



**SLOVENSKI STANDARD**  
**SIST EN 13021:2004**

**01-september-2004**

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**Stroji za storitve zimske službe - Varnostne zahteve**

Winter service machines - Safety requirements

Maschinen für den Winterdienst - Sicherheitsanforderungen

Machines pour le service hivernal - Prescriptions de sécurité

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ICS 43.160

English version

## Winter service machines - Safety requirements

Machines pour le service hivernal - Prescriptions de  
sécurité

Maschinen für den Winterdienst - Sicherheitsanforderungen

This European Standard was approved by CEN on 21 November 2002.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## Foreword

This document (EN 13021:2003) 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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.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 EU Directive(s).

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

Annex A is informative and contains "Terminology", annex B is informative and shows a "Truck attachment plate", annex C is normative and contains "safety guards on winter service machines" and annex D is normative and contains "Warning sign — Warning of danger ahead".

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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## Introduction

This European Standard is a Type C-standard as stated in EN 292.

The machinery concerned and the extent to which hazards are covered is indicated in the scope of this standard.

## 1 Scope

This European Standard applies to winter service machines which are defined in clause 3.

This European Standard deals with all significant hazards (see clause 4) identified through a risk assessment pertinent to winter service machines when they are used as intended and under the conditions foreseen by the manufacturer. 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 only with machine operation, setting and adjustments, load discharge and routine maintenance.

Winter service machines are normally mounted on carrier vehicles (e.g. trucks, tractors, construction machinery and mobile industrial handling equipment). This European Standard does not cover requirements for the carrier vehicles even where specific modifications have been made to realise the winter service application. These requirements will be handled in directives and standards for the construction of carrier vehicles. The use of winter service machines in public road traffic is governed by national regulations.

This standard does not cover any requirements for demountable bodywork systems (e.g. demountable containers). These requirements are specified in other standards.

This European Standard does not deal with:

- machines or components which are solely designed for clearing rails such as rail sweepers or blowers;
- walker-operated and hand-held winter service machines;
- highway maintenance machines covered by prEN 13524, such as front-mounted sweepers;
- machines for the maintenance of sports grounds;
- machines for agriculture, horticulture and forestry;
- machines intended for use in potentially explosive atmospheres.

This European Standard applies to winter service machines which are manufactured after the date of approval of the standard by CEN.

## 2 Normative references

This European Standard incorporates by dated or undated references, 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 13021:2003 (E)

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 294, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs.*

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

EN 620, *Continuous handling equipment and systems — Safety and EMC requirements for fixed belt conveyors for bulk materials.*

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, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics.*

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

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

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

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### 3 Terms and definitions

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For the purposes of this European Standard, the terms and definitions given in EN 1070 together with the following apply.

#### 3.1

##### winter service machines

machines for maintaining traffic areas free of ice and snow during the winter

#### 3.2

##### snow ploughs

machines with which snow can be cleared from traffic areas by pushing aside with a plough blade

#### 3.3

##### snow removing machines with rotating tools

machines with which snow can be removed from traffic areas by rotating means, accelerated and ejected by blower means

#### 3.4

##### spreaders

machines for defined application of substances to traffic areas to maintain or improve the skid resistance of the pavement

#### 3.5

##### traffic areas

paved areas on which there is vehicular and/or pedestrian traffic. Not included are rail tracks which are solely for rail-mounted traffic, as well as traffic areas inside buildings and underground.

#### 3.6

##### demountable equipment

equipment that may be demounted from and remounted to the carrier vehicle



**3.7****operating area**

area in which the work procedures are carried out e.g. removal of snow by precutting tools, rotating plough or blower equipment

**3.8****rear area**

area at the rear of the vehicle where hazards can occur due to a rearwards movement of the vehicle

**3.9****reject ring**

cover having the shape of a ring or a disk which is attached to a rotating body (e.g. sideways of rotary plough tool) to provide protection against drawing-in or trapping

**3.10****lashing point**

point or device (e.g. ring device) at the machine or at the demountable equipment which allows its lifting by a appropriate lifting device

**4 List of significant hazards**

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.

**iTeh STANDARD PREVIEW****Table 1**

	<b>Hazards</b>	<b>Typical location of hazard</b>	<b>Relevant clauses</b>
1	Mechanical hazards (caused for example by: <ul style="list-style-type: none"> <li>— shape;</li> <li>— relative location;</li> <li>— mass and stability; (potential energy of elements)</li> <li>— mass and velocity; (kinetic energy of elements)</li> <li>— inadequacy of mechanical strength</li> <li>— accumulation of potential energy by:               <ul style="list-style-type: none"> <li>• elastic elements (springs), or</li> <li>• liquids or gases under pressure or</li> <li>• vacuum of the machine or parts or workpieces).</li> </ul> </li> </ul>		

Table 1 (continued)

Hazards		Typical location of hazard	Relevant clauses
1.1	Crushing hazards	<ul style="list-style-type: none"> <li>— Coupling area of machines</li> <li>— Beneath lifting and lowering machines and machine parts</li> <li>— Slewing area of machines and machine parts</li> <li>— Worm conveyors, chain conveyors of spreaders, agitator and crushing equipment (access to inner receptacle)</li> <li>— Belt conveyor of spreaders</li> <li>— Ladders</li> <li>— Slewing area of ejectors</li> </ul>	5.1.1 5.1.3 5.1.5 5.5.1 5.5.2 5.3 5.6.2
1.2	Shearing hazard	<ul style="list-style-type: none"> <li>— Coupling area of machines</li> <li>— Worm conveyors, chain conveyors of spreaders, agitator and crushing equipment (access to inner receptacle)</li> <li>— Slewing area of machines and machine parts</li> <li>— Slewing area of ejectors</li> </ul>	5.1.1 5.5.1 5.1.4 5.6.2
1.3	Cutting or severing hazard	<ul style="list-style-type: none"> <li>— Spinner disc on spreaders</li> <li>— Beneath lifting and lowering machines and machine parts</li> <li>— Slewing area of machines and machine parts</li> <li>— Slewing area of ejectors</li> </ul>	5.5.3.1 5.1.3 5.1.4 5.6.2
1.4	Entanglement hazard	<ul style="list-style-type: none"> <li>— Worm conveyors, chain conveyors of spreaders, agitator and crushing equipment</li> <li>— Drive and guide rollers of the belt conveyor of spreaders</li> <li>— Rotary tools</li> </ul>	5.5.1 5.5.2 5.6.1
1.5	Drawing-in or trapping hazard	<ul style="list-style-type: none"> <li>— Drive and guide rollers of belt conveyor of spreaders</li> <li>— Rotary tools</li> <li>— Ejectors on snow clearing machines with rotary tools</li> </ul>	5.5.2 5.6.1 5.6.2
1.6	Impact hazard	<ul style="list-style-type: none"> <li>— Impact caused by driving into solid obstacles with the snow plough</li> </ul>	5.7.1
1.7	Ejection of parts (of machinery and processed material/ workpieces)	<ul style="list-style-type: none"> <li>— Ejection of solid objects from snow clearing machines with rotary tools</li> </ul>	5.6.1 5.6.3
1.8	Loss of stability(of machinery and machine parts)	<ul style="list-style-type: none"> <li>— Supports for machines</li> </ul>	5.1.5
1.9	Slip, trip and fall hazards in relationship with machinery (because of their mechanical nature)	<ul style="list-style-type: none"> <li>— Access ladders and walkways</li> </ul>	5.3
1.10	High pressure fluid ejection	<ul style="list-style-type: none"> <li>— Power transmission lines</li> </ul>	5.5.1 5.5.2

Table 1 (concluded)

2	Thermal hazards resulting in:		
2.1	burns and scalds, by a possible contact of persons, by flames or explosions and also by the radiation of heat sources	— Workstations on machines powered by internal combustion engines	5.4
3	Hazards generated by materials and substances processed, used or exhausted by machinery for example:		
3.1	hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	— Sprinkle area of thawing solutions	6.1
4	Hazards generated by neglecting ergonomic principles in machine design (mismatch of machinery with human characteristics and abilities) caused for example by:		
4.1	unhealthy postures or excessive efforts	— Slewable spreader distributors	5.5.3.2
4.2	mental overload or underload, stress etc.	— Covering of the windscreen with snowparticles when using snow ploughs	5.7.2 5.8.2

## 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 significant but not dealt with, and for those 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.

Where the means of reducing the risk is by a safe system of operating 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 Design as regards handling

#### 5.1.1 Attachment fittings

Attachment fittings on winter service 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.

NOTE This requirement can be 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).

#### 5.1.2 Locking devices

Mechanical locking devices shall be designed to have positive engagement and to be connected with the machine so that they can not be lost.

### 5.1.3 Elevating equipment

- a) Elevating equipment shall be constructed or designed so that during intended use any lowering of the load<sup>1)</sup> is prevented.

This requirement shall be achieved for example by the provision of:

- check valves or similar functions within the control valves of hydraulic or pneumatic lifting equipment; or,
  - self-locking actuators or automatically engaging latches in arrangement with a ratchet wheel for mechanical winches; or,
  - control valves as reverse-flow prevention mechanism. Non-return valves (burst pipe protection) mounted directly on the lifting cylinder are not necessary unless workmen have to move underneath raised or tilted machine components as part of working procedure<sup>2)</sup>; or,
  - other locking devices conforming to 5.1.2.
- b) If persons have to enter beneath elevated machines or machine components when used as intended and under conditions foreseen by the manufacturer (e.g. maintenance, clearing, inspection) it is necessary to prevent unintended lowering of the elevated parts by providing safeguards, for example, by:
- automatically engaging mechanical locking devices; or
  - pilot check valves integrated into the lifting cylinder; or
  - mechanical locking devices which are operated from outside of the hazard area.
- c) Powered lifting devices shall be equipped to eliminate the possibility of equipment returning in free fall.
- In hydraulic or pneumatic systems, this requirement shall be satisfied when the reverse flow is restricted by a non-return valve or an appropriately sized orifice.
- d) Access to safeguards against return and free fall of lifting means shall be possible only with the use of tools.
- e) Demountable attachments and equipment shall be so designed and constructed that they can be mounted and dismantled safely.
- Powered systems shall incorporate a suitable form of synchronisation of the individual lifting elements of a lowering device. Where lifting elements are controlled independently of each other, each shall be provided with an interlock (e.g. shut-off valve on the hydraulic cylinder). Manually actuated lifting systems shall select the pitch of the spindle thread such that it is self-locking in every spindle position.
- f) The manufacturer shall include in the information for use details of the safe working practices to be observed and the elements of training to be provided to the operators.

### 5.1.4 Slewing devices

Moving and slewing shall be by a controlled movement.

Unintentional movements of slewing devices and uncontrolled movements of components of winter service machines shall be prevented.

<sup>1)</sup> Accidental lowering is when a load runs back or descends because of an interruption or an irregularity in the energy supply.

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