



SLOVENSKI STANDARD
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Gozdarski stroji - Stroji z lastnim pogonom - Varnostne zahteve

Forest machinery - Self propelled machinery - Safety requirements

Forstmaschinen - Selbstfahrer - Sicherheitsanforderungen

Machines forestieres - Machines automotrices - Prescriptions de securité

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Forest machinery - Self propelled machinery - Safety requirementsMachines forestières - Machines automotrices -
Prescriptions de sécurité

Forestmaschinen - Selbstfahrer - Sicherheitsanforderungen

This European Standard was approved by CEN on 1 April 2004.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 14861:2004) has been prepared by Technical Committee CEN/TC 144 "Tractors and machinery for agriculture and forestry", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2005, and conflicting national standards shall be withdrawn at the latest by February 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EN 14861:2004 (E)**0 Introduction**

This document is a type C standard as stated in EN 1070.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those, which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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1 Scope

This document deals with all common significant hazards, hazardous situations and events of the following forestry machinery: fellers, bunchers, delimiters, forwarders, log loaders, skidders, processors and harvesters as defined in ISO 6814 and also multi-function versions of these machines, when they are used as intended and under the conditions foreseen by the manufacturer, see Clause 4.

The machines listed can be of the mobile, ride-on or self-propelled type or a combination of these types.

The following significant hazards are excluded:

- thrown objects, that may occur on a particular machine,
- noise,
- vibration.

NOTE Noise clauses including a noise test code will be developed as an amendment to this document.

The use of this document will therefore not alone be sufficient to cover all significant risks for a majority of machines covered by this document.

The list of significant hazards dealt with in this document is given in normative Annex A. This Annex is the list of significant hazards that have been identified as common to the covered mobile, ride-on and self-propelled forestry machines.

It is not applicable to environmental hazards.

This document is not applicable to machines, which are manufactured before the date of publication of this document by CEN.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 294:1992, *Safety of machinery – Safety distance to prevent danger zones being reached by the upper limbs.*

EN 1070:1998, *Safety of machinery – Terminology.*

EN 12643:1997, *Earth-moving machinery – Rubber-tyred machines – Steering requirements.* (ISO 5010:1992, modified).

EN 13510:2000, *Earth-moving machinery – Roll-over protective structures – Laboratory tests and performance requirements* (ISO 3471: 1994).

EN ISO 2860:1999, *Earth-moving machinery – Minimum access dimensions* (ISO 2860:1992).

EN ISO 2867:1998, *Earth-moving machinery – Access systems* (ISO 2867:1994).

EN ISO 3411:1999, *Earth-moving machinery – Human physical dimensions of operators and minimum operator space envelope* (ISO 3411:1995).

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

EN ISO 3457:2003, *Earth-moving machinery – Guards – Definitions and requirements* (ISO 3457:2003).

EN ISO 6682:1995, *Earth-moving machinery – Zones of comfort and reach for controls*. (ISO 6682:1986).

EN ISO 6683:1999, *Earth-moving machinery – Seat belts and seat belt anchorages*. (ISO 6683:1981).

EN ISO 12100-1:2003, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology* (ISO 12100-1:2003).

EN ISO 12100-2:2003, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles* (ISO 12100-2:2003).

EN ISO 14982:1998, *Agricultural and forestry machinery – Electromagnetic compatibility – Test methods and acceptance criteria* (ISO 14982:1998).

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

ISO 3767-1:1998, *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*.

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

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

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

ISO 6814:2000, *Machinery for forestry – Mobile and self-propelled machinery – Terms, definitions and classification*.

ISO 8082:2003, *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 8084:2003, *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 9533:1989, *Earth-moving machinery – Machine-mounted forward and reverse audible warning alarm – Sound test method*.

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

ISO 10263-5:1994, *Earth-moving machinery – Operator enclosure environment – Part 5: Windscreen defrosting system test method.*

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

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

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

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 13766:1999, *Earth-moving machinery – Electromagnetic compatibility.*

ISO 14269-4:1997, *Tractors and self-propelled machines for agriculture and forestry – Operator enclosure environment – Part 4 : Air filter element test method.*

ISO 15078:1998, *Machinery for forestry – Log loaders – Location and method of operation of two-lever operator controls*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1070 and in ISO 6814 apply.

4 Safety requirements and/or protective measures

4.1 General

4.1.1 General design guidelines

Machinery shall comply with the safety requirements and/or protective measures of this document, Clause 4.

In addition, the machines shall be designed according to the principles of EN ISO 12100-1 and EN ISO 12100-2 for hazards relevant but not significant which are not dealt with in this document.

4.1.2 Safety distances, guards and shields

Unless otherwise specified in this document, safety distances shall comply with the requirements of Tables 1, 3, 4 and 6 of EN 294:1992. Guards and shields, including thermal guards, shall be in accordance with EN ISO 3457.

EN 14861:2004 (E)**4.2 Operator station****4.2.1 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 as defined in EN ISO 3411:1999, Clause 5, or the space required for operation of controls, see 4.7.

4.2.2 Structures for operator protection**4.2.2.1 Falling object protective structure (FOPS)**

All machines shall be equipped with a FOPS in accordance with ISO 8083.

4.2.2.2 Roll-over protective structure (ROPS)

All applicable machines according to the scope of ISO 8082 shall be equipped with a ROPS or other type of operator protection in accordance with ISO 8082 or EN 13510.

NOTE Research work is being done to develop a test method and acceptance criteria for machines with a rotating platform with a cab and boom on the platform. These machines are to be included in ISO 8082 at a later stage.

4.2.2.3 Operator protective structure (OPS)

All applicable machines according to the scope of ISO 8084 shall have OPS in accordance with ISO 8084.

A device or devices intended to deflect saplings and branches shall be installed on skidders 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 using polycarbonate or equivalent glazing, or other appropriate guards or shields, or both.

NOTE Criteria to be developed.

All machines equipped with winches or subject to breaking lines shall be equipped with protective screens or glazing or both, between the operator and the winch in accordance with ISO 8084.

4.2.2.4 Seat belt

All machines shall be equipped with a seat belt system in accordance with EN ISO 6683. Seat belts shall have a device to keep them off the floor when not in use. For the marking requirements of the seat belts, see 5.2.

4.2.2.5 Load bunk headboard

The load bunk of all tree and log transporting machines shall be equipped with a headboard capable of withstanding a force of 35 000 N applied at any point perpendicular to the face of the load bunk headboard structure. The test object used, a steel interlayer of diameter 200 mm or 200 mm x 200 mm, with edges rounded to R 13, shall be placed on as few bars of the headboard as possible. Permanent deformation shall be maximum of 100 mm. A 100 mm diameter log (or object) shall not pass through the load bunk headboard.

The headboard shall be located between the load and the operator's station and its height, in the transport position, shall be greater than or equal to the height of the operator station. The headboard width shall be no less than the width across the stakes.

4.2.2.6 Fumes, spillage, hose guards and sharp edges

A person in the operator station shall be protected as follows:

- a) engine exhaust and harmful gases from heating systems shall be directed away from the operator's station, including any of its air intakes;
- b) fuel and other fluid fillers shall be located outside the operator's station. The design, sealing and location of these fillers shall be chosen to minimize the potential for spillage into the operator's station. Tanks shall have means for safely relieving internal pressure before opening or when being opened;
- c) battery location or locations shall be within easy access and shall minimize the potential of fumes and acid entering the operator's station, even in the event of the machine overturning. Batteries shall have provisions for easy handling;
- d) pressurized hoses, pipes and components shall be located or shielded so that in the event of rupture, the fluid can not be discharged directly onto the operator when in the operating position. Movable shields (e.g. doors or windows) designed to be open during machine operations shall satisfy this requirement in all operating positions;
- e) structural edges and corners of metallic or non-metallic materials of hardness sufficient to cause contusions or penetration of the human skin shall meet the following requirements:
 - external corners such as on-cab or service doors and pointed objects shall have a minimum radius of 4 mm;
 - grab-handles and edges/corners of handholds shall have a minimum radius of 5 mm.

4.2.3 Seat

Machines shall be fitted with a seat in accordance with ISO 11112 which positions the operator for ergonomic and stable operation of the machine controls.

A minimum of 25 mm clearance between the seat and fixed objects that could cause pinching shall be maintained when adjusting the seat in the driving or working position or when rotating the seat between those positions. Adjusting the seat fore or aft, or both, shall be permissible while rotating it from the driving to the working position and vice versa.

The seat shall be adjustable without the use of tools.

4.2.4 Operator environment

If a closed cab is provided, it shall be equipped with a pressurization system that provides a positive pressure and with a filtration system that removes at least 98 % by mass of dust when measured in accordance with ISO 10263-2 or ISO 14269-4.

4.3 Access to operator's station and maintenance locations

Access to the operator's station and maintenance locations for daily service shall be as follows:

- a) the access shall permit a person to achieve three points of support if the platform or work surface is elevated by more than 550 mm above the ground, and shall be in accordance with EN ISO 2860 and EN ISO 2867. Foot placement surfaces shall be slip-resistant and the design of the steps shall be such that accumulation of debris, mud, snow etc. is minimized;
 - on tracked machines, an access step on the track frame may be inset up to 100 mm from the edge of the track shoe;
 - on machines with articulated steering, a minimum clearance of 150 mm shall be available, at the fully articulated steering position, as shown in Figure 1;