



SURFACE VEHICLE RECOMMENDED PRACTICE

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(R) Terminology - Motor Vehicle Lighting

RATIONALE

- Definitions revised & clarified from ballot
- 2.1 Cross Reference Matrix corrected
- 3.1.7 Comma removed
- 3.2.3 Revised Aiming Screws definition
- 3.2.5 Revised Cutoff definition
- 3.2.6 DRL Telltale (Indicator added)
- Removed 3.2.8 "Full Adaptive Forward Lighting System" per comment that 3.2.8 is confusing and incomplete and is covered by 3.2.2
- 3.2.13 Optical Center definition clarified
- 3.2.16 Turn Signal Indicator definition revised
- 3.3.4 Revised "Light Emitting Surface" for clarity and ballot comments
- 3.3.5 Revised "Effective Projected Luminous Lens Area" definition for clarity and ballot comments
- 3.3.9 Signal lamp ratio definition revised per ballot comments
- 3.4.1 Revised Back-up function definition
- 3.4.2 Revised Back-up definition
- 3.5.3 "Side Repeaters" eliminated in definition and changed to "Side Direction Indicators"
- 3.6.1 Parking lamps removed from DRL list of lamps.
- 3.6.5 Front Position added to title and definition revised to be consistent with the tail lamp definition
- 3.6.6 "Rear Position" added to Tail Light title and definition revised per ballot comments

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- 3.7.1 "Courtesy" added to Puddle Lamp title
- 3.8.1 Reversing added to Back Up title

1. SCOPE

This SAE Recommended Practice provides definitions of common terms used in SAE Documents pertaining to motor vehicle lighting. It covers not only basic lighting terms but also terms which identify major segments of technical reports.

2. REFERENCES

2.1 Cross Reference Matrix

| Section Name | Description | Section | Page |
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| 3.1 Light Source | Light Source Definition Accurate Rated Light Source Average Rated Lab Life Design Life Design Voltage Filament Filament Bulb Filament Rotation | Gaging Standard Light Emitting Diode (LED) LED Light Source Rated Voltage Replaceable Bulb Seasoned Light Source Test Voltage | 3.1.1 – 3.1.16 3 - 4 |
| 3.2 Lamp | Lamp Definition Adaptive Forward Lighting System Headlamp Aiming Screws Centroid of Lens Area Cutoff -Daytime Running Lamp Telltale Telltale (Indicator) Direct Reading Indicator Integral Beam Headlamp Lamp Area Integral Beam Headlamp | Mechanically Aimed Multiple Lamp Arrangement Optical Axis Optical Center Optically Combined Remote Reading Indicator Turn Signal Pilot Indicator Warning Light | 3.2.1 – 3.2.17 5 - 6 |
| 3.3 Photometry Terms | Aiming Plane & Reference Plane Axis of Reference Light Emitting Surface -Effective Projected Luminous Lens Area | H-V Axis Light Emitting Surface Ratio-License Lamps Ratio-Signal Lamps | 3.3.1 – 3.3.9 6 - 7 |
| 3.4 Signaling devices | Signaling Device Definition Backup Lamp(s) (function) -Center High Mounted Stop (function) Lamps (CHMSL) Stop, Signal Lamp (function) | -Rear Combination Lamps (RCL) Turn Signal Lamps | 3.4.1 – 3.4.8 7 - 8 |
| 3.5 Supplemental Signaling Devices | Supplemental Definition Front Cornering Lamps (vehicles) Rear Cornering Lamps | -Side Turn Signal (rear & side facing, long | 3.5.1 – 3.5.3 8 |

| Section Name | Description | Section | Page |
|--|---|--|---------------------------|
| 3.6 Marking Devices | Marking Device Definition -Daytime Running Light Lamps (DRL) Clearance Lamps Identification Lamps Side Marker Lamps | -Parking (Front Position) Lamps Rear Fog Lamps Reflex Reflectors Tail (Rear Position) Lamps | 3.6.1 – 3.6.9 8 - 9 |
| 3.7 Illumination Devices | Illumination Device Definition License Plate Lamp(s) Puddle (Courtesy) Lamps Side Facing Cargo Lamps | Spot Lights Rear Facing Cargo Lamp(s) | 3.7.1 – 3.7.5 9 -10 |
| 3.8 Road Illumination Devices | Back Up Lamps Headlamps: -Low (Lower) Beam -High (Upper) Beam | | 3.8.1 – 3.8.7 10 |
| 3.9 Supplemental Road Illumination Devices | Auxiliary High Beams Front Cornering Lamps Front Fog Lamps Rear Cornering Lamps | | 3.9.1 to 3.9.4 10 - 11 |
| 3.10 Test Fixture | | | 3.10 11 |
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| 3.12 Unit | | | 3.12 11 |
| 4.0 Technical Report Content | Guidelines Requirements | | 4.1-4.2 11 |
| 5.1 Marginal Indicia | | | 5.1 11 |

FIGURE 1 - DEFINITION MATRIX

3. DEFINITIONS

3.1 LIGHT SOURCE TERMS

3.1.1 Light Source

One or more elements emitting visible radiation, which may be assembled with one or more transparent envelopes and with a base for mechanical and electrical connection which may also be the extreme outlet of a light-guide, as part of a distributed lighting or light-signaling system.

3.1.2 Accurate Rated Light Source Unit, Bulb

A seasoned light source operated at design mean spherical luminous intensity and having its light source(s) positioned within strict tolerances as specified in the applicable standard.

3.1.3 Average Rated Lab Life

Samples obtained from production runs are tested in laboratories over long periods of time at their specified test voltage. It is meant to partially describe a manufactured product's life recognizing that individual lifetimes vary greatly. It is not the same as service life which is generally shorter due to environmental conditions such as vibration, voltage fluctuations and temperature.

3.1.4 Design Life

An operational time objective in hours of a light source at the test voltage.

3.1.5 Design Voltage

The voltage used for design purposes.

3.1.6 Discharge Bulb or Discharge Lamp

A device in which light is produced by an electric discharge through a gas, a metal vapor, or a mixture of gases and vapors.

3.1.7 Filament

A wire formed or wound into a coiled body which is heated to incandescence when voltage is applied.

3.1.8 Filament Bulb or Filament Lamp

Device in which light is produced by means of one or more filaments heated to incandescence by the passage of an electric current.

3.1.9 Filament Rotation

Any non-parallelism of either coil with respect to the centerline of design nominal filament location or any additional width of the end view of the filament in excess of the outside diameter of the first full turn.

3.1.10 Gaging Standard

A gage to calibrate filament location measuring equipment; the gage is capable of measuring to one-tenth the stated tolerance of the filament for the applicable bulb design requirement.

3.1.11 Light-Emitting Diode (LED)

A pn junction semiconductor device that emits incoherent optical radiation when forward biased. The optical emission may be in the ultraviolet, visible, or infrared wavelength regions. (ANSI definition)

3.1.12 LED Light Source

A light source made up of one or more LED's that emit visible radiation. An LED light source may or may not require an additional electronic control unit and may or may not require additional provisions for thermal management.

3.1.13 Rated Voltage

The nominal circuit or vehicle electrical system voltage classification. (Example: 12 V headlamp)

3.1.14 Replaceable Bulb

A light source with related envelope and mounting base which is removable from the head lamp or signal lamp for the purpose of replacement.

3.1.15 Seasoned Light Source, Bulb

A light source unit energized at design voltage (or current for LEDs) for 1% of its average rated lab life or 10 h maximum, whichever is shorter.

3.1.16 Test Voltage

The specified voltage and tolerance to be used when conducting a test.

3.2 LAMP TERMS

3.2.1 Lamp

A divisible assembly which contains a light source unit(s) and generally an optical system such as a lens, a reflector, or both and which provides a lighting function(s).

3.2.2 Adaptive Forward Lighting System (AFS)

A forward lighting system intended to adapt a forward lighting device's beam pattern to improve driver visibility based on inputs such as vehicle speed, road geometry and/or environmental conditions. The system is comprised of one or more forward lighting devices and the entirety of components required to control and operate the devices.

3.2.3 Aiming Screws

Screws with self-locking features used for adjusting horizontal and/or vertical aim and to retain the unit in the proper position.

3.2.4 Centroid of a Lens Area

The geometric centroid of a plane area which is perpendicular to the axis of reference of the vehicle and upon which the projection of the light-emitting lens area falls.

3.2.5 Cutoff

A visual/optical aiming cue in the low beam that marks a separation between areas of higher and lower luminance.

3.2.6 Daytime Running Lamp Telltale (Indicator)

An illuminated indicator to advise the driver that only the vehicle's Daytime Running Light Function is active, not the vehicle's headlamps and associated conspicuity lights. (reference 3.6)

3.2.7 Direct Reading Indicator

A device that is mounted in its entirety on a headlamp or headlamp aiming or headlamp mounting equipment, is part of a VHAD, and provides information about headlamp aim in analog or digital format.

3.2.8 Integral Beam Headlamp

A headlamp, other than a standardized sealed beam headlamp or a replaceable light source headlamp, comprising an integral and indivisible optical assembly including lens, reflector and light source.

3.2.9 Lamp Area

Minimum Luminous Intensities for signal lamps are based on the Effective Light Emitting Surface (3.3.4) and Effective Projected Luminous Lens Area (3.3.5). The three levels of luminous intensity are for lamp sizes that are less than 225cm², 225cm² to 450cm² and greater than 450cm².

3.2.10 Mechanically Aimed Headlamp

A headlamp having three pads on the lens, forming an aiming plane or an aiming ring, the aiming plane or aiming ring being used for laboratory photometric testing and for inspecting the aim of the headlamp when installed on the vehicle.

3.2.11 Multiple Lamp Arrangement

An array of two or more separate lamps on one side of the vehicle which operate together for a particular lighting function.

3.2.12 Optical Axis (Lamp Axis)

The optical axis is a line formed by the intersection of the horizontal and vertical planes through the light source center (or the centroid of multiple LED arrays) which possibly may not be center of multiple LED array and parallel to the vehicle longitudinal axis for front or rear mounted lamps, or perpendicular to the vehicle longitudinal axis for side mounted lamps.

NOTE: If the optical axis of a headlamp is not at the geometric center of the lens, then the location will be indicated by manufacturer on the headlamp.

3.2.13 Optical Center

The optical center is the point of the intersection of the optical axis with the external surface of the lens. To measure spacing between adjacent lamp functions with more than one light source, use the closest optical center(s). When multiple compartments and lamps are photometered together, the H-V axis shall intersect the midpoint between their light sources.

3.2.14 Optically Combined

Lamps having separate light sources or a single light source operating under different conditions, (for example optical, mechanical, electrical differences) totally or partially common optically functional lens area.

3.2.15 Remote Reading Indicator

A device that is not mounted in its entirety on a headlamp or headlamp aiming or headlamp mounting equipment, but otherwise meets the definition of a direct reading indicator.

3.2.16 Turn Signal Pilot Indicator (Telltale)

An illuminated indicator to advise the driver that the vehicle's turn signal is operating..

3.2.17 Warning Light

An adequately visible light used for signaling to vehicle operators, road users and pedestrians alike of an impending danger. Specific colors, intensities and flash modes may be used to indicate the right of way or emergency.

3.3 PHOTOMETRY TERMS

3.3.1 Aiming Plane

A plane defined by the surface of the three aiming pads on the headlamp lens or by the forward surface or an aiming ring.

3.3.2 Aiming Reference Plane

A plane which is perpendicular to the longitudinal axis of the vehicle and tangent to the forward most aiming pad on the headlamp or, where such a plane would intersect the surface of the lens between the aiming pads, a plane which is perpendicular to the longitudinal axis of the vehicle and is located forward of and as close to the lens as possible without causing interference.

3.3.3 Axis of Reference

The characteristic axis of the lamp for use as the direction of reference ($H = 0^\circ$, $V = 0^\circ$) for angles of field for photometric measurements and for installing the lamp on the vehicle.

3.3.4 Light Emitting Surface

All or part of the exterior surface of the transparent or translucent lens that encloses the light source or signaling device and allows conformance with photometric and colorimetric requirements.

3.3.5 Effective Projected Luminous Lens Area

The area of the (orthogonal) projection on a plane perpendicular to the lamp axis of that portion of the "light emitting surface" that directs light to the photometric test pattern. And does not include mounting hole bosses, reflex, reflector area, beads or rims that may glow or produce small areas of increased intensity as a result of uncontrolled light from small areas (0.5 degrees radius around the test point).

3.3.6 H-V Axis

A line from the center of the principle light source (or the centroid of multiple LED arrays) formed by the intersection of the horizontal (H) and vertical (V) planes which intersect the light source center and are perpendicular to the test screen. When multiple compartments are photometered at the same time, the H-V axis shall intersect the midpoint between the light sources parallel to the applicable longitudinal or transverse vehicle axis.

3.3.7 Light Emitting Surface

All or part of the exterior surface of the transparent or translucent lens that encloses the light source or signaling device and allows conformance with photometric and colorimetric requirements.

3.3.8 Ratio - License Lamps

The measurement of the ratio of the two highest test points to the two lowest test points.

3.3.9 Ratio - Signal Lamps

In an "Optically Combined Lamp", signal lamp ratio is the comparison of intensities of the major and minor functions at a single test point. Examples are stop/tail and turn signal/park ratio.

3.4 Signaling Devices

A vehicle lighting device providing operator intention; these lamps include the following:

3.4.1 Backup Function

A lighting device used to provide illumination behind the vehicle and to provide a warning signal to pedestrians and other drivers when the vehicle is backing up (reversing) or is about to back up.

3.4.2 Backup Lamp(s) (Reversing)

Lamp or lamps providing the backup function; more commonly referred to as a "Reversing Lamp" in ECE regulations. (Also listed as a road illumination device).

3.4.3 Center High Mounted Stop Lamp (CHMSL)

An additional lamp of the stop lamp system, giving a brake actuated steady warning light to the rear of the vehicle. The CHMSL is intended to provide a signal to both the operator of the following vehicle as well as through the intervening vehicle.

3.4.4 Rear Combination Lamp (RCL)

A common rear lamp body that may include any or all combination of functions such as tail, stop, signal, backup, rear / side reflex and side marker.

3.4.5 Stop Signal Function

A steady light to the rear of a vehicle to indicate the intentional deceleration or stopping of a vehicle.

3.4.6 Stop Lamps

A device providing the stop signal function.

3.4.7 Turn Signal Function

A flashing light to the front, side and rear of a vehicle on the side toward which a change of direction is intended.

3.4.8 Turn Signal Lamps

A device providing the turn signal function; also referred to as "Direction Indicator" in ECE regulations.

NOTE: Also see 3.5.3, Side Turn Signal. (Referred to as "Side Repeater" in ECE regulations)

3.5 SUPPLEMENTAL SIGNALING DEVICES

A lighting device intended to supplement standard lighting functions. These lamps include the following:

3.5.1 Front Cornering Lamps

See Section 3.9

3.5.2 Rear Cornering Lamps

See Section 3.9

3.5.3 Side Turn Signal Lamps

A lighting device normally mounted on the side of a vehicle at or near the front, and used as part of the turn signal system to indicate a change in direction by means of a flashing warning signal on the side toward which the vehicle operator intends to turn or maneuver. Also referred to as a "Side Direction Indicators" in ECE regulations.

3.5.3.1 Rear facing side turn signal lamps

A side turn signal lamp incorporated into a rearward facing surface on the side of a vehicle.

3.5.3.2 Side facing side turn signal lamp

A side turn signal lamp incorporated in an outboard facing surface on the side of a vehicle.

3.5.3.3 Side Turn Signal Lamp for Long Vehicles

A side turn signal lamp for use on vehicles 12 m or more in overall length.

3.6 MARKING DEVICES

The following lamps signal the presence of a vehicle:

3.6.1 Daytime Running Light Function (DRL)

Steady operating light function that is used to improve the conspicuity of a vehicle from the front when the regular headlamps are not required for driving. DRL function can be achieved with low or high beam headlamps, turn signal lamps as well as dedicated lamps.