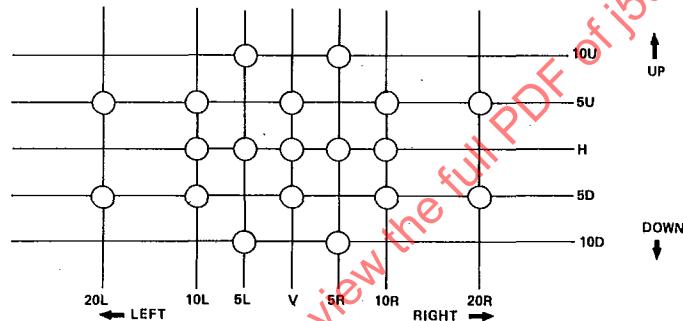


TABLE 2—PHOTOMETRIC DESIGN GUIDELINES

Test Points (deg)	Luminous Intensity (cd)
10U, 10D 5L, 5R	16
V	70
5U, 5D 10L, 10R	30
20L, 20R	10
V	80
H 5L, 5R	80
10L, 10R	40
Maximum Luminous Intensity (cd)	300

## NOTES:

1. Any photometric measurements that fall below 60% of the test point value given in Table 2 shall not be used in the calculation of zone totals.
2. The luminous intensity values (candela) specified in Table 2, Photometric Design Guidelines, have been established by empirical and field evaluation techniques for lighting devices to perform their intended function in field service.
3. See Fig. 2 for a graphical description of Photometric Design Guidelines.

GRAPHICAL DESCRIPTION OF THE PHOTOMETRIC GUIDELINES  
The Circles Indicate the Test Points for Distribution of Light. See Table 2 for Photometric Values.

The line formed by the intersection of a vertical plane through the light source of the device and normal to the test screen is designated V. The line formed by the intersection of a horizontal plane through the light source and normal to the test screen is designated H. The point of intersection of these two lines is designated H-V. The other points on the test screen are measured in terms of degree from these two lines. Degrees to the right (R) and to the left (L) are regarded as being to the right and left of the vertical line when the observer stands behind the lighting device and looks in the direction of the emanating light beam when the device is properly aimed for photometry with respect to the H-V point. Similarly, the upward angles designated as U and the downward angles designated D, refer to light emanating at angles above and below the horizontal line, respectively.

FIG. 2

arms as used on the vehicle, and shall not be considered part of the requirements.

6.2.1 The school bus stop arm should be installed on the left outside of the bus body and be mounted so as to be seen readily by motorists approaching from either the front or rear of the bus.

6.2.2 If the device is operated by a manual switch, that switch shall be located so as to be easily accessible to the driver.

**6.3 Design Guidelines**

6.3.1 The lamps should be located in the extreme top and bottom portions of the stop arm, one above the other.

6.3.2 It is recommended that the word "STOP" be displayed as white letters against a red background, and that the stop arm have the shape of a regular octagon which is at least 450 x 450 mm. The octagon should have a white border at least 12 mm wide. The maximum extension should not exceed 560 mm beyond the left side of the vehicle. The school bus stop arm may also optionally be reflectorized.

6.3.3 The two lamps on each face should flash alternately with a flash rate of 1-2 Hz and with a current "on" time of 50%.

7. *Appendix*—As a matter of information, attention is called to SAE J567 for requirements and gages to be used in socket design.

**LIGHTING INSPECTION CODE—SAE J599 MAY81****SAE Standard**

Report of the Lighting Division, approved January 1937, last revised by the Lighting Committee December 1974, editorial change May 1981. Rationale statement available.

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 5 3/4 in. (146 mm) Sealed Beam System**—A system employing four 5 3/4 in. (146 mm) Sealed Beam units: two Type 1 and two Type 2.

**1.7 5 3/4 in. (146 mm) Type 1 Sealed Beam Unit**—A 5 3/4 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 5 3/4 in. (146 mm) Type 2 Sealed Beam Unit**—A 5 3/4 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 4 x 6 1/2 in. (100 x 165 mm) Sealed Beam System**—A system employing four 4 x 6 1/2 in. (100 x 165 mm) sealed beam units: two Type 1A and two Type 2A.

**1.10 4 x 6 1/2 in. (100 x 165 mm) Type 1A Sealed Beam Unit**—A 4 x 6 1/2 in. (100 x 165 mm) rectangular unit having a single filament and used in a four-lamp system to provide the principal portion of the upper beam.

**1.11 4 x 6 1/2 in. (100 x 165 mm) Type 2A Sealed Beam Unit**—A 4 x 6 1/2 in. (100 x 165 mm) rectangular unit having two filaments and used in a four-lamp system to provide the lower beam and a secondary portion of the upper beam.

**1.12 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.

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

**1.14 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.

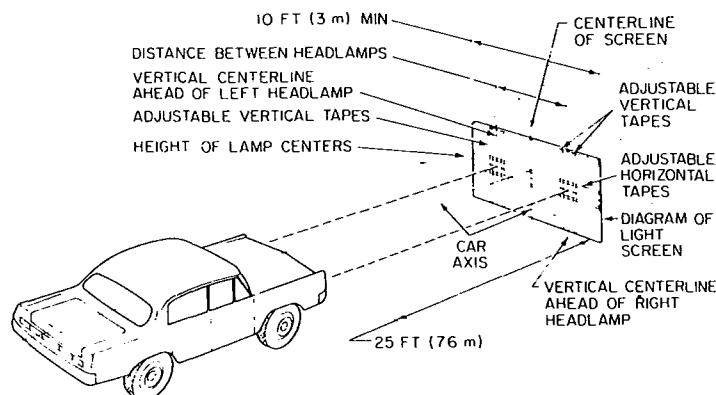


FIG. 1—ALIGNMENT OF HEADLAMP AIMING SCREEN

**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.

#### 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.

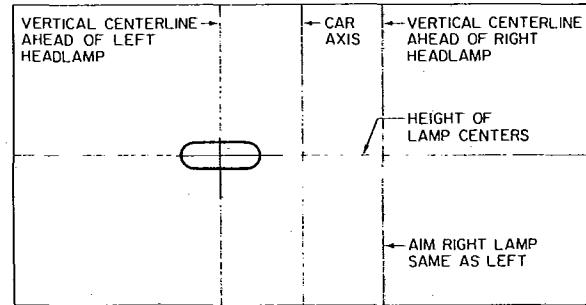


FIG. 2—HOW PROPERLY AIMED UPPER BEAM OF 5 3/4 IN (146 MM) TYPE 1 AND 7 IN (178 MM) SEALED BEAM (NOT MARKED "2" ON LENS) WILL APPEAR ON THE AIMING SCREEN 25 FT (7.6 M) IN FRONT OF VEHICLE. (SHADED AREA INDICATES HIGH INTENSITY ZONE)

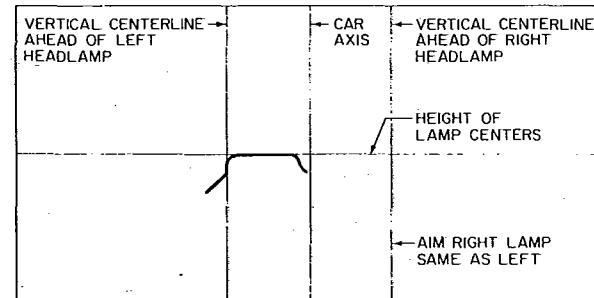


FIG. 3—HOW PROPERLY AIMED LOWER BEAM OF 5 3/4 IN (146 MM) AND 7 IN (178 MM) TYPE 2 SEALED BEAM WILL APPEAR ON THE AIMING SCREEN 25 FT (7.6 M) IN FRONT OF THE VEHICLE. (SHADED AREA INDICATES HIGH INTENSITY ZONE)