



SLOVENSKI STANDARD
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Obratovanje cestnih strojev - Varnost - 2. del: Zahteve za stroje za čiščenje cestnih površin

Road operation machinery - Safety - Part 2: Requirements for road surface cleaning machines

Maschinen für den Straßenbetriebsdienst - Sicherheit - Teil 2 Sicherheitsvorkehrungen für Straßenkehrmaschinen

Machines d'exploitation des routes - Sécurité - Partie 2 : Exigences pour machines de nettoyage des surfaces routières

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English Version

Road operation machinery - Safety - Part 2: Requirements for road surface cleaning machines

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: Exigences pour machines de nettoyage des surfaces
routières

Maschinen für den Straßenbetriebsdienst - Sicherheit -
Teil 2 Sicherheitsvorkehrungen für
Straßenkehrmaschinen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 151.

If this draft becomes a European Standard, 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (prEN 17106-2:2017) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 13019:2001+A1:2008, EN 13021:2003+A1:2008, EN 13524:2003+A2:2014.

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.

EN 17106 consists of the following parts, under the general title road operation machinery:

- Part 1: General requirements
- Part 2: Specific requirements for road surface cleaning machines
- Part 3-1: Winter service machines – Specific requirements for snow clearing machines with rotating tools and snow ploughs
- Part 3-2: Winter service machines – Specific requirements for spreading machines
- Part 4-1: Road service area maintenance machines – Specific requirements for grass and brush/hedge cutting machines

Introduction

This document is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situation 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 European Standard, together with part 1, deals with all significant hazards for road surface cleaning machines when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer associated with the whole life time of the machine (see Clause 4).

The requirements of this part are complementary to the common requirements formulated in prEN 17106-1:2017.

This European Standard does not repeat the requirements from prEN 17106-1:2017, but adds or replaces the requirements for application for road surface cleaning machines.

2 Normative references

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

EN 1829-1:2010, *High pressure water jet machines - Safety requirements - Part 1: Machines*

EN 15429-1:2007, *Sweepers - Part 1: Classification and Terminology*

EN 15429-4:2015, *Sweepers - Part 4: Symbols for operator controls and other displays*

prEN 17106-1:2017, *Road operation machinery — Safety — Part 1: General requirements*

EN 60335-2-72:2012, *Household and similar electrical appliances - Safety - Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use (IEC 60335-2-72:2012, modified)*

EN 60335-2-79:2010, *Household and similar electrical appliances — Safety — Part 2-79: Particular requirements for high pressure cleaners and steam cleaners (IEC 60335-2-79:2002 + A1:2004 + A2:2007, modified)*

EN ISO 2867:2011, *Earth-moving machinery - Access systems (ISO 2867:2011)*

EN ISO 3411:2007, *Earth-moving machinery - Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 6682:1986, *Earth moving machinery — Zones of comfort and reach for controls (ISO 6682:1986, including Amendment 1:1989)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2015)*

ISO/DIS 5006:2015, *Earth-moving machinery — Operator's field of view — Test method and performance criteria*

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ISO 26322-2:2010, *Tractors for agriculture and forestry — Safety — Part 2: Narrow-track and small tractors*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1**operator station**

area from which an operator controls the following travel and/or work functions of the road surface cleaning machine:

- sweeping;
- sucking with wander hose;
- cleaning with hand-held cleaning device (e.g. high-pressure water lance);
- discharge of the hopper, dirt water;
- filling the water tank

3.2**washing/flushing system**

system using water to clean a surface using high velocity jets and/or copious use to move and dislodge spoil from the surface being cleaned. The system may use scrubbing brooms and/or detergents to aid the cleansing function

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4 List of additional significant hazards

Clause 4 of prEN 17106-1:2017 applies with the following Table 1.

Table 1 of prEN 17106-1:2017 and Table 1 of this document 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.

Table 1 — List of additional significant hazards

	Hazard	Hazardous situation/event	Subclause of this part of EN 17106-2
A.1	Mechanical hazards		
A.1.1	Crushing hazard	<ul style="list-style-type: none"> — Controls — Boarding means — Platforms — Power transmission — Working tools — Service/maintenance — Stability 	5.2, 5.3 5.4.1, 5.15.1.2 5.4.1 5.3 5.3, 5.5 5.9 5.12
A.1.2	Shearing hazard	<ul style="list-style-type: none"> — Controls — Boarding means — Platforms — Power transmission — Working tools — Service/maintenance — Stability 	5.2 5.4.1, 5.15.1.2 5.4.1 5.3 5.3, 5.5 5.9 5.12
A.1.3	Cutting or severing hazard	<ul style="list-style-type: none"> — Working tools 	5.3.5.5
A.1.4	Entanglement hazard	<ul style="list-style-type: none"> — Power transmission parts — Working tools — Starting/stopping the engine 	5.3 5.3, 5.5 5.2.2, 5.2.3
A.1.5	Drawing-in or trapping hazard	<ul style="list-style-type: none"> — Power transmission parts — Working tools — Starting/stopping the engine 	5.3 5.3, 5.5 5.2.2, 5.2.3
A.5	Hazards generated by materials and substances		
A.5.1	Hazards from contact with, or inhalation, of harmful fluids, gases, mists, fumes and dusts	<ul style="list-style-type: none"> — Operating fluids 	5.6, 5.7, 5.8, 5.13, 5.14
A.6	Hazards generated by neglecting ergonomic principles in machinery design		
A.6.1	Unhealthy postures or excessive effort	<ul style="list-style-type: none"> — Boarding means — Service and maintenance — Operator station 	5.4.1, 5.15.1.2 5.9 5.4.2, 5.11, 5.15.1
A.6.2	Inadequate consideration of hand-arm or foot-leg anatomy	<ul style="list-style-type: none"> — Controls — Boarding means — Operator station 	5.2.1 5.4.1, 5.15.1.2 5.4.1, 5.4.2, 5.13, 5.15.1
A.6.3	Neglected use of personal protective equipment	<ul style="list-style-type: none"> — Operator's manual 	7
A.6.4	Inadequate local lighting	<ul style="list-style-type: none"> — Visibility 	5.15.1.3
A.6.6	Human error, human behaviour	<ul style="list-style-type: none"> — Operator's manual 	7
A.6.7	Inadequate design, location or	<ul style="list-style-type: none"> — Controls 	5.2, 5.10

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	Hazard	Hazardous situation/event	Subclause of this part of EN 17106-2
	identification manual controls		
A.7	Combination of hazards	— Operator's manual	7
A.8	Unexpected start-up, unexpected overrun/overspeed		
A.8.1	Failure/disorder of the control system	— Service and maintenance — Electrical equipment	5.9 5.2.4
A.8.4	Other external influences (gravity, wind, etc.)	— Stability	5.12
A.8.5	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities)	— Controls — Operator's manual	5.2 7
A.9	Impossibility of stopping the machine in the best possible conditions	— Controls — Starting/stopping the engine	5.2.4 5.2.3, 5.16.2
A.13	Errors of fitting	— Operator's manual	7
A.14	Break-up during operation	— Hydraulic components	5.7
A.15	Falling or ejected objects or fluids	— Supports — Hydraulic components	5.4, 5.6 5.7
A.16	Loss of stability/overturning of machinery	— Stability	5.12
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Additional hazards, hazardous situations and hazardous events due to mobility			
A.18	Related to the travelling function		
A.18.1	Movement when starting the engine	— Starting/stopping the engine	5.2.1
A.19	Link to the work position		
A.19.1	Fall of persons during access to (or at/from) the work position	— Boarding means	5.4.1
A.19.5	Insufficient visibility from the work positions	— Visibility	5.15.1.3
A.19.6	Inadequate lighting	— Visibility	5.15.1.3
A.19.7	Inadequate seating	— Operator's seat	5.4.2
A.19.9	Insufficient means for evacuation/emergency exit	— Emergency exit	5.4.1
A.20	Due to the control system		
A.20.1	Inadequate location of manual controls	— Controls	5.2, 5.10
A.20.2	Inadequate design of manual controls and their mode of operation	— Controls	5.2.4, 5.10

	Hazard	Hazardous situation/event	Subclause of this part of EN 17106-2
A.21	From handling the machine (lack of stability)	— Stability	5.12
A.22	Due to the power source and to the transmission of power		
A.22.1	Hazards from the engine and the batteries	— Starting/stopping the engine	5.2.2, 5.2.3
A.23	From/to third persons		
A.23.1	Unauthorized start-up and use	— Starting/stopping the engine	5.2.2
A.24	Insufficient instructions for the driver/operator	— Operator's manual	7

5 Safety requirements and/or measures

5.1 General

Road surface cleaning machines shall comply with the requirements of prEN 17106-1:2017, as far as not modified or replaced by the requirements of this part.

5.2 Controls

5.2.1 General

Subclause 5.1.4.1 in part 1 applies with the following modification:

Symbols for operator controls shall be in accordance with EN 15429-4.

5.2.2 Starting

Subclause 5.1.4.4 in part 1 applies with the following addition:

In case of road surface cleaning machines these requirements are deemed to be met for intended combinations of sequential and/or simultaneous starting of functions (e.g. the automatic starting of the brush rotation caused by the starting movement of the brush arms, since the starting of the movement of the brush arms is treated as an intended starting).

5.2.3 Emergency stop

Subclause 5.1.4.5.3 in part 1 applies with the following addition:

There shall be an emergency stop at every operating or driving position.

For operating of wander hose, hand-held cleaning device and the water filling position an emergency stop is not required.

An additional emergency stop function at the driver's position is not needed if the normal engine stop device provides the emergency stop function and is placed within easy reach according to EN ISO 6682.

The category of stop shall be Category '0' according to 4.1.4 of EN ISO 13850:2015.

5.2.4 Safety and reliability of control systems

Subclause 5.1.4.3 in part 1 applies with the following addition:

The safety related parts of the interlocking system shall be at least required performance level PL_r c according to EN ISO 13849-1.