



SURFACE VEHICLE STANDARD

J2267™

APR2024

Issued 2007-04
Reaffirmed 2017-10
Revised 2024-04

Superseding J2267 OCT2017

Minimum Performance Criteria for Operator Front Protective Structure (OFPS) for Certain Equipment

RATIONALE

SAE J2267 is being revised to update the figures and align the content with related industry OPS standards.

1. SCOPE

- 1.1 This SAE Standard applies to all forestry machines exposed to the hazard of objects penetrating the front of the operator station (other than the roof). This would include:
 - 1.1.1 Front guards for yarders with cabs mounted next to the tower.
 - 1.1.2 Front guards for forestry machines capable of handling material in front of and above the deflection limiting volume (DLV), such as knuckle boom log loaders and swing to tree feller bunchers but excluding rubber-tired or tracked front-end loaders when equipped with buckets or forks with hold down grapple arm(s) and excluding forwarders and clambunk skidders fitted with load bunk headboards meeting the requirements of ISO 11850.
- 1.2 The evaluations are for resistance to penetration of guards or deflection to the point of infringement of the deflection limiting volume (DLV) (refer to SAE J397). The performance requirements of a representative specimen (that is, within the manufacturer's specifications) are based on the performance of proven structures under laboratory evaluation procedures.
- 1.3 The purpose of an operator front protective structure (OFPS) is to protect the operator from boom and load collapse, or head-on collision or impact with logs handled by the machine with the least adverse effect on operator visibility and comfort.
- 1.4 Although OFPS meeting the following criteria may not give protection under all conceivable circumstances in which the machine could be struck from the front, it is expected that protection will be ensured under at least the loading condition specified in the test listed in Section 6.
- 1.5 The protection provided by this document is intended to supplement, but not replace, other types of protection provided by other standards, such as ISO 8084.
- 1.6 The purpose of this document is to establish a consistent, repeatable test procedure and performance requirements for evaluating OFPS intended to provide forestry machine operators with reasonable protection from falling or swinging objects, such as logs.

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2024 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

For more information on this standard, visit

https://www.sae.org/standards/content/J2267_202404/

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J397	Deflection Limiting Volume - Protective Structures Laboratory Evaluation
SAE J1119	Steel Products for Rollover Protective Structures (ROPS) and Falling Object Protective Structures (FOPS)
SAE J1209	Identification Terminology of Mobile Forestry Machines
SAE J3097Z26	Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways - Safety Standard

2.1.2 ISO Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

ISO 3471	Earth-moving machinery - Roll-over protective structures - Laboratory tests and performance requirements
----------	--

3. FACILITIES AND APPARATUS

3.1 Facilities for Static Test

- 3.1.1 Standard laboratory penetration test object, made of steel, with the shape of the tapered end of the object in Figure 1. The object length shall be at least 75 mm (3 inches).
- 3.1.2 A means of pushing the test object into the front guard.
- 3.1.3 A means of measuring the force exerted to push the object into the front guard.
- 3.1.4 A means of determining if the OFPS or drop test object enters the DLV during the drop test. This may be either of the following.
 - 3.1.4.1 A DLV made of a material which will indicate any penetration by the OFPS. Grease or a similar substance may be put on either the surface of the OFPS guard adjacent to the DLV, or on the surface(s) of the DLV adjacent to the OFPS, to indicate such penetration.
 - 3.1.4.2 A dynamic instrumentation system of sufficient frequency response to indicate the pertinent deflection with respect to the DLV ($\pm 5\%$).
- 3.1.5 A means of simultaneously measuring the deflection distance and the force used to push the object into the OFPS.

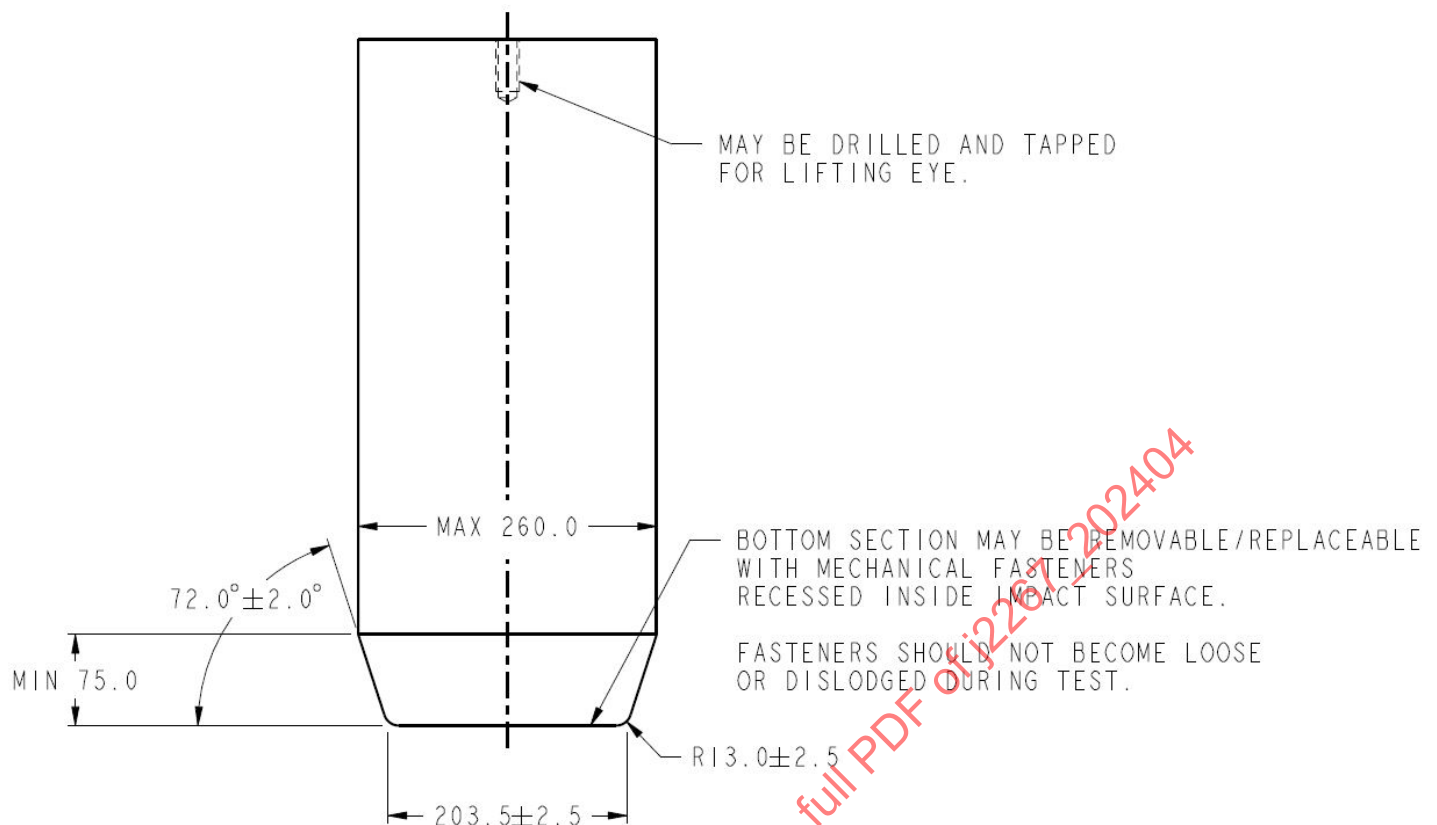


Figure 1 - Standard laboratory drop test object

3.2 Facilities for Optional Dynamic Test

- 3.2.1 A drop test object, made of steel, with a mass not less than 226.8 kg (500 pounds), as shown in Figure 1.
- 3.2.2 A means of raising the drop test object to the required height.
- 3.2.3 A means of releasing the drop test object so that it falls without restraint.
- 3.2.4 A surface of such firmness that it shall not be penetrated by the machine or test bed under the loading of the drop test.
- 3.2.5 A means of determining if the OFPS or drop test object enters the DLV during the drop test, as described in 3.1.4.

4. MACHINE OR TEST BED CONDITION

- 4.1 The OFPS to be tested must be attached to the machine structure in the same manner as it will be attached during machine use. A totally assembled machine is not required; however, the machine structure and frame which support the OFPS must represent the actual machine installation, and the stiffness of the structure and frame must not be less than that of an actual machine.
- 4.2 All detachable panels not part of the OFPS which might be removed on an operating machine shall be removed so that they do not contribute to the strength of the OFPS.
- 4.3 If glazing material is used it may be removed for the test.
- 4.4 Test specimens shall be representative of units within the manufacturer's specifications.

5. TEST PROCEDURE

5.1 Static Test

- 5.1.1 The small end of the appropriate laboratory penetration test object shall be placed against the OFPS at the location designated in 5.1.2 to 5.1.4.
- 5.1.2 The small end of the drop test object is to be entirely within the perpendicular projection of the DLV on the OFPS being tested (front or side).
- 5.1.3 Should the perpendicular projection of the DLV on the front guard be divided into two or more segments by perpendicular projections of major structural members, the directions of 5.1.2 and 5.1.4 shall apply to each segment (see Figure 2). If the cab is equipped with a sloped roof type skylight, this area is not considered part of the OFPS unless the angle between the skylight and horizontal exceeds 15 degrees.
- 5.1.4 Within the limitation of 5.1.2, the test object shall be so placed that it has the least possible distance from the centroid of the OFPS (front or side).
- 5.1.5 The object shall be pushed in a plane perpendicular to the OFPS surface at the location(s) indicated in 5.1.2 and 5.1.3.
- 5.1.6 The rate of deflection shall be such that the loading can be considered static. The rate of load application can be considered static provided the rate of deflection at the load application point is not greater than 5 mm/s (0.2 in/s).
- 5.1.7 Force and deflection at deflection increments no greater than 15 mm (0.6 inch), measured at the point of application of the load, shall be recorded.
- 5.1.8 Loading shall continue until the OFPS has achieved the energy requirements given in 6.1. See Figure 3 for the method of calculating energy. The deflection used in calculating energy shall be the displacement of the OFPS along the line of action of the force. The line of action of the load object shall be maintained within a circle of 50 mm (2 inch) radius of the initial contact point.

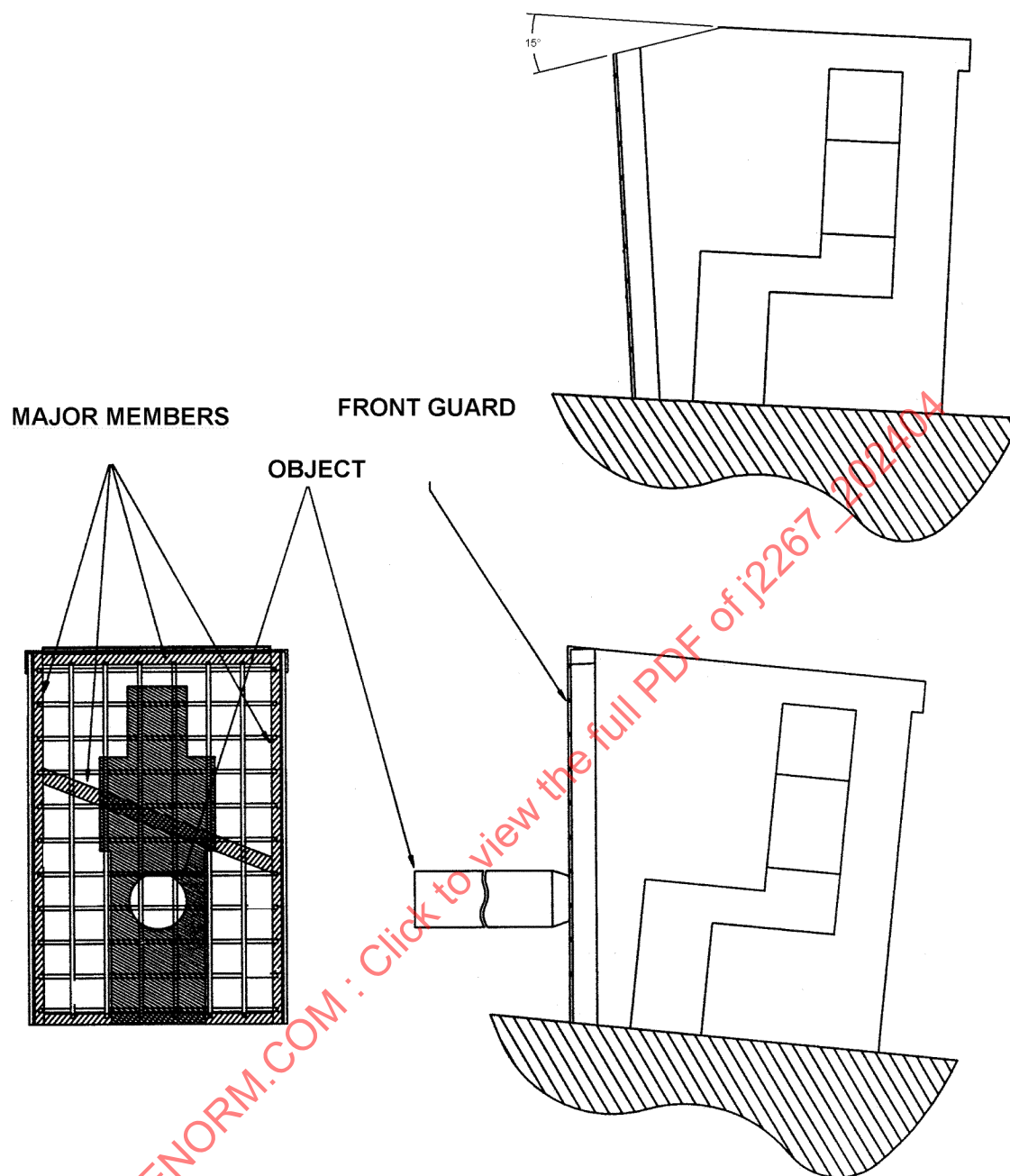


Figure 2 - Drop test impact point

5.2 Optional Dynamic Test

- 5.2.1 With the small end down, the drop test object shall be positioned so that it strikes the OFPS perpendicular to the surface of the OFPS being tested and at the locations designated in 5.1.2, 5.1.3, and 5.1.4.
- 5.2.2 The drop test object shall be raised vertically 5.2 m above the position indicated in 5.1.2, 5.1.3, and 5.1.4.
- 5.2.3 The drop test object shall be released so that it falls without effective restraint onto the OFPS.
- 5.2.4 As it is unlikely that the free fall will result in the object hitting at the location and/or in the attitude of 5.2.1 and 5.2.2, the following limits are placed on deviations.

- 5.2.4.1 The initial impact of the small end of the drop test object shall be entirely within a circle of 200 mm (8 inch) radius. The center of this circle is to coincide with the vertical center line of the drop test object as positioned per 5.2.1 through 5.2.4.
- 5.2.4.2 The first impact between the drop test object and the OFPS shall be only along the small end of the drop test object and or the radius contiguous to that end (see Figure 1).
- 5.2.4.3 There is no limitation on location or attitude of subsequent impacts.

NOTE: It is the intent of the recommended practice to impose the most severe test condition of the OFPS.

6. PERFORMANCE REQUIREMENTS

- 6.1 During static testing, the DLV shall not be entered by any deflection of the OFPS or the penetration test object up to an absorbed energy level of 11526 J (8500 ft-lb).
- 6.2 During optional dynamic testing, the DLV shall not be entered by any deflection of the OFPS or the drop test object under the first, or any subsequent impacts of the test object.
- 6.3 The test shall be performed with the OFPS guard at -18 °C (0 °F) or below, or the material used in the OFPS guard shall exhibit one of the Charpy V notch impact strengths at -30 °C (-20 °F) shown in Table 1. SAE J1119 presents more data on specifics of CVN requirements of Table 1. SAE J1119 also gives information on chemistries, manufacturing processes, and tensile properties of steel suitable for use in OFPS, but only the CVN impact strengths are the mandatory requirement of the OFPS material option.
- 6.4 If safety glazing materials are used as part of the OFPS it shall meet the criteria of SAE J3097Z26 except that safety glazing materials meeting the specifications of test groups 4 and 5 may be used anywhere in the machine including the front windshield.
- 6.5 The cab must remain attached to the machine or representative structure throughout the test.

7. LABELING

- 7.1 The OFPS shall be labeled in the manner defined in either ISO 8082-1 or ISO 8082-2, except indicating this standard. The protection afforded (operator front protection) should be described in the operator's manual and/or referenced on the label.