



SLOVENSKI STANDARD

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Stroji za vzdrževanje avtocest - Varnostne zahteve

Highway maintenance machines - Safety requirements

Maschinen für den Straßenbetriebsdienst - Sicherheitsanforderungen

Machines de maintenance des routes - Exigences de sécurité

Ta slovenski standard je istoveten z: **EN 13524:2003**

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EUROPEAN STANDARD

EN 13524

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English version

Highway maintenance machines - Safety requirements

Machines de maintenance des routes - Exigences de
sécuritéMaschinen für den Straßenbetriebsdienst -
Sicherheitsanforderungen

This European Standard was approved by CEN on 6 December 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 13524:2003) has been prepared by Technical Committee CEN/TC 151 "Construction equipment and building material machines – Safety", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2003, and conflicting national standards shall be withdrawn at the latest by September 2003.

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 EC Directive(s).

For relationship with EC Directives, see informative annex ZA, which is an integral part of this document.

The Annex A is informative and contains „Attachment plate of truck“. The Annex B is normative and contains "Stipulations on the design and testing of mowing and mulching machines".

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

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0 Introduction

This European Standard is a Type C-standard as stated in EN 292.
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The machinery concerned and the extent to which hazards are covered are indicated in the scope of this standard.

1 Scope

This European Standard applies to machines used for highway maintenance which are attached to or mounted on carrier vehicles and which are defined in clause 3. Directives and standards for the vehicular truck chassis aspect, termed 'carrier vehicle' in this standard, would be those relevant to that equipment, even where specific modifications have been made to adapt the machines for highway maintenance application. The use in public road traffic is governed by the national regulations.

This European Standard deals with all significant hazards identified through a risk assessment pertinent to highway maintenance machines, when they are used as intended and under the conditions foreseen by the manufacturer (see clause 4). This European Standard does not deal with significant hazards associated with noise and EMC. This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards associated with machine operation, setting and adjustments, load discharge and routine maintenance.

This European Standard does not include requirements for the carrier vehicles (e.g. trucks, tractors, construction machines, industrial trucks) as well as their demountable bodywork. These are covered in directives related to the construction of vehicles. Demountable bodywork systems are specified in other standards.

This European Standard does not deal with:

- walker-operated an hand-held machines;
- machines for the maintenance of sports grounds;

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- machines for agriculture, horticulture and forestry;
- winter-service machines;
- street-cleansing machines, except sweepers in compliance with 3.9;
- earth-moving machinery;
- pit and sewer cleaning vehicles/-machines;
- lifting platforms;
- refuse-collecting vehicles;
- bridge-inspection equipment;
- loading cranes;
- wood-choppers (bush wood choppers).

A machine which is a combination of several parts with different uses should conform to all the standards referring to the corresponding parts of the machine.

This European Standard does not deal with the risks associated with the operation of machines in potentially explosive atmospheres.

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This standard applies to machines manufactured after the date of approval of this standard through CEN.

2 Normative references

[SIST EN 13524:2004](https://standards.iteh.ai/catalog/standards/sist/1ebc8b5b-59c0-475f-8eba-94e0f5bfc13/sist-en-13524-2004)

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This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology.*

EN 292-2:1991, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications.*

EN 563:1994, *Safety of machinery – Temperatures of touchable surfaces – Ergonomics data to establish temperature limit values for hot surfaces.*

EN 953:1996, *Safety of machinery – Guards – General requirements for the design and construction of fixed and movable guards.*

EN 982:1996, *Safety of machinery – Safety requirements for fluid power systems and their components – Hydraulics.*

EN 983:1996, *Safety of machinery – Safety requirements for fluid power systems and their components – Pneumatics.*

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

EN ISO 2867:1999, *Earth-moving machinery – Access systems (ISO 2867:1994).*

ISO 730-1:1994, *Agricultural wheeled tractors – Rear-mounted three-point linkage – Part 1: Categories 1, 2, 3 and 4.*

ISO 2758:2001, *Paper – Determination of bursting strength.*

ISO 3416:1986, *Textile floor coverings – Determination of thickness loss after prolonged, heavy static loading.*

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

ISO 11001, *Agricultural wheeled tractors and implements - Three-point hitch couplers.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions stated in EN 1070:1998 apply.

Additional terms and definitions specifically needed for this European Standard are added below.

3.1

machine for highway maintenance

machine situated at the traffic surface which, from this position, prepares the traffic surface and its neighbouring areas

3.2

traffic surface

paved area where there is vehicular and/or pedestrian traffic. Not included are rail tracks which are solely for rail-mounted traffic, and traffic areas inside buildings and in underground mines

3.3

mulching machine

machine for reducing and/or shredding vegetation, working in a direction of motion substantially parallel and close to the ground

3.4

mowing machine

machine for cutting vegetation, working in a direction of motion substantially parallel and close to the ground

3.5

hedge-cutting machine

machine for cutting vegetation that operates not only close to the ground but can be used also, for example, for cutting hedges

3.6

verge mower

machine for removing growth on verges

3.7

ditch-maintenance machine

machine for keeping ditches clear

3.8

cleansing machine

machine for cleaning highway equipment such as delineators, traffic signs, tunnel walls

3.9

mechanical sweeper

machine for cleaning traffic areas. Machines within the scope of this standard are sweeper attachments which are not within the scope of EN 13019 (e.g. front-mounted sweepers)

EN 13524:2003 (E)**3.10****ground-boring machine**

machine for boring holes of low depth in the ground, e.g. for erecting posts. Machines within the scope of this standard are ground-boring attachments which are not within the scope of EN 791

3.11**refuse-collection machine**

machine that collects refuse and convey it to a receptacle or unloading point by means of a material handling device, so far as it is not in the scope of standard series EN 1501

3.12**weeding machine**

machine for mechanical removal of undesired vegetation on paved surfaces using rotating brushes

3.13**boom**

equipment that is located between the carrier vehicle and a machine listed under 3.3 to 3.12, serving as positioning devices

3.14**operating area**

operating area is that area in or immediately around the machine within which the work procedures are carried out (e.g. mowing of vegetation)

4 List of significant hazards

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This clause contains all hazards and hazardous situations as far as they are dealt with in this European Standard, identified by risk assessments significant to this type of machinery that require action to eliminate or reduce risk.

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Table 1 — List of significant hazards

	Hazards	Location of hazard	relevant for machine	Dealt with in clause
1.1	Crushing hazard	Persons in danger zone Coupling area of machines	all all	5.4 5.15 5.6
1.2	Shearing hazard	Operating area of rotating/oscillating tools; Moving elements; Slewing area of machines and machine parts	all	5.15
1.3	Cutting or severing hazard	Operating area of cutting machinery	3.4 3.5	5.15
1.4	Entanglement hazard	Operating area of rotating machinery; Rotating or oscillating machine parts	all	5.15
1.5	Drawing-in or trapping hazard	Operating area of rotating machinery; Rotary or oscillating machine parts	all	5.15
1.6	High pressure fluid ejection	Power transmission lines	all	5.12.1 5.12.2

Table 1 (continued)

	Hazards	Location of hazard	relevant for machine	Dealt with in clause
2	Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	Engine cooling systems; Exhaust system	all	5.5
3	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	Workplace	3.3 3.4 3.6 3.7 3.8 3.9 3.11 3.12	6
4	Human error, human behaviour	Operating area of the machines	all	6
5	Inadequate design, location or identification of manual controls	Operating area of the machines	all	5.2 5.14
6.1	Failure/disorder of the control system	Operating area of the machines	all	5.8 5.11
6.2	Restoration of energy supply after an interruption	Operating area of the machines	all	5.14 6
4	Falling or ejected objects or fluids	Operating area of rotating machinery	3.3 3.4 3.6 3.7	5.13 5.15
5	Loss of stability/overtipping of machinery	Impermissible combinations; Supporting equipment	all all	5.1 5.10
6	Slip, trip and fall of persons (related to machinery)	Access steps	3.13	5.3
7	Movement without all parts in a safe position	Movable machine parts	all	5.9 5.10

5 Safety requirements and/or measures

The machines shall comply with the safety requirements and/or measures of this clause. In addition the machines shall be designed to comply with the requirements of EN 292-1 and EN 292-2 for hazards that are relevant but not significant and therefore are not dealt with in this standard.

For the application of the reference standards EN 563, EN 953, EN 982 and EN 983 which are used in this standard, the manufacturer shall carry out an adequate risk assessment relating to those requirements for which a special safety measure or category is necessary.

NOTE This specific risk assessment should be part of the general risk assessment relating to the hazards not covered by this standard.

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Where the means of reducing the risk is by a safe system of working the machinery, the manufacturer shall include in the Information for use details of the system and of the elements of training required by the operating personnel.

5.1 Combination of carrier vehicle and machine for highway maintenance

The design of the highway maintenance machines shall conform to the requirements of the carrier vehicle defined by its manufacturer.

The assembled machine (carrier vehicle and the attached machine(s)) shall not cause any deterioration in safety provisions such as stability in motion, braking, operators view, etc.

5.2 Controls

- a) Controls of command devices which require a float setting or pressure setting.

Controls for elevating and slewing devices shall be designed so that they automatically return to zero position when released. This does not apply to elevating devices that necessitate a float or pressure position or a proportional control according to their function and also does not apply to continuously operating mechanisms such as hydraulic motors.

- b) Protection against actuation of controls by unauthorized person.

Controls shall be lockable by the operator when leaving the workplace by the use of:

- guards, or, **iTeh STANDARD PREVIEW**
- mechanical locking means, or, **(standards.iteh.ai)**
- locking through key-operated switches. [SIST EN 13524:2004](https://standards.iteh.ai/catalog/standards/sist/1ebc8b5b-59c0-475f-8eba-94e010cc1354/sist-en-13524-2004)

- c) Controls shall be positioned outside of the hazard zone. Hazardous conditions that are not protected shall be observable by the operator during the operation of the controls.

5.3 Access and walkways

Where equipment requiring regular access and walking on is inaccessible from the ground level, access ladders, walkways and standing areas complying with EN ISO 2867 shall be provided.

The bottom step or rung of a ladder shall not be more than 650 mm away from the ground level.

5.4 Precautions against hazards caused by moving parts

Hazards from moving parts shall be avoided by construction. Access to moving parts shall be prevented by the use of covers conforming to EN 953.

If there is a possibility of danger occurring as a result of the operation of the machine or machine components in normal use, no persons shall remain within the danger zone. The manufacturer shall fit warning notices that are easily visible from outside the danger zone, and shall make specific reference to the hazard in the information for use.

The danger zone shall be visible to the operator, either directly or by the provision of suitable measures, and information shall be provided in the Information for use.

5.5 Hot surfaces

Temperatures of surfaces of machinery with which the operator may come into contact shall conform to EN 563. This shall be achieved by the use of guards (e.g. perforated plates placed in front of or around the hot surfaces) or be positioned to avoid unintended risk of contact. Where guarding is impractical, e.g. engine radiator caps, adequate warning signs shall be employed advising on the nature of the risk and avoidance measures shall be described in information for use.

5.6 Attachment fittings

Attachment fittings on highway maintenance machines shall be designed so that during the actual coupling and de-coupling action nobody is required to be in the hazard zone between the components concerned.

This requirement is satisfied by attachment fittings designed in conformity with Annex B (for front fittings by adapter plates), or with ISO 730-1 in conjunction with ISO 11001 (for front and rear attachments respectively using three-point linkage).

5.7 Safety mechanisms for changing machines

Safety mechanisms shall be designed to be positively locking and shall be permanently fixed to the machine.

5.8 Lifting devices

- a) Lifting devices when used as intended shall prevent any unintended lowering of the load¹⁾.

This requirement shall be achieved by the provision of:

- non-return valves or a corresponding function in the control valves of hydraulic or pneumatic lifting devices, or;
- self-locking driving gear or an automatic drop-latch arrangement with a ratchet wheel for mechanical winches, or;
- a control valve as a back-run safety mechanism.

- b) Where persons have to stand under raised or tilted machines or components thereof as part of the working procedure²⁾ unintended lowering shall be prevented. This can be achieved, for example, by:

- automatically engaging mechanical locks, or;
- externally unlocking non-return valves mounted directly on the lifting cylinder, or;
- mechanical safety mechanisms which are operated from outside of the danger zone.

- c) Power-driven lifting devices shall not permit equipment to fall freely in an uncontrolled manner.

In hydraulic or pneumatic systems, this requirement is satisfied when the reverse flow is restricted e.g. by a non-return valve or an appropriately sized orifice.

- d) Back-run safety mechanisms and devices to protect lifting mechanisms against free-fall shall be so designed to ensure that any interference is possible only with the aid of tools.

1) Unintended lowering is when a load runs back or descends because of an interruption or an irregularity in the energy supply.

2) The term "as part of working procedure" does not cover repair work.