Innovative automobile lighting is transforming the industry

As lighting systems for vehicles incorporate new state-of-the-art technology, lighting product designers, original equipment manufacturers (OEMs) and their suppliers, wholesalers and retailers require safer, high-performing automobile lighting options.

At UL Solutions, we can help OEMs, tier suppliers and auto tech startups new to the industry navigate the complex safety, security, quality, performance and sustainability challenges related to both current industry expectations and new challenges.

Innovative LED technologies bring new challenges

Technology innovation affects everything from manufacturing processes to vehicle electronics and supporting infrastructure, so traditional regulations combine with new requirements to expand the compliance landscape.

Broad adoption of LEDs, emerging technologies and new lighting requirements are driving the adoption of new automotive lighting standards. IEC 60809 ¬– Lamps and light sources for road vehicles – Dimensional, electrical and luminous requirements is the standard for traditional filament and discharge lamps. LED light sources are not covered by IEC 60809 and must now meet new and different ultraviolet (UV) radiation, maintenance, electromagnetic compatibility (EMC) and rated lifetime requirements. The most recent amendment, AMD 2, to IEC 60810 covers performance requirements for lamps, light sources and LED packages for road vehicles.

LED board designs are shrinking to save costs and increase reliability. As these electronics shrink, designers often need to increase the operating frequency. Doing so can increase radiated emissions that, in turn, increase the risk of interference with other automobile features, such as the radio, Wi-Fi, Bluetooth, etc.

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Working with UL Solutions

- UL Solutions, a world leader in lighting safety and performance testing and certifications, is the partner you can trust to be your single-source provider for your automotive lighting products. UL Solutions has many laboratories which can conduct performance and reliability testing capabilities, and we continue to expand our service scope.
  - The U.S. Federal Motor Vehicle Safety Standard 108 (FMVSS 108) for Lamps, Reflective Devices and Associated Equipment is administered by the U.S. Department of Transportation's National Highway Traffic Safety Administration.
  - The Canada Motor Vehicle Safety Standard 108 (CMVSS 108) for Lamps, Reflective Devices and Associated Equipment is administered by Transport Canada Motor Vehicle Safety. CMVSS 108 is very similar to FMVSS 108, except for provisions about daytime running lamps (DRLs) and European headlamps.
- For decades, UL Solutions has partnered with the entire lighting supply chain, giving us a strong basis for providing the automotive market with support for compressed design and development engineering, Production Part Approval Process (PPAP) timelines and other industry concerns that involve complex timing.

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More about FMVSS and CMVSS

The U.S. primary standard for automotive lighting is Federal Motor Vehicle Safety Standard (FMVSS) 108 for lamps, reflective devices and associated equipment. The FMVSS:

- Is administered by the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA).
- Specifies design, construction, performance and durability requirements for motor vehicles and regulated automobile safety-related components, systems and design features.
- Applies to passenger cars, multipurpose passenger vehicles, trucks, buses, trailers (except pole trailers and trailer converter dollies) and motorcycles.

The primary Canadian standard for automotive lighting is Canada Motor Vehicle Safety Standard 108 (CMVSS 108), which is very similar to FMVSS 108. The primary differences are:

- CMVSS 108 requires DRLs on all vehicles made since Jan. 1, 1990, while FMVSS 108 permits but does not require DRLs.
- CMVSS 108, through an adjunct called CMVSS 108.1, permits European headlamps, while FMVSS 108 prohibits them.

Note that U.S. and Canadian standards diverge from the United Nations Economic Commission for Europe (UNECE) standards used in most other countries worldwide, with differences in technical provisions, terminology, requirements and format. Each European standard deals with only one type of lighting device, while the single U.S. and Canadian standards regulate all lighting and reflective devices.

UL Solutions

UL Solutions lighting test centers

Some specific lighting testing capabilities you'll find at our laboratories include:

- Photometry
- Vibration
- Environmental
- Thermal shock
- Salt, fog and cyclic corrosion
- Dust
- Moisture/rain spray
- Chemical resistance
- Vibration at temperature
- Mechanical shock
- Exterior forward and signal lighting
- Light source modules
- Electromagnetic compatibility (EMC) testing
- And more

For the many different light sources, we use advanced measurement and test equipment that includes:

- High-speed Type A goniophotometers
- Electro-dynamic vibration tables
- Thermal shock chambers
- Heat, humidity, water penetration and salt test chambers

Contact us to learn more about our performance and reliability testing capabilities.

Visit UL Transportation Lighting for more information.

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