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Machinery for forestry — Self-propelled machinery — Safety

Matériel forestier — Machines automotrices — Sécurité

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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Introduction

The purpose of this International Standard is to provide acceptably safe machines and conditions for the operator and others during normal machine operation and routine maintenance. Some of the factors, outside the scope of this International Standard, which have a significant effect upon safety are operator and service personnel training, experience and careful practice.

Deviations from these requirements are permissible to allow technological advances in machine systems and designs. In complying with this International Standard, the following three safety principles apply in the following order based upon their feasibility:

— eliminate potential hazards, by machine design;

— guard against contact with sources of potential safety hazards if elimination by design is not feasible;

— warn of potential safety hazards if neither of the above is feasible.

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Machinery for forestry — Self-propelled machinery — Safety

1 Scope

This International Standard specifies general safety requirements for specially designed self-propelled forestry machines defined in ISO 6814:1983, clause 4, and machines adapted for forestry applications when operating on work sites or transporting between sites.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2860:1992, *Earth-moving machinery — Minimum access dimensions.*

ISO 2867:1994, *Earth-moving machinery — Access systems.*

ISO 3411:1995, *Earth-moving machinery — Human physical dimensions of operators and minimum operator space envelope.*

ISO 3450:1996, *Earth-moving machinery — Braking systems of rubber-tyred machines — Systems and performance requirements and test procedures.*

ISO 3457:1986, *Earth-moving machinery — Guards and shields — Definitions and specifications.*

ISO 3600:1996, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and presentation.*

ISO 3767-1:—[1], *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols.*

ISO 3767-4:1993, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 4: Symbols for forestry machinery.*

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials.*

1) To be published. (Revision of ISO 3767-1:1991)

ISO 4254-1:1989, *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 1: General.*

ISO 4254-4:1990, *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 4: Forestry winches.*

ISO 5006-1:1991, *Earth-moving machinery — Operator's field of view — Part 1: Test method.*

ISO 5006-2:1993, *Earth-moving machinery — Operator's field of view — Part 2: Evaluation method.*

ISO 5010:1992, *Earth-moving machinery — Rubber-tyred machines — Steering requirements.*

ISO 5131:1996, *Acoustics — Tractors and machinery for agriculture and forestry — Measurement of noise at the operator's position — Survey method.*

ISO 6394:1985, *Acoustics — Measurement of airborne noise emitted by earth-moving machinery — Operator's position — Stationary test condition.*

ISO 6405-1:1991, *Earth-moving machinery — Symbols for operator controls and other displays — Part 1: Common symbols.*

ISO 6682:1986, *Earth-moving machinery — Zones of comfort and reach for controls.*

ISO 6683:1981, *Earth-moving machinery — Seat belts and seat belt anchorages.*

ISO 6687:1994, *Machinery for forestry — Winches — Performance requirements.*

ISO 6750:1984, *Earth-moving machinery — Operation and maintenance — Format and content of manuals.*

ISO 6814:1983, *Machinery for forestry — Mobile and self-propelled machinery — Identification vocabulary.*

ISO 8082:1994, *Self-propelled machinery for forestry — Roll-over protective structures — Laboratory tests and performance requirements.*

ISO 8083:1989, *Machinery for forestry — Falling-object protective structures — Laboratory tests and performance requirements.*

ISO 8084:1993, *Machinery for forestry — Operator protective structures — Laboratory tests and performance requirements.*

ISO 9244:1995, *Earth-moving machinery — Safety signs and hazard pictorials — General principles.*

ISO 10262:— [2], *Earth-moving machinery — Hydraulic excavators — Laboratory tests and performance requirements for operator protective guards.*

ISO 10263-2:1994, *Earth-moving machinery — Operator enclosure environment — Part 2: Air filter test.*

ISO 10263-3:1994, *Earth-moving machinery — Operator enclosure environment — Part 3: Operator enclosure pressurization test method.*

ISO 10263-4:1994, *Earth-moving machinery — Operator enclosure environment — Part 4: Operator enclosure ventilation, heating and/or air-conditioning test method.*

ISO 10532:1995, *Earth-moving machinery — Machine mounted retrieval device — Performance requirements.*

ISO 10533:1993, *Earth-moving machinery — Lift-arm support devices.*

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2) To be published.

ISO 10570:1992, *Earth-moving machinery — Articulated frame lock — Performance requirements.*

ISO 10968:1995, *Earth-moving machinery — Operator's controls.*

ISO 11112:1995, *Earth-moving machinery — Operator's seat — Dimensions and requirements.*

ISO 11169:1993, *Machinery for forestry — Wheeled special machines — Vocabulary, performance test methods and criteria for brake systems.*

ISO 11512:1995, *Machinery for forestry — Tracked special machines — Performance criteria for brake systems.*

ISO 11684:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles.*

ISO 12508:1994, *Earth-moving machinery — Operator station and maintenance areas — Bluntness of edges.*

ISO 12509:1995, *Earth-moving machinery — Lighting, signalling and marking lights, and reflex-reflector devices.*

ISO 15078:— [3], *Machinery for forestry — Log loaders — Location and method of operation of two-lever operator controls.*

ECE R43, *Uniform provisions concerning the approval of safety glazing and glazing material.*

ANSI Z26.1-1990, *Safety glazing materials for glazing motor vehicles, operating on land highways.*

3 Definitions

For the purposes of this International Standard the definitions given in ISO 6814 apply.

4 Requirements

4.1 Operator station

4.1.1 Operator space envelope

The design and arrangement shall allow the operator to perform all normal operations at each operating position without equipment or working attachments infringing on the operator space envelope defined in ISO 3411:1995, clause 5, or the space required for operation of the controls, see 4.5. Adequate space shall be provided for rotating the seat between operating positions.

4.1.2 Operator protection

4.1.2.1 Roll-over protective structure (ROPS) and falling-object protective structure (FOPS)

Skidders, forwarders, fellers, log loaders and multiple function versions of these machines shall provide ROPS and FOPS protection for the operator. The ROPS shall meet the requirements of ISO 8082. The FOPS shall meet the requirements of ISO 8083.

Machines with a boom operating in a vertical plane beside the operator's station, both of which are mounted on a rotating platform, are excluded from the requirements for ROPS. These machines shall be provided with front and overhead falling object guards meeting the requirements of category 2 of ISO 10262:—.

3) To be published.

4.1.2.2 Operator protective structure (OPS)

4.1.2.2.1 Skidders, forwarders, fellers and similar machines used for harvesting trees shall be equipped with an OPS which completely encloses the operator's station with solid material, screen, bars or glazing while maintaining adequate visibility. Protective screens shall have a maximum opening of 45 mm x 45 mm with 6 mm woven wire mesh or equivalent construction not allowing an object of at least 45 mm diameter to penetrate. The OPS shall meet the requirements of ISO 8084.

Device(s) to deflect saplings and branches shall be installed ahead of or behind the operator's station, as appropriate.

The operator shall be protected from hazards caused by failed chains, teeth, and similar failures.

Guards, bars, or screens provided for OPS window protection shall be constructed to allow manual cleaning of the windows. It is important to design the OPS to minimize adverse effects on operator visibility, comfort and protection from other hazards.

4.1.2.2.2 All machines equipped with winches or subject to breaking lines shall be equipped with protective screens and/or glazing meeting the performance requirements of ISO 8084 between the operator and the lines.

4.1.2.3 Seat belt

4.1.2.3.1 All machines equipped with ROPS shall be equipped with a seat belt system meeting the requirements of ISO 6683. When not in use, seat belts shall have a device to keep them off the floor.

4.1.2.3.2 Seat belts shall be labelled with a permanent and legibly marked label on the belt bearing the year of manufacture, model number, name of manufacturer or importer/distributor and a statement of compliance with ISO 6683.

4.1.2.4 Load bunk front guard

The load bunk of all tree and log transporting machines shall be equipped with front guard capable of withstanding a force of 35 000 N applied at any point perpendicular to the face of the structure. Permanent deformation shall be negligible. A 100 mm diameter log (object) shall not pass through the load bunk front guard. The minimum height shall be equal to the height of the operator station covering such as the cab roof or the OPS. The test object shall conform to ISO 8084:1993, subclause 4.1.2.

4.1.2.5 Glazing

The glazing used shall meet the requirements of ECE R43 or ANSI Z26.1 with the following exceptions:

a) If a machine's maximum travel speed is 40 km/h or less, windshield glazing is permitted according to ECE R43, annex 5 or ANSI Z26.1-1990, section 4, item 2.

b) Safety glazing plastic materials meeting the specifications of ANSI Z26.1-1990, sections 4 or 5, may be used anywhere in the machine including the front windscreen. If wipers are to be used, the glazing surface shall be hard coated.

Glazing provided for operator protection (OPS) shall meet the requirements specified in 4.1.2.2.

4.1.2.6 Fumes, spillage, hot surfaces and sharp edges

A person in the operator station shall be protected according to the following:

a) Engine exhaust and harmful gases from heating systems shall be directed away from the operator station including any of its air intakes.

b) Fuel fillers and other fluid fillers shall be located outside the operator station. The design, sealing and location of these fillers shall be chosen to minimize the potential for spillage into the operator's station.

c) Battery location(s) shall minimize the possibility of fumes and acid entering the operator's station, even in the event of an overturn.

d) Pressurized hydraulic or water hoses and tubes containing fluids over 5 000 kPa pressure or over 50 °C temperature and locating within 50 cm of the operator while in the operating position shall be shielded to protect the operator from hazards of leaks, burst and direct contact.

e) Edges, corners, or sharp projections that may cause inadvertent injury shall meet the requirements of ISO 12508.

4.1.3 Operator comfort

4.1.3.1 Seat

Forestry machines shall be fitted with a seat to position the operator for comfortable and stable operation of the machine controls. Seat dimensions and adjustment ranges shall be as in ISO 11112:1995, figure 1 and table 1.

4.1.3.2 Sound levels

Sound levels at the operator's ear shall be measured in accordance with ISO 6394 or ISO 5131:1996, annex D.

4.1.3.3 Operator environment

If heating and/or air conditioning are provided, they shall meet the performance requirements of ISO 10263-4.

A cab pressurization system shall provide a positive pressure of at least 50 Pa inside the cab when measured in accordance with ISO 10263-3.

A cab filtration system shall remove at least 98 % by weight of dust when measured in accordance with ISO 10263-2.

4.2 Access to operator station and service locations

Access to the operator station and service locations shall meet the following requirements:

a) Access shall permit a person to achieve three points of support if the platform or work surface is elevated more than 1 m above the ground. The access shall meet the requirements of ISO 2860 and ISO 2867. Hand grasp and foot placement surfaces shall be slip resistant and steps shall minimize accumulation of debris, mud, snow, etc.

b) The access system shall minimize the possibility that controls will be used as handholds.

c) The entrance opening dimensions shall comply with ISO 2867. On cab or partial enclosure equipped machines, a minimum of two openings on different cab surfaces shall be provided, one of which, the primary opening, shall meet the entrance dimensions and the other, the emergency exit, shall have dimensions as specified in ISO 2860. If the two required openings are enclosed by doors, windows or screens, they shall be openable. Locks are allowed on these openings providing they can be unlocked or opened from the inside.

d) Hinged doors, lids or hoods shall have a device to retain them in the open and shut positions if the size or weight create a hazard.

e) Service and maintenance openings shall be dimensioned according to ISO 2860.

f) When components or attachments must be held in the raised position for service or maintenance, a mechanical support device meeting the requirements of ISO 10533 shall be provided on the machine.

g) Articulated frame locks shall comply with ISO 10570.

h) Sharp edges and acute angles shall meet the requirements of ISO 12508.