SURFACE VEHICLE STANDARD

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Superseding J1388 JUL2019

Personnel Protection - Skid Steer Loaders

RATIONALE

This Standard was revised to align with the applicable requirements in the recent revision of ISO 20474-1 and ISO 20474-3.

SAE J1388 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Standard is intended to provide personnel protection guidelines for skid steer loaders. This document is intended as a guide towards standard practice, but may be subject to frequent change to keep pace with experience and technical advances. This should be kept in mind when considering its use. This document provides performance criteria for newly manufactured loaders and it is not intended for in-service machines.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision 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 J1042 Operator Protection for General-Purpose Industrial Machines

SAE J2292 Combination Pelvic and Upper Torso Operator and Occupant Restraint Systems for Off-Road Work Machines

2.1.2 ANSI Accredited Publications

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

ANSI/SAE Z26.1 American National Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways - Safety Standard

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/J1388_202408/

2.1.3 ISO Publications

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

ISO 2867	Earth-Moving Machinery - Access Systems
ISO 3411	Earth-Moving Machinery - Physical Dimensions of Operators and Minimum Operator Space Envelope
ISO 3449	Earth-Moving Machinery - Falling-Object Protective Structures - Laboratory Tests and Performance Requirements
ISO 3450	Earth-Moving Machinery - Wheeled or High-Speed Rubber-Tracked Machines - Performance Requirements and Test Procedures for Brake Systems
ISO 3457	Earth-Moving Machinery - Guards - Definitions and Requirements
ISO 3471	Earth-Moving Machinery - Rollover Protective Structures - Laboratory Tests and Performance Requirements
ISO 5006	Earth-Moving Machinery - Operator's Field of View - Test Method and Performance Criteria
ISO 5353	Earth-Moving Machinery, and Tractors and Machinery for Agriculture and Forestry - Seat Index Point
ISO 6165	Earth-Moving Machinery - Basic Types - Identification and Terms and Definitions
ISO 6405-1	Earth-Moving Machinery - Symbols for Operator Controls and Other Displays - Part 1: Common Symbols
ISO 6405-2	Earth-Moving Machinery - Symbols for Operator Controls and Other Displays - Part 2: Symbols for Specific Machines, Equipment and Accessories
ISO 6682	Earth-Moving Machinery - Zones of Comfort and Reach for Controls
ISO 6683	Earth-Moving Machinery - Seat Belts and Seat Belt Anchorages - Performance Requirements and Tests
ISO 6750	Earth-Moving Machinery - Operator's Manual - Content and Format
ISO 7131	Earth-Moving Machinery - Loaders - Terminology and Commercial Specifications
ISO 9244	Earth-Moving Machinery - Machine Safety Labels - General Principles
ISO 9533	Earth-Moving Machinery - Machine-Mounted Audible Travel Alarms and Forward Horns - Test Methods and Performance Criteria
ISO 10265	Earth-Moving Machinery - Crawler Machines - Performance Requirements and Test Procedures for Braking Systems
ISO 10533	Earth-Moving Machinery - Lift-Arm Support Devices
ISO 10968	Earth-Moving Machinery - Operator's Controls
ISO 12508	Earth-Moving Machinery - Operator Station and Maintenance Areas - Bluntness of Edges
ISO 12509	Earth-Moving Machinery - Lighting, Signalling and Marking Lights, and Reflex-Reflector Devices
ISO 13031	Earth-Moving Machinery - Quick Couplers - Safety
ISO 13333	Earth-Moving Machinery - Dumper Body Support and Operator's Cab Tilt Support Devices

ISO 14397-1 Earth-Moving Machinery - Loaders and Backhoe Loaders - Part 1: Calculation of Rated Operating Capacity and Test Method for Verifying Calculated Tipping Load

ISO 14397-2 Earth-Moving Machinery - Loaders and Backhoe Loaders - Part 2: Test Method for Measuring Breakout Forces and Lift Capacity to Maximum Lift Height

ISO 14401-1 Earth-Moving Machinery - Field of Vision of Surveillance and Rear-View Mirrors - Part 1: Test Methods

ISO 14401-2 Earth-Moving Machinery - Field of Vision of Surveillance and Rear-View Mirrors - Part 2: Performance Criteria

ISO 15818 Earth-Moving Machinery - Lifting and Tying-Down Attachment Points - Performance Requirements

ISO 16001 Earth-Moving Machinery - Object Detection Systems and Visibility Aids - Performance Requirements and Tests

ISO 24410 Earth-Moving Machinery - Coupling of Attachments to Skid Steer Loaders

3. DEFINITIONS

3.1 LOADER

A “loader” is a self-propelled crawler or wheeled machine, having front-mounted equipment primarily designed for loading operation (bucket use), which loads or excavates through forward motion of the machine.

NOTE: A loader work cycle normally comprises filling, elevating, transporting, and discharging material.

3.2 SKID STEER LOADER

A “skid steer loader” is a loader normally having an operator station between or to the side of the attachment-supporting structure(s) and steered by using variation of speed and/or direction of rotation between traction drives on opposite sides of a machine with fixed axles with wheels or with tracks.

NOTE: The component nomenclature is identified in ISO 7131. Earth-moving machinery definition is found in ISO 6165.

3.3 GUARD OR SHIELD

A “guard” or “shield” is a barrier that is intended to prevent inadvertent contact with a potential hazard during normal operation and servicing.

3.4 MOVING MACHINERY PART HAZARD

“Moving machinery part hazard” is a source of potential injury by direct contact or entanglement. This includes, but is not limited to, the projections on rotating parts and the nip points at the acute entry angle of power driven gears, belts, and chains.

3.5 NIP POINT

“Nip point” means the pinch point of gears and the run-on point where a belt or chain contacts a sheave, sprocket, or idler.

3.6 GUARDED BY LOCATION

“Guarded by location” means a component is guarded during normal operation and servicing when, because of its location, no person can inadvertently come in contact with the potential hazard.

3.7 SIDE SCREENS

“Side screens” are barriers that cover the side openings of an operator cab.

3.8 NORMAL OPERATION

"Normal operation" is the reasonable use of the loader by a trained person using attachments as approved by the loader manufacturer.

3.9 FIELD MAINTENANCE

"Field maintenance" is a service performed in accordance with the operator manual, field service manual, or machine sign.

3.10 APPROVED LIFT ARM SUPPORT DEVICE

"Approved lift arm support device" is a mechanical device approved by the manufacturer, used to prevent accidental lowering of the lift arms when the lift arms are required to be held in the elevated position for maintenance, service, or purpose other than loader operation.

3.11 QUICK COUPLER

"Quick coupler" is a device mounted on the skid steer loader's lift arms to allow the quick interchange of attachments.

4. OPERATION INSTRUCTIONS

General operator instructions and field maintenance procedures shall be provided by manuals and/or machine signs attached to the loader. Manuals should use ISO 6750 as a guideline. A space intended for storing the operator's manual and other instructions shall be provided in the operator cab.

4.1 Instructions shall be included for loading, traveling, and dumping. Information shall be included regarding the effects of changes of motion and of field conditions such as a slope.

4.2 Instructions shall be provided for transporting the loader.

4.3 Instructions shall be given for lifting the loader as a total unit.

4.4 Instructions shall be provided for field maintenance.

5. OPERATION

5.1 Movement of operator controls shall be in accordance with ISO 10968. It is not necessary to have neutral interlocks or steering controls with a secondary motion when passing through neutral.

5.2 Controls should be identified. If symbols are used, they should be in accordance with ISO 6405-1 and ISO 6405-2.

5.3 Handholds, steps, or other means to facilitate entry and exit from the loader operator's position shall be provided and comply with ISO 2867.

5.4 Location of operator seat and controls should be within guidelines established by ISO 6682 and ISO 5353.

5.5 Rated operating capacity shall be in accordance with ISO 14397-1 and ISO 14397-2. Tipping load is defined by ISO 14397-1.

5.6 If the engine is stopped, it shall be possible to lower the attachment to the ground or the lift arms to the frame of the skid steer loader, if not equipped with an attachment, from the operator cab.

6. OPERATOR CONSTRAINTS

6.1 Loaders shall be equipped with Type 1 seat belt systems which meet ISO 6683 requirements. Type 2 seat belt systems, if provided, shall meet SAE J2292.

6.2 A means to prevent lift arm movement, quick coupler pivoting and activation of the drive system when the operator is entering or exiting shall be provided.

7. OPERATOR GUARDS AND SHIELDS

7.1 The following shall be shielded or guarded by location.

7.1.1 Nip point of exposed gears, belts, and chain drives.

7.1.2 Outside faces of pulleys, sheaves, sprockets, cooling fans, and gears that rotate when the engine is running with all clutches disengaged.

7.1.3 Rotating parts with projections such as exposed bolts, keys, or set screws.

7.1.4 Revolving shafts, except smooth shaft ends, protruding less than one-half the outside diameter of the shaft.

7.2 Fluid System Shielding

7.2.1 Batteries, fuel tanks, oil reservoirs, and coolant systems should be constructed, located, or sealed per guidelines in SAE J1042.

7.3 Guard Design

7.3.1 Guards and shields shall comply with ISO 3457.

7.3.2 Guards which must be opened for frequent lubrication or inspection such as required for field maintenance, shall be hinged or otherwise permanently attached and latched.

8. OPERATOR CAB

8.1 Skid steer loaders shall be provided with suitable cabs with side screens as follows:

8.1.1 A rollover protective structure (ROPS) which complies with ISO 3471 and is labeled accordingly.

8.1.2 A falling object protective structure (FOPS) which complies with ISO 3449 Level 1.

8.1.3 If ROPS or side screens/side windows are capable of being removed, a warning sign to reinstall them before operating the loader shall be attached to part of the loader which is not removed. A sign shall also be attached to the machine warning against modifying equipment.

8.1.4 Operator cab shall have at least two openings for emergency exit, one of which can be the normal operator entrance. They shall conform to ISO 2867.

8.1.5 Glazing material, such as glass or plastic used in cabs, shall be in accordance with ANSI/SAE Z26.1, ECE R43, or similar.

8.1.6 All edges, corners, or other projections that might be contacted by a 95th percentile male operator restrained by a tight seat belt shall comply with ISO 12508.

8.1.7 The operator space envelope shall comply with ISO 3411.

8.1.8 Loader visibility shall be evaluated from the operator's position as defined by the manufacturer according to ISO 5006.