Billing Code 4910-59-P

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2022-0109]

Soft Lights Foundation, Denial of Petition for Decision of Non-Compliance Order

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Denial of petition for a non-compliance order.

SUMMARY: Soft Lights Foundation (Petitioner) has petitioned NHTSA requesting NHTSA to issue an order of non-compliance for certain model year (MY) 2021 Tesla Model 3, 2021 Ford Bronco, and 2021 Rivian R1T motor vehicles based on its assertions that these motor vehicles do not fully comply with Federal Motor Vehicle Safety Standard (FMVSS) No. 108, *Lamps, Reflective Devices, and Associated Equipment*. Soft Lights Foundation petitioned NHTSA on August 5, 2022, for the 2021 Tesla Model 3, on August 11, 2022, for the 2021 Ford Bronco, and on September 9, 2022, for the 2021 Rivian R1T. This notice announces the denial of Soft Lights Foundation's petitions.

FOR FURTHER INFORMATION CONTACT: Leroy Angeles, Office of Vehicle Safety NHTSA, (202) 366-5304.

SUPPLEMENTARY INFORMATION:

I. Overview:

Under 49 U.S.C. 30162(a)(2) and 49 CFR Part 552.1, interested persons can petition NHTSA to begin a proceeding to make a determination that a motor vehicle or an item of

replacement equipment does not comply with an applicable FMVSS. Upon receipt of a properly filed petition, the Agency conducts a technical review of the petition, material submitted with the petition and any additional information. 49 U.S.C. 30162(a)(2); 49 CFR 552.6. After conducting the technical review and considering appropriate factors, the Agency will grant or deny the petition. *See* 49 U.S.C. § 30162(a)(2); 49 CFR § 552.8.

Soft Lights Foundation has alleged that certain MY 2021 Tesla Model 3, MY 2021 Ford Bronco, and MY 2021 Rivian R1T motor vehicles, herein also known as "subject vehicles," do not fully comply with the requirements of paragraphs S4, S5, S10.1.1, S14.1.1, and Table XIX of FMVSS No. 108, *Lamps, Reflective Devices, and Associated Equipment* (49 CFR 571.108) and has requested that NHTSA issue a noncompliance order.

II. Vehicles Involved:

MY 2021 Tesla Model 3, MY 2021 Ford Bronco, and MY 2021 Rivian R1T motor vehicles are potentially involved. These vehicles are likely equipped with integral beam headlamps that utilize Light Emitting Diode ("LED") technology.

III. Rule Requirements:

Paragraphs S4, S5, S10.1.1, S14.1.1, and Table XIX of FMVSS No. 108 include the requirements relevant to this petition as cited by Soft Lights Foundation.

Paragraph S4 defines a filament as that part of the light source or light emitting element(s), such as a resistive element, the excited portion of a specific mixture of gases under pressure, or any part of other energy conversion sources, that generates radiant energy which can be seen.

Paragraph S5 addresses references to SAE publications where each required lamp, reflective device, and item of associated equipment must be designed to conform to the

requirements of applicable SAE publications as referenced and subreferenced in this standard. The words "it is recommended that," "recommendations," or "should be" appearing in any SAE publication referenced or subreferenced in this standard must be read as setting forth mandatory requirements. S10.1.1 specifies headlighting system requirements for vehicle headlighting systems. Wherein this section states that each passenger car, multipurpose passenger vehicle, truck and bus must be equipped with a headlighting system conforming to the requirements of Table II and this standard.

S14.1.1 specifies physical and photometry test procedures and performance requirements. Wherein this sections states that each lamp, reflective device, item of conspicuity treatment, and item of associated equipment required or permitted by this standard must be designed to conform to all applicable physical test performance requirements specified for it.

Table XIX specifies the minimum and maximum photometric intensities at specific test points for the lower beam headlamp.

IV. Summary of Soft Lights Foundation's Petition:

The views and arguments presented in this section are the views and arguments provided by Soft Lights Foundation. They do not reflect the views of the Agency. Soft Lights Foundation described an alleged noncompliance for the subject vehicles and stated their belief that the subject vehicles do not comply with FMVSS No. 108. The subject vehicles are equipped with LED headlamps. The subject Rivian R1T vehicles are also equipped with Daytime Running Lights (DRLs).

According to Soft Lights Foundation, the subject vehicles do not meet federal safety regulation as specified in FMVSS No. 108 for the following reasons:

1. Congress has determined that visible light from an electronic device is different than light from a burning filament or gas discharge and that this visible electromagnetic radiation from an electronic product requires special federal regulations. Congress has determined that "visible electromagnetic radiation from an electronic product requires special federal regulations."
2. The Food and Drug Administration (FDA) has not yet developed safety regulations for LED products, and thus LED headlamps are an unregulated product which have not been deemed safe.
3. FMVSS No. 108 is only applicable to spherical/point light sources and specifies intensity minimums and maximums using luminous intensity measured in candela. Only vehicles using spherical/point light sources can be compliant with FMVSS No. 108.
4. LED lights are flat-surface sources, which results in spatially non-uniform energy, and which creates a Lambertian mathematical shape. Brightness is measured with luminance in nits (candela per square meter). NHTSA has not yet developed the health and safety regulations for surface source LED headlamps and has not specified the necessary restrictions that might make LED headlamps safe. The characteristics specific to LED headlamps that should be regulated include restrictions on spatial non-uniformity, peak luminance, spectral power distribution, and square wave flicker.
5. Tesla, Ford, and Rivian failed to petition NHTSA for amendment of existing regulations to allow use of LED technology for headlamps and has not received authorization from NHTSA.

6. FMVSS No. 108 contains no tables for specifying the minimum or maximum peak luminance of an LED headlight system and does not specify or refer to measurement requirements that involve a laboratory setting and precision measurement devices. Thus, a vehicle with an LED headlight system is non-compliant with FMVSS No. 108 because an LED headlight system cannot meet the requirements of Table XIX and there are no tables in FMVSS No. 108 that are applicable to an LED light source.
7. LED headlights and Daytime Running Lights are dangerous due to the excessive glare, non-uniform luminance, excessive peak luminance, and square wave flicker, putting public comfort, health, and safety at risk.

Soft Lights Foundation is requesting NHTSA to issue an Order of Non-Compliance to Tesla, Ford, and Rivian as well as for NHTSA to notify the public that LED headlamps do not comply with FMVSS No. 108.

VI. NHTSA's Analysis:

NHTSA has reviewed the information Soft Lights Foundation provided and additional material in response to Soft Lights Foundation's statements that Congress stated LED products require special federal regulations, that the FDA has not developed regulations specific to LED products, and therefore they are unregulated products that have not been deemed safe.

First, the FDA has authority to regulate certain aspects of LED products as radiation-emitting devices.[1] 21 U.S.C. 360kk states that the Secretary of Health and Human Services shall by regulation prescribe performance standards for electronic products to control the emission of electronic product radiation from such products if the Secretary determines that

[1] *See,* the Federal Food, Drug, & Cosmetic Act § 531 et seq.

such standards are necessary for the protection of the public health and safety. Pursuant to its authority, FDA issued Title 21, Part I, Subchapter J, Part 1040 of the Code of Federal Regulations, "Performance Standards for Light-Emitting Products."[2] Currently, there is no FDA performance standard for LED products in Part 1040.

The issue that the petition presents to NHTSA, however, is whether NHTSA should determine (or open an investigation to determine) that the headlamps in the subject vehicles comply with FMVSS No. 108. In addressing this, NHTSA is guided by the National Traffic and Motor Vehicle Safety Act, as amended and recodified, 49 U.S.C. Chapter 301, and the requirements set out in FMVSS No. 108. The Petitioner asserts that "[o]nly vehicles using spherical/point light sources can be compliant with FMVSS No. 108." NHTSA understands "spherical/point light sources" to refer to filament (e.g., tungsten/halogen) or High-Intensity Discharge Arc (HID) light sources. NHTSA therefore understands the Petitioner to be asserting that headlamps that utilize LED technology are *de facto* noncompliant with FMVSS No. 108. NHTSA disagrees. FMVSS No. 108 is not limited to "spherical/point light sources." Specifically, regardless of the light sources used in headlamps, headlamps all have an area from which they emit light and they all emit different intensities of light in different directions. A key to understanding this topic is that the integral beam photometry requirements are for the lamp, not the light source. In addition, a NHTSA interpretation has stated that a design that combines an "integral beam lower beam headlamp" that uses LEDs (wired in series), with a "replaceable bulb upper beam headlamp" would be permissible, provided that it meets the applicable photometric requirements of the standard.[3]

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[2] *See* https://www.fda.gov/radiation-emitting-products/home-business-and-entertainment-products/laser-products-and-instruments

[3] Koito Manufacturing Co., Ltd. – Takayuki Amma, December 21, 2005: https://isearch.nhtsa.gov/files/LEDlamp.1.html

While the Agency acknowledges that LED light sources have different physical properties when compared to halogen, incandescent, or a high-intensity discharge light source, the light emitted by integral beam headlamps utilizing any of these light sources is measurable by current laboratory test equipment and can be evaluated based on the performance requirements in FMVSS No. 108. In a laboratory setting, a photometer is used to measure, in candela, the amount of light emitted by a lighting device in a particular direction over multiple test points. This measurement can determine whether a vehicle's integral beam headlamp pattern meets the photometry requirements of FMVSS No. 108. Further, the Office of Vehicle Safety Compliance's annual test program has found evidence that LED headlamp assemblies can meet the current requirements of FMVSS No. 108,[4][5] and therefore, using LED technology in an integral beam headlamp does not *de facto* make the headlamp noncompliant.

Accordingly, regarding Soft Lights Foundation's argument that, Tesla, Ford, and Rivian "failed to petition NHTSA for amendment of existing regulations to allow use of LED technology for headlamps and has not received authorization from NHTSA," neither a petition, nor authorization, is necessarily required for a manufacturer to manufacture a vehicle that is equipped with FMVSS No. 108-compliant integral beam headlamps using LED technology. NHTSA does not "authorize" or "approve" motor vehicles or motor vehicle equipment. Under NHTSA's self-certification system, the manufacturer is legally bound to ensure their vehicles meet all applicable FMVSSs, including FMVSS No. 108.

With respect to the Soft Lights Foundation's statement that "LED headlights and Daytime Running Lights are dangerous due to the excessive glare, non-uniform luminance,

[4] See 2018 Toyota Camry – Compliance Test Report – 108-CAN-22-001: https://static.nhtsa.gov/odi/ctr/9999/TRTR-647670-2022-001.pdf
[5] See 2012 Nissan Leaf – Compliance Test Report – 108-CAN-18-013: https://static.nhtsa.gov/odi/ctr/9999/TRTR-645804-2018-001.pdf

excessive peak luminance, and square wave flicker, putting public comfort, health and safety at risk," NHTSA believes the current research supports that FMVSS No. 108 contains the appropriate requirements to address these areas. NHTSA agrees that glare can have a negative safety impact and believes FMVSS No. 108 addresses that issue. As NHTSA has stated, the requirements of FMVSS No. 108 apply to LED headlamps. Photometric requirements stated in FMVSS No. 108 Table XIX specify candela maximums over several test points to prevent excess light which can result in glare and other issues. While LED integral beam headlamps can be made to have a smaller footprint compared to lamps that use halogen or high-intensity discharge (HID) light sources, which can be perceived to be more uncomfortable at closer distances, an agency report to Congress, "Nighttime Glare and Driving Performance," stated that when viewed from more than approximately 100 feet, the size of a headlamp has little impact on discomfort and that no research has identified any impact of oncoming headlamp size on the visibility of the person experiencing glare.[6] With respect to flicker, FMVSS No. 108 requires that "modulating light from the lamp [must be] perceived to be steady burning."[7] LED integral beam headlamp systems can meet this requirement.

NHTSA also wants to express appreciation to the Petitioner for bringing to its attention health concerns that the Petitioner associates with LED headlamps. NHTSA takes these concerns seriously. NHTSA, as an agency focused on automotive safety, also recognizes the expertise of its sister agencies that are health-focused, such as the FDA.

NHTSA wants to be clear that its decision in connection with these petitions is intended to address integral beam headlamps that use LED lighting technology and does not address other

[6] Nighttime Glare and Driving Performance (2007) – https://www.nhtsa.gov/sites/nhtsa.gov/files/glare_congressional_report.pdf
[7] Koito Manufacturing Co., Ltd. – Kiminori Hyodo, November 5, 2005: https://www.nhtsa.gov/interpretations/koito2followup

headlamp types like replaceable bulb headlamps or sealed beam headlamps. FMVSS No. 108 specifies performance requirements for headlamp systems. The most common types of headlamp systems are integral beam (S10.14) and replaceable bulb (S10.15, S11) systems. The standard does not mandate a light source type for integral beam headlamps, so, as we explained above, LED light sources are permitted in an integral beam headlamp,[8] provided that the headlamp complies with the performance requirements set out in FMVSS No. 108. LED light sources are not, however, permitted in a replaceable bulb headlamp. For replaceable bulb headlamps, S11 of the standard requires that "[e]ach replaceable light source must be designed to conform to the dimensions and electrical specifications furnished with respect to it pursuant to part 564 of this chapter[.]"[9] Part 564 requires that replaceable bulb manufacturers submit to NHTSA various design specifications of the bulb. This design information is then placed in a publicly-available docket to facilitate the manufacture and use of those light sources. The design information that must be submitted is set out in Part 564 and includes information regarding the filament or discharge arc and the filament capsule. Because an LED light source lacks these components, an LED light source may not be submitted for inclusion in the Part 564 docket; and, because it cannot be submitted to the Part 564 docket, a replaceable bulb headlamp may not use an LED replaceable light source.

VII. NHTSA's Decision:

[8] FMVSS No. 108, S4 defines integral beam headlamps as "a headlamp (other than a standardized sealed beam headlamp designed to conform to paragraph S10.13 or a replaceable bulb headlamp designed to conform to paragraph S10.15) comprising an integral and indivisible optical assembly including lens, reflector, and light source, except that a headlamp conforming to paragraph S10.18.8 or paragraph S10.18.9 may have a lens designed to be replaceable."

[9] *See also* Letter from John Womack, Acting Chief Counsel, NHTSA, to Nancy Tavarez, Beitrix Industries (Aug. 30, 1995), available at https://www.nhtsa.gov/interpretations/11118 (clarifying application of Part 564 to replaceable headlamp bulbs).

In consideration of the foregoing, NHTSA does not believe that a formal investigation is warranted, and NHTSA has decided to deny Soft Lights Foundation's petitions for non-compliance orders on the subject vehicles. After full consideration of appropriate factors, Soft Lights Foundation's petitions are denied.

(Authority: 49 U.S.C. 30162(d); delegation of authority at 49 CFR 1.95 and 49 CFR 501.8)

Anne L. Collins, ANNE LOUISE COLLINS Digitally signed by ANNE LOUISE COLLINS Date: 2022.12.02 12:44:11 -05'00'

Associate Administrator for Enforcement.