



## HEADLAMP AIMING DEVICE FOR MECHANICALLY AIMABLE SEALED BEAM HEADLAMP UNITS—SAE J602a

SAE Standard

Report of Lighting Committee approved October 1957 and last revised July 1970.

**Scope**—This specification applies to the requirements of a device used to aim the mechanically aimable type of sealed beam headlamp units.

The purpose of this specification is to provide a practical laboratory test procedure to determine whether the devices under test are capable of accurately positioning sealed beam headlamp units from their aiming pads and maintaining their accuracy in service within the tolerances designated in this specification.

**Definition**—A device used to aim mechanically aimable headlamp units consists of one or more fixtures designed to seat against the three aiming pads (aiming plane) on mechanically aimable headlamp units installed on a vehicle to facilitate accurate aiming of such units, vertically and laterally.

**Samples for Test**—Sample devices submitted for laboratory tests should be representative of the devices as regularly manufactured and marketed. Each sample should include all accessory equipment peculiar to the device. Full assembly and operating instructions should be provided, including information on how to check accuracy and maintain the device in calibration.

**Laboratory Facilities**—The laboratory should be equipped with all facilities necessary to make the tests required in this recommended practice and, shall use lamps from various manufacturers to check the attachment of the aimer.

**General Requirements**—The device should be of such design that the seating portion will register only on the three aiming pads on the 5¼-in. or 7-in. sealed beam units as covered by SAE J571.

The device should have no projections, tangs, lugs, and so forth, which will permit seating the device on any part of the headlamp, other than the three aiming pads or promote using the device on other than mechanically aimable sealed beam headlamp units.

Any device which uses an adapter to fit more than one size sealed beam unit should meet all of the requirements of this recommended practice with and without the adapter.

The seating portion (locating plane) of the aimer should meet the dimensions shown in Fig. 1, Dimensional Specifications for Headlamp Aimer Locating Plate. The locating flange on the aimer should center the device on the headlamp units or retaining rings in such a way as to insure that the seating portion will always engage the three aiming pads on the units.

When aiming headlamp units spaced 90 in. apart, the torque exerted by the aimer at the aiming plane should not exceed 36 in.-lb vertically and 12 in.-lb laterally.

The means provided for securing the device to the lamp should be adequate to seat it securely against the three aiming pads on the units while in use.

If a suction cup is used to retain aimer to headlamp unit, effective diameter should not exceed 3½ in. in diameter when installed.

Means should be provided in the device for compensating within  $\pm 0.1$  deg for reasonable variations in floor slope and clearly explained in the operating instructions.

The device and/or instructions should provide a practical means for a periodic check of its accuracy in the field.

If the lateral aim is to be accomplished by reference between devices on opposite sides of the vehicle, the means provided for handling lateral adjustment (string or equivalent) should be at least 9¼ in. ahead of the aiming plane for 5¼ in. sealed beam units or 10¼ in. for 7 in. units.

The spirit level or other means provided for indicating vertical aim should be capable of showing at least a 0.1 in. deviation with a 0.2 deg

(1 in. in 25 ft.) change in level.

A lateral aim scale should be provided with graduations in steps of not more than 2 in. at 25 ft from straight ahead to at least 6 in. left and right.

The instructions covering use of the aimer should include those items shown in the section 2(a) of Preparation for Aiming in SAE J599.

The vertical aim scale should be marked 0 with the aiming plane vertical.

The vertical aim scale should be provided with numerical graduations in steps, each of which represent 1 in. at 25 ft to provide for variations in vertical aim at least from 6 in. above 0 to 10 in. below 0.

**Test Procedure**—Assuming that the devices comply with the general requirements, they shall be considered acceptable if they comply with additional test requirements as follows:

**NOTE 1**—All tests are to be made in an ambient temperature of  $75 \pm 5$  F unless otherwise specified.

**NOTE 2**—If a vertical indication means other than a spirit level is used, an equivalent accuracy should be maintained.

1. With the aiming plane vertical and with the vertical scale on the device set at 0, the angle through which the aiming plane must be rotated vertically to properly position the bubble in the spirit level, or equivalent, should not exceed 0.1 deg.

2. With the aiming planes in the same vertical plane and with the means provided for adjusting lateral aim in use, the angle through which the aiming plane must be rotated laterally to indicate straight ahead should not exceed  $\pm 0.2$  deg with the lamps 24 in. and 90 in. apart.

3. With the aiming planes initially in the same vertical plane and subsequently toed inward and outward 1.2 deg and with the means provided for checking lateral aim in use, the error in reading should not exceed  $\pm 0.2$  deg with the lamps 60 in. apart.

4. With the aiming plane vertical and with the vertical scale on the device set at 0, the level on the aimer should be adjusted prior to each of the following tests to properly position the bubble in the spirit level, or equivalent.

(a) Each step on the vertical aim scale should be checked and in no case should the variation from correct aim exceed  $\pm 0.1$  deg.

(b) A pair of aimers should be stabilized at  $20 \pm 5$  F and then installed on a pair of unlighted units spaced 60 in. apart at the 20 F ambient temperature. After a period of 30 minutes the seating portion should continue to register against the three aiming pads and the variation from correct vertical aim should not exceed  $\pm 0.1$  deg and the variation from correct lateral aim should not exceed  $\pm 0.2$  deg.

(c) A pair of aimers should be stabilized at  $100 \pm 5$  F and then installed on a pair of lighted units spaced 60 in. apart at the 100 F ambient temperature. After a period of 30 minutes the seating portion should continue to register against the three aiming pads and the variation from correct vertical aim should not exceed  $\pm 0.1$  deg and the variation from correct lateral aim should not exceed  $\pm 0.2$  deg.

(d) A pair of aimers should be exposed with the aiming plane down in a circulating air oven to  $140 \pm 5$  F for 24 hr followed by a temperature of  $-40 \pm 5$  F for 24 hr and then permitted to return to room temperature after which they should show no visible damage. They should then be installed on a pair of unlighted units spaced 60 in. apart and the variation from correct vertical aim should not exceed  $\pm 0.1$  deg and the variation from correct lateral aim should not exceed  $\pm 0.2$  deg.

(e) A sample aimer should be exposed to  $35 \pm 5$  F for one hour and then immediately allowed to free fall onto a concrete floor three