularly for a high-performance vehicle manufacturer. [redacted]

[redacted]

Safety standards such as FMVSS 216(a) roof crush resistance, FMVSS 226 ejection mitigation, and FMVSS 214 side impact protection affect vehicle weight, aerodynamics and other aspects of vehicle design. Ferrari strongly supports these safety standards, but they create design challenges to balance compliance with these standards with fuel economy improvement.

§ 525.7(h)(4): Fuel Efficiency Technologies Rationale

In evaluating new technologies, Ferrari must consider a number of factors. These include maintaining the high performance and unique driving experience of a Ferrari, customer acceptance, and impact on overall vehicle design. [redacted]

§ 525.7(h)(5): Fuel Efficiency Improvements in MY 2020 and Beyond

As established in the preceding pages and throughout this presentation, Ferrari has demonstrated its efforts to improve fuel economy for its vehicle fleet for MY 2020 and subsequent Model Years. [redacted]

[redacted]

[redacted]

<u>Conclusion</u>

As stated at the outset, Ferrari believes the information provided in this Petition as well as the Attachment demonstrate that each of the requests in subsection 525.7 is fully addressed and that the alternative standard Ferrari requests is the maximum feasible standards that can be applied to a manufacturer with limited size and which competes in a small niche of the overall vehicle market. Ferrari has marked pages in the Attachment that contain confidential information with the designation "Confidential Business Information". A separate request for confidentiality pursuant to 49 CFR Part 512 is also attached. A redacted version of the attached document and supporting materials is also included.

Please contact [redacted] with any questions or if you or the Agency personnel would like to discuss any aspect of this Petition.

Sincerely,

Elisa Cavicchioli
Ferrari N.V.
Head of Certification & Regulatory Affairs

FERRARI:
PETITION FOR ALTERNATIVE FUEL ECONOMY STANDARD FOR MY 2020

Maranello, July 2020

PART I: PETITION FOR ALTERNATIVE FUEL ECONOMY STANDARD FOR MY 2020

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49 CFR Part 525 – Exemption from Average Fuel Economy Standards

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(c):
Cars Manufactured
MY 2018

PRODUCT PORTFOLIO

FERRARI offers three GT & four SPORTS cars, with V8 & V12 engines

MY 2018 TOTAL NUMBER OF CARS MANUFACTURED

Applicant: Ferrari

- Since its creation, top level sports car manufacturer, with very small production volumes
- Started production in 1947, is present in US since more than 60 years
- High technology (8 & 12 cylinder GDI) sports and GT cars only

Total Global Production:

Total US Production:

INFORMATION REGARDING MY 2020 ➔ NEW MODELS

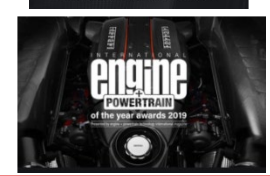
Ferrari portfolio:

Very high performance car market:

- Ferrari has a derogation in European Union for a fleet average of 280 g/km in 2020 based on NEDC.
- Ferrari cars have to remain competitive on overall performance, and have to offer superior performance, even with a very ambitious strategy focused on fuel economy improvement.

CURRENT V8 F154 ENGINE FAMILY

✓	WINNER OF INTERNATIONAL ENGINE OF THE YEAR	2016
✓	WINNER OF BEST NEW ENGINE	2016
✓	WINNER OF BEST PERFORMANCE ENGINE	2016
✓	WINNER OF 3,0lt TO 4,0lt CATEGORY	2016
✓	WINNER OF INTERNATIONAL ENGINE OF THE YEAR	2017
✓	WINNER OF BEST PERFORMANCE ENGINE	2017
✓	WINNER OF 3,0lt TO 4,0lt CATEGORY	2017
✓	WINNER OF BEST OF THE BEST	2018
✓	WINNER OF INTERNATIONAL ENGINE OF THE YEAR	2018
✓	WINNER OF BEST PERFORMANCE ENGINE	2018
✓	WINNER OF 3,0lt TO 4,0lt CATEGORY	2018
✓	WINNER OF INTERNATIONAL ENGINE OF THE YEAR	2019
✓	WINNER OF BEST PERFORMANCE ENGINE	2019



CURRENT V8 F154 ENGINE FAMILY 2/2

CURRENT V12 F140 ENGINE FAMILY

- ✓ WINNER OF ABOVE 4,0lt CATEGORY 2016
- ✓ WINNER OF ABOVE 4,0lt CATEGORY 2017
- ✓ WINNER OF ABOVE 4,0lt CATEGORY 2018
- ✓ WINNER OF BEST NEW ENGINE 2018

CURRENT V12 F140 ENGINE FAMILY 2/2

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(d)(1-4):
MY 2020
Projected Production Mix

§525.7(d)(1): MY 2016 → MY 2019: GLOBAL MANUFACTURED VEHICLES & CORPORATE FUEL ECONOMY

§525.7(d)(1): MY 2016 ➔ MY 2019: US SALES & CORPORATE FUEL ECONOMY

§525.7(d)(1): MY 2020: PROJECTED GLOBAL & US SALES & PRODUCTION MIX

§525.7(d)(2): MY 2020 Production Capacity

§525.7(d)(3): Efforts to Comply with MY 2020 CAFE Standards

§525.7(d)(4): MY 2020 Anticipated US Demand

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(e)(1-9):
MY 2020
Vehicle Specifications

FERRARI:

PETITION FOR ALTERNATIVE FUEL ECONOMY STANDARD

MY 2020 PORTFOLIO

GTC4LUSSO

812superfast

GTC4LUSSO T

Ferrari Portofino

Ferrari 488 PISTA

Ferrari 488 PISTA SPIDER

Ferrari

F8 TRIBUTO

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(f) and (g):
MY2020 Vehicle and Fleet
Projected Fuel Economy

MODEL YEAR 2020

MODEL YEAR 2020

FACTORS AFFECTING PREDICTED FLEET CAFE LEVELS

FERRARI ALTERNATIVE STANDARD PROPOSAL

PROPOSAL FOR AN ALTERNATIVE AVERAGE FUEL ECONOMY STANDARDS FOR MY 2020

Proposal for MY 2020:

- Ferrari proposes a MY 2020 alternative FE standard of 21,0 mpg.

49 CFR Part 525 – Exemption from Average Fuel Economy Standards

§ 525.7(h)(1-5): Support for Fuel Efficiency Determinations

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(1) & (2):
Chronological and Technical Support for Fuel Efficiency Determinations

2020 – 2023: MAIN DEVELOPMENTS

FUEL ECONOMY ESTIMATES

FUEL ECONOMY ESTIMATES 2/2

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(3):
Other Federal Motor Vehicle Standards
Impact on Fuel Efficiency

IMPACT OF OTHER US VEHICLE STANDARDS ON FUEL EFFICIENCY

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(4):
Fuel Efficiency
Technologies Rationale

PROJECTED TECHNOLOGIES EVALUATION

49 CFR Part 525 –
Exemption from Average Fuel Economy Standards

§ 525.7(h)(5):
Fuel Economy
In MY 2021 or MY 2022

§525.7(h)(5): FUEL ECONOMY IN MY 2021 OR MY 2022

- As established in the preceding pages and throughout this presentation, Ferrari has demonstrated its efforts to improve fuel economy for its vehicle fleet for MY 2020 and subsequent MYs.

Koenigsegg

October 18, 2017

To:
Administrator National Highway Traffic Safety Administration, Mr. Maurice Hicks
Washington DC 20590

From:
Koenigsegg Automotive AB, Mr. Wouter Griffioen,
Koenigsegg US emissions Compliance Representative - Consultant/Contractor
Kelliehousevägen 73
262 74 Ängelholm
SWEDEN

2015 Model Year Average Fuel Economy Standards Exemption Petition

Introduction
Koenigsegg Automotive AB (in short: Koenigsegg) is a low volume manufacturer of passenger automobiles, that produces less than 10,000 passenger automobiles in any given model year. As such Koenigsegg is eligible for exemption from average fuel economy standards as per 49 CFR §525. Koenigsegg also meets the definition for Small Business Administration qualification according to 13 CFR Part 121, having less than 1,500 worldwide employees including affiliates.

Good cause for later submission
As a European passenger automobiles manufacturer, Koenigsegg experienced a steep learning curve when entering the US market. However, it was only after receiving the NHTSA's compliance short letter concerning its MY 2015 CAFE credit deficit (October 6th, 2017), that Koenigsegg staff realized their lack of knowledge regarding LVM CAFE exemption provisions. After consulting NHTSA staff (Mr. Maurice Hicks), the possibility was offered to file for a retroactive petition.

Relationship with other manufacturers
Koenigsegg is an independent, privately owned company. It is not owned by or controlled by any other manufacturer. Also, it does not own or control any other manufacturer.

Total number of passenger automobiles manufactured in 2016MY
Please refer to the "Confidential Business Information" section of this document.

Model Year 2015 realized US sales number and Model Year 2011 through 2015 global production numbers
Please refer to the "Confidential Business Information" section of this document.

Model Year 2015 vehicle features
- Maximum overall body width: 2,060 mm – 81.1 inches
- Overall length: 4,500 mm – 177.2 inches
- Overall height: 1,125 mm – 45.3 inches
- Vehicle curb weight: 3272 lbs.
- Number of designated seating positions: 2.
- Interior volume index: 53.0.
- Basic engine: Combustion engine, V8, turbo charged.
- Engine displacement: 5 liters.
- SAE rated net power, 850 kilowatts (1140 HP).

- Fuel metering system: Sequential multipoint injection.
- Drive train configuration: Rear wheel drive.
- Total drive ratio: 2.331 in 7th gear, final drive ratio: 3.454
- Emission control system: SFI/2TWC/2Ho2S/TC/CAC
- Dynamometer road load: 15.7 hp@50mph (not adjusted for AC usage)
- Engine lubricant viscosity: 5W50
- Gearbox/differential lubricant viscosity: 75W-90

MY2015 Fuel Economy per 40 CFR 600.510
Please refer to the "Confidential Business Information" section of this document.

Maximum feasible average fuel economy achievable
The MY2015 Fuel Economy per 40 CFR 600.510 is the maximum feasible average fuel economy achievable because Koenigsegg offers only one vehicle configuration. Therefore, it is not possible to modify the production mix in order to achieve a better fuel economy. Furthermore, Koenigsegg has used the following technological means to improve average fuel economy:

- Model Year 2015: N/A
- Model Year 2016: Introduction of Agera RS with reduced aerodynamic drag achieved by smaller wings as well as other aerodynamic drag reduction modifications
- Model Year 2017: N/A

It is expected that the Federal motor vehicle standards regarding rear view mirrors have a significant effect on fuel economy. If rear view mirrors are replaced by camera systems, fuel economy will improve significantly.
Koenigsegg is developing a hybrid drive train, consisting of a conventional combustion engine and a combination of three electric motors. However, for MY15 through MY18 this technology has not been introduced into production, due to budget and staff limitations.

Further Data, Views and Arguments
Koenigsegg passenger automobiles are worldwide known for their uncompromised and unchallenged performance. An obligation to meet the corporate average fuel economy would jeopardize Koenigsegg's position as world class leader of hyper cars. Also, due to its size, Koenigsegg has a limited budget for research and development. Notwithstanding this, Koenigsegg has implemented several fuel saving engineering changes:

- Lightweight materials. Koenigsegg uses carbon fibers, not only for the body panels, but also for structural parts.
- Compact engine. Where other competitors often use 6 liters or larger displacement 10- or 12-cylinder engines, the Koenigsegg engine is a relative small (5 liters) V8 engine. The twin turbos facilitate hyper car performance (over 1000 HP).

Koenigsegg realizes that their vehicles contribute to the world CO2 emissions and the linked global warming problems. The CO2 emissions however are to be considered marginal, due to the limited number of vehicles and the limited mileage per vehicle.
Koenigsegg is in a similar situation as several other low volume manufacturers that received exemption from meeting CAFE standards. It is not unreasonable to state that the Koenigsegg exemption petition be granted.

CONCLUSION
Based upon the foregoing, Koenigsegg respectfully requests that NHTSA grant this petition for an exemption to the CAFE standards set forth above for Model Year 2015.

Respectfully submitted,

Christian von Koenigsegg
CEO
Koenigsegg Automotive AB

Koenigsegg

December 22, 2017

To:
Administrator National Highway Traffic Safety Administration, Mr. Maurice Hicks
Washington DC 20590

From:
Koenigsegg Automotive AB, Mr. Wouter Griffioen,
Koenigsegg US emissions Compliance Representative - Consultant/Contractor
Kelliehousevägen 73
262 74 Ängelholm
SWEDEN

2018 Model Year Average Fuel Economy Standards Exemption Petition

Introduction
Koenigsegg Automotive AB (in short: Koenigsegg) is a low volume manufacturer of passenger automobiles, that produces less than 10,000 passenger automobiles in any given model year. As such Koenigsegg is eligible for exemption from average fuel economy standards as per 49 CFR §525. Koenigsegg also meets the definition for Small Business Administration qualification according to 13 CFR Part 121, having less than 1,500 worldwide employees including affiliates.

Good cause for later submission
As a European passenger automobiles manufacturer, Koenigsegg experienced a steep learning curve when entering the US market. However, it was only after receiving the NHTSA's compliance short letter concerning its MY 2015 CAFE credit deficit (October 6th, 2017), that Koenigsegg staff realized their lack of knowledge regarding LVM CAFE exemption provisions. After consulting NHTSA staff (Mr. Maurice Hicks), the possibility was offered to file for a retroactive petition for 2015MY, as well as a late petition for 2018MY. The 2015MY petition was submitted in October, 2017, and this is the 2018MY petition.

Relationship with other manufacturers
Koenigsegg is an independent, privately owned company. It is not owned by or controlled by any other manufacturer. Also, it does not own or control any other manufacturer.

Total number of passenger automobiles manufactured in 2016MY
Please refer to the "Confidential Business Information" section of this document.

Model Year 2018 projected US sales number and Model Year 2013 through 2017 global production numbers
Please refer to the "Confidential Business Information" section of this document.

Model Year 2018 vehicle features
- Maximum overall body width: 2,060 mm – 81.1 inches
- Overall length: 4,500 mm – 177.2 inches
- Overall height: 1,125 mm – 45.3 inches
- Frontal area: 1.873 square meters – 20,16 square feet
- Loaded vehicle weight: 3483 lbs.
- Number of designated seating positions: 2.
- Interior volume index: 53.0.
- Basic engine: Combustion engine, V8, turbo charged.

- Engine displacement: 5 liters.
- SAE rated net power, 865 kilowatts (1160 HP).
- Fuel metering system: Sequential multipoint injection.
- Drive train configuration: Rear wheel drive.
- Total drive ratio: 2.331 in 7th gear, final drive ratio: 3.454
- Emission control system: SFI/2TWC/2Ho2S/TC/CAC
- Dynamometer road load: 15.7 hp@50mph (not adjusted for AC usage)
- Engine lubricant viscosity: 5W50
- Gearbox/differential lubricant viscosity: 75W-90

MY2018 Fuel Economy per 40 CFR 600.510
Please refer to the "Confidential Business Information" section of this document.

Maximum feasible average fuel economy achievable
The MY2018 Fuel Economy per 40 CFR 600.510 is the maximum feasible average fuel economy achievable because Koenigsegg offers only one vehicle configuration. Therefore, it is not possible to modify the production mix in order to achieve a better fuel economy. Furthermore, Koenigsegg has used the following technological means to improve average fuel economy:

- Model Year 2015: N/A
- Model Year 2016: Introduction of Agera RS with reduced aerodynamic drag achieved by smaller wings as well as other aerodynamic drag reduction modifications
- Model Year 2017: N/A

It is expected that the Federal motor vehicle standards regarding rear view mirrors have a significant effect on fuel economy. If rear view mirrors are replaced by camera systems, fuel economy will improve significantly.
Koenigsegg is developing a hybrid drive train, consisting of a conventional combustion engine and a combination of three electric motors. However, for MY15 through MY18 this technology has not been introduced into production, due to budget and staff limitations.

Further Data, Views and Arguments
Koenigsegg passenger automobiles are worldwide known for their uncompromised and unchallenged performance. An obligation to meet the corporate average fuel economy would jeopardize Koenigsegg's position as world class leader of hyper cars. Also, due to its size, Koenigsegg has a limited budget for research and development. Notwithstanding this, Koenigsegg has implemented several fuel saving engineering changes:

- Lightweight materials. Koenigsegg uses carbon fibers, not only for the body panels, but also for structural parts.
- Compact engine. Where other competitors often use 6 liters or larger displacement 10- or 12-cylinder engines, the Koenigsegg engine is a relative small (5 liters) V8 engine. The twin turbos facilitate hyper car performance (over 1000 HP).

Koenigsegg realizes that their vehicles contribute to the world CO2 emissions and the linked global warming problems. The CO2 emissions however are to be considered marginal, due to the limited number of vehicles and the limited mileage per vehicle.
Koenigsegg is in a similar situation as several other low volume manufacturers that received exemption from meeting CAFE standards. It is not unreasonable to state that the Koenigsegg exemption petition be granted.

CONCLUSION
Based upon the foregoing, Koenigsegg respectfully requests that NHTSA grant this petition for an exemption to the CAFE standards set forth above for Model Year 2018.

Respectfully submitted,

Christian von Koenigsegg
CEO
Koenigsegg Automotive AB

Koenigsegg

January 14, 2019

To:
Administrator National Highway Traffic Safety Administration, Mr. Maurice Hicks
Washington DC 20590

From:
Koenigsegg Automotive AB, Mr. Edward Ponagai
Koenigsegg US Emissions Compliance Representative Consultant/Contractor
Vehicle Environmental Engineering
127 Castlewood Dr.
Brooklyn, MI 49230-9723

2019-2021 Model Year Average Fuel Economy Standards Exemption Petition

Introduction:
Koenigsegg Automotive AB (in short: Koenigsegg) is a low volume manufacturer of passenger automobiles, that produces less than 10,000 passenger automobiles in any given model year. As such Koenigsegg is eligible for exemption from average fuel economy standards as per 49 CFR §525. Koenigsegg also meets the definition for Small Business Administration qualification according to 13 CFR Part 121, having less than 1,500 worldwide employees including affiliates.

This is Koenigsegg's 2019MY through 2021MY petition as a low volume manufacture (LVM) CAFE exemption.

Relationship with other manufacturers:
Koenigsegg is an independent, privately owned company. It is not owned by or controlled by any other manufacturer. Also, it does not own or control any other manufacturer.

Total number of passenger automobiles manufactured in 2017MY:
Please refer to the "Confidential Business Information" section of this document.

Model Year 2019 – 2021 projected US sales number and Model Year 2013 through 2017 global production numbers.
Please refer to the "Confidential Business Information" section of this document.

Koenigsegg Regera Model Year 2019 vehicle features

- Maximum overall body width: 2,024 mm – 79.7 inches
- Overall length: 4,580 mm – 180.3 inches

- Overall height: 1,120 mm – 44.1 inches
- Frontal area: 1.873 square meters – 20,16 sq ft
- Front track: 1,694 mm – 66.7 inches
- Rear track: 1,650 mm – 65.0 inches
- Average track: 65.8 inches
- Footprint: 47.9 sq ft
- Curb weight: 1675 kg - 3690 lbs.
- Number of designated seating positions: 2
- Interior volume index: 53.0
- Basic engine: Combustion engine, V8, turbo charged
- Engine displacement: 5 liters
- Combustion engine net power: 900kW – 1,200 HP
- Electric motors maximum hourly output: 260 kW – 350 HP
- Total propulsion power, combustion engine and electric drive: 1120 kW – 1500 HP
- Fuel metering system: Sequential multipoint injection
- Drive train configuration: Rear wheel drive
- Transmission: Single speed direct drive with lock-up torque converter
- Hybrid drive: One crankshaft mounted motor, two transmission output axle mounted motors
- 800 V, 4.5 kWh hybrid battery
- Emission control system: CAC, HO2S, TC, TWC, WR-HO2S
- Dynamometer road load: 11.2 hp@50mph
- Engine lubricant viscosity: 5W50
- The lubricants used in the engine, transmission, and differential were chosen to withstand stresses experienced from extreme output power-train, so no low friction optimization.

Koenigsegg was unable to submit this petition promptly for the following reasons. The all new 2019 Regera hybrid was in development and engineering validation longer than anticipated and it took a large investment in capital to design, engineering, testing and validation of engine, electric motors and all new transmission. The required coastdown data, dynamometer road load settings and development fuel economy results that are needed to submit the exemption pertition were not available until recently.

MY2019 Fuel Economy per - 49 CFR Part 531
Please refer to the “Confidential Business Information” section of this document.

Maximum feasible average fuel economy achievable:
The MY2019-2021 Fuel Economy per - 49 CFR Part 531 is the maximum feasible average fuel economy achievable, because Koenigsegg has no opportunity to improve its fuel economy by changing its fleet mix since it has only one model during the years for which this petition is being filed. Furthermore, Koenigsegg has used the following technological means to improve average fuel economy:

- Model Year 2016: Introduction of Agera RS with reduced aerodynamic drag achieved by smaller wings as well as other aerodynamic drag reduction modifications
- Model Year 2017: N/A

- Model Year 2018: First US sales of the Agera RS with combustion engine.
- Model Year 2019: Introduction of the Regera hybrid electric vehicle.

  a. Three electric motors are used to complement the combustion engine.
  b. The electric motors allow for torque vectoring, regenerative braking and energy conversion.
  c. Koenigesgg Direct Drive (KDD) transmission is revolutionary technology that replaces the combustion engine's traditional transmission making the car lighter and more efficient.
  d. The KDD provides direct drive to the rear axle without the need of multitude gears that have inherently high energy losses.
  e. During highway driving the KDD reduces drive-train losses compared to the traditional transmission by over 50%, because there is no up shifting or down shifting.
  f. Vehicle aerodynamic drag optimization.

- Model Year 2020-2021: Continuation of Regera build, no significant changes planned

The Federal motor vehicle standard FMVSS 111 Rearview mirrors, has a negative effect on fuel economy. If Koenigsegg were allowed to remove side-view mirrors and replace them with cameras that may expand side vision while the aerodynamic benefits that will reduce fuel consumption.

Further Data, Views and Arguments:
Koenigsegg passenger automobiles are worldwide known for their uncompromised and unchallenged performance. An obligation to meet the corporate average fuel economy would jeopardize Koenigsegg's position as world class leader of hyper cars. Also, due to its size, Koenigsegg has a limited budget for research and development. Notwithstanding this,

Koenigsegg has implemented several fuel saving engineering changes:

- Lightweight materials. Koenigsegg uses carbon fibers, not only for the body panels, but also for structural parts.
- Compact engine. Where other competitors often use 6 liters or larger displacement 10- or 12-cylinder engines, the Koenigsegg engine is a relatively small (5 liters) V8 engine. The twin turbo's and hybrid propulsion facilitate hyper car performance (approaching 1500 HP).
- Hybrid introduction with the Regera to enable significant performance increase with virtually unchanged fuel economy in spite of a weight increase of approx. 600 lbs. vs. the 2018MY Agera RS

Koenigsegg realizes that their vehicles contribute to the world CO2 emissions and the linked global warming problems. The CO2 emissions however are to be considered marginal, due to the limited number of vehicles and the limited mileage per vehicle. It is not technologically feasible or economically practicable for Koenigsegg to achieve an average fuel economy in model years 2019 through 2022 above the target footprint level. We estimate the fuel consumed by operating the MYs 2019 – 2022 vehicles for the expected use full life would consume 3,571 barrels, this is insignificant compared to the fuel used daily by the entire motor vehicle fleet. In

2017, about 142.85 billion gallons (or about 3.40 billion barrels) of finished motor gasoline were consumed in the United States, a daily average of about 391.40 million gallons (or about 9.32 million barrels per day). (Source, U.S. Energy Information Administration)

Koenigsegg is in a similar situation as several other low volume manufacturers that received exemption from meeting CAFE standards. It is not unreasonable to state that the Koenigsegg exemption petition be granted.

CONCLUSION

Based upon the foregoing, Koenigsegg respectfully requests that NHTSA grant this petition for an exemption to the CAFE standards set forth above for Model Years 2019-2021.

Respectfully submitted,

Christian von Koenigsegg
CEO
Koenigsegg Automotive AB

[redacted]

Koenigsegg Automotive AB
Kelliehousevägen 73
Ängelholm
262 74
Sweden

April 29, 2020

To: Mr. Daniel Rabinovitz
Chief Council
National Highway Traffic Safety Administration
1200 New Jersey Avenue, NCC-111
West Building W41-204
Washington, DC 20590
ATTENTION: Part 512 Confidentiality Request

From:
Henrik Wiese
Technical Manager
Koenigsegg Automotive AB

2022-2024 Model Year Average Fuel Economy Standards Exemption Petition

Introduction:
Koenigsegg Automotive AB (Koenigsegg) is a low volume manufacturer of high-performance sports cars, see www.Koenigsegg.com. We submit this petition under 40 CFR Part 525 as a small volume manufacturer seeking a Corporate Average Fuel Economy (CAFE) exemption and alternative standards for model years 2022-2024.

Koenigsegg requests alternative fuel economy standards of 16.9, 15.7 and 15.6 mpg for the 2022, 2023 and 2024MY. These standards are currently approximations. The two model lines which will be delivered during these years, Jesko and Gemera, have not been fully tested. As such, Koenigsegg is estimating the fuel economy data based on previous models. A updated petition will be submitted when final data is available.

Timeliness (49 CFR 525.6(b))
In an effort to show good faith compliance with the 24 months in advance submission requirement in 49 CFR § 525.6(b), Koenigsegg is submitting its petition for MY 2022-2024 now, even though actual fuel economy numbers for vehicles to be sold during those model years is not yet available.

Moreover, the absence of such actual numbers constitutes "good cause" for any delay in filling this petition, as does the global Coronavirus pandemic which has created global havoc in all industries, including the automotive sector.

The data presented by Koenigsegg in this petition is based on fuel economy data from models tested previously.

Koenigsegg will supplement this petition when actual fuel economy data for the MY 2022-2024 is available.

Eligibility (49 CFR 525.5)
Koenigsegg is a part of a corporate group that produces less than 10,000 passenger automobiles globally in any given model year, and will not surpass that limit either in 2020, the second model year preceding the first model year affected by this petition, or in any of the model years 2021 - 2024. As such, Koenigsegg is eligible for exemption from average fuel economy standards as per 49 CFR part 525.

In the absence of an exemption, Koenigsegg, per 49 CFR § 531.5(c) would be required to meet fuel economy standards of 45.0, 43.9 and 45.9 mpg for the 2022, 2023 and 2024MY. See confidential Appendix A for calculation.

Set forth below is the required information supporting Koenigsegg's 2022MY through 2024MY petition for a small volume manufacturer (SVM) CAFE exemption.

Koenigsegg Automotive AB
Kelliehousevägen 73
Ängelholm
262 74
Sweden

***49 CFR § 525.7 (b)** - Whether the petitioner **controls, is controlled by, or is under common control with another manufacturer** of passenger automobiles, and if so, the nature of that control relationship, and the total number of passenger automobiles manufactured by such other manufacturer or manufacturers.*

Koenigsegg is a part of the corporate group involving Evergrande, NEVS, Meneko, Alpraaz and Koenigsegg. At the time of submitting this petition, 2020-04-29, no other companies in the corporate group besides Koenigsegg and Meneko produce or are likely to produce or start producing vehicles throughout the time period from present through 2024. Koenigsegg will only produce the Koenigsegg Jesko and Jesko Absolut. Meneko will produce the Gemera as a Koenigsegg, and is included in this petition. Presently, Meneko does not produce any vehicles.

49 CFR § 525.7 (c)** - The total number of **passenger automobiles manufactured** or likely to be manufactured (whether or not in the customs territory of the United States) by the petitioner **in the second model year immediately preceding each of the affected model years.

Calendar year 2020 through 2022 predicted global Koenigsegg production numbers:

2020 Please refer to the "Confidential Business Information" section of this document.
2021 Please refer to the "Confidential Business Information" section of this document.
2022 Please refer to the "Confidential Business Information" section of this document.

***49 CFR § 525.7 (d)** - For each affected model year, the petitioner's **projections of the most fuel-efficient production mix of vehicle configurations** and base levels of its passenger automobiles which the petitioner could sell in the US in that model year, and a discussion demonstrating that these projections are reasonable.*

Our projections of our most fuel-efficient production mix of US-sales are as follows:

2022MY Please refer to the "Confidential Business Information" section of this document.
2023MY Please refer to the "Confidential Business Information" section of this document.
2024MY Please refer to the "Confidential Business Information" section of this document.

Koenigsegg manufactures high performance aerodynamic sport vehicles. We cannot change this fundamental aspect of our vehicle **configuration**. Changing this nature of Koenigsegg cars (such as by reducing performance) would be economically impractical. It would significantly reduce our already very small number of sales and cause economic ruin as a small volume manufacturer.

In 2022MY, Koenigsegg also has no opportunity to improve its fuel economy by changing its fleet **mix** since it will have only one model during that year.

In 2023MY, Koenigsegg will introduce the Gemera - the second hybrid electrical vehicle in Koenigsegg's fleet (the first being Regera, introduced into the US in MY 2019). The Gemera will be All Wheel Drive and Koenigsegg's first 4 passenger vehicle and is being introduced because of global market shifts in that direction, even for super premium vehicles.

Our projections under 49 CFR 525.7 (d) is consistent with:

Koenigsegg Automotive AB
Kelliehousevägen 73
Ängelholm
262 74
Sweden

- *Per **49 CFR § 525.7 (d)(1)** - Our **annual total production and production mix** of passenger automobiles manufactured or likely to be manufactured in each of **the four model years immediately preceding affected model years.***

2018	15 vehicles	One carline only
2019	20 vehicles	One carline only
2020	Please refer to the "Confidential Business Information" section of this document.	
2021	Please refer to the "Confidential Business Information" section of this document.	

- *Per **49 CFR § 525.7 (d)(2)** - Koenigsegg´s passenger automobile world-wide **production capacity** for affected model years.*

2022	Please refer to the "Confidential Business Information" section of this document.
2023	Please refer to the "Confidential Business Information" section of this document.
2024	Please refer to the "Confidential Business Information" section of this document.

- ***49 CFR § 525.7 (d)(3)** - Koenigsegg´s **efforts to comply** with average fuel economy standards.*

Koenigsegg has made important efforts towards improving fuel economy. The key Koenigsegg effort have been aerodynamics, decreased internal combustion engine (ICE) size, hybridization, a revolutionary direct drive transmission, and lightweight materials.

Koenigsegg has developed and introduced innovative hybrid technology.

In 2019MY Koenigsegg introduced its first **hybrid** electric vehicle, the Regera. With the 2023MY Gemera, Koenigsegg will introduce its first **plug-in hybrid** vehicle and continue with commercialize high-performance hybrid electrical vehicles into a segment where traditional combustion engines have been the norm.

The Gemera is the first vehicle offered by Koenigsegg with a pure electric drive mode and an estimated all-electric range of 31 miles. The Regera does not have a pure electric drive mode.

Given the nature of the high-performance vehicles, however, this technology does not necessarily lead to improved fuel economy.

A low coefficient of drag, does improve the fuel economy and also contributes to the performance of the vehicle. Koenigsegg vehicles, are designed to reduce the drag. Because of the performance nature, however, higher downforce is also a key element incorporated into the Koenigsegg design, and higher downforce is a disadvantage to the fuel economy.

Lightweight materials - Koenigsegg vehicles are designed to reduce weight by using materials like carbon fiber, titanium, Inconel or other lightweight substances. Koenigsegg uses carbon fibers, not only for body panels, but also for structural parts. E.g. monocoque, rear crash structure, doors, side crash structures, and the roof are made of carbon fiber to reduce weight. As an option also the rims are offered in carbon fiber.

Furthermore, the ICE fitted into Gemera will be a *three*-cylinder engine - a very significant downsizing from the traditional Koenigsegg V8. Given the nature of the high-performance vehicles, however, uses of the small 3-cylinder engine, does not necessarily lead to improved fuel economy. Where other competitors often use 6 liter or larger displacement 10- or 12-cylinder engines, the Koenigsegg engine

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have been relatively small (5 liters) V8 engine for Jesko, and for Gemera an unique inline 3-cylinder engine combined with hybrid propulsion.

Last, Koenigsegg has developed and implemented its Direct Drive (KDD) transmission. This is revolutionary technology, that replaces the combustion engine's traditional transmission, making the car lighter and more efficient.

- The KDD provides direct drive to the front axels without the need of multitude gears that have inherently high energy losses.
- During highway driving the KDD reduces the drive-train losses compared to the traditional transmission by over 50%, because there is no up shifting or down shifting.

See also below regarding 40 CFR § 525.7(h)- information demonstrating that the average fuel economy figure provided for each affected model year under paragraph (g) of this section is the maximum feasible average fuel economy achievable.

- *Per **49 CFR § 525.7 (d)(4)** - Anticipated **consumer demand** in the United States for passenger automobiles during that affected model year.*

Based on our market research, we have forecasted US demand as follow:

2022MY	Please refer to the "Confidential Business Information" section of this document.
2023MY	Please refer to the "Confidential Business Information" section of this document.
2024MY	Please refer to the "Confidential Business Information" section of this document.

***49 CFR § 525.7 (e)** - For each affected model year, a **description of the following features of each vehicle** configuration of the petitioner's passenger automobiles to be manufactured in that affected model year*

2022-2024MY Koenigsegg Jesko and Koenigsegg Jesko Absolute
Koenigsegg will offer two vehicle configurations of the model Jesko, where the differences between those are limited to aerodynamic features. The powertrain is shared between the two vehicle configurations. Both variants use the same conventional combustion engine.

Koenigsegg Jesko Model Year 2022-2024 vehicle features:

- Maximum overall body width: 2023 millimeters, 79.65 inches
- Overall length: 4610 millimeters, 181.50 inches
- Overall height: 1210 millimeters, 47.64 inches
- Frontal area: 1.87 square meters, 20.13 sq. ft
- Front track width: 1714 millimeters, 67.48 inches
- Rear track width: 1664 millimeters, 65.51 inches
- Average track width: 1689 millimeters, 66.50 inches
- Wheelbase: 2700 millimeters, 106.30 inches
- Footprint: 4.56 square meters, 49.08 sq. ft
- Curb weight: 1420 kg, 3130.6 lbs.
- Number of designated seating positions: 2
- Interior volume index: 53
- Basic engine: Combustion engine, V8, turbo charged
- Engine displacement: 5.0 liters
- Combustion engine net power gasoline: 985 kW, 1280 hp
- Combustion engine net power E85: 1195 kW, 1600 hp
- Electric motors maximum hourly output: N/A

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- Total propulsion power gasoline: 985 kW, 1280 hp
- Total propulsion power E85: 1195 kW, 1600 hp
- Fuel metering system: Sequential multipoint injection
- Drive train configuration: Rear wheel drive
- Transmission: 9-speed automatic
- Hybrid drive: N/A
- High-voltage battery: N/A
- Emission control system: CAC, WR-HO2S, TC, HTWC, TWC, AIR, IMRC
- Dynamometer road load: Not determined at the time of submitting this document.
- Engine lubricant viscosity: 5W-50
- The lubricants used in the engine, transmission, and differential were chosen to withstand stresses experienced from extreme output power-train, so no low friction optimization.

Koenigsegg Jesko Absolute Model Year 2022-2024 vehicle features:

- Maximum overall body width: 2030 millimeters, 79.92 inches
- Overall length: 4845 millimeters, 190.75 inches
- Overall height: 1210 millimeters, 47.64 inches
- Frontal area: 1.87 square meters, 20.13 sq. ft
- Front track width: 1714 millimeters, 67.48 inches
- Rear track width: 1664 millimeters, 65.51 inches
- Average track width: 1689 millimeters, 66.50 inches
- Wheelbase: 2700 millimeters, 106.30 inches
- Footprint: 4.56 square meters, 49.08 sq. ft
- Curb weight: 1290 kg, 2844.0 lbs.
- Number of designated seating positions: 2
- Interior volume index: 53
- Basic engine: Combustion engine, V8, turbo charged
- Engine displacement: 5.0 liters
- Combustion engine net power gasoline: 985 kW, 1280 hp
- Combustion engine net power E85: 1195 kW, 1600 hp
- Electric motors maximum hourly output: N/A
- Total propulsion power gasoline: 985 kW, 1280 hp
- Total propulsion power E85: 1195 kW, 1600 hp
- Fuel metering system: Sequential multipoint injection
- Drive train configuration: Rear wheel drive
- Transmission: 9-speed automatic
- Hybrid drive: N/A
- High-voltage battery: N/A
- Emission control system: CAC, WR-HO2S, TC, HTWC, TWC, AIR, IMRC
- Dynamometer road load: Not determined at the time of submitting this document.
- Engine lubricant viscosity: 5W-50
- The lubricants used in the engine, transmission, and differential were chosen to withstand stresses experienced from extreme output power-train, so no low friction optimization.

2023-2024MY Koenigsegg Gemera

The Gemera will be the first four-seater and <u>first plug-in</u> hybrid electric vehicle produced by Koenigsegg. It will also be the first Koenigsegg car not to have a V8. Instead, it will have a newly developed 3-cylinder combustion engine paired with <u>three</u> electrical drive motors.

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Koenigsegg Gemera Model Year 2023-2024 vehicle features:

- Maximum overall body width: 1988 millimeters, 78.27 inches
- Overall length: 4975 millimeters, 195.87 inches
- Overall height: 1295 millimeters, 50.98 inches
- Frontal area: 2.17 square meters, 23.26 sq. ft
- Front track width: 1690 millimeters, 66.54 inches
- Rear track width: 1645 millimeters, 64.76 inches
- Average track width: 1667.5 millimeters, 65.65 inches
- Wheelbase: 3000 millimeters, 118.11 inches
- Footprint: 5.00 square meters, 53.85 sq. ft
- Curb weight: 1850 kg, 4078.6 lbs.
- Number of designated seating positions: 4
- Interior volume index: 99
- Basic engine: Inline 3-cylinder, turbo charged, Freevalve VVT
- Engine displacement: 2.0 liters
- Combustion engine net power: 447 kW, 600 hp
- Electric motors maximum hourly output: 1044 kW, 1400 hp
- Total propulsion power, combustion engine and electric drive: 1268 kW, 1700 hp
- Fuel metering system: Sequential multipoint injection
- Drive train configuration: AWD, FWD and RWD, user selectable
- Transmission: Single speed direct drive with lock-up torque converter
- Hybrid drive: One crankshaft mounted motor, two rear output axle mounted motors
- High-voltage battery: 800V, 15kWh
- Emission control system: WCAC, WR-HO2S, TC, GPF, TWC, AIR, VVT
- Dynamometer road load: Not determined at the time of submitting this document.
- Engine lubricant viscosity: 5W-50

The lubricants used in the engine, transmission, and differential were chosen to withstand stresses experienced from extreme output power-train, so no low friction optimization.

49 CFR § 525.7 (f) *- For each affected model year,* ***a fuel economy value for each vehicle configuration*** *specified in 40 CFR 600.506(a)(2), base level, and model type of the petitioner's passenger automobiles to be manufactured in that affected model year*

Until actual fuel economy data is available, for the moment, Koenigsegg has calculated the fuel economy for the Jesko and Gemera, based on previously tested models as follows:

2022MY	16.6 mpg	Koenigsegg Jesko based on Koenigsegg Agera FE.
2023MY	16.6 mpg	Koenigsegg Jesko based on Koenigsegg Agera FE.
2023MY	15.3 mpg	Koenigsegg Gemera based on Koenigsegg Regera FE.
2024MY	16.6 mpg	Koenigsegg Jesko based on Koenigsegg Agera FE.
2024MY	15.3 mpg	Koenigsegg Gemera based on Koenigsegg Regera FE.

The fuel economy for 2022-2024MY Jesko is projected based on the 2018MY Koenigsegg Agera RS. They are both two seaters and are based on the same 5.0L V8, neither have HEV or PHEV. The footprint for Jesko is slightly larger compared to Agera RS, 49.1 vs. 48.0 sq. ft, but it has an **improved aerodynamics and engine controller.**

The fuel economy for 2023-2024MY Gemera is projected based on the 2019MY and 2020MY Koenigsegg Regera. But the Gemera is an AWD, four-seater plug-in hybrid with pure electric mode and fitted with a new 2.0L 3-cylinder engine combined with 3 electric drive motors. The Regera is a RWD, two-seater with 5.0L V8

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and 3 electric drive motors. It is not a plug-in hybrid. The footprint of the Gemera is also larger compared to the Regera, 53.9 vs. 47.9 sq. ft. This fact, together with the AWD and heavier mass, means that fuel economy benefits of the Gemera over the Regera are not expected.

49 CFR § 525.7 (g) *- For each affected model year, a* ***fleet average fuel economy figure*** *for the petitioner's passenger automobiles to be manufactured in that affected model year calculated in accordance with 40 CFR 600.510(e) and based upon the fuel economy values provided under paragraph (f) of this section and upon the petitioner's production mix projected under paragraph (d) of this section for the affected model year.*
The average fuel economy based on the 19 CFR § 525.5 (f) figures:

2022MY	16.9 mpg
2023MY	15.7 mpg
2024MY	15.6 mpg

See confidential Appendix B for calculations.

49 CFR § 525.7 (h) *- Information demonstrating that the average fuel economy figure provided for each affected model year under paragraph (g) of this section is the* ***maximum feasible average fuel economy achievable by the petitioner for that model year***

Please refer to the information above under 49 CFR 525.7(d)(3).

The requested MY2022 - MY2024 fuel economy value are the maximum feasible average fuel economy achievable, because Koenigsegg has no opportunity to improve its fuel economy by changing its vehicle configurations (given the high performance nature of its product line) or fleet mix (given the shifting market demand to AWD, 4 seat sport vehicles). Given the extremely production of Koenigsegg, we cannot add another model line.

Furthermore, even though Koenigsegg has used the following technological means in an effort to improve average fuel economy, the effort thus far has not produced improvement in an absolute sense. But, the use of the technologies below has meant that certain fuel economy degradation gas been avoided:

- Model Year 2016: Introduction of Agera RS with reduced aerodynamic drag achieved by smaller wings, as well as other aerodynamic drag reduction modifications, extensive use of lightweight materials such as carbon fiber.
- Model Year 2019: Introduction of the Regera hybrid electric vehicle:
  a. Three electric motors are used to complement the combustion engine.
  b. The electric motors allow for torque vectoring, regenerative braking and energy conversion.
  c. Koenigsegg Direct Drive (KDD) transmission is revolutionary technology that replaces the combustion engine's traditional transmission making the car lighter and more efficient.
  d. The KDD provides direct drive to the rear axle without the need of multitude gears that have inherently high energy losses.
  e. During highway driving the KDD reduces drive-train losses compared to the traditional transmission by over 50%, because there is no up shifting or down shifting.
  f. Vehicle aerodynamic drag optimization.
- Model Year 2023: Introduction of Gemera
  a. Plug-in hybrid electric vehicle using 3-cylinder ICE.
  b. The Gemera is the first vehicle offered by Koenigsegg with a pure electric drive mode and an estimated all-electric range of 31 miles - a clear improvement over the Regera which does not have a pure electric drive mode.

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- Per ***49 CFR § 525.7 (h)(1)*** *For each affected model year and each of the two model years immediately following the first affected model year, a description of the technological means selected by the petitioner for improving the average fuel economy of its automobiles to be manufactured in that model year.*

  Koenigsegg has provided this information below and under section 49 CFR 525.7(d), above.

- Per ***49 CFR § 525.7 (h)(2)*** *A chronological description of the petitioner's past and planned efforts to implement the means described under paragraph (h)(1) of this section.*

  Koenigsegg has provided this information below and under section 49 CFR 525.7(d), above.

- Per ***49 CFR § 525.7 (h)(3)*** *A description of the effect of other Federal motor vehicle standards on the fuel economy of the petitioner's automobiles.*

  If Koenigsegg were able to delete outside rear-view mirrors and instead install cameras, fuel economy would benefit. Presently, FMVSS 111 does not permit this.

- Per ***49 CFR § 525.7 (h)(4)*** *For each affected model year, a discussion of the alternative and additional means considered but not selected by the petitioner that would have enabled its passenger automobiles to achieve a higher average fuel economy than is achievable with the means described under paragraph (h)(1) of this section. This discussion must include an explanation of the reasons the petitioner had for rejecting these additional and alternative means.*

  Koenigsegg has in fact developed and implemented every identified means of achieving a higher fuel economy – as described herein.

- Per **49 CFR § 525.7 (h)(5)** In the case of a petitioner which plans to increase the average fuel economy of its passenger automobiles to be manufactured in either of the two model years immediately following the first affected model year, an explanation of the petitioner's reasons for not making those increases in that affected model year.

  Not applicable.

The Need to Both Conserve Energy and Reduce GHG
Koenigsegg fully realizes that vehicles contribute to the world CO2 emissions and the linked global warming problems. The Koenigsegg CO2 emissions however are de minimis, due to the extremely limited number of vehicles sold by Koenigsegg and the extremely low number of miles each vehicle is driven per year. The average yearly mileage after 12 months in service is 2000 miles for a Koenigsegg vehicle.

We estimate the fuel consumed by operating the MYs 2022 – 2024 Koenigsegg vehicles for the expected use full life would consume around 0.0008% of the fuel used by the entire motor vehicle fleet in the USA (which in 2018, was about 3.40 billion barrels of motor gasoline per day were consumed in the United States (Source, U.S. Energy Information Administration), the Koenigsegg contribution to this usage is insignificant.

We firmly believe that by developing the technology which we have indeed developed - such as the 3-cylinder engine linked with plug-in hybrid technology, three electric drive motors and our direct drive transmission- will open the way for *main-stream* manufacturing of highly fuel-efficient vehicles. In short, Koenigsegg´s

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development of small displacement ICEs mated with advanced hybrid technology drivetrains will in fact serve the purpose of addressing the worlds' need to both conserve energy as reduce GHG.

CONCLUSION
Koenigsegg is a small volume manufacturer, producing world class ultra-high-performance sport cars. Meeting the corporate average fuel economy requirement is not possible when producing only a limited number of such vehicles all having the same sport car characteristic, with extreme performance. Notwithstanding this, Koenigsegg has developed and introduced significant fuel economy technologies as described above.

It is not technologically feasible or economically practicable for Koenigsegg to achieve the large volume average fuel economy standards in model years 2022 through 2024. The requested alternative standards are the maximum feasible.

Koenigsegg is in a similar situation as other low volume manufacturers who over the years that received exemptions from meeting the CAFE standards. Its reasonable that the requested Koenigsegg exemption petition be granted.

Respectfully submitted,

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TITLE 49 PART 525 PETITION FOR AN EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS FOR MODEL YEARS 2012, 2013 AND 2014

6 September 2011

To:

Administrator, National Highway Traffic Safety Administration, Washington, DC 20590

Please Note: This petition has confidential material redacted

For additional information or clarification, please contact:

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THE APPLICANT

McLaren Automotive, ‘McLaren’, based in Woking England, was established in 1989 and is renowned for its expertise in engineering and manufacturing high technology sports cars. McLaren has established its own unique approach to sports car design, combining the most advanced engineering and technology with the technology developed through its sister Formula 1 race team to develop the most advanced, efficient sports cars in the world.

McLaren is an independent, highly specialised small volume manufacturer and plans to start production of its sports cars in 2011, in very low volume for a global market including the US.

COMPANY BACKGROUND AND PRODUCT HISTORY

The McLaren F1 was introduced in 1994 and was the first road car ever with carbon fiber construction. It weighed just 2508 lb while providing seats for 3 adults, ample luggage space and a footprint barely the size of a Ford Focus sedan. The engine was supplied by BMW. Production ended in 1998 with total production of 100 cars.

The Mercedes-Benz SLR McLaren was introduced in 2003, and was designed, developed and manufactured by McLaren Automotive (but was sold by Mercedes through its distribution network). The SLR brought revolutionary carbon fiber construction to higher volume (and lower cost). 2,039 of these cars were produced, of which 716 were sold in the US.

THE VEHICLE - A NEW APPROACH TO FUEL EFFICIENT SUPERCARS

McLaren has embarked on an ambitious programme to develop a range of compact, highly efficient sports cars at much lower cost. The first car in this range, the MP4-12C, has been designed from scratch to be the safest and most efficient car in its segment.

The new cars look beyond traditional, one-dimensional parameters of performance such as top speed and horsepower, and instead focus on producing the most efficient, safest, and most driveable high-performance sports cars in the world.

Fuel economy and CO_2 improvements were a major focal point when setting out the specification for the MP4-12C. In order to deliver the highly ambitious efficiency targets, the key components were all designed by or specifically for McLaren - the MP4-12C features no carryover parts from any other car.

The McLaren MP4-12C features a revolutionary carbon fiber chassis structure to provide a rigid safety cell around passengers - the Carbon MonoCell – the first time such a strong and lightweight engineering solution has been used as the base of a car in this market segment, and the first time any car has ever featured a one-piece carbon fiber structure.

The McLaren MP4-12C is powered by a twin-turbocharged, 3.8 litre V8 engine, ‘M838T’. This marks the start of a new era in ‘core’ segment sports cars- smaller capacity, higher efficiency, lighter weight, and more economical power units.

‘M838T’ features dual variable valve timing to optimize engine efficiency, and a flat plane crankshaft running in a dry sump, which allows the engine to be placed extremely low in the chassis, thereby lowering the centre of gravity and improving handling responses. It also features Nikasil-coated aluminium liners for further weight reduction.

The engine drives the rear wheels through two wet clutches and a McLaren-developed seven speed ‘Seamless Shift’ dual clutch gearbox (SSG). The MP4-12C’s SSG is a development on the automated and sequential manual gearboxes with paddle shifts that proliferate in the car market today. Design of the SSG system was driven by a demanding mechanical package that resulted in not only reduced weight and improved dynamic control for the entire vehicle, but also improved fuel consumption and CO_2 emissions.

An array of electronic aids is fitted to the MP4-12C that will assist and protect the less-experienced driver, or when conditions challenge even the best. These include ABS, ESP, ASR traction control, Electronic Brake Distribution, Hill Hold and Brake Steer. The level of intervention varies according to the handling mode selected.

McLaren expects to sell between 400-900 MP4-12C cars annually into the US market from MY2012-2014. Moving forward, McLaren has planned a range of other models which will not only significantly reduce the price point of models available with these technologies, but will also introduce (over the next 3-5 model years) new, innovative technologies designed to improve efficiency even further. Over this time period, McLaren hopes to grow US sales annually through a US distribution system that will employ well over 200 people.

ALTERNATE STANDARDS REQUESTED

McLaren requests alternate standards equal to the unadjusted average fuel economies set forth in Table 2 below:

Model Year	Standard Requested (Unadjusted CAFE under 40 CFR 600.510(c) [1]
2012	21.6 MPG
2013	21.6 MPG
2014	21.6 MPG

Table 2 – McLaren Alternate Fuel Economy Standards Request

[1] The requested standard is unadjusted AFE. It is not known at this time what the EPA adjustment formula, under 40 CFR 600.510(e), will be for the model year at issue. This number is based on a combined fuel economy expected to be obtained at EPA. The request is 0.4 mpg less than that forecasted in order to allow for potential development and production variation.

TIMELINESS OF THIS PETITION

McLaren acknowledges that petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. However, late filing is permitted if good cause is shown. See 49 CFR 525.6(b).

McLaren has developed a totally new powertrain and vehicle platform which has been undergoing an intensive development process, resulting in the emissions and fuel consumption development programme not being completed until the end of June 2011. As such, McLaren (as a new entrant) has been unable to submit an application before its engine development was complete and fuel economy performance largely established.

In the Spyker case, 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007), Spyker's decision to enter the U.S. market for MY 2006 was not made until late 2004 after it identified a U.S. certified powerplant. NHTSA concluded that Spyker took reasonable measures to submit a petition in as timely a manner as possible. This finding is equally applicable to McLaren. While with Spyker, the ability to enter the U.S. market "hinged on obtaining a U.S.-certified powerplant", McLaren's timing has been impacted by the development of a completely new powertrain to meet the US requirements. With Spyker, it was not possible or feasible to file sooner because the company was waiting for an agreement with its engine supplier. In McLaren's case, as in Spyker, good cause exists for the late submission of the petition. As NHTSA noted in Spyker, this approach is consistent with a previous determination made by NHTSA with regard to the timeliness of a petition submitted by DeTomaso Automobiles, Ltd. (see, 64 FR 73476 (December 30, 1999).

The use of the multimode dual clutch transmission also added complication to the development and certification process. EPA guidance note CISD-09-19 (LDV/LDT) 'Policy Revisions for Testing Vehicles Equipped with Select-Shift Transmissions, Multimode Transmissions and Shift Indicator Lights (SILs)' requires the manufacturer to provide data on the mode usage along with other assessment criteria. This work could only be completed once we had representative prototypes conducting road based assessments with independent drivers. The initial results were presented to EPA during the pre-certification meeting with final agreement from EPA/CARB on the test method confirmed on April 1st, 2011. Until this agreement was in-place, the exact testing process and calculation of the fuel economy could not be determined.

Taking these two significant factors in to account; June 2011 was the earliest McLaren could file with accurate data following the approved and agreed testing and calculation method with EPA. McLaren requests that NHTSA considers this good cause for the late application.

ELIGIBLITY FOR AN EXEMPTION

Under Part 525.5, petitions for alternate standards are limited to manufacturers that manufacture, world-wide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that the petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

McLaren is not affiliated with any other companies (other than its 100% owned subsidiary company McLaren Automotive, Inc). McLaren has not manufactured passenger cars for sale in the 2011 model year, and forecasts world-wide annual production in each of the model years 2012-2014 inclusive to be less than 10,000 passenger cars

Shareholder	Percentage
Bahrain Mumtalakat Holding Company	40.9
Ronald Dennis	18.1
TAG Group Limited	18.1
Favorita Limited	9.1
Perlman Investments	9.1
Acanitt	4.6

Table 5 – McLaren Shareholding Structure

McLaren meets these criteria and is eligible to request the exemption and alternate standards.

THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM THAT IS FEASIBLE

The fuel economy values requested in this petition do in fact represent the maximum feasible CAFE that McLaren can achieve for the model years at issue. Starting with MY 2012, the new attribute CAFE system would require the MP4-12C to have the following fuel economy based on the calculation set forth below

Model Year	CAFE Target MPG
2012	32.48
2013	33.17
2014	33.94

This standard is not achievable notwithstanding McLaren's adoption of all technology available.

Below is a description of the technologies that McLaren has introduced and is developing for future models based on current best practice as detailed in the NHTSA recommended technology roadmap. [EPA–HQ–OAR–2009–0472; FRL_8959-4; NHTSA-2009-0059] RIN 2060-AP58; RIN 2127-AK50 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule

Technologies already deployed on the MP4-12C

McLaren will have implemented the following technologies to improve fuel economy:

Engine Technologies:

<u>Turbo charging and downsizing</u>:
McLaren has already made a confident step in downsizing the M838T engine, in advance of its competitors in this market sector. McLaren recognises the importance of fuel economy now and in the future. Simulation has been used to demonstrate the significant impact that reduced engine displacement has on CO_2 emissions and improvement in fuel economy – it is the most dominant factor that can be utilised to reduce fuel consumption. As such, McLaren has made an aggressive step to 3.8L displacement and class leading specific performance and fuel economy. It is worth noting that the specific power of the M838T is already class leading at 158 PS/Litre.

<u>VVT dual cam phasing:</u>
The M838T specification includes four overhead camshafts each with a dedicated phaser. The units are bespoke for the M838T and are specifically designed for low inertia and fast hydraulic response. This enables the valve timing to be optimised for emissions, fuel economy and performance, throughout the operating envelope. The valve timing on the M838T has been calibrated for best fuel economy under typical road driving speeds and loads, within the limitations of acceptable combustion stability. Final optimisation of the VCT mapping (prototype to pre-production validation engine) yielded 4-5% in specific fuel consumption reduction on the M838T.

<u>Engine friction reduction:</u>
The M838T utilises much technology that has been born and developed in racing powertrains and as such already represents a significant step forward in friction reduction when compared to current benchmark engines. The low friction designs and technologies are wide ranging – from reduced diameter bearing journals, to superfinished surfaces and specialist coatings. Examples include aggressively reduced bearing sizes for the crankshaft, Nikasil-coated cylinder liners, low friction piston skirt coating, superfinished finger followers and coated valves in the valvetrain. The piston ring pack has been developed to meet oil consumptions targets with minimum ring tension. The use of a dry-sump scavenge system, running at a significant depression compared to atmospheric wet sump systems, allows a more aggressive reduction in nominal piston ring tension as well as reducing churning losses in the crankcase.

<u>Low friction lubricants:</u>
McLaren currently uses the latest lubrication and tribology technology available from ExxonMobil, who have been involved in the detail of the engine and transmission design. As a result, the engine currently utilises the fully synthetic 0W/40 oil from Mobil, which is available throughout the McLaren markets. This viscosity specification is relatively low for the extreme loading in this application.

ExxonMobil oils are world leaders in lubricant and tribology development and as such their oils represent leading edge technology. As a result, the advantage that would remain in moving to a bespoke oil is limited. Practicalities of developing and supplying bespoke oils throughout McLaren markets are also challenging and extremely costly. The extreme cost and limited supply to the end customer could encourage the use of poorer substitute oils.

McLaren is also working with ExxonMobil to further reduce the viscosity rating to 0W/30 or even 0W/20. If viable, the change will be introduced after considerable durability validation.

Transmission technologies

Seven speed dual clutch transmission:

McLaren has developed a seven speed, Seamless Shift dual clutch gearbox (SSG). The Seamless Shift technology offers variable programmes ranging from 'normal' for road use and 'sport' for quicker changes still, right up to a high performance mode. In addition, 'launch control' and 'winter' modes can be selected, the latter changing all electronic functions to suit low friction conditions and delivering maximum driver aid and support. There is no traditional manual transmission offered.

With minimal torque interruption during a gear shift, there is none of the lurch, hesitation or unpredictability that characterise traditional automated-manual transmission systems. In fact, the shift quality of the new SSG transmission is sufficiently high that McLaren have elected to have the MP4-12C always start in "Auto normal" mode. In this mode gear shift points are optimised with respect to driver demand in order to provide the maximum possible powertrain efficiency and greatest fuel economy. In addition to the Auto mode, the transmission software allows temporary manual mode, allowing the driver to demand a higher or lower gear, without reverting to full manual mode. When a gear is manually selected the transmission will quickly revert back to Auto mode without driver intervention, in order to allow maximum possible fuel economy to be achieved once again.

The gear ratios have been optimised in order to allow acceptable vehicle performance whilst maximising fuel economy. The maximum speed of the MP4-12C is achieved in 6^{th} gear leaving 7^{th} gear as a true "overdrive" gear intended for maximum fuel efficiency. The transmission lubricants and the quantity of those lubricants have been optimised in order to provide the best compromise between fuel economy and transmission life/service intervals.

Improved automatic transmission controls:

McLaren has conducted extensive development work to ensure that the default shift schedule has been optimised to ensure the best possible fuel economy. The high levels of torque available at low engine speeds have been exploited to improve fuel economy. The engine idle speed has been reduced to 600rpm to minimise the fuel consumption when in this condition.
If a very high level of performance is requested by the driver, the shift schedule will adapt to this request before returning to the low engine speed, maximum fuel economy schedule, once the driver demand is reduced to lighter load driving. This adaption will be completed after just 20 seconds of light load driving. If the driver is holding a constant speed around 50kph / 30mph then this will trigger a shortcut and the adaption will be complete within just 4 seconds.

Transmission loss reduction:

The clutch losses have been examined in detail both in terms of hardware as well as software strategy. A hardware efficiency drive between first prototypes and the final validation prototypes lead to reducing losses by 45%. The default park position for the clutches is very wide resulting in a much reduced level of friction than would otherwise be expected. This in turn allows a reduction of cooling flow to the clutches, making a significant contribution to the efficiency at idle. There is some performance trade off for this park position, so once again the vehicle relies on an adaptive strategy to detect when a higher level of performance is required, returning to the low friction park position once the high performance demand has subsided.

Vehicle technologies

McLaren has pioneered a new carbon fiber production process that allows the Carbon MonoCell to be produced to exacting quality standards, in a single piece, in only four hours, compared to the dozens of carbon components (and dozens of production hours) that normally feature in a carbon fiber chassis structure. This naturally brings huge efficiency and quality benefits.

The finished Carbon MonoCell emerges in one piece and this new process could revolutionise car design. It avoids the need to bond different parts to make the whole structure, as with all other carbon fiber cars. It is hollow, saving further weight, and the integrity of production ensures the location of suspension and ancillaries is accurate to the finest of tolerances.
The advantages this technology brings are light weight, high torsional rigidity, a very strong safety cell, low perishability, ease of repair and extreme dimensional accuracy.

The 12C MonoCell weighs less than 175 lb. Carbon fiber contributes to the MP4-12C's low overall weight and it forms the structural basis for the whole car. The Carbon torsional rigidity is considerably stiffer than a comparable alloy structure. The Carbon MonoCell also offers greater occupant safety; it acts as a safety survival cell, as it does for a Formula 1 car.

<u>Mass reduction and material substitution to reduce weight</u>:

Increased customer demands for safety and advanced features all mean that shaving weight is ever more difficult. Weight is the enemy of performance in every area of car design. It affects acceleration, speed, handling, fuel consumption and CO2 emissions. McLaren engineers pursued weight saving in the following areas:

• The Carbon MonoCell not only reduces the weight of the structure but also allows for the use of much lighter weight body panels.

• The close position of the driver and passenger allows a narrower, lighter body while giving improved visibility with a clearer perception of the car's extremities.

• Brakes with forged aluminium hubs save 17 lb and weigh less than optional carbon ceramic brakes.

• Exhaust path length was minimised, to reduce the length and weight of the exhaust pipes.

• Airflow-assisted airbrake deployment dramatically reduces weight of the airbrake activation system.

• Small, compact downsized engine coupled to lightweight compact transmission minimizes vehicle length, weight and polar moment of inertia.

• Significant weight was pared off the alloy wheels through intensive Finite Element Analysis of wall thicknesses.

• The engine cooling radiators were mounted at the rear, as close to the engine as possible, to minimize the pipework, the fluids contained within them, and therefore weight. They were also mounted in car line to minimize vehicle width.

• Electrical cables – The use of halogen free compressed wire used throughout the vehicle giving weight save and smaller bundles. Complete aluminium power distribution system through design of bespoke busbars and cables. The total effort into reducing electrical looms yielded a mass reduction of over 15 lb. In addition to the weight saving the use of halogen free wiring insulation results in a reduced environmental impact at end of life.

• The Li-ion battery saves over 20lb compared with a lead acid battery of a similar capacity.

Aero Drag reduction:

The vehicle down force has been increased by 90% while still achieving an 8% reduction in CdA relative to the Mercedes SLR McLaren. This has been achieved by adopting the following strategies:

- Inherently more efficient vehicle shapes
- Careful control of vehicle cooling air
- The extensive use of under floor guide vanes to control wheel wakes while producing downforce with little or no drag penalties.

These improvements have been achieved by making considerable investment in CFD technology.

Accessories

The MP4-12C has been designed by or specifically for McLaren, enabling McLaren to optimise systems across the vehicle for a reduction in parasitic loss.

Electric power steering

McLaren is using an electrically powered hydraulic system on the MP4-12C. This system gives fuel efficiency improvements over a conventional engine-driven hydraulic pump by removing the need to continually drive the pump when the pressure is not required. In our experience it also gives improved steering feel over a purely electric system.

Electrical load reduction

Electrical power consumption has been reduced using Xenon LED lamps and Series Parallel fan control.
The car will ‘sleep’ with a quiescent draw of just 50mA.

MCLAREN HAS ADOPTED ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set a McLaren alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible" -- improvements based on technology available to McLaren during the model years at issue that will improve fuel economy. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41228 (August 3, 1993); 65 FR 58483 (September 29, 2000); 64 FR 73476 (December 30, 1999).

The high performance sport car nature of McLaren's product-lines does not lend itself to high fuel economy values. Further fuel economy improvements are not possible within the current constraints of available technology, development time and access to funding.

COMPLETE DESCRIPTION OF THE VEHICLE CONFIGURATION

A complete description of the vehicle configuration is set forth in Table 8, in accordance with the requirements of 525.7(e-g).

Table 8 -- Projected Vehicle Description

Frontal area (sq. ft)	20.7 sq.ft
Height/width/length(mm)	Length: 4509mm Width: 2093mm (without door mirrors, 1895mm) Height: 1199mm
Est. curb weight (lbs)	3459 lbs
Seating positions	2
Int. vol. index (cu. ft)	50.5ft^3
Engine type	Gasoline V8 Twin Turbocharged
Engine displacement (L)	3.8 L
SAE NET Horsepower (kW)	441 kW
Fuel metering system	Electronic multipoint port fuel injection
Transmission	Dual Clutch Transmission Automatic

Total drive ratio

Gear	Internal gearbox ratios (ratios of engine to gearbox output shaft revolutions)	Final drive ratio(s) of gearbox output shaft to driven wheel revolutions)	Total Gear Ratios
1	3.982	3.308	13.171
2	2.612		8.642
3	1.905		6.302
4	1.479		4.892
5	1.16		3.838
6	0.906		2.997
7	0.686		2.27
R	2.803		9.273

Emission control sys.	Bosch ME17 system
Dynamometer road load HP	Obtained using Coastdown method described in SAE J1263

Radial tires Brand: Pirelli

Variant	Version	Tyre Dimensions	Rim	Offset
CC4A50	70AAA200	A1: 235/35ZR19 91Y XL A2: 305/30ZR20 99Y	A1: 8.5 x 19 A2: 11 x 20	A1: 47 A2: 47
		A1: 235/35R19 87V M & S A2: 295/30R20 101W M & S	A1: 8.5 x 19 A2: 11 x 20	A1: 47 A2: 47
CS4A50	70CCC200	A1: 235/35ZR19 91Y XL A2: 305/30ZR20 99Y	A1: 8.5 x 19 A2: 11 x 20	A1: 47 A2: 47
		A1: 235/35R19 87V M & S A2: 295/30R20 101W M & S	A1: 8.5 x 19 A2: 11 x 20	A1: 47 A2: 47

A1: Axle 1 A2: Axle 2

Lubricants (type): Mobil 1 0W-40

Low friction lubricants explanation: Fully synthetic 0W/40 oil from ExxonMobil, This viscosity specification is relatively low for the extreme loading in this application.

Unadjusted Fuel economy values (mpg)

City	Highway	Combined
18.5 mpg	29.4 mpg	22.2 mpg

PLEASE NOTE THAT THESE ARE PRELIMINARY RESULTS AND MIGHT CHANGE WITH THE FINAL FEDERAL CERTIFICATION.

FUEL ECONOMY LABEL VALUES ARE SIMILAR TO THE COMPETITION

The McLaren MP4-12C anticipated mpg Fuel Economy label values of 15mpg city and 20mpg highway (certified as MY2012) are equal to or better than the results of manufacturers of similar vehicles (given vehicle type and price range).

Make and model	Engine/ Power (HP)	Transmission	Price$	City MPG	Highway MPG
McLaren MP4-12C	3.8 V8 / 592	A-7	229,000	15	20
Aston Martin DBS	5.9 V12/ 510	AS-6	286,700	12	18
Audi R8	5.2l V10 / 525	AM-6	196,800	14	20
Chevrolet Corvette	6.2 V8 / 638	M-6	110,000	14	20
Lamborghini Gallardo coupe	5.2 V10 / 542	AM-6	237,600	14	20
Porsche 911 turbo coupe	3.8 6 / 530	A-7	160,000	17	25
Ferrari California	4.3 V8 / 453	AM-7	192,000	13	19

THE MCLAREN REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECOMOMIC PRACTICABILITY

In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are McLaren's financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of McLaren automobiles - high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993).[2]

Limited Financial Resources

As noted previously, McLaren is a privately-held, small volume vehicle manufacturer. To date, the company has invested approximately $415 million in design, development, homologation, and start of production. For a company of McLaren's size, the financial commitment is considerable.

Basic Vehicle Design Concept

McLaren cannot currently adopt further FE improvements that are compatible with the basic vehicle design concept of a high performance sports car. With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 FR 44493 (Dec. 10, 1986). With regard to Rolls-Royce, NHTSA similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles [are] not considered." This approach must also be applied to McLaren.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... would be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). This is particularly relevant to McLaren because McLaren has been financially constrained due to investment in start-up and vehicle homologation.

[2] In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

MCLAREN CANNOT ALTER ITS SALES MIX SO AS TO IMPROVE FUEL ECONOMY

McLaren has no opportunity to improve fuel economy by changing its model mix since it will initially only sell the one model in the US, all using the same power plant. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). There is no room for CAFE changes based upon marketing actions. More fuel efficient models are not possible within this time frame covered by this petition, although McLaren is actively developing further improvement for the next generations of cars.

NHTSA has acknowledged that "producing additional models or making some of the configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by Rolls-Royce preclude significant changes to the basic concept of the ...car." 58 FR 41229 (Aug. 3, 1993, Emphasis added). The same rationale applies in this case. McLaren produces "niche" cars and has limited financial resources.

McLaren will only be offering one base vehicle architecture for the 2012, 2013 and 2014 model years so there is no opportunity to change the model mix to improve the fuel economy.

OTHER FEDERAL STANDARDS RESTRICT MCLAREN'S MAXIMUM FEASIBLE CAFE

McLaren's small size limits "the amount of resources [it] can apply to comply with both the mandatory [safety and emissions] standards and fuel economy requirements." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007).

As regards FMVSS, crash-worthiness standards can generally tend to reduce achievable CAFE, since they preclude, in some instances, the use of lighter-weight components. See 64 FR 73476 (December 30, 1999). Other upcoming safety standards that will demand McLaren resources and could have weight and fuel economy impacts include upgraded FMVSS 301 rear crash requirements, upgraded FMVSS 214 side impact requirements and upgraded FMVSS 216 roof crush requirements.

THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

McLaren is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of McLaren's sales in the US together with the fact that a McLaren vehicle is almost exclusively used as a second or third car (and hence infrequently), means that McLaren has a virtually immeasurable effect on US energy consumption.

Since McLaren cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

CONCLUSION

McLaren has made enormous investment for a company its size on fuel economy and safety technologies, making its cars amongst the best in class in these areas. However, the nature of the sports cars it produces makes it impossible to meet CAFE fuel economy standards, despite its aggressive application of technology. Based upon the foregoing, McLaren respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2012, 2013 and 2014.

Respectfully submitted,

Geoff Grose
Head of Vehicle Development

TITLE 49 PART 525 PETITION FOR AN EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS FOR MODEL YEARS 2015, 2016 AND 2017

January 2014

To:

Administrator, National Highway Traffic Safety Administration, Washington, DC 20590

Please note: This petition has confidential material redacted

For additional information or clarification, please contact:

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1 THE APPLICANT

McLaren Automotive, 'McLaren', based in Woking England, was established in 1989 and is renowned for its expertise in engineering and manufacturing high technology sports cars. McLaren has established its own unique approach to sports car design, combining the most advanced engineering and technology with the technology developed through its sister Formula 1 race team to develop the most advanced, efficient sports cars in the world.

McLaren is an independent, highly specialised small volume manufacturer and started production of its sports cars in 2011, in very low volume for a global market including the US.

2 COMPANY BACKGROUND AND PRODUCT HISTORY

The McLaren F1 was introduced in 1994 and was the first road car ever with carbon fibre construction. It weighed just 2508lb while providing seats for 3 adults, ample luggage space and a footprint barely the size of a Ford Focus sedan. The engine was supplied by BMW. Production ended in 1998 with total production of 100 cars.

The Mercedes-Benz SLR McLaren was introduced in 2003, and was designed, developed and manufactured by McLaren Automotive (but was sold by Mercedes through its distribution network). The SLR brought revolutionary carbon fibre construction to higher volume (and lower cost). 2,039 of these cars were produced, of which 716 were sold in the US.

McLaren has always been at the forefront of innovative technologies, and this continues with its new range of high performance sports cars. McLaren has independently invested in the resources and infrastructure to design, develop, manufacture and distribute its vehicles, all of which are based on a Carbon MonoCell platform with a downsized turbocharged engine, coupled to a seamless shift dual clutch transmission.

In 2011 McLaren launched the first in a range of independently developed new models, the McLaren MP4-12C. When McLaren first embarked on the design and development programme for the all new MP4-12C, the company set out to deliver something markedly different to what already existed in the market place. One key objective was to deliver a class leading blend of performance and economy, whilst meeting current and future legislative requirements. In line with its brand values, McLaren set out to deliver these targets through innovative design and the intelligent application of technology.

McLaren developed its own new engine, 'M838T' with bespoke calibration for its first vehicle, the MP4-12C. At 3.8 litres, it is already an example of an aggressively downsized, turbocharged engine within its market segment, offering a higher specific output (at 162 BHP/L) than any of its competitors.[1] This engine already has Variable Valve Timing (VVT), Secondary Air Injection (SAI) and electronically controlled twin thermostats. McLaren also already uses its own unique 7-speed, dual clutch, automatic transmission.

As a small business, McLaren has to focus research and development on key innovative technologies that make a real difference; for example, the pioneering approach to developing designs and processes to bring lightweight carbon fibre technologies to new automotive segments (Formula 1 → F1 road car → SLR → MP4-12C).

As a Small Volume Manufacturer with limited development resources, McLaren must develop a high performance product that produces class-leading CO_2 emissions, fuel economy and driveability. Having invested significantly to launch the first product, McLaren' s relatively low sales volumes mean that a return on investment must come from carefully considered platform engineering and an extended lifecycle for the base powertrain. The M838T powertrain will be utilised, with some specification updates, on subsequent vehicle applications in production until at least 2023. An evolution of this powertrain is likely to be used thereafter. The projected trend for this market sector is for continued increase in rated power. As a consequence, sustained reduction in CO2 numbers will be extremely challenging. McLaren has already made a significant step in downsizing the MP4-12C engine capacity with resultant CO2 benefits. By delivering in excess of 160BHP/L and a combined 5-cycle fuel economy of 18mpg, whilst also meeting stringent global emissions requirements, McLaren has clearly met the original programme objectives.

In 2014 McLaren will introduce the P1 to the US market. The P1 is a plug-in hybrid, powered by an upgraded version of the M838T powertrain from the MP4-12C in parallel with an electric motor, with a combined power output of 904bhp. The hybrid powertrain is the first of its kind and allows the P1 to operate in either blended or electric-only modes, as well as

[1] The M838T engine was the 2013 winner of the International Engine of the Year Award (3-4L category).

allowing energy recovery through regenerative braking via the electric motor. The hybrid system McLaren has implemented allows the P1 to achieve increased fuel economy over the MP4-12C, despite a 50% increase in power.

McLaren operates a research and development department to assess the potential of new technologies and innovations that could contribute towards achieving future legislative requirements and provide product differentiation in the market place. Cost/benefit analysis is key to identifying the most suitable of these new technologies prior to moving them forward into product development.

The key technologies, design and development steps employed to achieve these targets are identified by system and technology area in Section 7. Commentary is also provided regarding the opportunities to make further advances to improve cleanliness and economy.

4 ALTERNATE STANDARDS REQUESTED

McLaren requests alternate standards equal to the average fuel economies set forth in Table 1 below:

Model Year	Standard Requested[2]
2015	22.5 MPG
2016	22.9 MPG
2017	23 0 MPG

Table 1 – McLaren Alternate Fuel Economy Standards Request

These values demonstrate an improvement in the achieved CAFE and requested standards from MY2012-2014.

[2] Fleet AFE as per 40 CFR 531.5(c).

5 TIMELINESS OF THIS PETITION

McLaren acknowledges that petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. However, late filing is permitted if good cause is shown. See 49 CFR 525.6(b).

McLaren has continued development of its M838T engine, originally designed for the MP4-12C, with implementation of a hybrid system, used on the MY14 McLaren P1. The P1 is capable of a combination of operating modes which, at present, is not demonstrated on any other production road car and as such, McLaren has been working extensively with EPA to define the test method for the P1, both for compliance with emissions standards and for calculation of fuel economy. The P1 test programme was not completed until January 2014; as such, McLaren has been unable to submit an application before this time as the impact of the technologies developed on the P1 (both the hybrid system as well as improvements to the M838T engine hardware) on future projects, and thus CAFE values, could not be accurately assessed.

In the Spyker case, 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007), Spyker's decision to enter the U.S. market for MY 2006 was not made until late 2004 after it identified a U.S. certified powerplant. NHTSA concluded that Spyker took reasonable measures to submit a petition in as timely a manner as possible. This finding is equally applicable to McLaren. While with Spyker, the ability to enter the U.S. market "hinged on obtaining a U.S.-certified powerplant", McLaren's timing has been impacted by the development and certification of a new hybrid powertrain to meet the US requirements. With Spyker, it was not possible or feasible to file sooner because the company was waiting for an agreement with its engine supplier. In McLaren's case, as with Spyker, good cause exists for the late submission of the petition. As NHTSA noted in Spyker, this approach is consistent with a previous determination made by NHTSA with regard to the timeliness of a petition submitted by DeTomaso Automobiles, Ltd. (see, 64 FR 73476 (December 30, 1999).

Taking this into account; January 2014 was the earliest McLaren could file with accurate data following the approved and agreed testing and calculation method with EPA. McLaren requests that NHTSA considers this good cause for the late application.

6 ELIGIBILITY FOR AN EXEMPTION

Under Part 525.5, petitions for alternate standards are limited to manufacturers that manufacture, world-wide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that the petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

McLaren is a Small Volume Manufacturer and neither controls nor is controlled by a third party firm or corporate office that manufactures/produces vehicles or engines for the US market. McLaren vehicles are imported into the US by McLaren's wholly owned US subsidiary which imports only cars manufactured by McLaren.

McLaren therefore meets the criteria to request the exemption and alternate standards.

7 THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM THAT IS FEASIBLE

The fuel economy values requested in this petition do in fact represent the maximum feasible CAFE that McLaren can achieve for the model years at issue. For MY2015-2017, the attribute CAFE system would require McLaren's fleet to have the following average fuel economy:

Model Year	CAFE Target MPG
2015	35.1
2016	36.6
2017	38.8

Table 6 - Footprint-Based CAFE Targets

These standards are not achievable notwithstanding McLaren's adoption of all technology available.

7.1 MCLAREN HAS ADOPTED ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set a McLaren alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible" -- improvements based on technology available to McLaren during the model years at issue that will improve fuel economy. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41228 (August 3, 1993); 65 FR 58483 (September 29, 2000); 64 FR 73476 (December 30, 1999).

In order to demonstrate that McLaren is doing everything reasonably possible to achieve maximum fuel economy, we have set forth below a description of the technologies that McLaren has introduced and is developing for future models based on current best practice as detailed in the NHTSA recommended technology roadmap. [EPA–HQ–OAR–2009–0472; FRL_8959-4; NHTSA-2009-0059] RIN 2060-AP58; RIN 2127-AK50 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule.

7.8 FURTHER SUPPORT REGARDING MAXIMUM FEASIBLE FUEL ECONOMY

7.8.1 FUEL ECONOMY LABEL VALUES ARE SIMILAR TO THE COMPETITION

The McLaren MP4-12C fuel economy label combined value of 18mpg (certified MY2012-14) are equal to or better than the results of manufacturers of similar vehicles (given vehicle type and price range). Table 7 below shows the specifications and fuel economy figures of similar vehicles from MY2014.

Make and model	Displacement (L)	Power (HP)	Transmission	City (mpg)	Highway (mpg)	Combined (mpg)
McLaren MP4-12C	3.8 V8	617	A-7	15	22	18
Bugatti Veyron	8.0 W16	987	A-7	8	15	10
Lamborghini Aventador Coupe	6.5 V12	690	A-7	11	18	13
Audi R8	5.2 V10	525	A-7	13	22	16
Ferrari 458 Italia	4.5 V8	562	A-7	13	17	15
Bentley Continental GT	6.0 W12	552	S-8	12	21	15
Mercedes Benz SLS AMG	6.2 V8	563	A-7	13	19	15

Table 7 – Similar Vehicle Fuel Economy

7.8.2 EU DEROGATION

McLaren has also been granted a derogated target for EU fleet CO2 requirements by the European Commission for model years 2012-2018.

7.9 CONCLUSIONS AS REGARDS MCLAREN'S ACHIEVING MAXIMUM FEASIBLE FUEL ECONOMY

- In sum, all the above information supports McLaren's position that its requested alternate standards represent the maximum feasible fuel economy.
- McLaren has invested over $100M to deliver the current MP4-12C powertrain, which is class-leading in terms of specific performance (hp/litre and hp/lb) and fuel efficiency (CO_2). A further $25M of investment has been committed to the development of the engine, transmission and hybrid system for the McLaren P1™.
- McLaren's business strategy demands technical leadership from its products and that these products are borne from innovative and efficient design. McLaren continues to invest in R&D to support this strategy.
- Current powertrain R&D is assessing technologies to support future emissions and CO_2 reductions. Initial findings have demonstrated practical limitations of certain technologies in McLaren's high performance applications.
- McLaren's efforts have achieved the maximum feasible fuel economy given available technology and realistic limits to the level of investment available within a small, independent car manufacturer.

8 COMPLETE DESCRIPTION OF THE VEHICLE CONFIGURATIONS

A complete description of the vehicle configurations is set forth in Table 9, in accordance with the requirements of 525.7(e-g).

Table 9 – Vehicle Descriptions

PROJECT	MP4 12C	P1
Frontal Area (sq ft)	20.7	
Length (mm)	4512	4588
Width (w/o mirrors) (mm)	2093 (1906)	2144 (1946)
Height (mm)	1199	1188
Footprint (sq ft)	46.6	46.9
Est. Curb weight (lb)	3260	3301
Seating Positions	2	2
Int. Vol. Index (cu. ft)	50.5	
Fuel Type	Gasoline	Gasoline & Electricity
Engine	V8 Twin Turbo	V8 Twin Turbo & Electric Motor
Engine Displacement (L)	3.8	3.8
SAE NET Horsepower (kW)	478	542
Fuel Metering	Electronic multipoint port fuel injection	
Transmission	7-Speed Dual Clutch Automatic Transmission	

Total drive ratio

Gear	Internal gearbox ratios (ratios of engine to gearbox output shaft revolutions)	Final drive ratio(s) of gearbox output shaft to driven wheel revolutions)	Total Gear Ratios
1	3.982	3.308	13.171
2	2.612		8.642
3	1.905		6.302
4	1.479		4.892
5	1.16		3.838
6	0.906		2.997
7	0.686		2.27
R	2.803		9.273

Emission control sys. Bosch ME17 system

Dynamometer road load HP Obtained using Coastdown method described in SAE J1263

Radial tires Brand: Pirelli

Project	Axle	Tyre Dimensions	Rim	Offset
MP4-12C	Front	235/35ZR19 91Y XL	8.5 x 19	47
	Rear	305/30ZR20 99Y	11 x 20	
P1	Front	235/35ZR19 91Y XL	8.5 x 19	47
	Rear	305/30ZR20 99Y	11 x 20	

Lubricants (type): Mobil 1 0W-40

Low friction lubricants explanation: Fully synthetic 0W/40 oil from ExxonMobil, This viscosity specification is relatively low for the extreme loading in this application.

Fuel Economy Values (mpg):

PROJECT	**MP4-12C**
Unadjusted 5-Cycle City (mpg)	15
Unadjusted 5-Cycle Highway (mpg)	22
Unadjusted 5-Cycle Combined (mpg)	18
Combined City/Highway (mpg)	22.6

9 THE MCLAREN REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are McLaren's financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of McLaren automobiles - high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993).[3]

9.1 INVESTMENTS MADE AND LIMITED FINANCIAL RESOURCES

As noted previously, McLaren is a privately-held, small volume vehicle manufacturer with limited financial resources.

9.2 BASIC VEHICLE DESIGN CONCEPT

McLaren cannot currently adopt further FE improvements that are compatible with the basic vehicle design concept of a high performance sports car. With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 FR 44493 (Dec. 10, 1986). With regard to Rolls-Royce, NHTSA similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles [are] not considered." This approach must also be applied to McLaren.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... would be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). This is particularly relevant to McLaren because McLaren has been financially constrained due to investment in start-up and vehicle homologation.

10 MCLAREN CANNOT ALTER ITS SALES MIX SO AS TO IMPROVE FUEL ECONOMY

McLaren has no opportunity to improve fuel economy by changing its model mix since its vehicles share a common platform, all using the same power plant. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). There is no room for CAFE changes based upon marketing actions.

NHTSA has acknowledged that "producing additional models or making some of the configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by Rolls-Royce preclude significant changes to the basic concept of the ...car." 58 FR 41229 (Aug. 3, 1993, Emphasis added). The same rationale applies in this case. McLaren produces "niche" cars and has limited financial resources.

McLaren will only be offering one base vehicle architecture for the 2015, 2016 and 2017 model years based on the M838T engine so there is no opportunity to change the model mix to improve the fuel economy.

[3] In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

11 OTHER FEDERAL STANDARDS RESTRICT MCLAREN'S MAXIMUM FEASIBLE CAFE

McLaren's small size limits "the amount of resources [it] can apply to comply with both the mandatory [safety and emissions] standards and fuel economy requirements." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007).

As regards FMVSS, crash-worthiness standards can generally tend to reduce achievable CAFE, since they preclude, in some instances, the use of lighter-weight components. See 64 FR 73476 (December 30, 1999). Other safety standards that demand McLaren resources and have weight and fuel economy impacts include upgraded FMVSS 301 rear crash requirements, upgraded FMVSS 214 side impact requirements and upgraded FMVSS 216 roof crush requirements.

Furthermore, EPA will release in February 2014 its Tier 3 emissions rule implementing severely stringent tailpipe and evaporative standards. Compliance with these new pollution limits will demand both resources (financial and personnel) as well as a balancing of priorities in order to achieve compliance with all governmental requirements.

12 THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

McLaren is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of McLaren's sales in the US together with the fact that a McLaren vehicle is almost exclusively used as a second or third car (and hence infrequently), means that McLaren has a virtually immeasurable effect on US energy consumption.

Since McLaren cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

13 CONCLUSION

McLaren has made enormous investment and uses cutting edge technology to achieve fuel economy and safety, making its cars amongst the best in class in these areas. However, the nature of the sports cars it produces makes it impossible to meet CAFE fuel economy standards, despite its aggressive application of technology. Based upon the foregoing, McLaren respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2015, 2016 and 2017.

Respectfully submitted,

Luca Viadana
Certification Manager
McLaren Automotive Limited

McLaren Automotive Limited, McLaren Technology Centre, Chertsey Road, Woking, Surrey GU21 4YH, United Kingdom

TITLE 49 PART 525 PETITION FOR AN EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS FOR MODEL YEARS 2018, 2019 AND 2020

April 2017

To:

Administrator, National Highway Traffic Safety Administration, Washington, DC 20590

For additional information or clarification, please contact:

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1 THE APPLICANT

McLaren Automotive, 'McLaren', based in Woking England, was established in 1989 and is renowned for its expertise in engineering and manufacturing high technology sports cars. McLaren has established its own unique approach to sports car design, combining the most advanced engineering and technology with the technology developed through its sister Formula 1 race team to develop the most advanced, efficient sports cars in the world.

McLaren is an independent, highly specialised small volume manufacturer and started production of its sports cars in 2011, in very low volume for a global market including the US.

2 COMPANY BACKGROUND AND PRODUCT HISTORY

Founded in 1963 as a racing team, McLaren entered road car manufacture with the McLaren F1 in 1993. The company further developed its road car business producing the McLaren Mercedes SLR. McLaren has independently invested in the resources and infrastructure to design, develop, manufacture and distribute a new range of sports cars.

In 2011, McLaren launched the first in a range of independently developed new models, the McLaren MP4-12C, featuring a downsized turbocharged engine, dual clutch 7-speed transmission, active aerodynamics, and the lightweight carbon fibre MonoCell platform which characterises McLaren's commitment to innovation.

As a small business, McLaren must focus research and development on key innovative technologies that make a real difference, for example the pioneering approach to developing designs and processes to bring lightweight carbon fibre technologies to new automotive segments (from Formula 1 racing, to the F1 road car, to the SLR, to the MP4-12C).

When McLaren first embarked on the design and development programme for the all new MP4-12C, the company set out to deliver a class leading blend of performance and economy, whilst meeting current and future legislative requirements, through innovative design and the intelligent application of technology.

In MY2014 McLaren launched the new plug-in hybrid McLaren P1™, following extensive research and development into new technologies. The result is a new generation of high performance sports car, and one that is arguably among the most technologically advanced and most accomplished cars ever made in the UK.

The MP4-12C was upgraded for MY2015 to the facelifted 650S Coupe and Spider, forming the basis for the 'Super Series' model range. These models used the same 3.8l V8 engine as the MP4-12C, but boasting more power and torque whilst reducing CO2 and fuel consumption. McLaren also launched the 675LT, a limited production, track-focused version of the 650S. The 675LT featured a further increase in engine power and performance while maintaining the same levels of fuel economy as the 650S.

In MY2016, McLaren launched the 570S Coupe, as the start of the new Sports Series range, followed by the 570GT in MY2017. The Sports Series sits at a lower price point than the Super Series, with reduced power and performance but increased utility, featuring further development of the 3.8l engine to improve fuel efficiency.

McLaren operates a research and development department to assess the potential of new technologies and innovations that could contribute towards achieving future legislative requirements and provide product differentiation in the market place. Cost/benefit analysis is key to identifying the most suitable of these new technologies prior to moving them forward into product development.

The key technologies, design and development steps employed to achieve these targets are identified by system and technology area in Section 7. Commentary is also provided regarding the opportunities to make further advances to improve cleanliness and economy.

3 COMPANY INVESTMENT IN FUEL EFFICIENCY

McLaren recognises the need to reduce energy consumption and fuel demand, and supports NHTSA's efforts in this regard. McLaren strives to pursue high performance technology while achieving ambitious improvements in fuel consumption, and is committed to support the objective of consistent improvements in vehicle fuel economy across the US fleet. McLaren's vehicles compare favourably with those high performance niche products produced by large volume manufacturers in terms of fuel consumption. In March 2016, McLaren announced that it plans to implement hybrid technology on 50% of its fleet by 2022, supported by an investment of over £1bn between 2016-2022, with a targeted 20-25% of annual revenue being invested in research and development of new technologies.

McLaren appreciates NHTSA's recognition of the need for small-volume manufacturer provisions under fleet standard mechanisms, as defined in 49 CFR 525.

4 ALTERNATE STANDARDS REQUESTED

McLaren requests alternate standards equal to the average fuel economies set forth in Table 1 below:

Model Year	Standard Requested[1]
2018	22.5 MPG
2019	22.5 MPG
2020	22.5 MPG

Table 1 – McLaren Alternate Fuel Economy Standards Request

[1] Fleet AFE as per 40 CFR 531.5(c).

5 TIMELINESS OF THIS PETITION

McLaren acknowledges that petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. However, late filing is permitted if good cause is shown. See 49 CFR 525.6(b).

As publicly announced in 2016, McLaren is developing hybrid capability, for deployment across at least 50% of its fleet by MY2022. Prior to the hybrid technology's introduction, McLaren is introducing a higher-performing 4.0L engine. McLaren has needed to test and certify the new 4.0L engine (used in the new 720S vehicle) in order to accurately predict McLaren's CAFE values during the period covered by this petition. The 720S test programme was not completed until April 2017; as such, McLaren was unable to submit a CAFE application before this time since the impact of the technologies implemented on the 720S powertrain, and their effect on CAFE values, could not be accurately assessed until the testing was completed.

The above scenario presents good cause for McLaren's late filing. In the Spyker case, 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007), Spyker's decision to enter the U.S. market for MY 2006 was not made until late 2004 after it identified a U.S. certified powerplant. NHTSA concluded that Spyker took reasonable measures to submit a petition in as timely a manner as possible. This finding is equally applicable to McLaren. While with Spyker, the ability to enter the U.S. market "hinged on obtaining a U.S.-certified powerplant", McLaren's timing has been impacted by the development and certification of a new powertrain to meet the US requirements. With Spyker, it was not possible or feasible to file sooner because the company was waiting for an agreement with its engine supplier. In McLaren's case, as with Spyker, good cause exists for the late submission of the petition. As NHTSA noted in Spyker, this approach is consistent with a previous determination made by NHTSA with regard to the timeliness of a petition submitted by DeTomaso Automobiles, Ltd. (see, 64 FR 73476 (December 30, 1999).

Additionally, McLaren has been waiting for EPA to respond to its application for an alternative GHG standard for model years 2017-21, originally submitted in July 2013. EPA's delay in finalising their response to McLaren's application, and those of other SVMs, has hindered our ability to plan effectively for the coming model years.

Taking this into account; April 2017 was the earliest McLaren could file with accurate data following the approved and agreed testing with EPA. McLaren requests that NHTSA considers this good cause for the late application.

6 ELIGIBILITY FOR AN EXEMPTION

Under Part 525.5, petitions for alternate standards are limited to manufacturers that manufacture, world-wide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that the petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

McLaren is a Small Volume Manufacturer and neither controls nor is controlled by a third party firm or corporate office that manufactures/produces vehicles or engines for the US market. McLaren vehicles are imported into the US by McLaren's wholly owned US subsidiary which imports only cars manufactured by McLaren.

McLaren therefore meets the criteria to request the exemption and alternate standards.

7 THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM THAT IS FEASIBLE

The fuel economy values requested in this petition do in fact represent the maximum feasible CAFE that McLaren can achieve for the model years at issue. For MY2018-2020, NHTSA's footprint-based CAFE system would require McLaren's fleet to have the following average fuel economy based on the calculation set forth in Appendix I.

Model Year	CAFE Target MPG
2018	39.8
2019	41.2
2020	42.9

Table 6 - Footprint-Based CAFE Targets

Given the very specific nature of McLaren's entire product line – high performance sports cars – these standards are not achievable notwithstanding McLaren's adoption of all technology available.

7.1 MCLAREN HAS ADOPTED ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

McLaren entered the US market in MY2012 with the MP4-12C, featuring a highly-efficient powertrain platform considering the type of vehicle and the efficiency of its competitors. McLaren can make further significant improvements only with the introduction of a new powertrain platform. Overall, McLaren has demonstrated a commitment to reducing fuel consumption through innovation and adoption of technologically feasible fuel economy improvements. The 5-cycle label fuel economy values can be seen for McLaren's vehicles in the table below:

Model Year	Model Year	City MPG	HW MPG	Combined MPG
MP4-12C	2012	15	22	18
650S	2015	16	22	18
570S	2016	16	23	19

Table 7 – 5-Cycle Fuel Economy Values

In determining the proper level at which to set a McLaren alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible" -- improvements based on technology available to McLaren during the model years at issue that will improve fuel economy. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41228 (August 3, 1993); 65 FR 58483 (September 29, 2000); 64 FR 73476 (December 30, 1999).

In order to demonstrate that McLaren is doing everything reasonably possible to achieve maximum fuel economy, we have set forth below a description of the technologies that McLaren has introduced and is developing for future models based on current best practice as detailed in the NHTSA recommended technology roadmap. [EPA–HQ–OAR–2009–0472; FRL_8959-4; NHTSA-2009-0059] RIN 2060-AP58; RIN 2127-AK50 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule.

7.2 FURTHER SUPPORT REGARDING MAXIMUM FEASIBLE FUEL ECONOMY

7.2.1 FUEL ECONOMY LABEL VALUES ARE SIMILAR TO THE COMPETITION

The McLaren 570S Coupe fuel economy label combined value of 19mpg (certified MY2016-17) is equal to or better than the results of manufacturers of similar vehicles (given vehicle type and price range). Table 8 below shows the specifications and fuel economy figures of similar vehicles from MY2016.

Make and model	*Displacement (L)*	*Power (HP)*	*Transmission*	*City (mpg)*	*Highway (mpg)*	*Combined (mpg)*
McLaren 570S Coupe	3.8 V8	562	A-7	16	23	19
Aston Martin V12 Vantage S	6.0 V12	563	A-7	12	18	14
Bentley Continental GT	6.0 W12	552	S-8	12	21	15
Chevrolet Corvette	6.2 V8	650	S-8	13	23	16
Dodge Viper SRT	8.4 V10	645	M-6	12	21	15
Ferrari California T	3.9 V8	552	A-7	16	23	18
Lamborghini Huracan	5.2 V10	602	A-7	14	21	17
Mercedes Benz AMG GT S	4.0 V8	503	A-7	13	19	15
Porsche 911 GT3RS	4.0 S6	493	A-7	14	20	16

Table 8 – Similar Vehicle Fuel Economy

7.3 CONCLUSIONS AS REGARDS MCLAREN'S ACHIEVING MAXIMUM FEASIBLE FUEL ECONOMY

- In sum, all the above information supports McLaren's position that its requested alternate standards represent the maximum feasible fuel economy.
- As announced in March 2016, McLaren plans to implement hybrid technology on 50% of its fleet by 2022, supported by an investment of over £1bn between 2016-2022, with a targeted 20-25% of annual revenue being invested in research and development of new technologies.
- McLaren's business strategy demands technical leadership from its products and that these products are borne from innovative and efficient design. McLaren continues to invest in R&D to support this strategy.
- Current powertrain R&D is assessing technologies to support future emissions and CO_2 reductions. Initial findings have demonstrated practical limitations of certain technologies in McLaren's high performance applications.
- McLaren's efforts have achieved the maximum feasible fuel economy given available technology and realistic limits to the level of investment available within a small, independent car manufacturer.

8 COMPLETE DESCRIPTION OF THE VEHICLE CONFIGURATIONS

A complete description of the vehicle configurations is set forth in Table 10, in accordance with the requirements of 525.7(e-g).

Table 10 – Vehicle Descriptions

PROJECT	570S / 570GT	720S
Frontal Area (sq ft)	21.5	21.5
Length (mm)	4530	4543
Width (w/o mirrors) (mm)	1914	1930
Height (mm)	1202	1196
Footprint (sq ft)	46.6	46.6
Est. Curb weight (lb)	3340	3235
Seating Positions	2	2
Int. Vol. Index (cu. ft)	50.5	TBC
Fuel Type	Gasoline	Gasoline
Engine	V8 Twin Turbo	V8 Twin Turbo
Engine Displacement (L)	3.8	4.0
SAE NET Horsepower (kW)	419	530
Fuel Metering	Electronic multipoint port fuel injection	Electronic multipoint port fuel injection
Transmission	7-Speed Dual Clutch Automatic Transmission	7-Speed Dual Clutch Automatic Transmission

Total drive ratio

Gear	Internal gearbox ratios (ratios of engine to gearbox output shaft revolutions)	Final drive ratio(s) of gearbox output shaft to driven wheel revolutions)	Total Gear Ratios
1	3.982	3.308	13.171
2	2.612		8.642
3	1.905		6.302
4	1.479		4.892
5	1.160		3.838
6	0.906		2.997
7	0.686		2.27
R	2.803		9.273

Emission control sys. Bosch ME17 system

Dynamometer road load HP Obtained using Coastdown method described in 40 CFR 86.129
No adjustment for air conditioning
All models equipped with radial tires

Lubricants (type): Mobil 1 0W-40

Low friction lubricants explanation: Fully synthetic 0W/40 oil from ExxonMobil, This viscosity specification is relatively low for the extreme loading in this application.

Fuel Economy Values (mpg):

PROJECT	570S	720S
Unadjusted 5-Cycle City (mpg)	16	15
Unadjusted 5-Cycle Highway (mpg)	22	22
Unadjusted 5-Cycle Combined (mpg)	19	18
Combined City/Highway (mpg)	23.8	22.7

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In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are McLaren's financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of McLaren automobiles - high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993).[2]

9.1 INVESTMENTS MADE AND LIMITED FINANCIAL RESOURCES

As noted previously, McLaren is a privately-held, small volume vehicle manufacturer with limited financial resources. McLaren is committed to innovation and is targeting to invest 20-25% of annual revenue in research and development of new technologies between 2016 and 2020, with over half of McLaren's fleet to feature hybrid technology by 2022.

9.2 BASIC VEHICLE DESIGN CONCEPT

McLaren cannot currently adopt further FE improvements that are compatible with the basic vehicle design concept of a high performance sports car. With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 FR 44493 (Dec. 10, 1986). With regard to Rolls-Royce, NHTSA similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles [are] not considered." This approach must also be applied to McLaren.

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McLaren will only be offering one base vehicle architecture for the 2018, 2019 and 2020 model years based on the 3.8L and 4.0L variants of the current powertrain platform, so there is no opportunity to change the model mix to improve the fuel economy.

[2] In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

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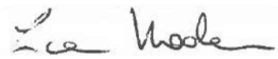
13 CONCLUSION

McLaren has made enormous investment and uses cutting edge technology to achieve fuel economy and safety, making its cars amongst the best in class in these areas, and is committed to further investment in research and development of new technologies. However, the nature of the sports cars it produces makes it impossible to meet CAFE fuel economy standards, despite its aggressive application of technology. Based upon the foregoing, McLaren respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2018, 2019 and 2020.

Respectfully submitted,



Luca Viadana
Head of Government & Legislative Affairs
McLaren Automotive Limited

TITLE 49 PART 525 PETITION

FOR AN EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS FOR MODEL YEARS 2021, 2022 AND 2023

MAY 2020

FAO: Administrator, National Highway Traffic Safety Administration, Washington, DC 20590

Please note: This petition has had Confidential Business Information redacted

For additional information or clarification, please contact:

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1 THE APPLICANT

McLaren Automotive, 'McLaren', based in Woking England, was established in 1989 and is renowned for its expertise in engineering and manufacturing high technology sports cars. McLaren has established its own unique approach to sports car design, combining the most advanced engineering and technology with the technology developed through its sister Formula 1 race team to develop the most advanced, efficient sports cars in the world.

McLaren is an independent, highly specialised small volume manufacturer and started production of its sports cars in 2011, in very low volume for a global market including the US.

2 COMPANY BACKGROUND AND PRODUCT HISTORY

McLaren Automotive is a creator of luxury, high-performance sportscars and supercars.

Launched in 2010, the company is now the largest part of the McLaren Group.

Every vehicle is hand-assembled at the McLaren Production Centre (MPC) in Woking, Surrey, England.

The company has three defined product families; Sports Series, Super Series and Ultimate Series; which are retailed through over 80 retailers in 30 markets around the world, and in which over 20 models have been launched since 2010.

McLaren is a pioneer that continuously pushes the boundaries. In 1981, it introduced lightweight and strong carbon fibre chassis into Formula 1 with the McLaren MP4/1. Then in 1993 it designed and built the McLaren F1 road car - the company has not built a car without a carbon fibre chassis since. McLaren developed its own downsized twin turbo V8 engine with specific power and efficiency among the best in class in the high-performance vehicles that McLaren manufactures. As part of the Ultimate Series, McLaren was the first to deliver a hybrid hypercar, the McLaren P1™.

Announced at Goodwood Festival of Speed in 2018, the company's Track25 business plan will see it invest £1.2billion in research and development to deliver 18 new cars or derivatives by the end of 2025.

McLaren operates a research and development department to assess the potential of new technologies and innovations that could contribute towards achieving future legislative requirements and provide product differentiation in the market place. Cost/benefit analysis is key to identifying the most suitable of these new technologies prior to moving them forward into product development.

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3 COMPANY INVESTMENT IN FUEL EFFICIENCY

McLaren recognises the need to reduce energy consumption and fuel demand, and supports NHTSA's efforts in this regard. McLaren strives to pursue high performance technology while achieving ambitious improvements in fuel consumption, and is committed to support the objective of consistent improvements in vehicle fuel economy across the US fleet. McLaren's vehicles compare favourably with those high performance niche products produced by large volume manufacturers in terms of fuel consumption. In March 2016, McLaren announced that it plans to implement hybrid technology on 50% of its fleet by 2022, supported by an investment of over £1bn between 2016-2022. In July 2018 , McLaren extended this plan to implement hybrid technology on 100% of its Sports and Super series vehicles by 2025, with total investment increased to £1.2bn.

McLaren appreciates NHTSA's recognition of the need for small-volume manufacturer provisions under fleet standard mechanisms, as defined in 49 CFR 525.

4 ALTERNATE STANDARDS REQUESTED

McLaren requests alternate standards equal to the average fuel economies set forth in Table 1 below. The 1.5% rate of annual improvement is aligned with that requested in the newly issued Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 (NHTSA-2018-0067, 30th March 2020).

MODEL YEAR	Standard Requested (mpg)[1]
2021	22.7
2022	23.0
2023	23.4

Table 1 - McLaren Alternate Fuel Economy Standards Request

[1] Fleet AFE as per 49 CFR 531.5(c)

5 TIMELINESS OF THIS PETITION

McLaren acknowledges that petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. However, late filing is permitted if good cause is shown. (49 CFR 525.6(b)).

As publicly announced in 2018, McLaren is developing hybrid capability for deployment across its main fleet by 2025, as well as engine development to meet more stringent Tier 3 emissions standards from MY2022. As a Small Volume Manufacturer (SVM), McLaren must also develop this technology under financial and operational constraints that large volume OEMs are not subject to. The corresponding engineering challenges have resulted in a prolonged development phase which has delayed both testing and production launch, and recently has been further exacerbated by the global COVID-19 crisis.

The efficiency of this new powertrain is critical in achieving a step improvement in fleet average fuel economy. The preliminary testing phase has now been completed, enabling McLaren to provide NHTSA with a much more reliable forecast of its CAFE values, and minimising the iterations required to assess the viability of the maximum feasible fuel economy values described within this document.

As such, McLaren was unable to submit a CAFE application before this time since the impact of the technologies implemented on the new powertrain, and their effect on CAFE values, could not be accurately assessed.

The above scenario presents good cause for McLaren's late filing. In the Spyker case, 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007), Spyker's decision to enter the U.S. market for MY 2006 was not made until late 2004 after it identified a U.S. certified powerplant. NHTSA concluded that Spyker took reasonable measures to submit a petition in as timely a manner as possible. This finding is equally applicable to McLaren. While with Spyker, the ability to enter the U.S. market "hinged on obtaining a U.S.-certified powerplant", McLaren's timing has been impacted by the development and certification of a new powertrain to meet the US requirements. With Spyker, it was not possible or feasible to file sooner because the company was waiting for an agreement with its engine supplier. In McLaren's case, as with Spyker, good cause exists for the late submission of the petition. As NHTSA noted in Spyker, this approach is consistent with a previous determination made by NHTSA with regard to the timeliness of a petition submitted by DeTomaso Automobiles, Ltd. (see, 64 FR 73476 (December 30, 1999).

Taking this into account; May 2020 was the earliest McLaren could file with accurate data and production estimates. McLaren requests that NHTSA considers this good cause for the late application.

6 ELIGIBILITY FOR AN EXEMPTION

Under Part 525.5, petitions for alternate standards are limited to manufacturers that manufacture, world-wide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that the petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year.

McLaren is a Small Volume Manufacturer and neither controls nor is controlled by a third party firm or corporate office that manufactures/produces vehicles or engines for the US market. McLaren vehicles are imported into the US by McLaren's wholly owned US subsidiary which imports only cars manufactured by McLaren.

McLaren therefore meets the criteria in 49 CFR 525.7 to qualify for submission of this petition.

7 THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM THAT IS FEASIBLE

The fuel economy values requested in this petition do in fact represent the maximum feasible CAFE that McLaren can achieve for the model years at issue. For MY2021-2023, NHTSA's footprint-based CAFE system would require McLaren's fleet to have the following average fuel economy based on the calculation set forth in Appendix I.

MODEL YEAR	CAFE Target (mpg)
2021	43.7
2022	44.0
2023	44.7

Table 2 - Footprint-Based CAFE Targets

Given the very specific nature of McLaren's entire product line – high performance sports cars – these standards are not achievable, notwithstanding McLaren's adoption of all technology available.

7.1 MCLAREN HAS ADOPTED ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

McLaren develops its own powertrain platform, which is highly efficient considering the type of vehicle and the efficiency of its competitors. McLaren can make further significant improvements only with the introduction of a new powertrain platform. Overall, McLaren has demonstrated a commitment to reducing fuel consumption through innovation and adoption of technologically feasible fuel economy improvements. The 5-cycle label fuel economy values can be seen for recent McLaren vehicles in the table below:

MODEL	MODEL YEAR	City MPG	HW MPG	Combined MPG
720S COUPE	2018	15	22	18
600LT COUPE	2019	15	23	18

Table 3 - 5-Cycle Fuel Economy Values

In determining the proper level at which to set a McLaren alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible"; improvements based on technology available to McLaren during the model years at issue that will improve fuel economy. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41228 (August 3, 1993); 65 FR 58483 (September 29, 2000); 64 FR 73476 (December 30, 1999).

7.8 FURTHER SUPPORT REGARDING MAXIMUM FEASIBLE FUEL ECONOMY

7.8.1 FUEL ECONOMY LABEL VALUES ARE SIMILAR TO THE COMPETITION

The McLaren 600LT & 720S Coupe fuel economy label combined value of 18mpg (certified MY19-20) is equal to or better than the results of manufacturers of similar vehicles (given vehicle type and price range). Table 8 below shows the specifications and fuel economy figures of similar vehicles from MY19-20.

Make/Model	Cylinders	Displacement	Power	Transmission	City FE	Highway FE	Combined FE
	#	*litres*	*hp*	*# of gears*	*mpg*	*mpg*	*mpg*
McLaren 600LT Coupe	8	3.8	592	AM-S7	15	23	18
McLaren 720S Coupe	8	4.0	710	AM-S7	15	22	18
Lamborghini Aventador	12	6.5	690	AM-S7	9	15	11
Ferrari 812 Superfast	12	6.5	789	AM7	12	16	13
Ford GT	6	3.5	550	AM7	11	18	14
Chevrolet Corvette ZR1	8	6.2	755	AM-S8	12	20	15
Audi R8	10	5.2	562	AM-S7	13	20	16
Porsche 911 GT3	6	4.0	500	AM-S7	15	20	17
Ferrari 488 Pista	8	3.9	710	AM7	15	20	17
Aston Martin DBS	12	5.2	715	AS8	14	22	17
Mercedes AMG GT R	8	4.0	577	AM7	15	20	17

Table 4 - Efficiency of comparable competitor vehicles

7.8.2 IMPROVEMENT IN USA CAFE

The requested standards for MY2021-2023 are shown in Table 9 below, alongside the requested standards for MY2018-2020, demonstrating improvement and consistency in requested standards over this period.

The inability to achieve continuous annual improvement is a result of the limited fleet diversity and extended product lifecycles inherent to small volume manufacturers, as recognised by NHTSA and EPA in fuel economy and greenhouse gas rulemakings.

Model Year	2018	2019	2020	2021	2022	2023
Requested Standard (mpg)	22.5	22.5	22.5	22.7	23.0	23.4

7.9 CONCLUSIONS AS REGARDS MCLAREN'S ACHIEVING MAXIMUM FEASIBLE FUEL ECONOMY

- In sum, all the above information supports McLaren's position that its requested alternate standards represent the maximum feasible fuel economy.
- As announced in July 2018, McLaren plans to implement hybrid technology on 100% of its core fleet by 2025 (excluding Ultimate series limited models). This is supported by an investment of £1.2bn.
- McLaren's business strategy demands technical leadership from its products and that these products are borne from innovative and efficient design. McLaren continues to invest in R&D to support this strategy.
- Current powertrain R&D is assessing technologies to support future emissions and CO2 reductions. Initial findings have demonstrated practical limitations of certain technologies in McLaren's high performance applications.
- McLaren's efforts have achieved the maximum feasible fuel economy given available technology and realistic limits to the level of investment available within a small, independent car manufacturer.

8 COMPLETE DESCRIPTION OF THE VEHICLE CONFIGURATIONS

A redacted description of the vehicle configurations is set forth in Table 10, in accordance with the requirements of 525.7(e-g).

MODEL	720S COUPE	720S SPIDER	GT
Frontal Area (sq ft)	21.5	21.5	21.5
Length (mm)	4543	4543	4683
Width (w/o mirrors) (mm)	1930	1930	1925
Height (mm)	1196	1194	1213
Footprint (sq ft)	46.9	46.9	47.2
Est. Curb Weight (lb)	3139	3217	3379
Seating Positions	2	2	2
Int. Vol. Index (cu ft)	N/A (Two seater)	N/A (Two seater)	N/A (Two seater)
Fuel Type	Gasoline	Gasoline	Gasoline
Engine	V8	V8	V8
Engine Displacement	4.0L	4.0L	4.0L
SAE NET Horsepower (kW)	530	530	456
Fuel Metering	MPFI	MPFI	MPFI
Transmission	7-speed DCT	7-speed DCT	7-speed DCT

Table 5 - Description of vehicle configurations

9 THE MCLAREN REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are McLaren's financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of McLaren automobiles - high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993).[2]

9.1 INVESTMENTS MADE AND LIMITED FINANCIAL RESOURCES

As noted previously, McLaren is a privately-held, small volume vehicle manufacturer with limited financial resources. McLaren is committed to innovation and is targeting to invest £1.2billion in research and development to deliver 18 new cars or derivatives, with hybrid technology on all Sports Series and Super Series models, by the end of 2025.

9.2 BASIC VEHICLE DESIGN CONCEPT

McLaren cannot currently adopt further FE improvements that are compatible with the basic vehicle design concept of a high performance sports car. With regard to Ferrari, NHTSA has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 FR 44493 (Dec. 10, 1986). With regard to Rolls-Royce, NHTSA similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles [are] not considered." This approach must also be applied to McLaren.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... would be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007).

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[2] In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

10 MCLAREN CANNOT ALTER ITS SALES MIX SO AS TO IMPROVE FUEL ECONOMY

McLaren has no opportunity to improve fuel economy by changing its model mix since its vehicles share a common platform, all using variants of the same power plant. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). There is no room for CAFE changes based upon marketing actions.

NHTSA has acknowledged that "producing additional models or making some of the configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by Rolls-Royce preclude significant changes to the basic concept of the ...car." 58 FR 41229 (Aug. 3, 1993, Emphasis added). The same rationale applies in this case. McLaren produces "niche" cars and has limited financial resources.

11 OTHER FEDERAL STANDARDS RESTRICT MCLAREN'S MAXIMUM FEASIBLE CAFE

McLaren's small size limits "the amount of resources [it] can apply to comply with both the mandatory [safety and emissions] standards and fuel economy requirements." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007).

As regards FMVSS, crash-worthiness standards can generally tend to reduce achievable CAFE, since they preclude, in some instances, the use of lighter-weight components. See 64 FR 73476 (December 30, 1999). Other safety standards that demand McLaren resources and have weight and fuel economy impacts include upgraded FMVSS 301 rear crash requirements, upgraded FMVSS 214 side impact requirements and upgraded FMVSS 216 roof crush requirements.

Furthermore, in April 2014 EPA published the Final Rule on "Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards", implementing severely stringent tailpipe and evaporative standards. Compliance with these new pollution limits will demand both resources (financial and personnel) as well as a balancing of priorities in order to achieve compliance with all governmental requirements.

12 THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

McLaren is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of McLaren's sales in the US (see the USA sales numbers in Appendix 1 below), together with the fact that a McLaren vehicle is almost exclusively used as a second or third car (and hence infrequently), means that McLaren has a virtually immeasurable effect on US energy consumption.

Since McLaren cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

13 CONCLUSION

McLaren has made enormous investment and uses cutting edge technology to achieve fuel economy and safety, making its cars amongst the best in class in these areas, and is committed to further investment in research and development of new technologies. However, the nature of the sports cars it produces makes it impossible to meet CAFE fuel economy standards, despite its aggressive application of technology. Based upon the foregoing, McLaren respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2021, 2022 and 2023.

Respectfully submitted,

Peter Montague
Certification Manager
McLaren Automotive Limited

PETITION OF MOBILITY VENTURES, LLC
FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS FOR MODEL YEARS 2014-2016

AUGUST 18, 2017

MOBILITY VENTURES, LLC

MOBILITY VENTURES LLC PETITION

FOR

ALTERNATIVE FUEL ECONOMY STANDARD

Table of Contents

1. INTRODUCTION

In accordance with 49 CFR Part 525, Mobility Ventures LLC ("Mobility Ventures") hereby petitions the U.S. Department of Transportation, National Highway Traffic Safety Administration for an exemption from the Corporate Average Fuel Economy *("CAFE")* Standards for model years [redacted] and for Alternate Standards to be granted and applied to these three Model Years.

The Alternate Standards requested shall apply to: [redacted]

2. ALTERNATE STANDARDS REQUESTED

Mobility Ventures requests the following Alternate Standards:

Model Year	Requested Alternate Standards
2014	19.6
2015	20.1
2016	20.1

3. BACKGROUND

[redacted] AM General is a privately-owned company, headquartered in South Bend, Indiana, best known for designing, engineering, and producing the military HMMWV as well as other military Light Tactical Vehicle offerings. AM General's competencies also extend to commercial vehicles—both as an original equipment manufacturer (OEM) and as a contract manufacturer for customers such as General Motors and Mercedes-Benz. Additional information about AM General is available at http://www.amgeneral.com/.

Late in the 2013 Calendar Year, AM General established Mobility Ventures to assume engineering, production, and distribution of the former Vehicle Production Group LLC ("VPG") MV-1 vehicle. [redacted]

Prior to forming Mobility Ventures, AM General was contracted by VPG to assemble their MV-1 vehicle at AM General's Commercial Assembly Plant in Mishawaka, Indiana. Production of the VPG MV-1 began in 2011 and ended in February 2013 when VPG ceased operations when it could no longer maintain compliance with the minimum conditions of a loan that had been awarded by the U.S. Department of Energy in 2011. [redacted] Production of the MV-1 restarted under the Mobility Ventures "banner" on March 11, 2014.

The Alternative Standards being requested in this Petition are for the 2014-2016 model year MV-1 handicapped accessible vehicles manufactured by Mobility Ventures.

4. CORPORATE CONTROL

Mobility Ventures is a wholly owned subsidiary of AM General. Mobility Ventures was formed in late 2013 to engineer, produce and distribute the MV-1 after VPG ceased its activities. [redacted] None of the other vehicles produced by AM General are subject to the CAFE program.

5. ELIGIBILITY

Per 49 CFR Part 525.5 (limitation on eligibility), any Manufacturer that manufactures fewer than 10,000 passenger automobiles[1] (whether or not in the customs territory of the United States) in the second model year preceding an affected model year or in the affected model year is eligible for an exemption for that affected model year.

Mobility Ventures' first production of any passenger automobile occurred in March 2014 and they were produced as 2014 Model Year vehicles. Mobility Ventures did not have vehicle production of any type in any of the three model years prior to Model Year 2014. Mobility Ventures' production of passenger automobiles in the affected model years, and the three prior model years, is shown in the table below.

Model Year	Mobility Ventures as an OEM	Production For Domestic Sale	Production for Export Sale	MV-1 Total Production
2011	No	0	0	0
2012	No	0	0	0
2013	No	0	0	0
2014	Yes	2093*	220	2313
2015	Yes	195	59	254
2016	Yes	555	45	600

[redacted]

Based on Mobility Ventures' annual passenger automobile production volumes and the criteria established in 49 CFR Part 525.5 (limitation on eligibility), we have concluded that Mobility Ventures is eligible for an Alternate Standard for the affected model years. Note: As indicated above in Section 4, AM General produces no other vehicles subject to the CAFE program.

6. TIMELINESS OF THE PETITION

In accordance with 49 CFR Part 525.6, Petitions for an Alternate Standard shall be submitted at least 24 months prior to the start of the affected model year, unless good cause for a later submission is shown.

Prior to the formation of Mobility Ventures in the fall of 2013, regulatory compliance for the MV-1 was the responsibility of now-defunct VPG. [redacted]

[1] Per 49 CFR Part 525.4 (definitions), the term *passenger automobile* means an automobile determined by the Administrator under 49 CFR part 523 to be a passenger automobile. Per Part 523.4, a passenger automobile is any automobile (other than an automobile capable of off-highway operation) manufactured primarily for use in the transportation of not more than 10 individuals.

When Mobility Ventures acquired the assets of VPG via the Department of Energy in September 2013, Mobility Ventures became responsible for the design, engineering, certification, production, distribution, sales, and compliance of the Mobility Ventures-produced MV-1 vehicle. Regarding compliance, Mobility Ventures leveraged the activities that had been undertaken by VPG and that were in process at the time of VPG's demise. [redacted] Since September 2013, Mobility Ventures has worked diligently to ensure that the MV-1 complies with all applicable regulatory requirements, including CAFE. [redacted]

7. ABOUT THE MV-1

A. General

The MV-1 is the only American-made vehicle specifically engineered from the ground up in support of wheelchair users and people with other disabilities. Unlike accessible minivans, which start as an ordinary minivan and are converted to be wheelchair accessible, the MV-1 was designed from the start with wheelchair users in mind.

The MV-1 is sold through a small network of Mobility Ventures dealers. As it is a purpose-built wheelchair accessible vehicle, the MV-1 is purchased by government paratransit fleets, by non-government fleets that need to transport disabled persons, and by individual consumers with disabilities.

Additional information about the MV-1 is available via the Mobility Ventures website (http://www.mv-1.us/).

Photos of the MV-1 are below.

B. MV-1 specifications

In accordance with 49 CFR Part 525.7, the following specifications are provided:

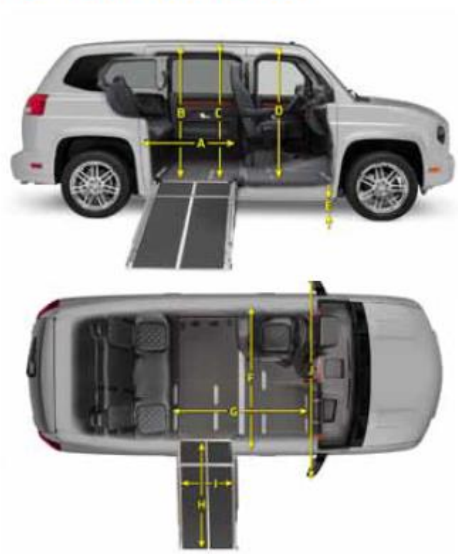
Specification	MY2014	MY2015	MY2016
Maximum overall body width	79.4 inches	79.4 inches	79.4 inches
Maximum overall length	205.0 inches	205.0 inches	205.0 inches
Maximum overall height	75.0 inches	75.0 inches	75.0 inches
Vehicle curb weight	5055 lbs. (gasoline) 5312 lbs. (CNG)	5055 lbs.	5055 lbs.
Number of designated seating positions	4	4	4
interior volume index[2]	165.9 ft^3	165.9 ft^3	165.9 ft^3
Basic engine displacement	4.6 L V8 (gasoline) 4.6 L 2V EFI V8 (CNG)	Ford 3.7L 4V EFI V6	Ford 3.7L 4V EFI V6
SAE rated net power (kilowatts)	248 HP (184.9 kw) (gas) 213 HP (158.8 kw) (CNG)	270 HP (201.3 kw)	270 HP (201.3 kw)
Fuel metering system	Multipoint/sequential fuel injection	Multipoint/sequentia l fuel injection	Multipoint/sequential fuel injection
Drive train configuration and total drive ratio	2-wheel drive (rear) 4 speed automatic transmission with overdrive, gear ratios: 1^{st} – 2.84:1	2-wheel drive (rear) 6 speed automatic transmission with overdrive, gear ratios: 1^{st} – 4.17:1	2-wheel drive (rear) 6 speed automatic transmission with overdrive, gear ratios: 1^{st} – 4.17:1

[2] Interior volume index was determined using the following values: front seat head room: 41.7 in^3, rear seat head room: 43.4 in^3, front seat shoulder room: 65.3 in^3, rear seat shoulder room: 66.9 in^3, front seat hip room: 63 in, rear seat hip room: 69 in, front seat leg room: 42.1 in, rear seat leg room: 36.6 in, cargo volume index: 36.4 ft^3. Front seat volume was calculated to be 65.2 ft^3. Rear seat volume was calculated to be 64.3 ft^3.

	2^{nd} – 1.33:1 3^{rd} – 1.00:1 4^{th} – 0.70:1	2^{nd} – 2.34:1 3^{rd} – 1.52:1 4^{th} – 1.14:1 5^{th} – 0.87:1 6^{th} – 0.69:1	2^{nd} – 2.34:1 3^{rd} – 1.52:1 4^{th} – 1.14:1 5^{th} – 0.87:1 6^{th} – 0.69:1
Emission control system	Three-way catalyst	Three-way catalyst	Three-way catalyst
Dynamometer road load setting	22.1	21.5	21.5
Use of synthetic lubricants, low viscosity lubricants, or lubricants with additives that affect friction characteristics in the crankcase, differential, or transmission	Engine oil: SAE 5W-20 Premium Synthetic Blend Motor Oil Differential oil: 75W90 Synthetic Axle Lubricant with Limited Slip Additive Transmission oil: Mercon® LV Transmission Fluid	Engine oil: SAE 5W-20 Premium Synthetic Blend Motor Oil Differential oil: 75W90 Synthetic Axle Lubricant with Limited Slip Additive Transmission oil: Mercon® LV Transmission Fluid	Engine oil: SAE 5W-20 Premium Synthetic Blend Motor Oil Differential oil: 75W90 Synthetic Axle Lubricant with Limited Slip Additive Transmission oil: Mercon® LV Transmission Fluid

Specifications of interest to the typical MV-1 buyer/user are shown below.

SPECIFICATIONS



Access Door Usable Width	A	36 in	914 mm
Access Door Usable Height	B	56 in	1422 mm
Interior Height (Rear Wheelchair Position)	C	59.5 in	1511 mm
Interior Height (Front Wheelchair Position)	D	58.3 in	1481 mm
Minimum Ground Clearance	E	6 in	152 mm
Interior Width at B Pillars	F	64.5 in	1638 mm
Interior Floor Length	G	81.5 in	2070 mm
Ramp Length (Manual)	H	63.75 in	1619 mm
Ramp Length (Power, Short Deployment)	H	69.5 in	1765 mm
Ramp Length (Power, Long Deployment)	H	92.25 in	2343 mm
Usable Ramp Width	I	30 in	762 mm
Mirror to Mirror Width	J	79.69 in	2024 mm

C. MV-1 Fuel Economy

Model Year/Configuration	Configuration Fuel Economy (mpg)	Fleet Fuel Economy (mpg)
2014		19.6
Ford 4.6 L V8 (gas)	18.4	
Ford 4.6L V8 (CNG)	114.7	
2015		20.1
Ford 3.7L 4V EFI V6	20.1	
2016		20.1
Ford 3.7L 4V EFI V6	20.1	

8. MAXIMUM FEASIBLE FUEL ECONOMY

A. Technologies Deployed to Achieve Fuel Economy Performance

2014 Model Year

In the 2014 model year, the following two variants of the MV-1 were offered:

Variant 1: Ford 4.6 L V8 (gasoline)

Variant 2: Ford 4.6 L 2V EFI V8 (CNG)

Variant 1 (gasoline) combined fuel economy was 18.4 mpg.

Variant 2 (CNG) combined fuel economy was 114.7 mpg. Note: Since the CAFE standard emphasizes the reduction of petroleum consumption in addition to increasing fuel economy, CNG vehicles receive favorable treatment under CAFE. The gasoline gallon equivalent (CGE) for CNG is counted as just 0.15 gallons of gasoline (this calculation is the Petroleum Equivalency Factor, or PEF). A dedicated CNG vehicle with a real-world fuel economy of 15 mpg is treated as a 100 mpg vehicle for CAFE compliance (15/0.15-100).

Variant 2 City FE was 14.7 mpg and highway FE was 21.8 mpg.

Variant 1 production was 1937 units.

Variant 2 production was 156 units.

Fleet fuel economy for CAFE (variants 1 and 2 given above production) was 19.6 mpg.

Both versions were equipped with a 4-speed automatic transmission with overdrive.

2015 Model Year

In the 2015 model year, the CNG variant was deleted from the lineup and a 3.7L V6 engine replaced the 4.6L V8 previously offered.

Fuel economy for the 2015MY MV-1 improved to 20.1 mpg (a 9.2% improvement over the prior year). The 2015MY MV-1 was equipped with a 6-speed automatic transmission with overdrive.

2016 Model Year

In the 2016 model year, the MV-1 was equipped with the same 3.7L V6 engine and 6 speed automatic transmission used in 2015 model year vehicle. Fuel economy was unchanged from 2015 model year.

B. Fuel Economy Technologies Considered but Not Deployed

In acquiring the assets of VPG in September of 2013 via the Department of Energy auction, Mobility Ventures sought to return the MV-1 to production in its previously existing form (i.e., as produced for the 2012 model year[3]). [redacted]

[redacted]

C. The Effect of Other Motor Vehicle Regulatory Requirements

It is generally accepted that the introduction of new safety and emissions standards may require new technology, thus [redacted] The MV-1 curb weight was unchanged over the affected model years. The curb weight of the gasoline version of the MV-1 was 5055 lbs. in each of the affected model years. The CNG variant offered in the 2014 model year had a curb weight of 5312 lbs. Mobility Ventures does not claim that other motor vehicle regulatory requirements impacted Mobility Ventures' ability to improve MV-1 fuel economy for the affected model years.

D. Discussion of Maximum Feasible Fuel Economy

As indicated in Section 8.b, after acquiring the assets of VPG in 2013, Mobility Ventures put the MV-1 into production without modifying the vehicle from VPG's 2012 model year configuration. [redacted] As indicated in Section 8.a, Model Year 2015 fuel economy improved by 9.2% as a result of Mobility Ventures deleting the 4.6L V8 gasoline engines previously offered and replacing it with the more fuel efficient 3.7L V6. The fuel economy also improved by replacing the 4-speed transmission with a 6-speed transmission. This new configuration was retained for the 2016 model year.

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[3] No 2013 model year MV-1s were produced.

[4] It was discovered that the vehicle would not start below 32 degrees F.

[5] In the 2014 model year, only 156 CNG versions of the MV-1 were produced. Also, starting in the summer of 2014, gasoline prices began to fall precipitously causing further concerns about the future demand for the CNG vehicles of this type.

In considering what is the maximum achievable fuel economy for the MV-1, it is important to consider how the vehicle is used in the field. [redacted] Thus, the vehicles are subject to considerable abuse. The MV-1 was designed and constructed to withstand such day-to-day punishment. [redacted] As NHTSA is aware, tooling expenses for low volume manufacturers comprise a much larger share of overall production expenses when compared to full line high volume vehicle manufacturers. [redacted] Consistent with its need to retain the basic form and function of the MV-1's original design, Mobility Ventures did not seek to alter the vehicle design during the affected model years. As discussed above, Mobility Ventures did acquire a more fuel-efficient powertrain from Ford (which improved fuel economy by 9.2%).

It is the position of Mobility Ventures that the fuel economy values associated with the vehicles produced for the 2014-2016 model years represent the maximum feasible fuel economy values achievable by Mobility Ventures for the MV-1.

9. JUSTIFICATION FOR REQUESTING ALTERNATE STANDARDS

As discussed in Section 8 above, it is the position of Mobility Ventures that the production fuel economy for the MV-1 in model years 2014-2016 represents the maximum fuel economy achievable.

Based on the regulatory requirements established for 2014-2016 model years, Mobility Ventures has calculated target fuel economy values for the MV-1 as follows:

[redacted]

[redacted]

Mobility Ventures began production of the MV-1 with the idea of providing wheelchair users and people with other disabilities a purpose-built, made-in-the-USA vehicle. Mobility Ventures produced a CNG version of the MV-1 which, for purposes of CAFE, had a combined fuel economy of 114.7 mpg. Customers opted instead for the gasoline version of the vehicle. Then, at its first opportunity, Mobility Ventures provided a gasoline version of the MV-1 with a smaller displacement engine having 9.2% better fuel economy.

Mobility Ventures believes that NHTSA would be justified in granting the Alternative Standards requested, as failure to do so would effectively ignore the many efforts put into producing the most fuel-efficient specifically-designed wheelchair accessible vehicle ever manufactured in the United States. It would also discount the fact that, when establishing the 2012-2016 model year CAFE standards for passenger cars, the agency never contemplated the possibility that its passenger car standards might be applied to wheelchair-accessible vehicles purchased almost exclusively by commercial fleets to transport disabled persons.

10. IMPACT ON PASSENGER AUTOMOBILE FUEL CONSUMPTION

Using the EPA/DOT Fuel Economy Label value for vehicle miles per year of 15,000[6], annual fuel consumption of the MV-1 fleet would be as follows:

MY 2014: 15,000 mi/19.6 mpg x 2093 units = 1,601,786 gal

MY 2015: 15,000 mi/20.1 mpg x 195 units = 145,522gal

MY 2016: 15,000 mi/20.1 mpg x 555 units = 414,179 gal

Total consumption: 2,161,487 gal

If the MV-1 were compliant with the CAFE standards, annual fuel consumption would be as follows:

MY 2014: 15,000 mi/29.0 mpg x 2093 units = 1,082,586 gal

MY 2015: 15,000 mi/29.9 mpg x 195 units = 97,826 gal

MY 2016: 15,000 mi/30.9 mpg x 555 units = 269,417 gal

Total consumption: 1,449,829 gal

If the MV-1 was compliant with applicable CAFE standards, total fuel saved per year would amount to 711,658 gallons.

Motor vehicle gasoline consumption in U.S. currently exceeds 143 billion gallons per year[7]. By comparison, the typical amount of gasoline consumed by a 2014 model year MV-1 that travels 15,000 miles per year would be roughly 765 gallons. If all 2093 MV-1s produced in the 2014 model year traveled 15,000 miles per year, total gasoline consumption per year would amount to 1,601,786 gallons. [redacted]. The 195 MV-1s produced in the 2015 model year and the 555 MV-1s produced in the 2016 model year would consume an additional 145,522 gallons and 414,179 gallons per year, respectively. Total fuel consumed by 2014-2016 MY MV-1s annually amounts to 2,161,487 gallons. MV-1s compliant with the CAFE standards would have consumed 1,449,829 gallons of fuel.

Granting the Alternate Standards for the vehicles covered by this Petition will have no noticeable impact on U.S. fleet fuel consumption and will not affect the need of the nation to conserve energy.

[6] 15,000 miles per year is used to calculate annual cost of fuel purchased as shown on the EPA/DOT Fuel Economy Label. See https://www.fueleconomy.gov/feg/Find.do?action=bt1.
[7] U.S. Energy Information Administration (https://www.eia.gov/tools/faqs/faq.php?id=23&t=10)

11. MANUFACTURER CONTACTS

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P.IVA / C.F. 02054560368

PETITION OF
PAGANI
FOR EXEMPTION FROM
CORPORATE AVERAGE FUEL ECONOMY STANDARDS
AND FOR ESTABLISHMENT OF
ALTERNATE FUEL ECONOMY STANDARDS
FOR MODEL YEARS 2012, 2013 and 2014

JUNE 1, 2010

NONCONFIDENTIAL VERSION

PAGANI AUTOMOBILI S.P.A.
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THE APPLICANT:

Pagani Automobili SpA, formerly Modena Design, is a small Italian corporation formed in 1991 and owned by the Pagani Family. Pagani started production of Pagani-brand sports cars in 1999, and currently produces only one model, the ZONDA, in very low volume.

THE VEHICLE

The Vehicle
The current vehicle, the Pagani ZONDA C8, is a high performance sports car powered by a Mercedes Benz 12 cylinder engine and retailing for about 700,000 euros. See Exhibit 1 for the specifications. A unique aspect of the Pagani vehicle is the extensive use of carbon fiber – a very lightweight, strong material that offers excellent safety features but is also very expensive (which is why it is not used in mass-produced vehicles). The combination of the carbon fiber passenger compartment with front and rear subassemblies in impact-absorbing alloys provides an extremely safe vehicle that is based on Formula 1 design.

The extensive use of advanced composites guarantees a low vehicle mass, a key factor in reducing fuel consumption and pollution. While weight reduction has only recently been introduced as a key factor in automotive design, for the development at Pagani it has always been fundamental.

Compared to the C8, the new ZONDA – the C9 -- will have a number of upgrades – in particular a new engine:

- Removed as confidential

World-wide Production:

- Current production volume ranges from 15 to 17 C8 vehicles per year; 17 is the factory's current annual production capacity.
- ZONDA production started in 1999, and thus far 113 vehicles have been delivered: an average of just over 11 per year.
- World-wide production over the last 3 years has been extremely small, as follows:

	Production
2007	15

2008	14
2009	15

Forecasted Production and Capacity: World-wide:

MY	US street car	Race cars	European spec	Capacity
2010*		6	25	50
2011*	20	0	30	50
2012*	20	0	30	50
2013*	20	0	30	50

* = estimate

BACKGROUND:

Horacio Pagani entered the world of automobile manufacturing in 1978, at the age of 18, designing an F.3 race car that competed in Argentina for the Renault team.

In 1980, Horacio met Juan Manuel Fangio, the world famous F1 driver, who introduced him to Modena, Italy, the home of legends like Ferrari and Lamborghini. Horacio emigrated to Italy in 1983, and started work at Lamborghini as a bodywork technician. He was promoted to manager of the new composite material department, and took part in important Lamborghini projects of the 1980's, such as the LMA, the restyling of the Jalpa, the design of the Countach Evoluzione (the first car in the world with a one hundred per cent carbon chassis).

In 1988, Horacio started Pagani Composite Research, a company that undertook various automotive projects, including the restyling of the Lamborghini Countach Anniversary, for which the company supplied the composite materials. The company embodied the idea of designing a high performance sports car around a carbon fiber monocoque with front and rear deformable alloy subframes – an idea which virtually all high performance sports cars use today.

In 1991, Pagani Composite Research became Modena Design SpA, and in 1993 development began on the C8. Mercedes agreed to supply its V12 engine in 1994 and in 1999 C8 production began, making Modena Design an independent vehicle manufacturer specializing in the design, development and construction of high performance vehicles.

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In 2008 Modena Design SpA became Pagani Automobili SpA. The company does all the assembly of its vehicles. No third party company is involved. Mercedes is an arm's length engine supplier. Pagani has a work force of 45 highly skilled designers, engineers, managers, technicians and mechanics**.**

Even with an excellent product that commands a high price, the costs associated with vehicle development are overwhelming. While many other small volume companies in the past have succumbed to high expenses—DeLorean, Bricklen, Qvale, Bugatti -- Pagani is facing a huge economic challenge.

MY 2012 CAFE STANDARDS FORMULA AND CALCULATION

For model years 2012-2014, Pagani's fleet must comply with the fuel economy level calculated for that model year according to Figure A below and the appropriate values in Table B below

Figure 2 :
$$CAFE_{required} = \frac{\sum_i Production_i}{\sum_i \frac{Production_i}{TARGET_i}}$$

Where:

CAFE [required] is the required level for a given fleet (domestic passenger automobiles or import passenger automobiles),

Subscript i is a designation of multiple groups of automobiles, where each group's designation, *i.e.*, i = 1, 2, 3, etc., represents automobiles that share a unique model type and footprint within the applicable fleet, either domestic passenger automobiles or import passenger automobiles.

Production [i] is the number of passenger automobiles produced for sale in the United States within each ith designation, *i.e.*, which shares the same model type and footprint.

TARGET [i] is the fuel economy target in miles per gallon (mpg) applicable to the footprint of passenger automobiles within each ith designation, *i.e.*, which shares the same model type and footprint, calculated according to Figure 3 and rounded to the nearest hundredth of a mpg, *i.e.*, 35.455 = 35.46 mpg, and the summations in the numerator and denominator are both performed over all models in the fleet in question.

Figure 3 :
$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Where:

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TARGET is the fuel economy target (in mpg) applicable to vehicles of a given footprint (*FOOTPRINT*, in square feet),

Parameters *a, b, c,* and *d* are defined in Table B, and

The *MIN* and *MAX* functions take the minimum and maximum, respectively, of the included values.

Table B--Parameters for the Passenger Automobile Fuel Economy Targets

	Parameters			
Model year	**a**	**b**	**c**	**d**
2012	35.95	27.95	0.0005308	0.006057
2013	36.80	28.46	0.0005308	0.005410
2014	37.75	29.03	0.0005308	0.004725

Variable *x* represents the footprint of the passenger car model in question:

ZONDA Model	Approximate Rear Track		Wheelbase		Footprint/*x*
	mm	feet	mm	feet	$feet^2$
R	1813	5.95	2785	9.14	**54.38**
ALL OTHERS	1849	6.07	2730	8.96	**54.39**

- Individual Model CAFE Standard for all models of the Pagani C9: 27.95 MPG.
- As Pagani will only build the C9 in MY 12+, the Required Fleet Fuel Economy Level Standard is 27.95 MPG.

The above 27.95 mpg required CAFÉ is technologically and economically infeasible for Pagani. This gives rise to the requested exemption and alternative standard

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ALTERNATE STANDARDS REQUESTED

Pagani requests alternate standards equal to the unadjusted average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510(c) [1]
2012	**15.5 mpg**
2013	**15.5 mpg**
2014	**15.5 mpg**

[1] The requested standard is unadjusted AFE. It is not known at this time what the EPA adjustment formula, under 40 CFR 600.510(e), will be for the model year at issue. This number is based on a combined fuel economy expected to be obtained at EPA. The request is .02.mpg less than that forecasted in order to allow for potential development and production variation.

TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. Late filing is permitted if good cause is shown. See 49 CFR 525.6(b). Since Pagani will not enter the US market until early CY 2012, this petition is timely.

PAGANI IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATE STANDARD

Under Part 525, petitions for alternate standards are limited to manufacturers that manufacture, worldwide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner, when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner), must be less than 10,000 in the preceding model year. Pagani meets this test and is eligible to request the exemption and alternate standards.

THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT PAGANI CAN ACHIEVE

The fuel economy values requested in this petition do in fact represent the maximum feasible CAFE that Pagani can achieve for the model years at issue.

A. PAGANI HAS ADOPTED ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set a Pagani alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible" -- improvements based on technology available to Pagani during the model years at issue that will improve fuel economy. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72

FR 28619 (May 22, 2007); see also, 58 FR. 41228 (August 3, 1993); 65 FR 58483 (September 29, 2000); 64 FR 73476 (December 30, 1999).

The nature of Pagani's product-line does not lend itself to high fuel economy values. Pagani cannot change the nature of its car and is constrained by the supplier of its engine (since it does not build its own powertrain). Pagani is producing, however, traditional

sports cars using traditional design. Further fuel economy improvement is not possible. Significant fuel economy facts are as follows:

In short, "since the chassis/body configuration is small, aerodynamic and lightweight, further fuel economy improvements through changes to the chassis and body [are] limited". See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). Similarly, Pagani cannot change its engine supplier and therefore it "cannot change the vehicle's engine, the engine is one of the most advanced engines available to a small volume manufacturer from an outside source. Accordingly the ability to obtain further fuel economy improvements from engine and drivetrain modifications is limited. Id.

Initiatives Taken by Pagani to Maximize the Fuel Efficiency

Lightweight materials: The C9 will use carbon fibre in both chassis and panels, and chromoloy steel space frames, and employs racing car construction techniques – trading excess weight for increased safety and efficiency.

The new S65 engine, by Mercedes Benz, is more powerful than its predecessor, but smaller, further reducing weight and increasing efficiency.

This vehicle's curb weight is 2866 pounds. The Zonda's design optimizes aerodynamics, allowing for greater efficiency at all speeds; 0.35 co efficient drag.

A complete description of the vehicle configuration is set forth in Table 2, in accordance with the requirements of 525.7(e-g).

Table 2 -- Projected Vehicle Descriptions

Removed as confidential

NOTE: Method used to determine setting: coast down; adjusted to account for presence of a/c; setting based on use of radial tires.

Pagani Fuel Economy Label Values Are Similar to The Competition

As an indication that Pagani is doing all possible to maximize fuel economy, we note that the Pagani mpg is comparable to that of the competition. Hypothetical MY 2009 Pagani Fuel Economy *label* values would be 11 mpg city and 18 mpg highway (based on Mercedes Benz data and MY 2009 calculations). These figures are equal to or better than the results of manufacturers of similar vehicles (given vehicle type and price range).

2010 Model	*City /Highway mpg**
Ferrari 599	11/15
Aston Martin DBS Coupe	12/18
Lamborghini Murcielago	9/14
Bugatti Veyron	8/14
SLK AMG	14/22

*Source: 2010 EPA FE Guide

As NHTSA said in granting the DeTomaso/Qvale CAFE exemption request: "Because of … financial constraints and its limited resources, the manufacturer must use an engine and transmission that is produced by an outside supplier. Therefore, [the] ability to obtain further fuel economy improvements from engine and drivetrain modifications is quite limited, [since the] chassis/body configuration is small, aerodynamic and lightweight, so further fuel economy improvements through changes to the chassis and body also appear to be limited." 64 FR 73476 (December 30, 1999). This conclusion is equally applicable here.

B. THE PAGANI REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are Pagani's financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of Pagani automobiles -- high performance and/or luxury cars. See

Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993). [2]

Limited Financial Resources

As noted above, Pagani is a privately held, small volume vehicle manufacturer. To date, the company has invested approximately 20 million Euros in design, development, homologation, and start of production. Pagani is facing major financial challenges and financial resources are severely limited.

Basic Vehicle Design Concept

There are no further FE improvements for Pagani to adopt that are compatible with the basic design concept of a traditional sports car. With regard to Ferrari, the agency has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 FR 44493 (Dec. 10, 1986). With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles are not considered." Spyker, supra. This approach must also be applied here.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... would be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). This is particularly relevant here because Pagani has been financially constrained due to investment in start-up and vehicle homologation.

C. PAGANI CANNOT ALTER ITS SALES MIX SO AS TO IMPROVE FUEL ECONOMY

[2] In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

Pagani has no opportunity to improve fuel economy by changing its model mix since it will only sell the one model in the US, all using the Mercedes AMG power plant. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007) There is no room for CAFE changes based upon marketing actions. More fuel efficient models are not possible.

NHTSA has acknowledged that "producing additional models or making some of the configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by Rolls-Royce preclude significant changes to the basic concept of the . . . car." 58 FR 41229 (Aug. 3, 1993. Emphasis added). The same rationale applies in this case. Pagani produces "niche" cars and has limited financial resources. The Projected US sales mix of Pagani models MY 2010-2012 is shown in Table 3.

OTHER FEDERAL STANDARDS RESTRICT PAGANI'S MAXIMUM FEASIBLE CAFE

Pagani's small size limits "the amount of resources it can apply to comply with both the mandatory [safety and emissions] standards and fuel economy requirements." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007).

As regards FMVSS, crash-worthiness standards can generally tend to reduce achievable CAFE, since they preclude, in some instances, the use of lighter-weight components. See 64 FR 73476 (December 30, 1999). Other upcoming safety standards that will demand Pagani resources, and that could have weight and fuel economy consequences, include upgraded FMVSS 301 rear crash requirements, upgraded FMVSS 214 side impact requirements and upgraded FMVSS 216 roof crush requirements.

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THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

Pagani is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of Pagani's sales in the US together with the fact that a Pagani vehicle is almost exclusively used as a second or third car (and hence infrequently), means that Pagani has a virtually immeasurable effect on US energy consumption.

Since Pagani cannot achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

CONCLUSION

Based upon the foregoing, Pagani respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2012, 2013 and 2014.

Respectfully submitted,

PAGANI AUTOMOBILI SpA

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Capitale Sociale € 536.000,00 Int. Vers.
P.IVA, Codice Fiscale e Numero d'Iscrizione: 02054560368 del registro delle imprese di Modena

PETITION OF PAGANI FOR EXEMPTION FROM CORPORATE AVERAGE FUEL ECONOMY STANDARDS FOR MODEL YEARS 2015, 2016 and 2017

May 27, 2014

NON CONFIDENTIAL

PAGANI AUTOMOBILI S.P.A.
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NON CONFIDENTIAL

THE APPLICANT:

Pagani Automobili Spa, formerly Modena Design, is a small Italian corporation formed in 1991 and owned by the Pagani Family. Pagani started production of Pagani-brand sports cars in 1999, and currently produces only two models, the Zonda and Huayra, both in very low volume. The Huayra is the only vehicle that will be sold as a road going vehicle in the United States for MY 15-17 and therefore the following data pertains to that vehicle's specifications.

This declaration is meant to demonstrate Pagani Automobili Spa's status as an SVM (small volume manufacturer) and to establish exemption from current CAFE standards for MY 2015 through 2017.

THE VEHICLE:

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[ ]

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BACKGROUND:

Horacio Pagani entered the world of automobile manufacturing in 1978, at the age of 23, designing an F.3 racecar that competed in Argentina for the Renault team.

In 1980, Horacio met Juan Manuel Fangio, the world famous F1 driver, who introduced him to Modena, Italy, the homes of legends like Ferrari and Lamborghini. Horacio emigrated to Italy in 1983, and started work at Lamborghini as a bodywork technician. He was promoted to manager of the new composite material department, and took part in important Lamborghini projects of the 1980's, such as the LMA, the restyling of the Jalpa, and the design of the Countach Evoluzione (the first car in the world with a one hundred per cent carbon chassis).

In 1988, Horacio started Pagani Composite Research, a company that undertook various automotive projects, including the restyling of the Lamborghini Countach Anniversary, for which the company supplied the composite materials. The company embodied the idea of designing a high performance sports car around a carbon fiber monocoque with front and rear deformable alloy sub frames – an idea which virtually all high performance sports cars in use today.

In 1991, Pagani Composite Research became Modena Design Spa, and in 1993 development began on the C8. Mercedes agreed to supply its V12 engine in 1994 and in 1999 C8 production began, making Modena Design an independent vehicle manufacturer specializing in the design, development and construction of high performance vehicles.

In 2008 Modena Design Spa became Pagani Automobili Spa. The company does all the assembly of its vehicles. No third party company is involved. Mercedes is an arm's length engine supplier. Pagani has a work force of 45 highly skilled designers, engineers, managers, technicians and mechanics.

The Huayra C9 debuted at the Geneva Auto Salon in March of 2011 with official production beginning shortly thereafter. Vehicle testing and homologation for the US market began the same year and initial designs for a new factory setup (to increase capacity to 50 vehicles per year) were drafted. Move in to the new factory, was completed in Q2 2014 and official US specification Huayra C9's were delivered to the US in May of the same year.

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WORLD-WIDE PRODUCTION AND US SALES:

Remover as Confidential

[ ]

Classification as an SVM:

Under Part II of the EPA and Department of Transportation's Light Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, the first class of Small Vehicle Manufacturer (SVM) includes manufactures with annual U.S. sales of less than 5,000 vehicles per year. Given the current YTD US sales volumes are 5 vehicles and the estimated volumes for MY 2015-17 are no more than 50, Pagani Automobili Sp.A fits the SVM designation.
Pagani Spa does not own/control another auto manufacturer, is not owned/controlled by another auto manufacturer, and is not owned/controlled by a company that owns/ controls another auto manufacturer.

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MY 2015 CAFE STANDARDS FORMULA AND CALCULATION

For model years 2015-2017, Pagani's fleet must comply with the fuel economy level calculated for that model year according to Figure A below and the appropriate values in Table B below

Where:

CAFE [required] is the required level for a given fleet (domestic passenger automobiles or import passenger automobiles),

Figure 2: $$CAFE_{required} = \frac{\sum_i Production_i}{\sum_i \frac{Production_i}{TARGET_i}}$$

Subscript i is a designation of multiple groups of automobiles, where each group's designation, *i.e.*, i = 1, 2, 3, etc., represents automobiles that share a unique model type and footprint within the applicable fleet, either domestic passenger automobiles or import passenger automobiles.

Production [i] is the number of passenger automobiles produced for sale in the United States within each ith designation, *i.e.*, which shares the same model type and footprint.

TARGET [i] is the fuel economy target in miles per gallon (mpg) applicable to the footprint of passenger automobiles within each ith designation, *i.e.*, which shares the same model type and footprint, calculated according to Figure 3 and rounded to the nearest hundredth of a mpg, *i.e.*, 35.455 = 35.46 mpg, and the summations in the numerator and denominator are both performed over all models in the fleet in question.

Where:

Figure 3: $$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

TARGET is the fuel economy target (in mpg) applicable to vehicles of a given footprint (*FOOTPRINT*, in square feet),

Parameters *a, b, c,* and *d* are defined in Table B, and

The *MIN* and *MAX* functions take the minimum and maximum, respectively, of the included values.

Table B--Parameters for the Passenger Automobile Fuel Economy Targets

Parameters

MY	a	b	c	d
2015	39.24	29.90	.005308	.004725
2016	41.09	30.96	.005308	.002573

MY	a	b	c	d	e	f	g	h
2017	32.65	43.61	.0005131	.001896	31.51	42.06	.005308	.00201

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Model	Approximate Rear Track		Wheelbase		Footprint/x
	mm	feet	mm	feet	$feet^2$
Huayra C9	1849	6.07	2730	8.96	**54.39**

The CAFE standards for the Huayra C9 are therefore:

MY	CAFE
15	30.69
16	31.81
17	32.65

The above standard CAFE mpg required is technologically and economically infeasible for Pagani. This gives rise to the requested exemption.

Pagani Huayra Fuel Economy

In order for Pagani Automobili Sp.A to meet the fuel economy standards set forth above, the company would incur detrimental costs to its business and brand. Pagani's vehicles are known amongst its peers as the premier sports car brand in the world. Notwithstanding the challenges, Pagani has adopted fuel saving engineering changes to its vehicles to improve efficiency.

Initiatives Taken by Pagani to Maximize Fuel Efficiency

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Pagani Fuel Economy Label Values Are Similar to The Competition

As an indication that Pagani is doing all possible to maximize fuel economy, we note that the Pagani mpg is comparable to that of the competition. MY 2014 Pagani *label* Fuel Economy values are 13-mpg city and 20 mpg highway. These figures are equal to or better than the results of comparable manufacturers products.

2014 Model	*City /Highway mpg**
Ferrari F12	11/16
Aston Martin Vanquish	13/19
Lamborghini Aventador	11/18
Bugatti Veyron	8/15
SLS AMG Black Series	13/17

*Source: 2014 FuelEconomy.gov

THE PAGANI REQUEST IS APPROPRIATE

In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are Pagani's financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of Pagani automobiles -- high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993).

Limited Financial Resources

As noted above, Pagani is a privately held, small volume vehicle manufacturer. To date, the company has invested approximately 20 million Euros in design, development, homologation, and start of production. Pagani is facing major financial challenges and financial resources are severely limited.

Basic Vehicle Design Concept

There are no further FE improvements for Pagani to adopt that are compatible with the basic design concept of ITS sports car. With regard to Ferrari, the agency has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby

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reducing sales and causing significant economic injury to Ferrari." 51 FR 44493 (Dec. 10,198 6).With regard to Rolls Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, was not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles are not considered." Spyker, supra. This approach must also be applied here.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... would be economically impracticable since they might well significantly reduce demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). This is particularly relevant here because Pagani has been financially constrained due to investment in start-up and vehicle homologation.[3]

[3] In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

Pagani is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of Pagani's sales in the US together with the fact that a Pagani vehicle is almost exclusively used as a second or third car (and hence infrequently with very low vehicle miles travelled, means that Pagani has a virtually immeasurable effect on US energy consumption. We note that under the EPA/CARB regulations controlling GHG ($CO2$) as a small entity Pagani is exempt from the $CO2$ standard.

Pagani, therefore is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

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CONCLUSION

Based upon the foregoing, Pagani respectfully requests that NHTSA grant this petition for an exemption to the CAFÉ standards set forth above for model year 2015, 2016 and 2017.

Respectfully submitted,

Horacio Pagani,
CEO
Pagani Automobili Spa

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Petition of Pagani for exemption from Corporate Average Fuel Economy Standards <u>for Model Years 2018, 2019 and 2020</u>

November 26, 2015

NON CONFIDENTIAL

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THE APPLICANT

Pagani Automobili SpA is a small Italian corporation formed in 1991 and owned by the Pagani Family. Pagani started production of Pagani-brand sports cars in 1999, and currently produces only two models, the Zonda and the Huayra, both in very low volume. The Huayra is the only vehicle forecasted to be sold as a road going vehicle MY 18-20. The following data pertains to vehicle MY17 specification, the latest available.

This petition demonstrates Pagani Automobili SpA's status as an SVM (small volume manufacturer) and to establish exemption from current CAFE standards for MY 2018 through 2020.

THE VEHICLE

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BACKGROUND

Horacio Pagani entered the world of automobile manufacturing in 1978, at the age of 23, designing an F.3 racecar that competed in Argentina for the Renault team.

In 1980, Horacio met Juan Manuel Fangio, the world famous F1 driver, who introduced him to Modena, Italy, the homes of legends like Ferrari and Lamborghini. Horacio emigrated to Italy in 1983, and started work at Lamborghini as a bodywork technician. He was promoted to manager of the new composite material department, and took part in important Lamborghini projects of the 1980's, such as the LMA, the restyling of the Jalpa, and the design of the Countach Evoluzione (the first car in the world with a one hundred per cent carbon chassis).

In 1988, Horacio started Pagani Composite Research, a company that undertook various automotive projects, including the restyling of the Lamborghini Countach Anniversary, for which the company supplied the composite materials. The company embodied the idea of designing a high performance sports car around a carbon fiber monocoque with front and rear deformable alloy sub frames – an idea which virtually all high performance sports cars in use today.

In 1991, Pagani Composite Research became Modena Design Spa, and in 1993 development began on the C8. Mercedes agreed to supply its V12 engine in 1994 and in 1999 C8 production began, making Modena Design S.p.A. an independent vehicle manufacturer specializing in the design, development and construction of high performance vehicles.

In 2008 Modena Design S.p.A. became Pagani Automobili S.p.A. The company does all the assembly of its vehicles. No third party company is involved. Mercedes is an arm's length engine supplier. Pagani has a work force of 45 highly skilled designers, engineers, managers, technicians and mechanics.

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WORLD-WIDE PRODUCTION AND US SALES

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PAGANI IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATE STANDARD

Under Part 525, petitions for alternate standards are limited to manufacturers that manufacture, worldwide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner, when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner), must be less than 10,000 in the preceding model year. Pagani meets this test and is eligible to request the exemption and alternate standards.

Model Year	Unrounded CAFE standard [mpg]
2018	15.5
2019	15.5
2020	15.5

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CAFE STANDARDS FORMULA AND CALCULATION

The target CAFE fuel economy is calculated per 49 CFR 531:

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

CONSTANTS					
MY	a [mpg]	b [mpg]	c [gal/mi/sqft]	d [gal/mi/sqft]	Footprint [sqft]
2018	45.21	33.84	0.0004954	0.001811	49.8
2019	46.87	35.07	0.0004783	0.001729	49.8
2020	48.74	36.47	0.0004603	0.001643	49.8

Model	Track width av. (f/r)*		Wheelbase		Footprint
	["]	[ft]	["]	[ft]	[sqft]
Huayra	65.2	5.43	110.0	9.17	49.8

* Track width calculation achieved by averaging front and rear track width.

Model Year	Target CAFE standard [mpg]
2018	37,76
2019	39,14
2020	40,71

ALTERNATE STANDARDS REQUESTED

Pagani requests alternate standards equal to the unadjusted average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted CAFE under 40 CFR 600.510(c) [1]
2018	15.0 mpg
2019	15.0 mpg
2020	15.0 mpg

[1] The requested standard is unadjusted CAFE. It is not known at this time what the EPA adjustment formula, under 40 CFR 600.510(e), will be for the model year at issue. This number is based on a combined fuel economy expected to be obtained at EPA. Also a new developed engine is expected for introduction in MY18. Therefore the request is .5 mpg less than that forecasted in order to allow for potential development and production variation.

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II.

Pagani Huayra Fuel Economy

Under the EPA's CAFÉ calculation method, the current 2016 Pagani Huayra has a fuel economy of 15.5 mpg combined, 12.9 mpg city and 20.4 mpg highway.

In order for Pagani Automobili S.p.A. to meet the fuel economy standards set forth above, the company would incur detrimental costs to its business and brand. Pagani's vehicles are known amongst its peers as the premier sports car brand in the world. Notwithstanding the challenges, Pagani has adopted fuel saving engineering changes to its vehicles to improve efficiency.

Initiatives Taken by Pagani to Maximize Fuel Efficiency

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Pagani Fuel Economy Label Values Are Similar to The Competition

As an indication that Pagani Automobili S.p.A. is doing all possible to maximize fuel economy, we note that the Pagani mpg is comparable to that of the competition. MY 2016 Pagani Fuel Economy values are 13-mpg city and 20 mpg highway. These figures are equal to or better than the results of comparable manufacturers products.

Model	Fuel consumption Comb/City/HWY
Ferrari F12 (MY16)	13/11/16
Aston Martin Vantage S (MY16)	14/12/18
Lamborghini Aventador Roadster (MY16)	12/10/17
Bugatti Veyron (MY15)	10/08/15
SLS AMG Black Series (MY14)	14 13/17
Pagani Huayra (MY16)	13/11/17

MY16 label comparison

* Source: 2014 - 2016 Fuel Economy Guide (2016 preliminary)

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THE PAGANI REQUEST IS APPROPRIATE

In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are Pagani's Automobili S.p.A. financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of Pagani Automobili S.p.A. -- high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993). 1

Limited Financial Resources

As noted above, Pagani Automobili S.p.A. is a privately held, small volume vehicle manufacturer. To date, the company has invested approximately 20 million Euros in design, development, homologation, and start of production. Pagani Automobili S.p.A. is facing major financial challenges and financial resources are severely limited.

Basic Vehicle Design Concept

There are no further FE improvements for Pagani to adopt that are compatible with the basic design concept of ITS sports car. With regard to Ferrari, the agency has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari."51 FR 44493 (Dec. 10,1986).With regard to Rolls Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, was not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles are not considered." Spyker, supra. This approach must also be applied here.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes... would be economically impracticable since they might well significantly reduce demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). This is particularly relevant here because Pagani has been financially constrained due to investment in start-up and vehicle homologation.

3 In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

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THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

Pagani is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of Pagani's sales in the US together with the fact that a Pagani vehicle is almost exclusively used as a second or third car (and hence infrequently WITH VERY LOW VEHICLE MILES TRAVELLED), means that Pagani has a virtually immeasurable effect on US energy consumption. WE NOTE THAT UNDER THE EPA/CARB REGULATIONS CONTROLLING GHG (CO2), AS A SMALL ENTITY PAGANI IS EXEMPT FROM THE CO2 STANDARD.

Pagani, therefore is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that"... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

CONCLUSION

Based upon the foregoing, Pagani respectfully requests that NHTSA grant this petition for an exemption to the CAFÉ standards set forth above for model year 2018, 2019 and 2020.

Respectfully submitted,

Horacio Pagani,
Technical director
Pagani Automobili SpA

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Petition of Pagani for exemption from Corporate Average Fuel Economy Standards <u>for Model Years 2021, 2022 and 2023</u>

November 03, 2017

NONCONFIDENTIAL VERSION

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THE APPLICANT

Pagani Automobili SpA is a small Italian corporation formed in 1991 and owned by the Pagani Family. Pagani started production of Pagani-brand sports cars in 1999, and currently produces only three models, the Huayra (C9), Huayra BC (C9N) and Huayra Roadster (C9R), all of them in very low volume. The Huayra Roadster, and future variants, are the only vehicles forecasted to be sold as a road going vehicle MY 21-23. The following data pertains to vehicle MY17 specification, the latest available.

This petition demonstrates Pagani Automobili SpA's status as an SVM (small volume manufacturer) and to establish exemption from current CAFE standards for MY 2021 through 2023.

THE VEHICLE

Removed as confidential

[ ]

BACKGROUND

Horacio Pagani entered the world of automobile manufacturing in 1978, at the age of 23, designing an F.3 racecar that competed in Argentina for the Renault team.

In 1980, Horacio met Juan Manuel Fangio, the world famous F1 driver, who introduced him to Modena, Italy, the homes of legends like Ferrari and Lamborghini. Horacio emigrated to Italy in 1983, and started work at Lamborghini as a bodywork technician. He was promoted to manager of the new composite material department, and took part in important Lamborghini projects of the 1980's, such as the LMA, the restyling of the Jalpa, and the design of the Countach Evoluzione (the first car in the world with a one hundred per cent carbon chassis).

In 1988, Horacio started Pagani Composite Research, a company that undertook various automotive projects, including the restyling of the Lamborghini Countach Anniversary, for which the company supplied the composite materials. The company embodied the idea of designing a high performance sports car around a carbon fiber monocoque with front and rear deformable alloy sub frames – an idea which virtually all high performance sports cars in use today.

In 1991, Pagani Composite Research became Modena Design Spa, and in 1993 development began on the C8. Mercedes agreed to supply its V12 engine in 1994 and in 1999 C8 production began, making Modena Design S.p.A. an independent vehicle manufacturer specializing in the design, development and construction of high performance vehicles.

In 2008 Modena Design S.p.A. became Pagani Automobili S.p.A. The company does all the assembly of its vehicles. No third party company is involved. Mercedes is an arm's length engine supplier.

On 2016 the company started the production in its new headquarters based in Modena, alongside its historical site. Pagani Automobili has more than 140 employers with 45 highly skilled designers, engineers, managers, technicians and mechanics.

WORLD-WIDE PRODUCTION AND US SALES

Removed as confidential

[ ]

PAGANI IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATE STANDARD

Under Part 525, petitions for alternate standards are limited to manufacturers that manufacture, worldwide, fewer than 10,000 passenger cars in the preceding model year. The total world-wide production of the petitioner, when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner), must be less than 10,000 in the preceding model year. Pagani meets this test and is eligible to request the exemption and alternate standards.

Model Year	Unrounded CAFE standard [mpg]
2021	15.5
2022	15.5
2023	15.5

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CAFE STANDARDS FORMULA AND CALCULATION

The target CAFE fuel economy is calculated per 49 CFR 531:

$$TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

PARAMETERS					
MY	a [mpg]	b [mpg]	c [gal/mi/sqft]	d [gal/mi/sqft]	Footprint [sqft]
2021	50,83	38,02	0,0004419	0,001555	49,8
2022	53,21	39,73	0,0004227	0,001463	
2023	53,71	41,64	0,0004043	0,001375	

Model	Track width av. (f/r)*		Wheelbase		Footprint
	["]	[ft]	["]	[ft]	[sqft]
Huayra C9	65.2	5.43	110.0	9.17	49.8

* Track width calculation achieved by averaging front and rear track width.

Model Year	Target CAFE standard [mpg]
2021	42,44
2022	44,42
2023	46,49

ALTERNATE STANDARDS REQUESTED

Pagani requests alternate standards equal to the unadjusted average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted CAFE under 40 CFR 600.510(c) (1)
2021	15.0 mpg
2022	15.0 mpg
2023	15.0 mpg

(1) The requested standard is unadjusted CAFE. It is not known at this time what the EPA adjustment formula, under 40 CFR 600.510(e), will be for the model year at issue. This number is based on a combined fuel economy expected to be obtained at EPA. Also a new developed engine is expected for introduction in MY18. Therefore the request is 0.5.mpg less than that forecasted in order to allow for potential development and production variation.

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II.

Pagani Huayra Fuel Economy

Under the EPA's CAFÉ calculation method, the current 2016 Pagani Huayra has a fuel economy of 15.5 mpg combined, 12.9 mpg city and 20.4 mpg highway.

In order for Pagani Automobili S.p.A. to meet the fuel economy standards set forth above, the company would incur detrimental costs to its business and brand. Pagani's vehicles are known amongst its peers as the premier sports car brand in the world. Notwithstanding the challenges, Pagani has adopted fuel saving engineering changes to its vehicles to improve efficiency.

Initiatives Taken by Pagani to Maximize Fuel Efficiency

Removed as confidential

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Pagani Fuel Economy Label Values Are Similar to The Competition

As an indication that Pagani Automobili S.p.A. is doing all possible to maximize fuel economy, we note that the Pagani mpg is comparable to that of the competition. MY 2016 Pagani Fuel Economy values are 13mpg city and 20mpg highway. These figures are equal to or better than the results of comparable manufacturers products.

Model	*Fuel consumption Comb/City/HWY
Ferrari La Ferrari (MY17)	13/12/15
Aston Martin Vanquish S Zagato (MY17)	16/13/21
Lamborghini Aventador Roadster (MY18)	12/10/16
Mercedes-Benz SL 65 AMG (MY18)	16/13/22
Ferrari 812 Superfast (MY18)	13/12/16
Bugatti Chiron (MY18)	11/9/14
Pagani Huayra (MY18)	13/11/17

MY17&MY18 label comparison

* Source: Fuel Economy Guide (2017/2018)
https://www.fueleconomy.gov/feg/printGuides.shtml

THE PAGANI REQUEST IS APPROPRIATE

Pagani has already applied for this exemption regarding MY18, MY19 and MY20, without receive any objection from NHTSA.
In deciding a maximum feasible standard, "economic practicability" must be considered. The relevant inquiries are Pagani's Automobili S.p.A. financial resources and its capability to improve fuel economy by incorporating technologically feasible changes that are compatible with the basic design concept of Pagani Automobili S.p.A. -- high performance and/or luxury cars. See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also, 58 FR. 41229 (August 3, 1993). 1

Limited Financial Resources

As noted above, Pagani Automobili S.p.A. is a privately held, small volume vehicle manufacturer. To date, the company has invested approximately 35 million Euros in design, development, homologation, and start of production. Pagani Automobili S.p.A. is facing major financial challenges and financial resources are severely limited.

Basic Vehicle Design Concept

There are no further FE improvements for Pagani to adopt that are compatible with the basic design concept of ITS sports car. With regard to Ferrari, the agency has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari."51 FR 44493 (Dec. 10,1986).With regard to Rolls Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, was not examined. 58 FR 41228, (August 3, 1993). "Design changes that would require items traditionally offered on those types of vehicles are not considered." Spyker, Supra. This approach must also be applied here.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes... would be economically impracticable since they might well significantly reduce demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer." Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007). This is particularly relevant here because Pagani has been financially constrained due to investment in start-up and vehicle homologation.

In considering financial capability, NHTSA "has always considered market demand as an implicit part of the concept of economic practicability" since "consumers need not purchase what they do not want." See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007)

PAGANI AUTOMOBILI S.P.A.
VIA DELL'ARTIGIANATO, 5 - 41018 SAN CESARIO SUL PANARO - MODENA - ITALY
tel. +39 059 4739 205 - fax +39 059 927377 - www.pagani.com
Capitale Sociale € 536.000,00 Int.Vers.
P.IVA, Codice Fiscale e Numero d'Iscrizione: 02054560368 del registro delle imprese di Modena

THE NEED OF THE NATION TO CONSERVE ENERGY WILL NOT BE ADVERSELY AFFECTED

Pagani is not unmindful of the energy issues facing the US today, both as regards conservation and global warming. However, the extremely low volume of Pagani's sales in the US together with the fact that a Pagani vehicle is almost exclusively used as a second or third car (and hence infrequently WITH VERY LOW VEHICLE MILES TRAVELLED), means that Pagani has a virtually immeasurable effect on US energy consumption. WE NOTE THAT UNDER THE EPA/CARB REGULATIONS CONTROLLING GHG (CO2), AS A SMALL ENTITY PAGANI IS EXEMPT FROM THE CO2 STANDARD.

Pagani, therefore is in the same position as other companies who in the past have asked for and received CAFE exemptions. NHTSA has noted that"... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy. "See Spyker Automobielen B.V., 71 FR 49407 (August 23, 2006) and 72 FR 28619 (May 22, 2007); see also 51 FR 44492 (December 10, 1986).

CONCLUSION

Based upon the foregoing, Pagani respectfully requests that NHTSA grant this petition for an exemption to the CAFÉ standards set forth above for model year 2021, 2022 and 2023.

Respectfully submitted,

Horacio Pagani,
CEO
Pagani Automobili SpA

BY FEDERAL EXPRESS AND EMAIL

[redacted]

Administrator
National Highway Traffic Safety Administration
400 7th St. SW
Washington DC 20590

Re: Spyker CAFÉ Exemption Petition

Dear Sir or Madam:

Enclosed is a CAFÉ Petition submitted by Spyker Automobiles. Pursuant to 49 CFR part 525, seeking an exemption under the CAFÉ statute and regulations.

Please direct all correspondence to;
Lance Tunick
Vehicle Services Consulting
PO Box 23078
Santa Fe NM 87502
Tel 505 986 8463
Fax 505 986 8695
Email: lancetunick@comcast.net

Thank you for your kind attention.

Sincerely,

Spyker Automobielen B.V.

PETITION OF
SPYKER AUTOMOBIELEN B.V.
FOR EXEMPTION FROM
CORPORATE AVERAGE FUEL ECONOMY STANDARDS
AND FOR ESTABLISHMENT OF ALTERNATE FUEL ECONOMY STANDARDS
FOR MODEL YEARS 2008, 2009 and 2010

Petition Of
Spyker Automobielen B.V.
For Exemption From
Corporate Average Fuel Economy Standards
And For Establishment Of Alternate Fuel Economy Standards
<u>For Model Years 2008, 2009 and 2010</u>

In accordance with 49 CFR Part 525, Spyker Automobielen B.V. (Spyker) hereby petitions the US Department of Transportation, National Highway Traffic Safety Administration for exemption from the Corporate Average Fuel Economy ("CAFE") Standards for model years 2008, 2009 and 2010.

The standard requested shall apply to:
Spyker Automobielen B.V.

I.
ALTERNATE STANDARDS REQUESTED

Spyker requests alternate standards equal to the adjusted average fuel economies set forth below:

Model Year	Standard Requested (Unadjusted AFE under 40 CFR 600.510(c)*/
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

[1] The requested standard is unadjusted AFE. It is not known at this time what the EPA adjustment formula, under 40 CFR 600.510(e), will be for the model year at issue.
This number is based on a combined fuel economy expected to be obtained at EPA. The request is .2 mpg less than that forecasted in order to allow for potential development and production variation.

II.
BACKGROUND AND OVERVIEW

Spyker's History
Spyker is a new Dutch company that has resurrected an historical Dutch motor vehicle marque. The company is founded upon five key concepts: heritage, design, craftsmanship, performance and exclusivity.

Spyker was founded in Holland in the 1800's by the Spijker brothers who were originally coachbuilders. In fact, the most famous carriage of the Netherlands, The Golden Carriage, owned by HRH Queen Beatrix, is a Spyker. This carriage is still used for official state purposes.

In 1898, the Spijker brothers diversified the company and started building motor cars. Since the Spijker brothers were selling internationally, they decided to change the company name to "Spyker" for easier recognition in foreign markets.

The Spijker brothers then succeeded in establishing the name Spyker as the most famous Dutch name in international motor car history. In its time, it was even considered the Rolls Royce of the Continent.

The company then diversified into the aircraft industry and developed and built aircraft starting in 1914. From this airplane heritage comes the horizontal propeller found in the Spyker logo.

Though Spyker achieved many successes in the car industry, it ceased trading in 1925.

Spyker Cars Today
The Dutch engineer Maarten de Bruijn and entrepreneur Victor Muller revived the once great name in car history and started prototype manufacturing the new generation of Spyker cars during the first year of the new Millennium (2000). They took the decision to offer a limited-production sports car, built to individual order for the most discerning customers around the globe.

Spyker takes pride in having been able to revive a brand name that stands for exciting cars, designed and built with passion. We are also proud of the heritage of the classic Spykers. Our new cars are built in the same tradition, handcrafted by skilled craftsmen, using the best materials, the best technology, and the best engineering available.

The unveiling of the first Spyker C8 Spyder on October 17, 2000 at The British International Motor Show 2000 in Birmingham attracted considerable attention from both the international media and designers of leading car manufacturers. The outstanding design quality of this hand built, open, two-seater sports car won an important international award in Birmingham, the *Design Award for Specialist Low*

Volume Manufacturers. This award, organized by the Institute of Vehicle Engineering and sponsored by Corus, acknowledges Engineering Excellence.

After that first day, Spyker took off and has been in demand ever since. It has already participated in the grueling endurance 24-hour race of Le Mans, France, three times. In 2003 Spyker won its greatest victory so far, finishing 10th in class and 30th overall.

On September 4, 2005, the Spyker C8 Spyder GT2R finished second in its class during the LMES 1000Km of Nürburgring, Germany.
On November 18, 2005, the second podium place was won, finishing second in its class (GT2) in Dubai during the FIA GT race.

The 2006 Race events were Spyker will participate in are; 12 hours of Sebring, 24 hours of Le Mans, the complete LMES Championship and a few races at the end of the season of the FIA GT competition.

In 2005 -2006, Spyker has grown rapidly and has [redacted]
The demand out of the US and Middle East markets are very high for both the models.

Spyker: Business Arrangements
As of Q2, 2001, Spyker operates from its newly-built production facilities in Zeewolde, The Netherlands. Currently over 100 employees aim to make Spyker a successful new player in the high-end sports car market. Spyker is expanding as demand for the cars grows. Therefore, the state of the art facilities in Zeewolde are currently being expanded with a new production facility for the C8 Spyder. Spyker of North America LLC in Delaware, a subsidiary of Spyker, was incorporated on November 21, 2003 as the entity to be responsible for US distribution.

Spyker has also teamed up with Mahle Powertrain, (former known as Cosworth) to integrate the LEV V8 powertrain of the Audi A8 into the Spyker chassis, together with a fully adapted Bosch ME-7 engine management system.

On 27 May 2004 Spyker took the company public by means of an initial public offering (IPO). It is listed on the Amsterdam Stock Exchange (ticker symbol SPYKR) Euronext Amsterdam.

See **Exhibit 1** for additional information on Spyker.

III.

TIMELINESS OF THIS PETITION

Petitions for alternate fuel economy standards should be submitted not later than 24 months before the beginning of the affected model year. In view of the fact that Spyker plans to initiate its US MY 2008 in the first quarter of 2008,this petition should be considered timely.

IV.
SPYKER IS ELIGIBLE FOR AN EXEMPTION AND ALTERNATE STANDARD

Under Part 525, petitions for alternate standards are limited to manufacturers that manufacture, world-wide, fewer than 10,000 passenger cars in the preceding model year The total world-wide production of the petitioner when added together with the world-wide annual production of all other manufacturers related to the petitioner (i.e., that petitioner controls, or that are controlled by, or under common control with, petitioner) must be less than 10,000 in the preceding model year. Id.

Spyker meets this test and is eligible to request the exemption and alternate standards. Table 1 indicates Spyker actual and projected world-wide production figures for the period 2000 to 2005 (to date). Spyker is not related to any other motor vehicle manufacturer.

Table 1

Actual and Projected World-Wide Combined Spyker and Spyker Passenger Automobile Production and Capacity

Year	C8 Production	SSUV Production
2000	Only prototype	
2001	Only prototype	
2002	3	
2003	16	
2004	32	
2005	48	
2006	[redacted]	
2007	[redacted]	
2008	[redacted]	
2009	[redacted]	[redacted]
2010	[redacted]	[redacted]

Notes: *= projected

Table 2 (see below) shows the number of Spyker automobiles exported and projected to be exported to the US from 2000 to 2010.

V.
THE REQUESTED ALTERNATE CAFE STANDARDS REPRESENT THE MAXIMUM FEASIBLE AVERAGE FUEL ECONOMY THAT SPYKER CAN ACHIEVE

The fuel economy values requested in this petition do in fact represent the best possible CAFE that Spyker can achieve for the model years at issue.

A. SPYKER HAS ADOPTED ALL TECHNOLOGICALLY FEASIBLE FUEL ECONOMY IMPROVEMENTS

In determining the proper level at which to set a Spyker alternate standard, it is necessary to consider vehicle improvements that are "technologically feasible" -- improvements based on technology available to Spyker during the model years at issue that will improve fuel economy. See e.g., 58 Fed. Reg. 41228, August 3, 1993; 65 FR 58483, September 29, 2000; 64 FR 73476, December 30, 1999.

The high-performance nature of Spyker's product-lines generally does not lend itself to high fuel economy values. Spyker cannot change either the nature of its cars and is contained by the supplier of its engines. Spyker is producing, however, innovative sports cars using state-of-the art design and equipment. Nonetheless, further fuel economy improvement is not possible. Significant fuel economy facts are as follows:

C8

- For MY 2006, Spyker will use the 4.2 Ltr. Audi V8 engine for the C8. See **Exhibit 1** for vehicle information. This engine is the most advanced engine avialble to a small vehicle manufacturer seeking an engine from an outside source. The engine is LEV 1 approved and has sequential multipoint electronic fuel injection system.
- From MY 07 on, Spyker will use the new version of this engine for the C8, the 4.2 Ltr. Audi V8 BHF, LEV II approved.
- Spyker uses a lightweight body and chassis made of aluminum.
- Spyker has designed a small aerodynamic car -- with a drag coefficient of 0.411 CD (roof off) and 0.38 CD (roof on).
- The weight of the vehicle is only 1346 kg, and with 335 HP, has an impressive weight/horsepower ratio.
- The Spyker mpg Fuel economy *label* values of 14 mpg city and 19 mpg highway are similar to the results of manufacturers of similar vehicles (given vehicle type and price range).

2005 Model	City mpg /Highway mpg*	
Cadillac XLR	17/25	
Jaguar XKR	16/23	
MB 500 SL	16/23	
Porsche 911	15/23	
Dodge Viper	12/20	
Maserati coupe/spyder	12/17	Source: 2005 EPA FE Guide

SSUV

- [redacted]
- Also the SSUV will have a lightweight body and chassis made of aluminum.
- The drag coefficient is not known yet.
- The weight of the vehicle is to be expected around the 1800 kg, and with 500 HP, will have an impressive weight/horsepower ratio for a SSUV.

As NHTSA said in granting the DeTomaso/Qvale CAFÉ exemption request: "Because of … financial constraints and its limited resources, the manufacturer must use an engine and transmission that is produced by [an outside supplier]. Therefore, [the] ability to obtain further fuel economy improvements from engine and drivetrain modifications is quite limited.[since the] chassis/body configuration is small, aerodynamic and lightweight, so further fuel economy improvements through changes to the chassis and body also appear to be limited." 64 FR 73476, December 30, 1999. This conclusion is equally applicable here.

B. SPYKER CANNOT ALTER ITS SALES MIX
SO AS TO IMPROVE FUEL ECONOMY

Spyker has no opportunity to improve fuel economy by changing its model mix since it will only export the 3 high performance models to the US in model years 2008-2010, all using the Audi power plants that will be V8s or V12s.

Spyker is not in a position to manipulate model mix because the company was created to sell limited numbers of high performance automobiles (all with the same V8 or W12 engine), and there is no room for CAFE changes based upon marketing actions.

The US programs for Spyker are subject to change, but one thing clear is that producing more fuel efficient models or making existing configurations significantly more fuel efficient is not possible. For the model years at issue in this petition, the company will be using two performance-oriented engines.

NHTSA has acknowledged that "producing additional models or making some of the configurations significantly more fuel efficient is not possible since both corporate financial limitations and the unique market sector served by Rolls-Royce preclude significant changes to the basic concept of the ...car." 58 Fed. Reg. 41229 (Aug. 3, 1993, Emphasis added). The same rationale applies in this case. Spyker produces "niche" cars and has limited financial resources.

The projected US sales (exports) mix of the Spyker models for MY 2008-2010 are shown in Table 2.

Table 2
US Sales (Exports) Mix (By Units and Per Cent)
and Fuel Economy
By Model and Model Year

MODEL	Units (# and % of Production By Model	Fuel Econ. Value (unadjusted under 40 CFR 600.510(c)*[1]	MY Fuel Econ. Average
MY 2008-projected Spyker C8 (manual trans.)	[redacted] C8	19.1 mpg	[redacted]
MY 2009-projected Spyker C8 (manual trans.)	[redacted] C8	19.1 mpg	[redacted]
MY 2010-projected Spyker C8 (manual trans.)	[redacted] C8	19.1 mpg	[redacted]
MY 2009-projected Spyker SSUV Automatic trans.	[redacted] SSUV	[redacted]	[redacted]
MY 2010-projected Spyker SSUV Automatic trans.	[redacted] SSUV	[redacted]	[redacted]

A complete description of the vehicle configuration is set forth in Table 3, in accordance with the requirements of 525.7(e-g).

Table 3
Projected Vehicle Description

C8

Frontal area (sq. ft)	24
Height/width/length(mm)	1214 / 1910 / 4561

[1] Spyker predicted its FE based on available Audi information and reference to marketplace information regarding vehicles similar to the Spyker models.

Est. curb weight (Kg)	1425
Equivalent test wt.(lbs)	3208
Seating positions	2
Int. vol. index (cu. ft)	52.48 cu ft
Engine type	Audi V8 sequential multipoint electronic fuel injection
Engine displacement (L)	4.2
Horsepower (kW)	250
Fuel metering system	Port injection
Transmission	6 speed manual
Total drive ratio	3.889
Emission control sys.	SFI/2TWC/2HO2S(2)/AIR
Road load HP*	11.36 HP@50
Radial tires Position	Brand: Bridgestone Potenza S-03 Pole Sizes: 225/40ZR18; 235/35ZR19; 265/35ZR18; 265/30ZR19 Brand: Bridgestone Potenza RE050A Sizes: 225/40ZR18; 235/35ZR19; 265/35ZR18; 265/30ZR19
Low friction lubricants (type)	O W 30
N/V	41.3
Fuel economy values (mpg)	

City	16.0
Highway	24.8
Combined	19.1

NOTES: Method used to determine setting: coast down; adjusted to account for presence of a/c; setting based on use of radial tires.

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SSUV

Frontal area (sq. ft)	27 (Estimated)
Height/width/length(mm)	1775 / 2000 / 4950
Est. curb weight (lbs)	1850 kg
Equivalent test wt.(lbs)	2075 kg
Seating positions	4
Int. vol. index (cu. ft)	61.40 cu ft (Estimated)
Engine type	GM 6.2ltr V8 sequential multipoint electronic fuel injection
Engine displacement (L)	6.2
Horsepower (kW)	368
Fuel metering system	Port injection
Transmission	6 speed automatic
Total drive ratio	3.985 (Estimated)
Emission control sys.	SFI/2TWC/2HO2S(2)/AIR
Road load HP*	14.77 HP@50 (Estimated)
Radial tires	Front: 305/35ZR24 (112W) Rear : 305/35ZR24 (112W)
Low friction lubricants (type)	5 W 30

N/V 39.5 (Estimated)

Fuel economy values (mpg)

City [redacted]

Highway [redacted]

Combined [redacted]

NOTES: Method used to determine setting: coast down; adjusted to account for presence of a/c; setting based on use of radial tires.

The above are estimated projections, because the vehicles have yet to go into full production.

C. THE SPYKER REQUEST IS APPROPRIATE GIVEN THE REALITIES OF ECONOMIC PRACTICABILITY

In accordance with NHTSA's CAFE rulings concerning "economic practicability", the relevant inquiries are Spyker's financial resources and whether Spyker has adopted (or will adopt) technological improvements that are compatible with the basic design concept of Spyker automobiles -- high performance and/or luxury cars. See, 58 Fed. Reg. 41229 (Aug. 3, 1993).

Although a new company, Spyker has invested more than $30 million investment in design, development, homologation, and start of production (and this figure will rise to $33 million by mid 2005). The financial statements of Spyker indicate significant net operational losses, and the same are forecasted as well. Spyker losses for 2001-2004 totaled $14.5 million

With regard to Ferrari, the agency has stated that "design changes that would make the cars something other than high performance sports cars ... were not examined. Such changes to the basic design or performance might significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to Ferrari." 51 Fed. Reg. 44493, Dec. 10, 1986. With regard to Rolls-Royce, the agency similarly viewed the question of economic practicability and also stated that any design changes that "would remove items traditionally offered on luxury cars, such as air conditioning, automatic transmission, power steering, and power windows, were not examined. 58 Fed. Reg. 41228, August 3, 1993. Clearly this same approach must be applied in this case.

The reasoning behind NHTSA's approach is that if the agency considered improvements that were not compatible with the basic design concept of a petitioner's automobile, "such changes ... could be economically impracticable since they might well significantly reduce the demand for these automobiles, thereby reducing sales and causing significant economic injury to the low volume manufacturer [petitioner]." Id.

This rationale is particularly relevant here because Spyker has been financially constrained due to investment in start-up and new models.

VI.
OTHER FEDERAL STANDARDS
RESTRICT SPYKER'S MAXIMUM FEASIBLE CAFE

As a small volume manufacturer, more stringent California evaporative emission standards will apply to Spyker in model year 2006, and Tier 2-LEV II exhaust standards are applicable in MY 2007. Spyker’s limited engineering resources will have to be expended to comply with these more stringent standards.

In general, crash-worthiness standards tend to reduce achievable CAFE, since they preclude, in some instances, the use of lighter-weight components. Smaller companies with limited resources must give priority to compliance with safety standards. See, Id; 58 Fed. Reg. 41228, August 3, 1993. Spyker also needs to develop FMVSS 208 advanced air bags by June 2008 (under its Part 555 NHTSA temporary exemption). These Federal standards will also have an adverse impact on fuel economy by requiring added weight. See 64 FR 73476, December 30, 1999. Another upcoming safety standard that will demand Spyker resources include upgraded FMVSS 301 rear crash requirements.

VII.
THE NEED OF THE NATION TO CONSERVE ENERGY
WILL NOT BE ADVERSELY AFFECTED

Spyker recognizes America's need to conserve energy, especially today. However, because Spyker intends to export to the US an extremely low volume of cars each year – and frankly will do so regardless of whether the exemption is granted -- the granting of this petition will not negatively affect US energy consumption and therefore cannot affect the need of the nation to conserve.

Since Spyker cannot possibly achieve average fuel economy values higher than those levels requested in this petition, it is in the same position as other companies who have asked for and received CAFÉ exemptions. NHTSA has noted that "... granting [the company] an exemption and setting alternate standards at those levels for those model years will not result in any additional fuel consumption and will not affect the need of the nation to conserve energy." See 51 Fed. Reg. 44492, December 10, 1986.

Lastly, the extremely low volume of Spyker's sales in the US results in a virtually unmeasurable effect on US energy consumption. Id.

CONCLUSION

Based upon the foregoing, Spyker respectfully requests that NHTSA grant this petition for an alternate CAFE standard as set forth above for model years 2008, 2009 and 2010.

Respectfully submitted,

Spyker Automobielen B.V.