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SURFACE VEHICLE RECOMMENDED PRACTICE

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SEALED LIGHTING UNITS FOR CONSTRUCTION, INDUSTRIAL, AND FOREST MACHINERY

Foreword—This reaffirmed document has been changed only to reflect the new SAE Technical Standards Board format.

1. ***Scope***— This SAE Recommended Practice applies to floodlamp, headlamp, and general service lamp units intended for use on off-road self-propelled work machines classified as construction (1.1 and 1.2), general purpose industrial (2), and forestry machines (4), as noted in SAE J1116. Construction and Industrial Machinery is normally operated off highways; therefore, this document is not intended to be used as a basis for regulations by those having authority over motor vehicles used on public highways. Other performance and dimensional information is contained in SAE J572 and J760.

2. ***References***

2.1 Applicable Documents—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

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

SAE J572—Requirements for Sealed Lighting Unit for Construction and Industrial Machines
SAE J575—Test Methods and Equipment for Lighting Devices and Components for Use on Vehicles Less Than 2032 mm in Overall Width
SAE J578—Color Specifications
SAE J760—Dimensional Specifications for General Service Sealed Lighting Units
SAE J1116—Categories of Off-Road Self-Propelled Work Machines

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2.2 Definitions

2.2.1 FLOODLAMP (TRADE NO. 4078, 4478, 4578—145 mm (5-3/4 in) NOMINAL DIAMETER; 4406, 4410, 4593, 4752—114 mm (4-1/2 in) NOMINAL DIAMETER)—Recommended for general illumination of area close to the machine.

Typical usage—Track type machine, front and rear lamps
Wheeled tractor scraper, front lamp
Scraper bowl illumination
Motorgrader illumination
Tractor shovel bucket illumination
Off-highway truck backup illumination

2.2.2 GENERAL SERVICE LAMP (TRAPEZOIDAL BEAM) (TRADE NO. 4411, 4589—114 mm (4-1/2 in) NOMINAL DIAMETER)—Recommended for general illumination.

Typical usage—Wheeled tractor shovel, front lamp
Motorgrader, front lamp

2.2.3 HEADLAMP (TRADE NO. 4080, 4480, 4880, 4813—145 mm (5-3/4 in) NOMINAL DIAMETER; 4750—114 mm (4-1/2 in) NOMINAL DIAMETER)—The headlamp has a single beam with a sharp cutoff at the top to reduce glare to other vehicles and to minimize reflection from dust.

2.2.4 HEADLAMP (TRADE NO. 4814—145 mm (5-3/4 in) NOMINAL DIAMETER)—This headlamp has a concentrated beam for high-speed operation.

3. Laboratory Requirements

3.1 The following sections of SAE J575 are a part of this document.

3.1.1 SECTION 2.2—DEFINITIONS

3.1.2 SECTION 3.54.6—PHOTOMETRY TEST—The photometric test shall be made with the photometer at a distance of at least 18.3 m (60 ft) from the lamp. The unit shall be operated at its design voltage during the tests. For test values, see Tables 1 to 6. A tolerance of ±1/4 degree shall be allowed for any test point. Beam aim during photometric test shall be as follows:

1. Floodlamp and General Service Lamp Units—Visually center the beam vertically and horizontally on the photometer axis.
2. Headlamp Unit—Visually center the beam laterally on the photometer axis with the top cutoff of the beam 1 degree below photometer axis.
3. High-Speed Driving Lamp—Visually center the beam laterally on the photometer axis with the center of the high intensity zone 1/2 degree down from the lamp center level.

3.2 Color Test—The color of the light from the lighting device shall be white, as defined in SAE J578.

4. Physical Dimensions—Table 7 lists dimensional data for the lamps referred to in Tables 1 to 6.

5. Additional Specifications—Table 7 lists electrical and life specifications.

6. ***Additional Information***—The units whose characteristics are shown in Tables 3 and 4 are also widely used for purposes other than construction and industrial machinery lighting. The tables are presented to facilitate lamp application and machine design.

7. ***Installation Recommendations***—(These recommendations are not a part of the test specification.)

7.1 The units recommended have been evaluated for lighting performance with satisfactory results in average job situations when used as suggested under definitions.

7.2 Dimensional interchangeability among types and voltages make it possible for the equipment designer or operator to choose units to suit the wide variety of lighting tasks met in service.

7.3 These units have been selected with special emphasis on light for working conditions and lamp durability which are best provided by units producing only a single beam. Because machines that travel on construction haul roads often encounter traffic similar to highway conditions, careful aiming of the lighting units is required. Headlamp systems composed of these single beam types have been made that restrict glare to acceptable limits, while maintaining adequate illumination for the work areas. This approach avoids the necessity of using dimming switches. Systems employing four or more units, combining headlamps and floodlamps, without dimming switches, have been devised which provide a marked improvement in operating efficiency.

7.4 Good results from a construction and industrial machinery lighting system require ample provision for individual adjustment of the lamp unit aim, depending on the particular lighting task. Some applications have been used to advantage with vertical aims from 30 degrees below to 15 degrees above the horizontal and with lateral aims from 15 degrees left to 15 degrees right.

7.5 Service life or units may be materially prolonged by mountings properly designed to cushion the unit from shock and vibration loading inherent in construction machinery. Where space permits, it is recommended that the 145 mm (5-3/4 in) nominal diameter units be specified to obtain maximum illumination.

PREPARED BY THE SAE OFF-ROAD MACHINERY TECHNICAL COMMITTEE SC5—ELECTRICAL EQUIPMENT

TABLE 1—TEST POINT VALUES FOR FLOODLAMP[1] 145 mm (5-3/4 in) NOMINAL DIAMETER (Trade No. 4078, 4478, 4578)

Position, degrees	Min cd	Position, degrees	Min cd
10U-V	750	H-20R and 20L	500
10U-10R and 10L	500	5D-V	1000
10U-20R and 20L	250	5D-10R and 10L	750
5U-V	1000	5D-20R and 20L	500
5U-10R and 10L	750	10D-V	750
5U-20R and 20L	500	10D-10R and 10L	500
H-V	1000	10D-20R and 20L	250
H-10R and 10L	750		

[1] The extremities of the beam should be diffused.

TABLE 2—TEST POINT VALUES FOR HEADLAMP, 145 mm (5-3/4 in) NOMINAL DIAMETER (Trade No. 4080, 4480, 4880)

Position, degrees	Max cd	Min cd	Position, degrees	Max cd	Min cd
1U-10R and 10L	500	—	3D-10R and 10L	—	3000
H-10R and 10L	1000	—	3D-15R and 15L	—	1500
1-1/2D-V	—	3000	5D-V	—	3000
1-1/2D-10R and 10L	—	1500	5D-15R and 15L	—	750
1-1/2D-15R and 15L	—	1000	8D-V	—	1000
3D-V	—	6000	8D-10R and 10L	—	600

TABLE 3—TEST POINT VALUES FOR GENERAL SERVICE LAMP, 114 mm (4-1/2 in) NOMINAL DIAMETER (Trade No. 4411, 4589)

Position, degrees	Min cd	Position, degrees	Min cd
10U-V	1500	H-8R and 8L	650
10U-5R	1200	10D-V	500
H-V	1000	10D-12R and 12L	300

TABLE 4—TEST POINT VALUES FOR GENERAL SERVICE FLOODLAMP, 114 mm (4-1/2 in) NOMINAL DIAMETER (Trade No. 4406, 4410, 4593)

Position, degrees	Min cd	Position, degrees	Min cd
15U-V	250	H-40R and 40L	175
15U-40R and 40L	125	15D-V	250
H-V	400	15D-40R and 40L	125

TABLE 5—TEST POINT VALUES FOR HEADLAMP, 145 mm (5-3/4 in) NOMINAL DIAMETER (Trade No. 4813, 90W, Single Beam Headlamp Unit

Position, degrees	Max cd	Min cd	Position, degrees	Max cd	Min cd
1U-10R and 10L	500	—	3D-10R and 10L	—	5000
H-10R and 10L	1000	—	3D-15R and 15L	—	2000
1-1/2D-V	—	5 000	5D-V	—	5000
1-1/2D-10R and 10L	—	2 000	5D-15R and 15L	—	450
1-1/2D-15R and 15L	—	500	8D-V	—	500
3D-V	—	10 000	8D-10R and 10L	—	300

TABLE 6—TEST POINT VALUES FOR HEADLAMP, 145 mm (5-3/4 in) NOMINAL DIAMETER (Trade No. 4814, 90W, High-Speed Driving Lamp Unit

Position, degrees	Max cd	Min cd	Position, degrees	Max cd	Min cd
1U-10R and 10L	600	—	3D-10R and 10L	—	400
H-10R and 10L	1500	—	3D-15R and 15L	—	100
1-1/2D-V	—	20 000	5D-V	—	3500
1-1/2D-10R and 10L	—	700	5D-15R and 15L	—	100
1-1/2D-15R and 15L	—	100	8D-V	—	500
3D-V	—	12 000	8D-10R and 10L	—	100