SOCIETY OF AUTOMOTIVE ENGINEERS, INC. • TWO PENNSYLVANIA PLAZA • NEW YORK, NEW YORK 10001

LAND SEA AIR SPACE

TECHNICAL REPORT J599c

LIGHTING INSPECTION CODE—SAE J599c

SAE Standard

Report of Lighting Division approved January 1937 and last revised by Lighting Committee April 1972. Editorial change March 1973.

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

The original SAE code, adopted in 1937, was drafted for use in preparing Interstate Commerce Commission regulations for trucks and buses in interstate operation under the 1935 Motor-Carrier Act. Subsequently, the SAE code served as a basis for Section 2, Lighting Systems, of the American National Standard Code for Inspection Requirements for Motor Vehicles, ANSI D7-1939. The ANSI inspection requirements for lighting systems were adopted by the Society as the SAE Recommended Practice in January 1940.

1. Definitions

1.1 Sealed Beam Unit—An integral and indivisible optical assembly with the name "Sealed Beam" molded in the lens.

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

1.3 Lower Beam—A beam intended to illuminate the road ahead of the vehicle without causing undue glare to other drivers.

1.4 7 in (178 mm) Sealed Beam System—A system employing two 7 in (178 mm) Sealed Beam units.

1.5 7 in (178 mm) Type 2 Sealed Beam Unit—A 7 in (178 mm) diameter unit (with a numeral 2 molded in the lens), which provides an upper and a lower beam. These units are mechanically aimable. NOTE: Original 7 in (178 mm) Sealed Beam units which can be identified by the absence of "2" on the lens shall be aimed visually on the upper beam.

1.6 5¾ in (146 mm) Sealed Beam System—A system employing four 5¾ in (146 mm) Sealed Beam units: two Type 1 and two Type 2.

1.7 5¾ in (146 mm) Type 1 Sealed Beam Unit—A 5¾ in (146 mm) diameter unit having a single filament and used in a four-lamp system to provide the principal portion of the upper beam.

1.8 5¾ in (146 mm) Type 2 Sealed Beam Unit—A 5¾ in (146 mm) diameter unit having two filaments and used in a four-lamp system to provide the lower beam and a secondary portion of the upper beam.

1.9 Mechanically Aimable Sealed Beam Unit—A unit having three pads on the face of the lens forming a plane which is intended to be used to adjust and inspect the aim of the unit when installed on the vehicle.

1.10 Symmetrical Beam—A beam in which both sides are symmetrical with respect to the median vertical plane of the beam.

1.11 Asymmetrical Beam—A beam in which both sides are not symmetrical with respect to the median vertical plane of the beam. All lower beams are asymmetrical. NOTE: The inspector should see that the driver understands how to use multiple beam headlamps so as to obtain the best road lighting with minimum glare to other users of the highway.

2. Equipment—It is recommended that mechanically aimable headlamps be aimed and inspected for aim by mechanical aimers. Another aiming and inspection method is by visual means on a screen at a distance of 25 ft (7.6 m) ahead of the headlamps or on the screen of a headlamp testing machine.

2.1 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.

2.2 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. Provision 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 the amount the headlamp units are to the left and right. 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 Fig. 1.

2.3 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.

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

3.1 Remove ice or mud from under fenders.

3.2 See that no tire is noticeably deflated.

3.3 Check car springs for sag or broken leaves.

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

3.5 Check functioning of any "level-ride" control.

3.6 Clean lenses and aiming pads.

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

3.8 Stabilize suspension by rocking vehicle sideways.

4. Headlamp Aim Adjustment for Service Facilities

4.1 The following aim adjustment requirements should apply to dealers, service stations, and others who do headlamp adjusting.

4.2 It is recommended that mechanically aimable headlamps be aimed using mechanical aimers (paragraph 2.1). The aimers shall be calibrated for accuracy and shall be compensated for the level of the floor in the aiming area.

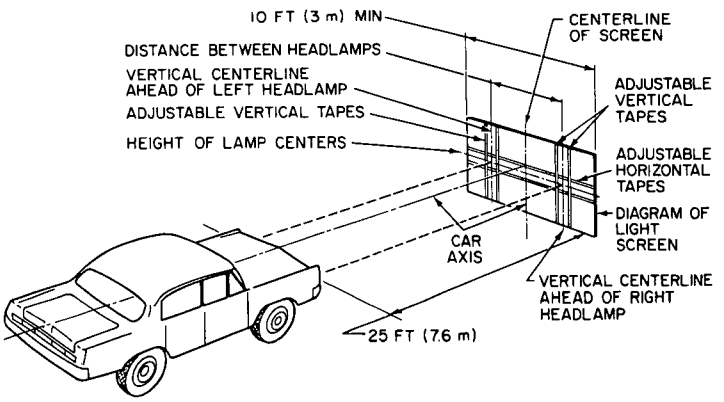

FIG. 1—ALIGNMENT OF HEADLAMP AIMING SCREEN

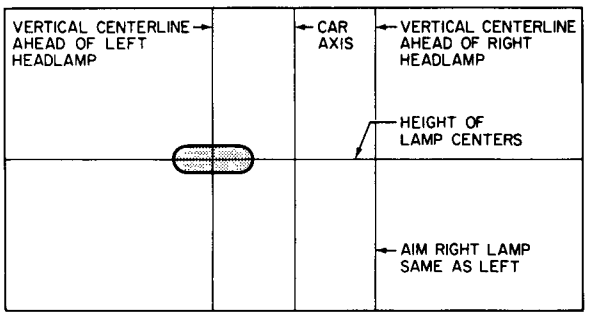

FIG. 2—HOW PROPERLY AIMED UPPER BEAM OF 5¾ IN (146 MM) TYPE 1 AND 7 IN (178 MM) SEALED BEAM (NOT MARKED "2" ON LENS) WILL APPEAR ON THE AIMING SCREEN 25 FT (7.6 M) IN FRONT OF VEHICLE. (SHADED AREA INDICATES HIGH INTENSITY ZONE)

4.3 Mechanical Aiming

4.3.1 The correct mechanical aim for both Type 1 and Type 2 units is 0-0.

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

4.4 Visual Aiming

4.4.1 The correct visual aim for Type 1 units is with the center of the high intensity zone at horizontal and straight ahead vertically. (See Fig. 2.)

4.4.2 The correct visual aim for Type 2 units is with the top edge of the high intensity zone of the lower beam horizontal and the left edge at vertical. (See Fig. 3.)

4.4.3 If the headlamp being serviced is not so aimed, it should be corrected to the above aim.

5. Headlamp Aim Inspection Limits for Vehicle Inspection Facilities

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

5.2 It is recommended that mechanically aimable lamps be inspected using mechanical aimers (paragraph 2.1). The aimers shall be calibrated for accuracy and shall be compensated for the level of the floor in the inspection area.

5.3 Mechanical Aim Inspection

5.3.1 The mechanical inspection limits for both Type 1 and Type 2 units shall be 4 (100 mm) up to 4 (100 mm) down and 4 (100 mm) left to 4 (100 mm) right.

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

5.4 Visual Aiming

5.4.1 The visual inspection limits for Type 1 units shall be with the center of the high intensity zone from 4 (100 mm) up to 4 (100 mm) down and from 4 (100 mm) left to 4 (100 mm) right based in inches (millimeters) on a screen at 25 ft (7.6 m). (See Fig. 4.)

5.4.2 The visual inspection limits for Type 2 units shall be with the top edge of the high intensity zone from 4 (100 mm) up to 4 (100 mm) down and the left edge of the high intensity zone from 4 (100 mm) left to 4 (100 mm) right based in inches (millimeters) on a screen at 25 ft (7.6 m). (See Fig. 5.)

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

6. Fog Lamps (Symmetrical Beams) Aim Adjustment for Service Facilities

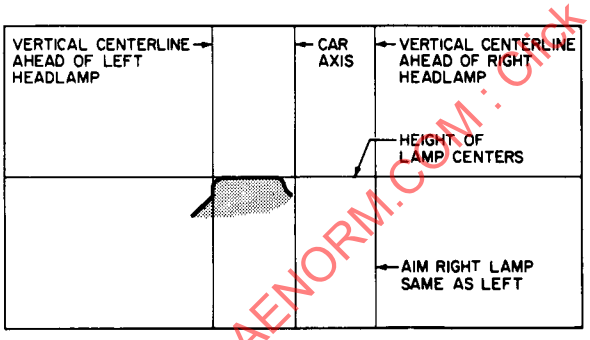

FIG. 3—HOW PROPERLY AIMED LOWER BEAM OF 5¾ IN (146 MM) AND 7 IN (178 MM) TYPE 2 SEALED BEAM WILL APPEAR ON THE AIMING SCREEN 25 FT (7.6 M) IN FRONT OF THE VEHICLE. (SHADED AREA INDICATES HIGH INTENSITY ZONE)

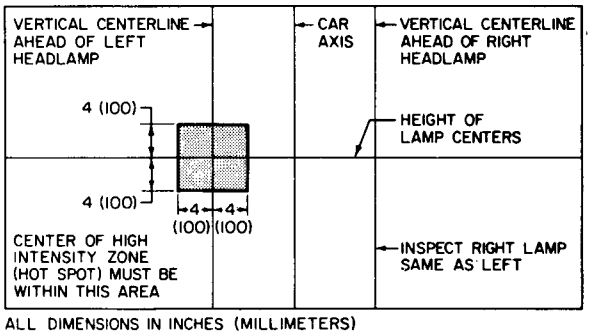

FIG. 4—AIM INSPECTION LIMITS FOR UPPER BEAM OF 5¾ IN (146 MM) TYPE 1 SEALED BEAM AND 7 IN (178 MM) SEALED BEAM UNITS NOT MARKED "2" AT THE TOP OF THE LENS. ALSO, TWO-BEAM LAMPS NOT MARKED SEALED BEAM ON THE LENS

6.1 The following aim adjustment requirements should apply to dealers, service stations, and others who do headlamp adjusting.

6.2 The correct visual aim for fog lamps (symmetrical beams) is with the top edge of the high intensity zone 4 (100 mm) below horizontal and the center of the high intensity zone straight ahead vertically based in inches (millimeters) on a screen at 25 ft (7.6 m). (See Fig. 6.)

7. Fog Lamps (Symmetrical Beam) Aim Inspection Limits for Vehicle Inspection Facilities

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

7.2 The visual inspection limits for fog lamps (symmetrical beam) 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 4 (100 mm) left to 4 (100 mm) right based in inches (millimeters) on a screen at 25 ft (7.6 m) (See Fig. 7.)

8. Fog Lamps (Asymmetrical Beam) and Passing Lamps Aim Adjustment and Inspection Limits

8.1 Lamp aim adjustment and inspection is the same as for Type 2 Sealed Beam headlamp units. See paragraph 4.4.2 for adjustment and 5.4.2 for inspection.

9. General Lamp Inspection Other Than Headlamp Aim Inspection —This includes the following types of lamps: head, tail, stop, license,

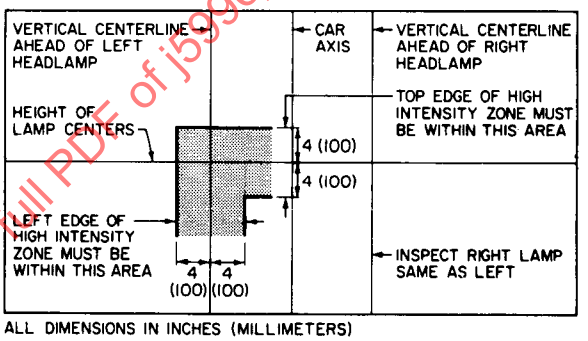

FIG. 5—AIM INSPECTION LIMITS FOR LOWER BEAM OF 5¾ IN (146 MM) TYPE 2 SEALED BEAM AND 7 IN (178 MM) TYPE 2 SEALED BEAM AND FOR AUXILIARY PASSING LAMP

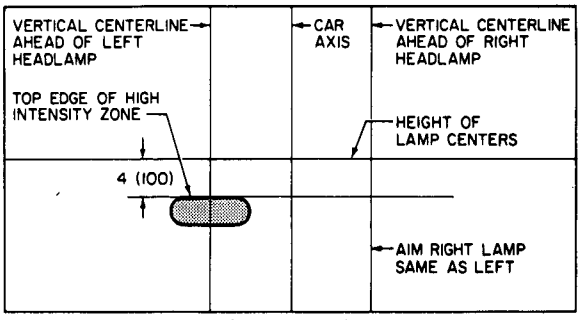

FIG. 6—HOW PROPERLY AIMED FOG LAMP (SYMMETRICAL BEAM) WILL APPEAR ON THE AIMING SCREEN 25 FT (7.6 M) IN FRONT OF VEHICLE. (SHADED AREA INDICATES HIGH INTENSITY ZONE)

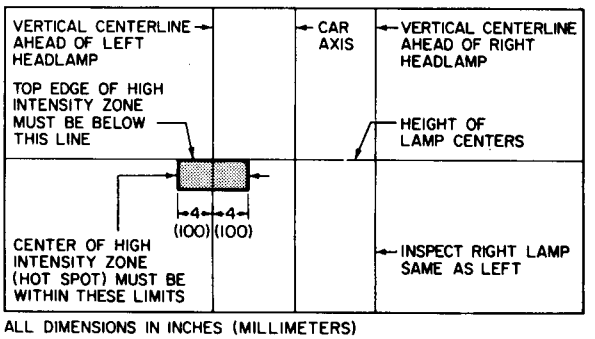

FIG. 7—AIM INSPECTION LIMITS FOR FOG LAMPS (SYMMETRICAL BEAM)