SURFACE VEHICLE STANDARD

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Operator's Field of View - Engineering Evaluation

RATIONALE

No users found. Superseded by ISO 5006.

Foreword—This document is a supplement to ISO 5006-1 and SAE J1091. The document provides a procedure for evaluating changes to earthmoving machines to determine and document their effect on the operator's field of view. ISO 5006-1 and SAE J1091 measure only blockages to vision at the test circle. This document provides a procedure to outline the operator's field of view within the test circle. The figure chosen is a large loader and illustrates the use of larger test circles in selected segments (sectors). If documenting the change is not required, a less formal evaluation can be made. This document does not include a criteria section. There is no comparable ISO document.

1. Scope—This SAE Standard specifies a stationary test method for determining and documenting the masking effect caused by parts of the base machine with equipment as specified by the manufacturer within a visibility test circle around the eye position of a seated operator. It applies to earthmoving machinery which has a specific seated operator's position.

2. References

2.1 Applicable Publications—The following standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision and the user of this document is encouraged to investigate the possibility of applying the most recent editions of the standards indicated in 2.1.1 and 2.1.2.

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

SAE J833—Human Physical Dimensions
SAE J1091—Earthmoving Machinery—Operator's Field of View
SAE J1116—Categories of Off-Road Work Machines
SAE J1163—Determining Seat Index Point

2.1.2 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 6165:87—Earth-moving machinery—Basic types—Vocabulary
ISO 5353:95—Earth-moving machinery and tractors and machinery for agricultural and forestry—Seat index point
ISO 3411:82—Earth-moving machinery—Human physical dimensions of operators and minimum operator space envelope
ISO 5006-1:91—Earth-moving machinery—Operator's field of view—Part 1: Test method

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3. Definitions

3.1 Filament Position Center-Point—Point located 660 mm above and 20 mm in front of the seat index point as defined by SAE J1163. This is identical to SAE J1091.

3.2 Visibility Test Circle—Circle with a 12 m radius on a horizontal surface with its center at the filament position center. The test circle can be increased in size to extend beyond horizontal blockages created by hoods, buckets, blades, etc.

3.3 Visibility Map—The area within the test circle on which a shadow is created because a part of the base machine and/or its equipment blocks the light rays from both of the filaments. This area is defined by locating the blockage points at the intersection of adjoining surfaces and connecting these points (see Section 6).

3.4 Sector of Vision (Front)—Segment of the visibility test circle to the front of the machine with a cord length of 9.50 m centered to the filament center-point.

3.5 Field of Vision (Front Side)—Segments of the visibility test circle to the front of the machine outside the sector of vision and bounded by the transverse plane through the filament center-point.

3.6 Visual Field (Rear)—Segment of the visibility test circle to the rear 45 degrees to each side of the filament center-point.

3.7 Field of View (Rear Side)—Segments of the visibility test circle to the rear between the visual field and the fields of vision.

3.8 Horizontal Blockage—A blockage that the light source is above and the light can be seen on the ground.

3.9 Vertical Blockage—A blockage that extends above the light source.

4. Test Apparatus

4.1 Light Source—Consisting of two halogen bulbs (or equivalent) mounted with the filaments vertical. The fixture shall be such that the center-point of the filaments is at the location defined in 3.1. Each filament should be 32.5 mm on each side of the filament position center-point, and rotatable. Additional degrees of movement are allowed such as specified in SAE J1091 but must be noted on the test drawing.

4.2 Test Surface—An area of compacted earth or paved surface which has no more than a 3% gradient in any direction.

5. Machine Test Configuration

5.1 The machine shall be equipped according to the manufacturer's specification.

5.2 All machine openings such as doors and windows shall be closed.

5.3 The machine shall be set up according to the specific information given in Appendix A of SAE J1091 for each type of machine.

6. Measurement Procedure

6.1 Place the machine on the test surface and mark the test circle on the test surface. If desired, the test can be limited to only a portion of the circle. If this is done, it should include complete segments (sectors). This is identical to SAE J1091.

6.2 With the light bulbs spaced at 32.5 mm either side of the filament position center-point, rotate the light source to be perpendicular to the intersection of two blockage surfaces. Mark this intersection point on the test surface. Using the same technique, continue around the machine marking all the intersection points of the blocking surfaces or a blocking surface and test circle.

6.3 The visibility map is completed by recording the intersection points and connecting lines between these points.

6.4 Testing can include other light spacings as provided in SAE J1091 and these spacings shall be recorded on the test results.

6.5 Total segments (sectors) shall be included in the tests even when the change being evaluated affects only a portion of the segment (sector). This is identical to SAE J1091.

7. Test Report—The test report shall include the information indicated in 7.1 and 7.2.

7.1 Machines Details

a. Manufacturer
b. Model
c. Machine mass or rated payload
d. Product identification number
e. Operator enclosure and/or ROPS description or identification
f. Equipment installed on the machine
g. Any other information which affects the masking measurements

7.2 Drawing—The drawing shall show the maskings on and within the visibility test circle in the segments (sectors) being evaluated. An outline of the machine shall be included for orientation purposes. If light spacings besides that specified in 6.2 are used, they shall be identified on the drawing. A drawing of a large loader is shown in Figure 1.