



## Transportation Safety Equipment Institute

April 9, 2021

Dr. Steven Cliff  
Deputy Administrator  
National Highway Traffic Safety Administration  
1200 New Jersey Avenue, SE  
Washington, DC 20590

Re: Advance Notice of Proposed Rulemaking; Federal Motor Vehicle  
Safety Standards: Test Procedures [Docket No. NHTSA-2020-  
0109]; 85 *Fed. Reg.* 79456 (Dec. 10, 2020)

Dear Deputy Administrator Cliff:

This comment is submitted on behalf of the Transportation Safety Equipment Institute (TSEI), a trade association representing manufacturers of vehicular safety equipment, including lamps, mirrors, warning devices, and reflective materials. TSEI welcomes the opportunity to provide this comment with respect to the above-referenced Advance Notice of Proposed Rulemaking (ANPRM), in which the Agency seeks comment on whether any FMVSS test procedures “may be a candidate for replacement, repeal, or modification, for reasons other than for considerations relevant only to automated driving systems (ADS).” Below, we address several areas in FMVSS No. 108, *Lamps, reflective devices, and associated equipment*, which TSEI believes should be updated to align with current testing approaches. In addition, we note several areas that, while not directly related to FMVSS 108’s test procedures, we urge the Agency to revisit and update in a future rulemaking.

### **1. Specify Spectroradiometer as Alternative Method of Color Measurement**

FMVSS 108, S14.4.1 provides that when a color requirement is specified, “[t]he color of the sample device must comply when tested by either the Visual Method or the Tristimulus Method.” Under the Visual Method, “[t]he color of light from the sample device must be compared visually with the color of the light from a standard.” S14.4.1.3.1. Under the Tristimulus method, “[t]he color of light from the H-V point of a sample device must be measured by photoelectric receivers with spectral responses that approximate CIE standard spectral tristimulus values.” S14.4.1.4.1.1.

TSEI recommends that NHTSA modify the Tristimulus methodology to expressly permit use of a spectroradiometer (as an alternative to photoelectric receivers) to determine compliance with the color requirements. The spectroradiometer is the current instrument of choice for color determination of lighting and conspicuity devices, as it is widely used in the industry, including by test labs contracted by NHTSA.

## **2. Conform Photometric Intensity Maximums Between Identification/Clearance and Taillamps**

FMVSS 108 at one time provided that tail, side marker, clearance, and identification lamps were each subject to a maximum of 15 cd. Under prior amendments to FMVSS 108, the taillamp maximum was raised to 18 cd, while the other lamps remained subject to a maximum of 15 cd. *See* FMVSS 108, Table XI. This discrepancy has created a practical burden for manufacturers, as many applications for vehicles over 80 inches wide use a 2-lamp Turn/Clear - Stop/Tail setup, utilizing the same lamps (typically a 4" round lamp). As a consequence, manufacturers are not, as a practical matter, able to make use of the 18 cd maximum on these tail lamps because they can also be considered clearance lamps.

Permitting a maximum of 18 cd for clearance and identification lamps (rather than 15 cd) will align the maximum among these dual function lamps, thereby allowing manufacturers to practicably take advantage of the higher taillamp intensity with its improved conspicuity.

## **3. Permit Use of Same Turn Signal Lamps and Stop Lamps on Both Wide ( $\geq 2032$ mm) and Narrow ( $< 2032$ mm) Vehicles**

As the Agency evaluates potential changes to FMVSS 108, TSEI urges the Agency to consider adding language to clarify that turn signal lamps and stop lamps designed for use on vehicles 2032 mm or more in overall width, that meet the one lighted section photometric values, may be used on narrower vehicles. We note that SAE J1395 APR85 and SAE J1398 MAY85, from which the relevant provisions within current FMVSS 108 were derived, expressly permit this by stating in their "Scope" section that lamps meeting the requirements for wider vehicles may also be used on narrower vehicles. The Agency arrived at the same conclusion in an August 22, 1990 interpretation letter to Hella. In that letter, the Agency stated:

Beginning December 1, 1990, Standard No. 108 will specify two different standards for turn signal lamps. If the lamp is intended for use on multipurpose passenger vehicles, trucks, buses, and trailers whose overall width is 80 inches or more, it must be designed to conform to SAE Standard J1395 APR85 Turn Signal Lamps for Use on Motor Vehicles 2032 mm or More in Overall Width. SAE J1395 also provides that these lamps may be used on vehicles less than this width, except for passenger cars. If a motor vehicle is not equipped with a turn signal lamp designed to conform to SAE J1395, it must be equipped with a turn signal lamp designed to conform to SAE Standard J588 NOV84 Turn Signal Lamps for Use on Motor Vehicles Less Than 2032 mm in Overall Width.

*See* Letter to Hella KG Hueck & Co (Aug. 22, 1990) <https://www.nhtsa.gov/interpretations/2622y>. Thus, when the Agency issued the Hella interpretation letter, it apparently understood that its

newly adopted rule permitted use of J1395-compliant turn signal lamps on narrower vehicles. (J1398 contains nearly identical language and, therefore, this interpretation should apply equally to stop lamps.) The industry had relied on this interpretation for many years, but the Agency addressed this issue during its “administrative rewrite” of FMVSS 108 and rejected the argument that FMVSS 108, as it existed prior to the rewrite, permitted use of J1395/J1398-compliant lamps on narrower vehicles. *See* Response to Petitions for Reconsideration, 76 *Fed. Reg.* 48008, 48020 (Aug. 8, 2011). As such, the issue was deemed outside the scope of the rewrite, which was not intended to make substantive changes to the standard. Thus, to the extent it does constitute a substantive change, we urge the Agency to consider adopting this change during any future rulemaking related to FMVSS 108.

This issue is important to suppliers of lighting for commercial vehicles. Manufacturers of generic catalog products do not typically know the types of vehicles (wide or narrow) on which their products will be installed. The proposed approach would allow manufacturers to certify their products to one standard and to manufacture and maintain an inventory of a single part that can be universally installed. Otherwise, manufacturers must develop and maintain a supply of an entirely separate series of products for the under-2032 mm (80 in) market segment, at significant additional costs. Vehicle manufacturers and fleet owners also incur substantial cost due to added complexity and inventory costs associated with incorporating both types of lamps into their various models and across their fleets. These costs come with no demonstrated safety benefit.

#### **4. Correct Apparent Typographical/Unit Conversion Error in FMVSS 108, S14.6.12.2**

FMVSS 108, S14.6.12.2 specifies that after the completion of the inward force test, “[t]he aim of the headlamp must not permanently deviate by more than 3.2 mm at a distance of 7.6 m.” TSEI believes the reference to 3.2 mm should actually be 32 mm, but for a carryover of a typographical or metric unit conversion error that originated in the SAE source document, J580, as demonstrated by a review of the history of SAE J580.

The pre-write version of FMVSS 108 incorporated the requirements of SAE J580 (Dec 1986) by reference for several headlamp types. Section 5.1.3.2 of SAE J580 (Dec. 1986) specified a maximum deviation of 3.2 mm:

### SAE J580 (Dec 1986), section 5.1.3

Page 3	SAE®	SAE J580
<p>5.1.2.3 The self-locking devices used to hold aiming screws in position shall continue to operate satisfactorily at least for 20 adjustments on each screw, over a length of screw thread of not less than 3 mm.</p> <p>Note: Paragraphs 5.1.2.2 and 5.1.2.3 are not applicable to lamps with ball and socket or equivalent adjusting means.</p> <p>5.1.3 Inward Force Requirements: When subjected to the tests in paragraph 4.3, the unit shall meet the following requirements:</p> <p>5.1.3.1 The sealed beam unit shall not permanently recede by more than 2.5 mm.</p> <p>5.1.3.2 The aim of the sealed beam unit shall not permanently deviate by more than 3.2 mm at a distance of 7.6 m.</p>		

However, the prior history of SAE J580, beginning with J580B (Nov. 1974), in which the inward force test was first introduced, illustrates the carryover of an initial typographical or conversion error:

### SAE J580B (Feb 1974), sections 6.2.1 and 6.2.2

<p>5.1 Headlamps shall be designed so that they may be inspected and aimed by mechanical aimers as specified in SAE J602 without the removal of any ornamental trim rings or other parts.</p> <p>5.2 When in use, a headlamp shall not have any styling ornament or other feature, such as a glass cover or grille, in front of the lens.</p> <p>6. Design Requirements and Tests—Unless otherwise specified, the following are laboratory tests in which the sealed beam headlamp assembly shall be mounted in design position with the sealed beam unit set at nominal aim (0,0).</p> <p>6.1 Aiming Adjustment Test—When making the aiming adjustment test, an accurate measurement technique shall be used. A device attached to the sealed beam unit such as a spot projector, or replacing the sealed beam unit with a mirror with a separate light source, or other accurate means can be used.</p> <p>6.1.1 When the headlamp assembly is tested in the laboratory, a minimum aiming adjustment of <math>\pm 4.0</math> deg shall be provided in both the vertical and horizontal planes.</p> <p>6.1.2 On headlamp assemblies with independent vertical and horizontal aiming screws, the adjustment shall be such that when tested in the laboratory neither the vertical nor horizontal aim shall deviate more than 4.0 in (102 mm) from horizontal or vertical planes respectively at a distance of 25 ft (7.6 m) through an angle of <math>\pm 4</math> deg.</p> <p>6.1.3 The self-locking devices used to hold aiming screws in position shall continue to operate satisfactorily at least for 20 adjustments on each screw, over a length of screw thread of <math>\pm 1/8</math> in (3.2 mm).</p> <p>NOTE: Paragraphs 6.1.2 and 6.1.3 are not applicable to lamps with ball and socket or equivalent adjusting means.</p> <p>6.2 Inward Force Test—The mechanism, including the aiming adjusters, when subjected to an inward force of 50 lb (222 N) directed normal to the headlamp aiming plane and symmetrically about the</p>	<p>FIG. 1—CONNECTOR TEST</p> <p>center of the sealed beam unit face shall meet the following requirements:</p> <p>6.2.1 The sealed beam unit shall not permanently recede by more than 0.1 in (2.5 mm).</p> <p>6.2.2 The aim of the sealed beam unit shall not permanently deviate by more than 1.25 in (3.2 mm) at a distance of 25 ft (7.6 m).</p> <p>6.3 Retaining Ring Tests—Positive means shall be provided for holding the sealed beam unit to the mounting ring.</p> <p>6.3.1 The fastening means shall be deemed adequate if it will withstand and hold the sealed beam unit securely in its proper position at the end of 20 replacements.</p> <p>6.3.2 When a unit having a flange thickness of 0.465 in (11.8 mm) is secured between the retaining ring and the mounting ring, it shall be held tight enough that it will not rattle.</p> <p>6.4 Connector Tests—Measure voltage drop as shown in Fig. 1.</p> <p>6.4.1 The voltage drop shall not exceed 40 mV with a 10 A load.</p> <p>6.5 Torque-Deflection Test—The headlamp assembly to be tested shall be mounted in designed vehicle position and set at nominal aim (0,0). The sealed unit shall be replaced by the deflectometer (Fig. 2) and a reading on the thumb wheel shall be taken. A torque of 20 lb-in (2.25 N·m) shall be applied to the headlamp assembly through the deflectometer and a second reading on the thumb wheel shall be taken.</p> <p>6.5.1 The difference between the two readings shall not exceed 0.25 deg.</p>
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Section 6.2.2 refers to “1.25 in (3.2 mm).” However, 1.25 inches properly converts to 32 millimeters, or 3.2 centimeters. This conversion error was carried over into the 1978 and 1979 revisions (SAE J580C (Nov. 1978) and SAE J580 (Aug. 1979)):

## **SAE J580C (November 1978), sections 6.2.1 and 6.2.2**

5.2 When in use, a headlamp shall not have any styling ornament or other feature, such as a glass cover or grille, in front of the lens.

**6. Design Requirements and Tests**—Unless otherwise specified, the following are laboratory tests in which the sealed beam headlamp assembly shall be mounted in design position with the sealed beam unit set at nominal aim (0,0).

**6.1 Aiming Adjustment Test**—When making the aiming adjustment test, an accurate measurement technique shall be used. A device attached to the sealed beam unit such as a spot projector, or replacing the sealed beam unit with a mirror with a separate light source, or other accurate means can be used.

6.1.1 When the headlamp assembly is tested in the laboratory, a minimum aiming adjustment of  $\pm 4.0$  deg shall be provided in both the vertical and horizontal planes.

6.1.2 On headlamp assemblies with independent vertical and horizontal aiming screws, the adjustment shall be such that when tested in the laboratory neither the vertical nor horizontal aim shall deviate more than 4 in (100 mm) from horizontal or vertical planes respectively at a distance of 25 ft (7.6 m) through an angle of  $\pm 4$  deg.

6.1.3 The self-locking devices used to hold aiming screws in position shall continue to operate satisfactorily at least for 20 adjustments on each screw, over a length of screw thread of  $\pm 1/8$  in (3 mm).

NOTE: Paragraphs 6.1.2 and 6.1.3 are not applicable to lamps with ball and socket or equivalent adjusting means.

**6.2 Inward Force Test**—The mechanism, including the aiming adjusters, when subjected to an inward force of 50 lb (222 N) directed normal to the headlamp aiming plane and symmetrically about the center of the sealed beam unit face shall meet the following requirements:

6.2.1 The sealed beam unit shall not permanently recede by more than 0.1 in. (2.5 mm).

6.2.2 The aim of the sealed beam unit shall not permanently deviate by more than 1.25 in. (3.2 mm) at a distance of 25 ft (7.6 m).

**6.3 Retaining Ring Tests**—Positive means shall be provided for holding the sealed beam unit to the mounting ring.

6.3.1 The fastening means shall be deemed adequate if it will withstand and hold the sealed beam unit securely in its proper position at the end of 21 replacements.

6.3.2 When a unit having a flange thickness shown below is secured between the retaining ring and the mounting ring, it shall be held tight enough that it will not rattle.

### **Flange Thickness**

5-3/4 in (146 mm)	0.465 (11.8 mm)
7 in (178 mm)	0.465 (11.8 mm)
4 x 6-1/2 in (100 x 165 mm)	1.24 (31.5 mm)
(142 x 200 mm)	0.398 (10.1 mm)

**6.4 Connector Tests**—Measure voltage drop as shown in Fig. 1.

6.4.1 The voltage drop shall not exceed 40 mV with a 10 A load.

**6.5 Torque Deflection Test**—The headlamp assembly to be tested shall be mounted in designed vehicle position and set at nominal aim (0, 0). The sealed unit shall be replaced by the appropriate deflector (Figs. 2, 3, and 4). A torque of 20 lb-in (2.25 N·m) shall be applied to the headlamp assembly through the deflector and a reading on the thumb wheel shall be taken. The torque shall then be removed and a second reading on the thumb wheel shall be taken.

6.5.1 The difference between the two readings shall not exceed 0.30 deg.

## **SAE J580 (August 1979), sections 6.2.1 and 6.2.2**

**6.2 Inward Force Test**—The mechanism, including the aiming adjusters, when subjected to an inward force of 50 lb (222 N) directed normal to the headlamp aiming plane and symmetrically about the center of the sealed beam unit face shall meet the following requirements:

6.2.1 The sealed beam unit shall not permanently recede by more than 0.1 in. (2.5 mm).

6.2.2 The aim of the sealed beam unit shall not permanently deviate by more than 1.25 in. (3.2 mm) at a distance of 25 ft (7.6 m).

Then, in the 1986 revision (shown further above, which NHTSA subsequently adopted), the SAE standard removed the English unit of measurement from the standard, retaining the incorrect reference of 3.2 mm. Accordingly, TSEI urges the Agency to address this error in a future rulemaking.

## **5. Commonize Dust Used in FMVSS 108 Dust Tests**

TSEI concurs in the comment of the Alliance of Automotive Innovators (Auto Innovators) that FMVSS 108 should be modified to specify that Portland Cement used to perform lighting dust tests be compliant with the “Current ASTM C-150.” As the Auto Innovators noted, the two Portland Cement versions specified in FMVSS 108 – ASTM C150-77 (April 1977) and ASTM C150-56 (1956) – are no longer available, and currently available Portland Cement states that it “Complies with Current ASTM C-150.”

## **6. Allow Flexibility Regarding Use of “Design Input Voltage”**

TSEI concurs in the Auto Innovators comment that NHTSA should (i) provide flexibility to permit manufacturers to use the “design input voltage” as an alternative to a specific voltage, and (ii) where an operating range is specified, allow an alternative operating range that includes a percentage below and above the nominal design voltage.

## **7. Modify the Definition of “Haze” to Allow Diffuse Inner Lenses**

TSEI concurs in the Auto Innovators comment recommending that NHTSA clarify S14.4.2 *Plastic optical materials tests* to provide that haze be evaluated as a delta, i.e., by subtracting the initial haze measurement from the measurement after weathering.

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TSEI appreciates the opportunity to comment on the ANPRM. Please contact me ([cwatrous@truck-lite.com](mailto:cwatrous@truck-lite.com)) or TSEI’s Executive Director, Paul Menig ([PaulMenig@tsei.org](mailto:PaulMenig@tsei.org)), if you have questions or would like to discuss these issues further.

Sincerely,

Craig Watrous  
President, TSEI