The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

An American National Standard

SAE J599

REV. AUG1997

Issued 1981-05
Revised 1997-08

Superseding J599 MAY81

(R) Lighting Inspection Code

1. Scope—This code is intended only for the inspection and maintenance of lighting equipment on motor vehicles that are in use.

2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J581—Auxiliary Driving Lamps
SAE J583—Front Fog Lamps
SAE J600—Headlamp Test Machines
SAE J602—Headlamp Aiming Device for Mechanically Aimable Headlamp Units
SAE J2338—Recommendations of the SAE Task Force on Headlamp Mounting Height

2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J582—Auxiliary Low Beam Lamps
SAE J1383—Headlamps

2.2.2 ANSI PUBLICATIONS—Available from American National Standards Institute Inc., 11 West 42nd Street, New York, NY 10036.

ANSI D7-1939—American National Standard Code for Inspection Requirements for Motor Vehicles

TO PLACE A DOCUMENT ORDER; (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS http://www.sae.org

3. Definitions

3.1 Headlamp—A lighting device providing a high and low beam for the purpose of illumination forward of the vehicle.

3.2 Sealed Beam Headlamp—An integral and indivisible optical assembly with the name “Sealed Beam” molded in the lens.

3.3 Replaceable Bulb Headlamp—A divisible optical assembly in which the light source and/or other parts may be removed and replaced.

3.4 High Beam—A beam intended primarily for distant illumination and for use on the open highway when not meeting other vehicles.

3.5 Lower Beam—A beam intended to illuminate the roadway and near berm areas ahead of the vehicle, without causing undue glare to other drivers.

3.6 Mechanically Aimable Headlamp—A headlamp having

a. Three raised pads on the lens forming a plane (the aiming plane)
b. An integral Vehicle Headlamp Aiming Device (VHAD), for the purpose of adjusting the aim of the headlamp in a laboratory test or on a motor vehicle.

3.7 Symmetrical Beam—The light pattern produced by a headlamp in which the left and right halves of the pattern are symmetrical, (or nearly so), about the center of the beam.

3.8 Asymmetrical Beam—The light pattern produced by a headlamp in which the left and right halves of the pattern are not symmetrical about the center of the beam. Most lower beams are asymmetrical.

4. Headlamp Aim and Inspection of Aim

4.1 Equipment—It is recommended that mechanically aimable headlamps having raised aiming pads be aimed and inspected for aim by mechanical aimers.

Headlamp aiming and inspection can also be accomplished by visual means. This is done on a screen located at a distance of 7.6 m (25 ft) ahead of the headlamps or on the screen of an optical headlamp testing machine. Headlamps with beam patterns designed to be visually aimed are marked with the symbol “VOL” or “VOR” based on whether the left or right side of the beam pattern is visually aimed.

4.1.1 The mechanical aimer used shall conform to the requirements of SAE J602. The device shall be in good repair, calibrated, and used according to the manufacturer’s instructions.

4.1.2 If a screen is used, it should be of adequate size with a matte-white surface well shaded from extraneous light and properly adjusted to the floor area on which the vehicle stands. Provisions should be made for moving the screen or its vertical centerline so that it can be aligned with the vehicle axis. In addition to the vertical centerline, the screen should be provided with four laterally adjustable vertical tapes and two vertically adjustable horizontal tapes. The four movable vertical tapes should be located on the screen at the left and right limits called for in the specification with reference to centerlines ahead of each headlamp unit. The headlamp centerlines shall be spaced either side of the fixed centerline on the screen by ½ the lateral distance between the light source centers of the pertinent headlamps. The horizontal tapes should be located on the screen at the upper and lower limits called for in the specifications with reference to the height of lamp centers and the plane on which the vehicle rests, not the floor on which the screen rests. See Figure 1.

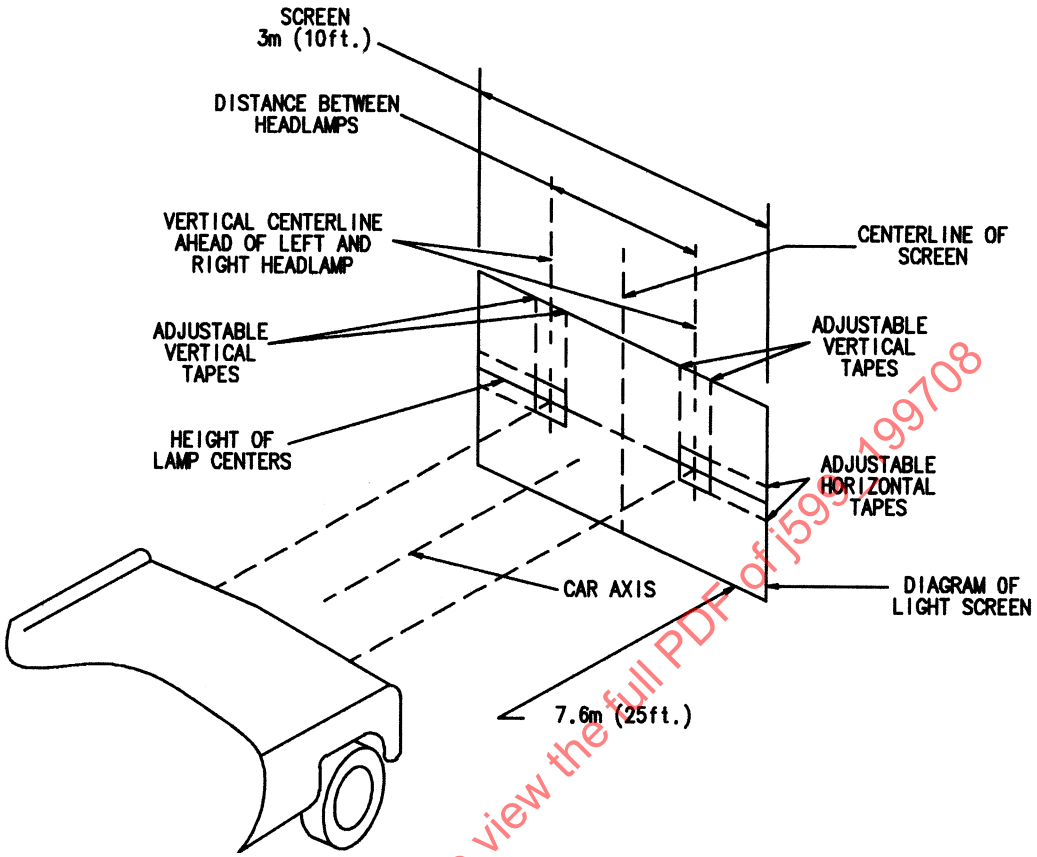

FIGURE 1—ALIGNMENT OF HEADLAMP AIMING SCREEN

4.1.3 The Headlamp Testing Machine used shall conform to the requirements of SAE J600. The device shall be in good repair, calibrated, and used according to the manufacturer's instructions, shall be capable of aiming the lamp to the manufacturer's specifications.

4.2 Preparation for Headlamp Aim or Inspection—Before checking beam aim, the inspector shall:

4.2.1 Remove ice or mud from under fenders.

4.2.2 Set tire inflation pressures to the values specified on the tire sidewall or information label.

4.2.3 Check car springs for sag or broken leaves.

4.2.4 See that there is no load in the vehicle other than the driver.

4.2.5 Check functioning of any automatic vehicle leveling systems and specific manufacturer's instructions pertaining to vehicle preparation for headlamp aiming.

4.2.6 Clean lenses and aiming pads.

4.2.7 Check for bulb burnout, broken mechanical aiming pads, and proper beam switching.

4.2.8 Stabilize suspension by rocking vehicle sideways.

4.2.9 After the previous adjustment, measure the vertical height of the center of the headlamp from the ground. This dimension will be required for comparison to Table 1.

4.3 Headlamp Aim Adjustment for Service Facilities

4.3.1 The following aim adjustment requirements are to be followed by dealers, service stations, and others who do headlamp adjusting.

4.3.2 It is recommended that mechanically aimable headlamps be aimed using mechanical aimers (see 3.1). The aimers shall be calibrated for accuracy and shall be compensated for the slope of the floor in the aiming area.

4.3.3 The Nominal vertical aim position on lower beam headlamps shall be adjusted based on the headlamp mounting height, from the ground to the light source center of the headlamp, according to Table 1.

TABLE 1—VERTICAL BEAM AIM GUIDELINEES

Headlamp (centerline) Mounting Height	Nominal Vertical Aim	Aim Inspection Limits for Vertical Aim
56 to 90 cm (22 to 36 in)	0 Vertical	10 cm (4 in) Up to 10 cm (4 in) Down
90 to 120 cm (36 to 48 in)	5 cm (2 in) Down	5cm (2 in) Up to 15 cm (6 in) Down
120 to 140 cm (48 to 54 in)	6.4 cm (4 in) Down	4 cm (1.5 in) Up to 16.5 cm (6.5 in) Down

4.3.4 MECHANICAL AIMING

4.3.4.1 The correct mechanical aim for high beam is 0-0. The mechanical aim for low beam shall be adjusted per 4.3.3.

4.3.4.2 Headlamps with plastic headlamps shall be "off" whenever mechanical aimers are attached.

4.3.4.3 If a headlamp being serviced is not so aimed, the aim shall be corrected to 0-0.

4.3.5 VISUAL AND HEADLAMP TESTING MACHINE AIMING

4.3.5.1 High-beam headlamps are aimed so that the center of the high-intensity zone is located at the horizontal and straight ahead vertically. (See Figure 2.)

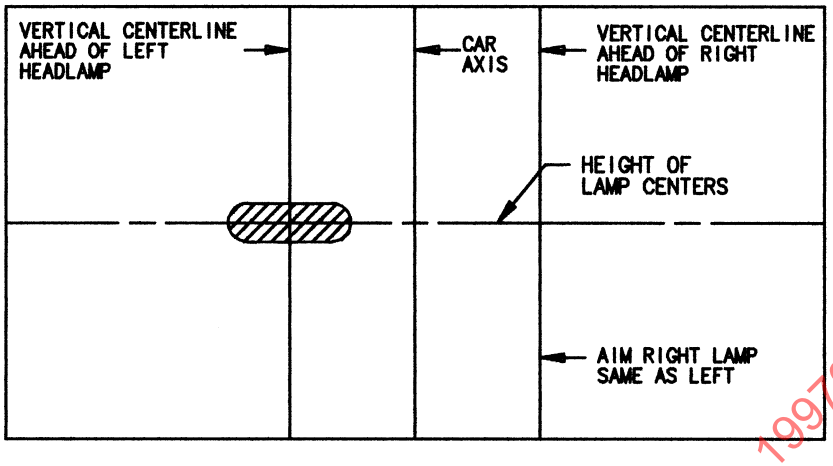

FIGURE 2—HIGH-INTENSITY ZONE (SHADED AREA OF A PROPERLY AIMED UPPER BEAM ON THE AIMING SCREEN 7.6 m (25 ft) IN FRONT OF VEHICLE

4.3.5.2 Low beam headlamps are aimed so that the top edge (the cutoff) of the high-intensity zone is at the vertical location in 4.3.3, and the left edge of the high-intensity zone is at the vertical centerline of the headlamp. (See Figure 3.)

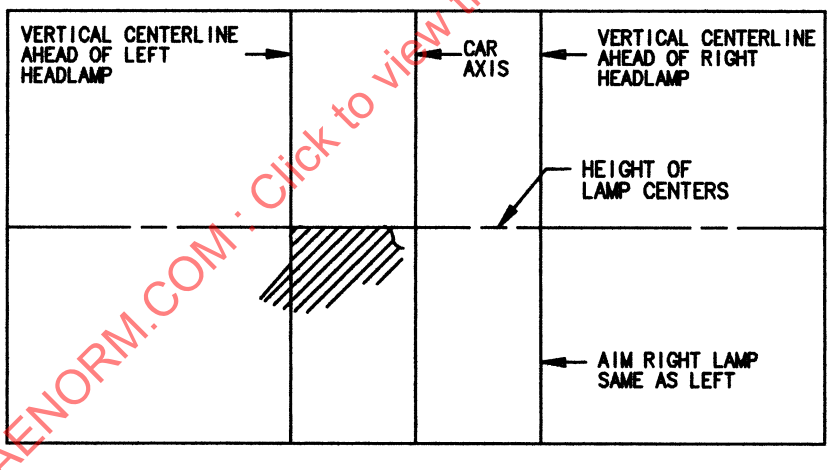

FIGURE 3—HIGH-INTENSITY ZONE (SHADED AREA) OF A PROPERLY AIMED LOWER BEAM ON THE AIMING SCREEN 7.6 m (25 ft) IN FRONT OF THE VEHICLE

4.4 Headlamp Aim Inspection Limits for Vehicle Inspection Facilities

4.4.1 The following inspection limits should apply to stations that conduct mandatory inspection of vehicles.

4.4.2 It is recommended that mechanically aimable lamps be inspected using mechanical aimers (4.1). The aimers shall be calibrated for accuracy and shall be compensated for the level of the floor in the inspection area.

4.4.3 MECHANICAL AIM INSPECTION

4.4.3.1 The mechanical inspection limits for high-beam headlamps shall be 10 cm (4 in) up to 10 cm (4 in) down and 10 cm (4 in) left to 10 cm (4 in) right.

4.4.3.2 The mechanical aim inspection limits for the low-beam headlamp or the low beam of dual-beam headlamp shall be 10 cm (4 in) left to 10 cm (4 in) right. The vertical inspection limits are given in 4.3.3 based on the height of the vertical center of the headlamp from the ground.

4.4.3.3 Failure to meet these limits shall be cause for rejection.

4.4.4 VISUAL AND OPTICAL HEADLAMP TESTING MACHINE AIM INSPECTION

4.4.4.1 The inspection limits for high-beam headlamps shall be with the center of the high-intensity zone from 10 cm (4 in) up to 10 cm (4 in) down; and, from 10 cm (4 in) left to 10 cm (4 in) right on a screen at 7.6 m (25 ft). (See Figure 4.)

4.4.4.2 The inspection limits in the vertical direction for low-beam headlamps or the low beam of a dual-beam headlamp, shall be as described in 4.3.3. In the horizontal direction, the left edge of the high-intensity zone) shall be located from 10 cm (4 in) left to 10 cm (4 in) right of the vertical centerline of the lamp. The viewing screen shall be located 7.6 m (25 ft) in front of the vehicle. (See Figure 5.)

4.4.4.3 Failure to meet these limits shall be cause for rejection.

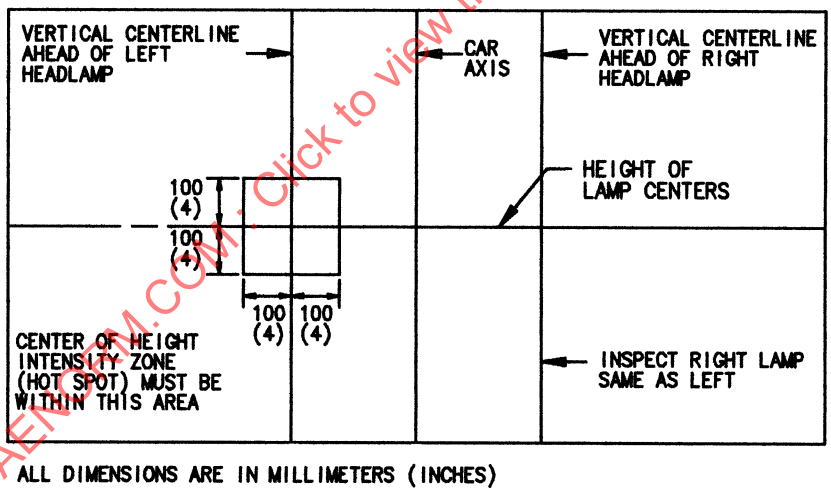

FIGURE 4—AIM INSPECTION LIMITS FOR UPPER-BEAM HEADLAMPS

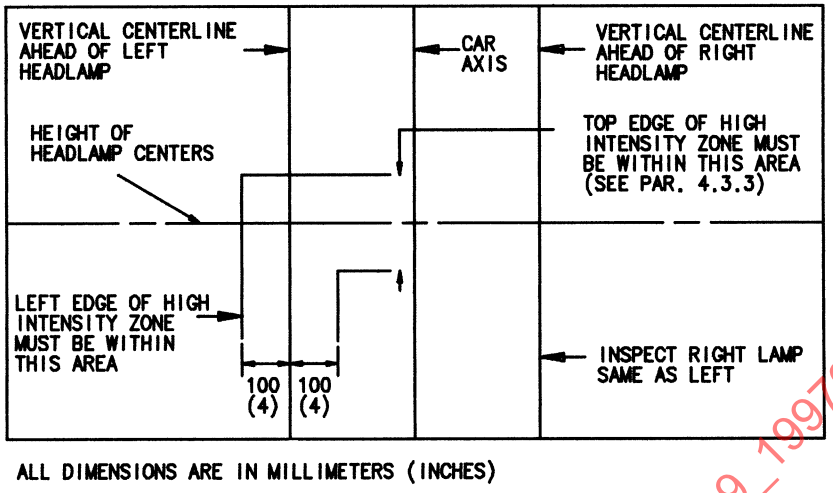

FIGURE 5—AIM INSPECTION LIMITS FOR LOWER-BEAM HEADLAMPS AND AUXILIARY PASSING LAMPS

5. Fog and Auxiliary Driving Lamp Aim

5.1 Aim Adjustment for Service Facilities—Symmetrical Beams

5.1.1 The following aim adjustment requirements should apply shall be followed by dealers, service stations, and others who do headlamp adjusting.

5.1.2 The correct visual aim for fog lamps with (symmetrical beams) (SAE J583) is with the top edge of the high-intensity zone 10 cm (4 in) below horizontal and the center of the high-intensity zone vertically centered on a screen located 7.6 m (25 ft) in front of the vehicle. (See Figure 6.)

5.1.3 The correct aim for auxiliary driving lamps (SAE J581) is the same as for high-beam lamps. See 4.3.5.1 and 4.4.4.1 for the respective adjustment and inspection specifications.

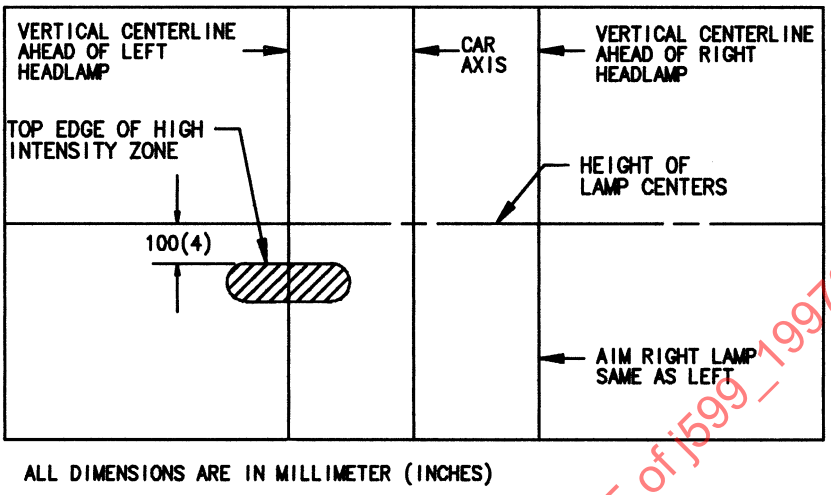

FIGURE 6—A PROPERLY AIMED SYMMETRICAL FOG LAMP BEAM
(SHADED AREA INDICATES HIGH INTENSITY ZONE)

5.2 Aim Inspection Limits of Fog Lamps with Symmetrical Beams

5.2.1 The following inspection limits apply to stations that conduct mandatory inspection of vehicles.

5.2.2 The visual inspection limits for symmetrical beam fog lamps installed with universal mounting applications, shall be with the top edge of the high-intensity zone at horizontal or below and with the center of the high-intensity zone from 10 cm (4 in) left to 10 cm (4 in) right on a viewing screen at located 7.6 m (25 ft) from the vehicle. (See Figure 7.)

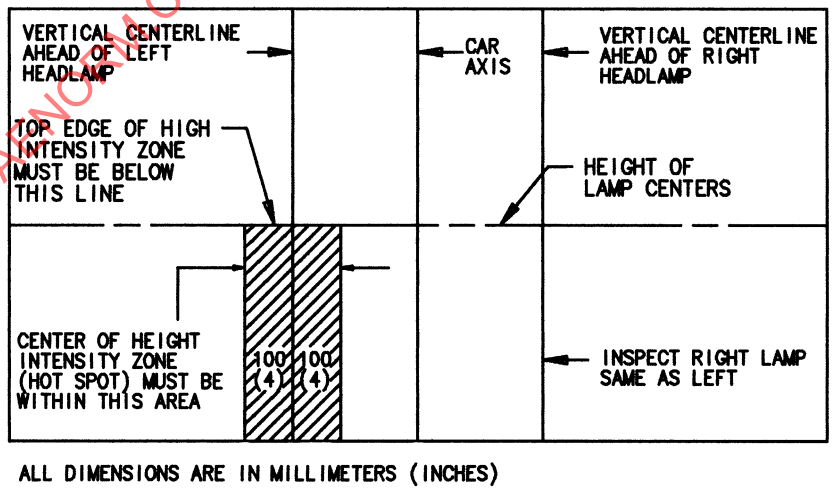

FIGURE 7—AIM INSPECTION LIMITS FOR SYMMETRICAL BEAM FOG LAMPS
(UNIVERSAL MOUNTING APPLICATION)