



SURFACE VEHICLE RECOMMENDED PRACTICE

J1356™

SEP2022

Issued 1988-02
Reaffirmed 2013-03
Revised 2022-09

Superseding J1356 FEB2022

Minimum Performance Criteria for Falling Object Guards for Excavators

RATIONALE

Recently published standard does not specify a laboratory drop test object mass for the FOPS guard. This is in error and needs to be corrected.

1. SCOPE

- 1.1 This SAE Recommended Practice applies only to excavators, as defined in ISO 6165, working above ground, near an excavated or free-standing bank or mine face which is higher than the top of the cab, or in demolition applications of freestanding buildings or objects higher than the top of the cab.
- 1.2 The evaluations are for resistance to penetration of guards 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 areas protected include the top of the operator station (top guard), for protection from falling objects, and the front of the operator station (front guard), for protection from objects which approach the front of the cab.
- 1.4 Although falling object guards meeting the following criteria may not give crush protection under all conceivable circumstances in which the machine could be struck from above or the front, it is expected that crush protection will be ensured under at least the loading condition specified in the tests listed in Section 5.

1.5 Purpose

This document establishes a consistent, repeatable test procedure and performance requirements for evaluating guards intended to provide excavator operators with reasonable protection from falling objects such as rocks.

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Full document details: SAE J1356_202209

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Documents

Document Sharing Hub

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of the 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)

2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A370 Test Methods and Definitions for Mechanical Testing of Steel Products

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 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 J2267 Minimum Performance Criteria for Operator Front Protective Structure (OFPS) for Certain Equipment

2.2.2 ISO Publications

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

ISO 10262 Earth-Moving Machinery - Hydraulic Excavators - Laboratory Tests and Performance Requirements for Operator Protective Guards

ISO 3449 Earth-Moving Machinery - Falling-Object Protective Structures - Laboratory Tests and Performance Requirement

ISO 6165 Earth-Moving Machinery - Basic Types - Identification and Terms and Definitions

3. FACILITIES

3.1 Top Guard

3.1.1 A standard laboratory drop test object, made of steel, with a mass not less than 226.8 kg (500 pounds), as shown in Figure 1.

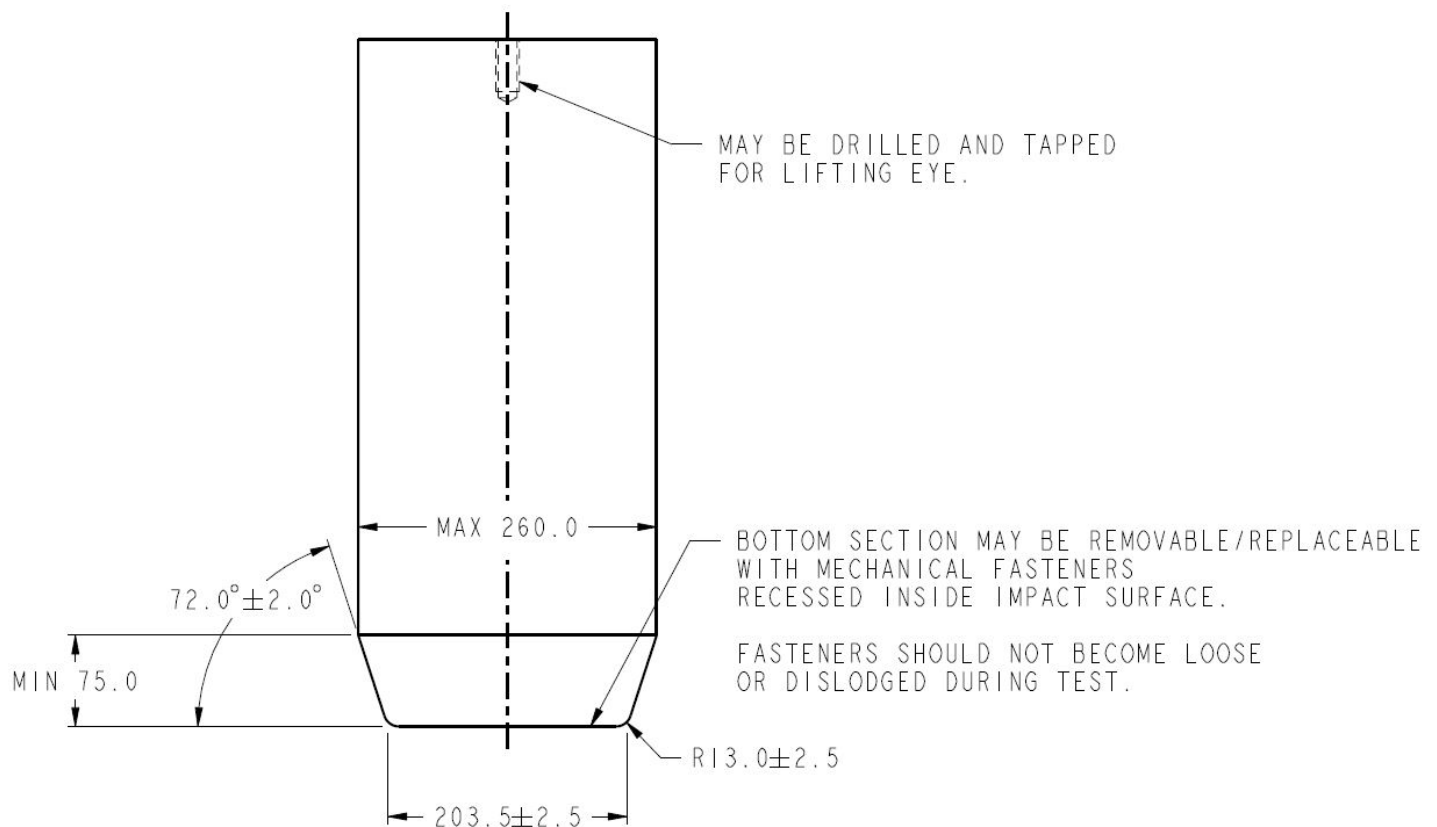


Figure 1 - Drop test object

- 3.1.2 A means of raising the object to the required height.
- 3.1.3 A means of releasing the object so that it falls without restraint.
- 3.1.4 A surface of such firmness that it will not be penetrated by the machine or test bed under the loading of the drop test.
- 3.1.5 A means of determining if the test object or top guard enters the DLV, during the drop test. This may be either of the following:
 - 3.1.5.1 A DLV in the upright attitude, made of material which will indicate any penetration by the test object or top guard. The DLV should be fixed firmly to the same part of the machine to which the operator seat is secured. Grease or similar substance may be put either on top of the DLV or on the lower surface of the Top guard cover to indicate penetration.
 - 3.1.5.2 A dynamic instrumentation system of sufficient frequency response to indicate the pertinent deflection with respect to the DLV.
- 3.2 Front Guard
 - 3.2.1 A 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 sufficient to avoid a diameter larger than 260 mm making contact with front guard during test.
 - 3.2.2 A means of pushing the object into the front guard.
 - 3.2.3 A means of measuring the force exerted to push the object into the front guard.