SAE International	SURFACE VEHICLE RECOMMENDED PRACTICE	J387	REV. JAN2007
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(R) Terminology—Motor Vehicle Lighting

RATIONALE

- Move those definitions from J1383 to J387 that are “common terms used in SAE Technical Reports”.
- Removed common definitions for “Light” and “Device”.
- Spelling errors corrected 3.1.14 (measuring), 3.3.1 (ratio), 3.1.10 (specified and conducting), 3.2 (contains and reflector) and 3.5.4 (without).
- Examples or clarification added to 3.1.3 (An example would be…), 3.1.5 (LED), 3.2.1 (“lighted sections” added), 3.2.11 (DLS), 3.3.1 (Examples are…), 3.4.1 (DRL), 3.5.1 (Another common term…) and 3.5.5 (Definition added for “visually/optically aimable headlamp”.)
- Terms such as reciprocally incorporated lamps, grouped lamps and single lamps were not included since they are not currently used in SAE technical papers.
- A new definition for “Designed to Comply” was not included because there is no current consensus for the change and for its wording.
- 3.1.14 Gaging Standard re-written for clarity and reviewed at Anaheim.
- 3.3.3 The “Signal Lamp Pilot Indicator” name is used since FMVSS references J588e, Sept. ’70 which uses this term. A reference to “Tell Tale” has been noted.

Note paragraph numbers are relative to the last version. Document completely revised.

- Scope, “Technical Reports” changed to “Documents”.
- 3.2.3b the line was changed from “…partially common on two or more lamp functions” to “…partially common for two or more lamp functions.”
- 3.2.8 definition of H-V axis was not changed because this definition is related to the lamp (product) not the vehicle plus the lamp is not photometered on the vehicle. See the definition for “Optical Axis”
- 3.2.8 SAE standards refers to “photometering a lamp” not reading or testing, therefore in the definition for H-V Axis, I changed the definition from read to photometered.
- 3.3 I agree side turn signal is a lamp that supplements the primary signal.
- 3.3.3 eliminated the word “indicator” at the end of the second sentence.
- 3.4 Cargo was placed in “Other Illumination Devices” and DRL moved to “Other Luminance Devices”.
- 3.4 Reflex Lamps changed to Reflex reflectors and placed under “Signal and Marking, Lighting Devices”
- 3.5 Road Illumination Devices was used in the new format. Cornering lamps were placed in Supplemental Illumination Devices.
- 3.5 The terms Upper and Lower Beam are used in SAE documents and referenced in the definition of High and Low Beam.

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- 3.5.1 and 3.5.2 Terms such as “passing beam” and “driving beam” were not included since they are not currently used in SAE technical papers as Marcin earlier agreed not to include definitions for “reciprocally incorporated lamps, grouped lamps and single lamps”. Since most of the US population lives in urban areas, driving beam could easily be construed as the low beam since it is the beam used most of the time. Furthermore, high beam is more commonly used in Europe than driving beam and the term driving beam would be confusing to most except automotive regulators and engineers. And although “dipped beam” is used in Europe more commonly than “passing beam”, the term low beam could logically be concluded to describe the dipped beam when most of the world understands the term high beam.
- 3.5.6 Adaptive Forward Lighting System is the current terminology used in SAE J2591. When J 2591 is changed to “Front Lighting” then this definition would be changed.
- Note document has been completely revised with new headings that agree with SAE terminology and reflect the changes / corrections most recently noted during balloting. These new categories have eliminated confusion by some as to a lamp’s proper category. These categories are as follows:

1.	Scope	3.7	Illumination Devices	5.	Notes
2.	References	3.8	Road Illumination Devices		
3.	Definitions	3.9	Supplemental Road Illumination Devices		
3.1	Light Source	3.10	Test Fixtures		
3.2	Lamp	3.11	Switches and Flashers		
3.3	Photometry Terms	3.12	Unit		
3.4	Signaling Devices	4.	Technical Report Content		
3.5	Supplemental Signaling Devices	4.1	Guidelines		
3.6	Marking Devices	4.2	Requirements		

- Note under the above categories that the definitions have been placed in alphabetical order to further aid the user in finding a definition.

Every attempt has been made to make these definitions clear, precise and accurate using only SAE lighting terminology found in SAE documents and technical reports.

11/29/06 – The following additional changes / corrections were made from comments:

- In paragraph 3.2.3, the following phrase was removed, “An example: The axis of reference for lamps mounted on the front and rear of a vehicle is the longitudinal axis of the vehicle” because this is not an example of a centroid.
- In paragraph 3.2.12 and 3.3.6, “filament center” was replaced with “light source center” because not all light sources have filaments.
- In paragraph 3.3.3, spelling error for “angles” corrected.
- In paragraph 3.3.4 and 3.3.7 “—“ was deleted in title.
- In paragraph 3.3.9, “turn” was added to read turn signal/park ratio.
- In paragraph 3.4, “vehicle intention” changed to “operator intention”.
- Definition for “Parking lamp” revised in paragraph 3.6. (“by a steady burning, low intensity light” added”).
- Reference to license lamp deleted from 3.6.

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

There are no referenced publications specified herein.

3. DEFINITIONS

3.1 Light Source

An emitter of visible radiant energy.

3.1.1 Accurate Rated Light Source Unit, Bulb

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

3.1.2 Design Life

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

3.1.3 Design Voltage

The voltage used for design purposes.

3.1.4 Discharge Bulb—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.

3.1.5 Filament Bulb—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.

3.1.6 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.

3.1.7 Gaging Standard

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

3.1.8 Light-Emitting Diode (LED)

An indivisible, discrete light source unit containing a semiconductor junction in which visible light is non-thermally produced when a forward current flows as a result of an applied voltage.

3.1.9 Light Source Unit, Bulb

A functionally indivisible assembly which contains a light source and which is normally used in a lamp. An example is an incandescent bulb or a light emitting diode.

3.1.10 Rated Average Lab Life

An average life in hours which is obtained by laboratory life testing of bulbs at the specified test voltage over a long period of production time. It is meant to partially describe a manufactured product 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.

3.1.11 Rated Voltage

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

3.1.12 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.

3.1.13 Seasoned Light Source Unit, Bulb

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

3.1.14 Test Voltage

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

3.2 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.

3.2.1 Adaptive Forward Lighting System (AFS)

A forward lighting system intended to modify a forward lighting device's beam pattern to improve driver visibility based on inputs such as vehicle speed, road geometry and/or environmental conditions.

3.2.2 Aiming Screws

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

3.2.3 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.

3.2.4 Cutoff

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

3.2.5 Daytime Running Lamp Telltale (Indicator)

An illuminated indicator that provides a visual signal to advise the driver that only his DRLs are on. (reference 3.6)

3.2.6 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.

3.2.7 High Beam (Upper Beam)

A beam intended primarily for distant illumination and for use when not meeting or following other vehicles.

3.2.8 Low Beam

A beam intended to illuminate the road ahead of the vehicle when meeting or following another vehicle.

3.2.9 Mechanically Aimeable 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.

3.2.10 Multiple Compartment Lamp

A lamp which provides its lighting function using two or more separately lighted sections which are joined by one or more common parts, such as a housing or lens.

3.2.11 Multiple Lamp Arrangement

An array of two or more separate lamps on each 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) 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. For a lamp function with more than one light source, use the closest optical center for lamp spacing measurements. 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

A lamp shall be deemed to be "optically combined" if both of the following conditions exist:

a. It has a single or two filament light source or two or more separate light sources that operate in different ways and

b. It's optically functional lens area is wholly or partially common for two or more lamp functions.

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 that provides a visual signal to advise the driver that his turn signals are on.

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°, V = 0°) for angles of field for photometric measurements and for installing the lamp on the vehicle.

3.3.4 Effective Light Emitting Surface

The portion of a lamp that directs light to the photometric test pattern, and does not include transparent lenses, 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 an area of ½° radius around a test point.

3.3.5 Effective Projected Luminous Lens Area

The area of the orthogonal projection of the effective light-emitting surface of a lamp on a plane perpendicular to a defined direction relative to the axis of reference. Unless otherwise specified, (i.e. visibility angles), the direction is coincident with the axis of reference.

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”, ratio refers to the intensity at a test point of the major function to the same test point of the minor function. 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:

- Stop—Lamps giving a steady light to the rear of a vehicle to indicate the intention of the operator of a vehicle to stop or diminish speed by e braking.
- Turn Signal—The signaling elements of a turn signal system which indicate an intention to turn by giving a flashing light on the side toward which the turn will be made.

- 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.
- Backup—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 or is about to back up. (Also listed as a road illumination device)

3.5 Supplemental Signaling Devices

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

- Front Cornering—See Section 3.9
- Rear Cornering—See Section 3.9
- Side Turn Signal—A lighting device normally mounted on the side of a vehicle at or near the front, and used as part of the trun 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.

3.6 Marking Devices

- Parking (Front Position)—Lamps used to indicate the presence and width of a vehicle by a steady burning, low intensity light when viewed from the front.
- Tail (Rear Position)—Lamps used to indicate the presence and width of a vehicle by a steady burning, low intensity light when viewed from the rear.
- Sidemarker—Lighting devices used to indicate the presence and length of the vehicle by a steady burning, low intensity light when viewed from the side.
- Clearance—A Lamp that provides light to the front or rear of a vehicle to indicate the overall width and height.
- Identification—A group of three lamps in a horizontal row which provide light to the front or rear or both, to identify vehicles 2032 mm or more in overall width.
- Reflex Reflectors—Devices that are used on vehicles go give an indication of presence to an approaching driver by reflected light from the headlamps on the approaching vehicle.
- Rear Fog/Tail—A lighting device providing a continuous red light of higher intensity than a tail lamp fro the purpose of marking the rear of a vehicle during fog or similar conditions of reduced visibility.
- Daytime Running Lamp (DRL)—Steady burning lamps that are used to improve the conspicuity of a vehicle from the front and front sides when the low beam headlamps are not required for driving.

3.7 Illumination Devices

Lamps that provide illumination to an area are:

- Cargo—A supplemental lamp mounted on the exterior of a vehicle weighing under 5443 kg (12 000 lb) GVWR for the purpose of providing illumination to load and unload cargo in an environment of otherwise insufficient light.
- License Lamp—A device that illuminates the license plate on the rear of a vehicle.
- Spot Light—Lamps which are designed to be installed on a motor vehicle or marine pleasure craft and which provide a substantially collimated beam of light that is capable of being readily aimed as desired by the user for non-driving purposes.

3.8 Road Illumination Devices

Lamps that provide illumination on the road. These lamps include the following:

- Backup— 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 or is about to back up.
- Headlamps—A lighting device providing an upper and / or lower beam designed to provide illumination forward of the vehicle.