



U.S. Department
of Transportation

National Highway
Traffic Safety
Administration

1200 New Jersey Avenue, SE
Washington, DC 20590

DEPARTMENT OF
TRANSPORTATION

SEP - 9 2019

2019 SEP 16 A 10: 28

DOCKET OPERATIONS

Paul Schaye
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Dear Mr. Schaye:

This responds to your letter requesting an interpretation of whether your auxiliary lamp, the Auto Motion Alert (“your product”), is permissible under Federal Motor Vehicle Safety Standard (FMVSS) No. 108, *Lamps, reflective devices, and associated equipment*. Because your product would be installed as aftermarket equipment, not as original equipment, and would not replace original equipment, and because FMVSS No. 108 applies only to equipment installed as original equipment or that replaces original equipment, we have interpreted your request as asking whether the installation of your product is permissible under the “make inoperative” provision of the National Traffic and Motor Vehicle Safety Act of 1966 (the Safety Act). The Safety Act prohibits most automotive businesses from installing aftermarket lighting equipment if doing so would take the vehicle out of compliance with FMVSS No. 108. For auxiliary lamps, the primary restriction imposed by FMVSS No. 108 is that the lamps cannot impair the effectiveness of a vehicle’s required lighting equipment.

We have tentatively concluded that your product is unlikely to impair the effectiveness of required lighting equipment, and is therefore unlikely to violate the “make inoperative” provision. However, we wish to emphasize that the existence of impairment would depend on the context in which your lamp is used, and thus must be determined on a case-by-case basis. It is the responsibility of the business installing your product to determine whether doing so constitutes a “make inoperative” violation. We explain our reasoning below.

Description of your product

You describe your product as a lamp that is designed to be installed above a vehicle’s front license plate using the two top mounting screws. You state that the purpose of installing the lamps on a vehicle is to communicate to road users ahead of the vehicle whether the vehicle is decelerating, accelerating, or maintaining a constant speed. You state that your product consists of a strip of amber and white LEDs, although you do not provide the exact photometric intensity. Either the white or amber LEDs are activated, depending upon the underlying condition. You state that the white LEDs are activated and steadily burn while the vehicle is accelerating or travelling at a constant speed, and that the amber LEDs are activated and steadily burn while the vehicle is decelerating or stopped. The LEDs are actuated by a microcontroller that detects the vehicle’s acceleration using internal accelerometers. We also understand, based on our communications with you, that the brightness of the LEDs, the

threshold levels of acceleration or deceleration activating the LEDs can be controlled through software, although it is our understanding that the product will be sold as a sealed unit that is not adjustable by the end user. You state that, although the LEDs activate independently of other vehicle systems (including the braking system), your product is powered by either a direct connection to the vehicle's battery, or a 12-volt DC wire supply that is live when the vehicle is turned on. The exterior housing consists of a weather-resistant polymer enclosure with gasket type seal.

Applicable Requirements

Because you state that you intend to sell your product aftermarket, the primary potential restriction on its installation is the Safety Act's "make inoperative" provision. 49 U.S.C. § 30122. The "make inoperative" provision states that manufacturers, distributors, dealers, rental companies and motor vehicle repair businesses may not "knowingly make inoperative any part of a device or element of design installed on or in a motor vehicle or motor vehicle equipment in compliance with an applicable motor vehicle safety standard" promulgated under the Safety Act. This means that the businesses subject to the "make inoperative" provision would be prohibited from installing your product on a vehicle if doing so would take the vehicle out of compliance with any FMVSS. The "make inoperative" provision does not apply vehicle owners, and these owners are not precluded from modifying their vehicle by NHTSA's statutes or regulations. State and local laws, however, may impact whether an owner may use a vehicle they have modified in a particular jurisdiction.

NHTSA considers the installation of an aftermarket lamp to violate the "make inoperative" provision if the installation of the same lamp as original equipment would violate FMVSS No. 108.¹ As a non-required ("auxiliary") lamp, your product is not required to meet any of the performance requirements in FMVSS No. 108 that it would need to meet if it were installed as original equipment.² However, your product would be prohibited under FMVSS No. 108 (and thus, would violate the "make inoperative" provision) if it would "impair[] the effectiveness of lighting equipment required by this standard." FMVSS No. 108, S6.2.1.

Because the existence of impairment is, in part, a function of the context in which an auxiliary lamp is used, impairment must be determined on a case-by-case basis. If a business subject to the "make inoperative" provision installs an aftermarket auxiliary lamp, that entity is responsible for determining whether doing so causes impairment. If NHTSA determines that a business to which the "make inoperative" provision applies has impaired the effectiveness of required lamps, that business would be subject to a fine of up to \$22,329 per violation.³

Discussion

Based on the information you provided in your interpretation request, we have tentatively concluded that your product, if configured and installed in conformance with the restrictions described in letter, is unlikely to impair the effectiveness of a vehicle's required

¹ E.g., Letter to Timothy C. Murphy (Nov. 1, 2004), available at <https://isearch.nhtsa.gov/files/GF006332.html>.

² We note that auxiliary lamps that use plastic optical materials must comply with S14.1.2, and are subject to various other minor restrictions that are not relevant here.

³ See 49 CFR part 578.

lighting, and its installation on a vehicle would be unlikely to constitute a “make inoperative” violation. There are four aspects of auxiliary lamps that are relevant to impairment: brightness (i.e., photometric intensity), color, location, and activation pattern. What follows is a brief explanation of NHTSA’s safety concerns for each of these characteristics, along with examples of instances in which the agency would consider an auxiliary lamp to violate the impairment prohibition. It should be noted that determining whether an auxiliary lamp impairs the effectiveness of required lamps involves a holistic assessment of the context in which the auxiliary lamps are used, and the examples provided are not exhaustive. Thus, although this letter discusses these four characteristics separately, they should not be considered in isolation, nor should they be considered an exhaustive list of all the considerations that should be taken into account when making an impairment determination.

Brightness (Photometric Intensity)

NHTSA interprets the impairment provision to prohibit auxiliary lamps that are so bright as to obscure or distract from a vehicle’s required lamps. For example, NHTSA has in the past stated that auxiliary lamps that were so bright as to “mask” adjacent required turning signal lamps would be prohibited due to impairment.⁴ While you do not state the precise brightness of your product, you state that its brightness “is limited and so would not impair or mask the vehicle’s headlamps or turn signals.” Although the extent to which your product would interfere with a vehicle’s required lighting may vary depending on the design and performance of a particular vehicle’s required lamps, we do not believe your product would impair the effectiveness of a vehicle’s required lamps on the basis of brightness if its photometric intensity is sufficiently limited such that your product’s LEDs are noticeably dimmer than the vehicle’s required head lamps and front turn signal lamps.

Color

NHTSA interprets the “impairment” provision to prohibit auxiliary lamps that are colors the agency believes are likely to cause confusion to other road users. For auxiliary lamps located on the front of the vehicle, colors that could cause confusion include red (which could be confused for a tail lamp), green (which could be confused for a traffic signal), and blue (which could be confused for a law enforcement vehicle). By contrast, we have consistently said that amber and white lamps are permissible on the front of the vehicle.⁵ Because your product illuminates as either amber or white, depending on the underlying condition, we do not believe your product would impair a vehicle’s required lamps on the basis of color.

Location

NHTSA interprets the “impairment” provision to prohibit auxiliary lamps that are mounted in locations that cause them to interfere with the ability of a vehicle’s required lamps to achieve their purpose. For example, NHTSA has stated in the past that auxiliary lamps placed too close to FMVSS No. 108-compliant identification lamps would be prohibited because they may confuse other road users.⁶ The agency has long maintained that highway

⁴ E.g., Letter to Mark Wallach (Oct. 17, 2006), available at <https://isearch.nhtsa.gov/files/Wallach.3.htm>.

⁵ E.g., Letter to Anthony M. Cooke (Oct. 19, 2006), available at <https://isearch.nhtsa.gov/files/Legg1.htm>.

⁶ E.g., Letter to [REDACTED] (Jan. 21, 2004), available at <https://isearch.nhtsa.gov/files/GF007705.html>.

traffic safety is enhanced by the familiarity of drivers with established lighting schemes, which facilitates their ability to instantly recognize the meaning the lamps convey and respond accordingly. Therefore, any auxiliary lighting on the front of a vehicle must be located such that it would not interfere or be confused with other required lamps. Your product is designed to be no wider than a license plate. In the case where a license plate holder is mounted at the centerline of the vehicle at a lower mounting height than the vehicle's required lamps, we think your product would, in most cases, be unlikely to interfere with the required lamps' ability to achieve their function based on proximity. However, we note that if a vehicle's front license plate were located somewhere other than the centerline of the front bumper, and especially if it were located near a vehicle's required lamps, it would be likely that the installation of your product on the front license plate holder would cause impairment. Our determination in this letter that your product would be unlikely to impair the effectiveness of required lamps on the basis of mounting location assumes that your product is mounted on front centerline of the vehicle. If your product were mounted somewhere other than the front centerline of the vehicle, we believe that it would be more likely to impair the effectiveness of the vehicle's required lamps.

Activation Pattern

NHTSA interprets FMVSS No. 108 to require that all auxiliary lamps be "steady burning," with the sole exception being auxiliary lamps that supplement required lamps that flash, such as turn signals.⁷ While this requirement has been relatively straight-forward to apply in the past, the introduction of new, programable lighting devices (such as your product) that are intended to communicate driver intent to other road users, has convinced the agency that it is necessary to clarify the meaning of "steady burning." To this end, we are clarifying here that the requirement that auxiliary lamps be steady burning does not mean that an auxiliary lamp is prohibited from being activated or deactivated automatically. Rather, it means that the lamp must be steady burning when activated, and that the event that triggers its activation or deactivation (in this case, the vehicle's rate of acceleration or deceleration exceeding a certain minimum threshold) cannot be so frequent or random that the lamp would distract or confuse other road users. For example, a lamp that activated and deactivated on an extremely short time interval due to sensitivity to slight changes in the underlying conditions, would not be considered steady-burning.⁸ More traditional examples of lamps that are not

⁷ Prior to 2007, FMVSS No. 108 included an explicit requirement that, with the exception of certain types of required lamps (e.g., turn signal lamps), all lamps on a vehicle, including auxiliary lamps, must be steady burning. In 2007, NHTSA implemented an administrative reorganization of FMVSS No. 108 which, among other things, converted the blanket "steady burning" requirement (and its exceptions) into individual activation requirements for each type of required lamp. See 72 FR 68234 (Dec. 4, 2007). Although the reorganized rule no longer includes a blanket "steady burning" requirement, NHTSA stated in the preamble to the reorganized rule that its "rewrite of FMVSS No. 108 is considered administrative in nature because *the standard's existing requirements and obligations are not being increased, decreased, or substantively modified.*" Moreover, NHTSA continues to believe that flashing auxiliary lamps would impair the effectiveness of required lamps by distracting or confusing other road users.

⁸ E.g., Letter to Timothy C. Murphy (Nov. 1, 2004), available at <https://isearch.nhtsa.gov/files/GF006332.html>.

steady-burning include, but are not limited to, strobes and turn signals. By contrast, an auxiliary lamp that gradually changes in intensity based on ambient lighting conditions may be considered steady burning.⁹

We have determined that your product would likely be considered steady burning because the event that triggers the activation of the LEDs—the deceleration of the vehicle—is likely not something that occurs so frequently or randomly that it would cause your product to appear to flash, which could confuse or distract other road users. We note that this determination rests on the assumption that your product’s accelerometer is calibrated not to be overly sensitive to small changes in acceleration.

We acknowledge that this interpretation supersedes some of our prior, more restrictive interpretations of the concept of “impairment.” In particular, this letter specifically supersedes our previous interpretation concluding that all auxiliary lamps used to communicate “non-standard signals” (i.e., information other than what is communicated by required lamps) to other drivers would categorically impair the effectiveness of a vehicle’s required lamps.¹⁰ We reiterate, however, that auxiliary lamps may not be used to communicate non-standard signals (or, in fact, any signals) if doing so impairs the effectiveness of required lighting.

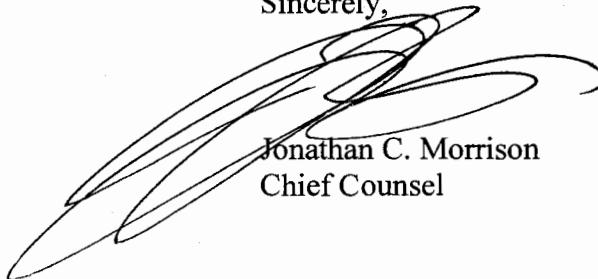
Other Considerations

You should be aware that, even if your product is permissible under FMVSS No. 108 and the “make inoperative” provision, it is possible that State and local laws or restrictions may apply to your product. You may wish to consult the State and local transportation authorities in the areas you intend to market your product to make sure it is permissible under these laws.

Finally, regardless of whether your product is subject to the restrictions of FMVSS No. 108 or the “make inoperative” provision, please be aware that if you or this agency finds your product to contain a safety-related defect after you market the product, you are responsible for conducting a notice and recall campaign as required under 49 U.S.C. §§ 30118-30120.

If you have further questions, please contact Daniel Koblenz of my staff at 202-366-2992.

Sincerely,



Jonathan C. Morrison
Chief Counsel

⁹ E.g., Letter to Ian Goldstein (July 21, 1998), available at <https://isearch.nhtsa.gov/files/18164.ztv.html>.

¹⁰ E.g., Letter to Kerry Legg (Feb. 21, 2008), available at <https://isearch.nhtsa.gov/files/07-001583as.htm>.

October 29, 2018

Heidi King
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Pedestrian Safety Solutions FMVSS 108 Interpretation Request

I. Introduction

Pedestrian Safety Solutions (“PSS” or “company”) is an automotive technology start-up with a focus on innovative safety performance solutions for the automotive aftermarket. Our mission is to provide affordable vehicle safety solutions that strengthen our collective responsibility to end avoidable crashes that result in loss of life and injury. Auto Motion Alert (“AMA”) is a front-mounted safety innovation that provides the comparable consumer and societal benefits that the center high-mounted stop light that NHTSA required on all new vehicles starting in 1985. AMA addresses the challenges of a new driving and mobility environment that is characterized by increased distractions for both drivers and pedestrians—it communicates a vehicle’s velocity by illuminating an array of LEDs (amber for deceleration, and white for acceleration/steady speed) regardless of whether a driver is distracted or not. By communicating “vehicle intent” information, AMA provides a greater degree of certainty about an approaching vehicle’s action(s) and the driver’s intent by providing actionable, real-time information to pedestrians, motorized/non-motorized vehicles, and other vulnerable road users.

The company asks the National Highway Traffic Safety Administration (“NHTSA” or “Agency”) to confirm that the AMA device is in accordance with Federal Motor Vehicle Safety Standard (“FMVSS”) 108, S5.1.3 (“S5.1.3”) and does not “impair the effectiveness of lighting equipment required by [the standard].” The AMA can be affixed to a vehicle’s front license plate casing or grill and is designed to change colors to indicate whether the vehicle is decelerating or braking. Much like a rear brake light that illuminates when the driver depresses the brake pedal in order to warn following drivers that the vehicle is slowing down, a front mounted AMA would communicate similarly important and useful vehicle braking action to other road users, such as pedestrians and bicyclists. When viewing an approaching vehicle, it can often be difficult for pedestrians and bicyclists to determine whether a vehicle is decelerating. We believe this device will help address this deficiency and provide road users with additional information to keep themselves safe. We have reviewed and analyzed a number of similar interpretations issued by NHTSA. Based on existing agency guidance on front brake lamps and fog lamps, we believe the Auto Motion Alert does not “impair the effectiveness of lighting equipment required by [FMVSS 108].”¹

¹ FMVSS 108, S5.1.3.

II. Discussion

The relevant law NHTSA should consider in determining if the AMA is a permissible after-market device is S5.1.3 and 49 U.S.C § 30122 (“§ 30122”). Specifically, S5.1.3 states, “No additional lamp, reflective device or other motor vehicle equipment shall be installed that impairs the effectiveness of lighting equipment required by this standard.” NHTSA, in assessing *impairment*, has “interpreted [§ 30122], where possible, to be the equivalent of the ‘impairment’ prohibition applicable to new vehicles...[and stated] [t]his prohibition applies to manufacturers, distributors and motor vehicle repair businesses as well.”² Indeed, the company’s AMA does not violate either of these laws and is in accordance with existing NHTSA guidance.

AMA relies on a built-in accelerometers that detect when the vehicle is decelerating to a stop and accelerating/maintaining steady speed. The accelerometer sensitivity will be adjusted to a mean average level of sensitivity, measured in meters per second squared (m/s^2) to act as the trigger point that will engage the device circuitry to function, activating LED illumination.

The software logic will consist of a master microprocessor chip installed in a chip containing the code. The hardware chip will be attached to a printed circuit board assembly that and will be responsible for designating activation of the LEDs based on information from the accelerometers. This component will also define the LED’s illumination intensity (in compliance with federal regulations), and will also control the reduced power drop through a transducer from 12VDC (vehicle battery) to average 3VDC (circuit running voltage). The intensity and illumination operation of amber and white LEDs will be programmed to provide a steady amber illumination when decelerating and steady white illumination when accelerating or maintaining steady speed.

The product’s power plant to support the illumination as well as the sensors and logic will be derived from a direct connection to the vehicle battery and or a 12 VDC wire supply that is live when vehicle is started and/or running. The device housing consists of semi flexible weather resistant polymer enclosure with gasket type seal, clear and amber lens as required, and white surface mounted high intensity LEDs.

The AMA aligns well with existing NHTSA interpretation guidance addressing front brake lamps and fog lamps. For example, in a letter to Mark Bauman on October 28, 1994, the Agency stated that Bauman’s front-mounted light, which would advise pedestrians and other drivers to proceed with caution while the vehicle is stopped at an intersection, would be considered “supplementary lighting equipment” and therefore, permitted “provided that [the lighting] does not impair the effectiveness of the lighting equipment that [S5.1.3] does require.”³ Similarly, in response to James Vasko on March 23, 1993, NHTSA stated that Vasko’s “Front Brake Light System,” a system which “activates the front signal lamps in a steady-burning state,

² 7/28/94 Front Brake Letter; *see also* 49 U.S.C § 30122(b) (saying, “Prohibition: A manufacturer, distributor, dealer, rental company, or motor vehicle repair business may not knowingly make inoperative any part of a device or element of design installed on or in a motor vehicle or motor vehicle equipment in compliance with an applicable motor vehicle safety standard prescribed under this chapter unless the manufacturer, distributor, dealer, rental company, or repair business reasonably believes the vehicle or equipment will not be used (except for testing or a similar purpose during maintenance or repair) when the device or element is inoperative.”).

³ NHTSA response to Mark Bauman (care of Senator Lautenberg) dated October 28, 1994.

with flashing turn signal overriding the steady-burning front stop signal when the turn signal is activated,” is permissible “provided that the equipment does not impair the effectiveness of the lighting equipment that [S5.1.3] requires.”⁴ In accordance with the Bauman and Vasko NHTSA Interpretation Letters, the AMA would not impair the effectiveness of the lighting equipment that [S5.1.3] requires because the AMA’s illumination would not exceed that of the existing lighting systems as required by FMVSS 108. Furthermore, since the AMA is an independent device that is not tied into the vehicle’s existing lighting system, it would not interfere with the vehicle’s front-, side-, or rear-mounted lamps.⁵

The AMA also aligns well with NHTSA’s existing guidance on fog lights. For example, in reviewing Jacqueline Frohman’s “AstonLaser,” a rear taillamp device, NHTSA stated on April 11, 2001 that the device “would not have an impairing effect upon stop lamps, taillamps, or rear turn signals, provided that the connection through the taillamp wiring has no effect upon the performance of the taillamps.”⁶ Pursuant to the AstonLaser Letter, the AMA would not impair a vehicle’s lamps, taillamps, or rear turn signals because the AMA wiring would have “no effect upon the performance of the [vehicle’s lamps.]”⁷ Indeed, the AMA is wholly independent of the vehicle’s electrical system and so its internal wiring would affect the vehicle’s wiring system or performance. Similarly, NHTSA stated in its response to Norbert Westerhujis on December 8, 1998 that it “would regard as an impairment...a fog lamp whose intensity masked the operation of a turn signal or a stop lamp...[and] located either greater than 100 mm from a front turn signal lamp, or the turn signal must be up to 2.5 times more intense than otherwise required, depending on its distance from the fog lamp.”⁸ The AMA’s illumination intensity is limited and so would not impair or mask the vehicle’s head lamps or turn signals.

⁴ NHTSA response to James Vasko dated March 23, 1993; *see also* NHTSA response to Gary Weintraub dated October 21, 1999 (stating, “front ‘brake’ lamps are prohibited only if they impair the effectiveness of front lighting equipment required under federal law, and...‘assuming front ‘brake’ lamps were implemented so as not to interfere with the effectiveness of required front lighting equipment, front brake lamps are permitted to be installed on vehicles now, without any changes to the [U.S. Federal motor vehicle lighting standard].”).

⁵ It is also worth noting that the device would not divert a driver’s attention either, a concern raised by NHTSA in 2009. In NHTSA’s response to Solomon Bekhor on July 29, 2009 the Agency stated that the “Communicar,” a device that “deploys an array of front-and side-mounted signal lamps, as well as displays wording on the vehicle’s windows” would impact the effectiveness of the vehicle’s required lamps because the Communicar “would divert a driver’s attention from the required signal lamps and cause confusion...” Conversely, the AMA would not divert a driver’s attention since it mounted beyond the driver’s line of sight.

⁶ NHTSA response to Jacqueline Frohman dated April 11, 2001.

⁷ *Id.*; *see also* NHTSA response to James Cruz dated September 24, 2001 (stating, in response to an import question regarding an overseas device, that “A fog lamp is a ‘lamp’ and not an item of ‘associated equipment.’ However, Standard No. 108 does not prescribe any requirements for fog, driving, and other aftermarket accessory lamps. Therefore, there are no requirements of this agency that [fog lamps made in Taiwan] must meet in order to be imported into Guam.”).

⁸ NHTSA response to Norbert Westerhujis dated December 8, 1998; *see also* NHTSA response to Michael Krumholz dated April 8, 1998 (saying, “Standard No. 108 prohibits supplementary original lighting equipment such as fog lamps or driving lamps if they impair the effectiveness of lighting equipment required by Standard No. 108. One example of impairment would be if a fog lamp were installed so close to a turn signal lamp (required by Standard No. 108) that its brightness masked the turn signal. To prevent this, front fog lamps must be located either more than 100 mm from a front turn signal lamp, or the turn signal must be up to 2.5 times more intense than otherwise required, depending on its distance from the fog lamp.”); NHTSA response to Byung M. Soh dated September 13, 1988 (stating, “Effectiveness may be impaired if the device creates a noncompliance in the existing lighting equipment or confusion with the signal sent by another lamp, or functionally interferes with it, or modifies its candlepower to either below the minima or above the maxima permitted by the standard. In addition, a motor vehicle must remain in conformance with Standard No. 108 (and all other safety standards) until its first purchase for purposes other than resale.”); NHTSA response to M. Iwase dated March 31, 1986 (stating, “...the determination of whether such a lamp is permissible or not must be made by the manufacturer of the vehicle upon which the fog lamp is installed, and would be dependent upon such factors as the photometrics of the lamp and its location in proximity to the frontal lighting equipment required by Standard No. 108. parking lamps, turn signal lamps, and headlamps.”).

III. Conclusion

Based on the review and analysis of NHTSA's existing interpretations on front brake lights and fog lights—devices similar to the AMA—we conclude that the AMA would not “impair the effectiveness of lighting equipment” required by FMVSS 108. As we prepare to initiate production, we ask that the Agency concur and issue an interpretation confirming that the AMA would not impair the effectiveness of a vehicle's lighting equipment.

Sincerely,

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