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Obratovanje cestnih strojev - Varnost - 3-1. del: Stroji za storitve zimske službe - Zahteve za stroje za čiščenje snega z vrtljivimi orodji in snežnimi plugi

Road operation machinery - Safety - Part 3-1: Winter service machines - Requirements for snow clearing machines with rotating tools and snow ploughs

Erdbaumaschinen - Sicherheit - Teil 3-1 Maschinen für den Winterdienst - Anforderungen für Schneeräumgeräte mit rotierenden Werkzeugen

Machines d'exploitation des routes - Sécurité - Partie 3-1 : Machines de service hivernal - Prescriptions spécifiques pour les machines de déneigement à outil rotatif et lames de déneigement

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This European Standard was approved by CEN on 16 August 2021.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 17106-3-1:2021) 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of an identical text or by endorsement, at the latest by April 2022, and conflicting national standards shall be withdrawn at the latest by April 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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

This document has been prepared under a standardization request 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 17106:2021 consists of the following parts under the general title “Road operation machinery – Safety”:

— 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: Road service area maintenance machines - Specific requirements for grass and brush cutting machines

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

Introduction

This document is a type-C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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

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

1 Scope

This document together with EN 17106-1:2021 deals with all significant hazards, hazardous situations and events relevant to winter service machines – snow clearing machines with rotating tools and snow ploughs when used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A) associated with the whole lifetime of the machine as described in EN ISO 12100:2010, 5.4.

The requirements of this document are complementary to the common requirements formulated in EN 17106-1:2021. This document does not repeat the requirements from EN 17106-1:2021 but supplements or modifies the requirements for winter service machines – snow clearing machines with rotating tools and snow ploughs.

This document is not applicable to snow clearing machines with rotating tools and snow ploughs manufactured before the date of its publication.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 17106-1:2021, *Road operation machinery - Safety - Part 1: General requirements*

EN ISO 6682:2008, *Earth-moving machinery - Zones of comfort and reach for controls (ISO 6682:1986, including Amd 1:1989)*

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

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

EN ISO 13857:2019, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN 15583-2:2012, *Winter maintenance equipment - Snow ploughs - Part 2: Testing criteria and their requirements*

ISO 5006:2017, *Earth-moving machinery - Operator's field of view - Test method and performance criteria*

ISO 14401-1:2009, *Earth-moving machinery - Field of vision of surveillance and rear-view mirrors - Part 1: Test methods*

ISO 14401-2:2009, *Earth-moving machinery - Field of vision of surveillance and rear-view mirrors - Part 2: Performance criteria*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17106-1:2021, EN ISO 12100:2010 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

NOTE Additional illustrations are provided in Annex C.

3.1
snow removing machine with rotating tool
self-propelled and attached machine with which snow can be removed from traffic areas by rotating means, accelerated and ejected by blower means, e.g. snow cutter, snow blower, snow cutter-blower and snow sweeper

3.1.1
snow cutter
machine for snow clearing with the rotating tools set at a right angle to the longitudinal axis of the vehicle

3.1.2
snow blower
machine for snow clearing with the rotating tools set parallel to the longitudinal axis of vehicle

3.1.3
snow cutter blower
combination of a snow cutter and snow blower; snow is collected by the cutter and expelled by the blower

3.1.4
snow sweeper
machine for snow clearing with rotating brushes

3.2
reject ring
cover having the shape of a ring or a disk which is attached to a rotating body (e.g. sidewards of rotary plough tool) to provide protection against drawing-in or trapping

3.3
operating volume
volume where tools and other moving parts involved in the process are moving (e.g. rotating plough, cutters)

3.4
snow plough
machine/equipment for snow clearing with a blade set at a right angle to the longitudinal axis of the vehicle

4 Safety requirements and/or protective/risk reduction measures

4.1 General

Winter service machines – snow clearing machines with rotating tools shall comply with the safety requirements and/or protective/risk reduction measures of this clause. In addition, the machines shall be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document.

Winter service machines – snow clearing machines with rotating tools shall comply with the requirements of EN 17106-1:2021, as far as not modified or replaced by the requirements of this part.

4.2 Noise measurement

EN 17106-1:2021, 4.1.2.3 applies with the following addition:

The determination of the reference box to the machine and operating conditions for noise measurement are described in Annex B.

4.3 Visibility

EN 17106-1:2021, 4.1.3 applies with the following modification(s):

Snow clearing machines with rotating tools and snow ploughs shall be designed in accordance with ISO 5006:2017 so that the operator has sufficient visibility from the operator's station in relation to the travel and work areas of the machine that are necessary for the intended use of the machine.

The travel mode as specified in ISO 5006:2017 is considered to be representative for testing visibility in both travel and operating modes.

It is sufficient to measure the machine with the most challenging standard attachment within the limits of the intended use.

Snow clearing machines with rotating tools shall be equipped with rear view mirrors according to ISO 14401-1:2009 and ISO 14401-2:2009.

Snow clearing machines with rotating tools shall meet the performance criteria (see Table 1) on the visibility test circle according to ISO 5006:2017, Table 1.

Table 1 — Visibility performance criteria on the visibility test circle

Type	Clearing head height (EN 15906)	A	B	C	D	E	F	RB
Self-propelled snow clearing machines with rotating tools	h < 1500	65	205	205	205	205	65	See Table 3
		1 – 3500 and 1 – 700	1 – 2500 and 1 - 1200	1 – 2500 and 1 - 1200	No specific criteria[a]	No specific criteria[a]	2 – 3000 or 1 - 5500	
Self-propelled snow clearing machines with rotating tools	1500 ≤ h	65	205	205	205	205	65	
		1 – 3500 and 1 – 700	1 – 2500 and 1 - 1200	1 – 2500 and 1 - 1200	No specific criteria[a]	No specific criteria[a]	2 – 3000 or 1 - 5500	

[a] No specific criteria are specified in this Table because no significant hazards exist for the machine sector, e.g. due to machine speed, distance to the test circle, machine manoeuvrability.

Table 2 — Rectangular boundary

Type	RB front	RB rear	RB left	RB right
Self-propelled snow clearing machines with rotating tools	405 4000 mm distance 1 – 3500 and 1 - 700	405 1 – machine width and 2 - 500	405 1-1200 and 1-500	405 1 - 500
Test object height	1500 mm	1500 mm	1500 mm	1500 mm

4.4 Controls

4.4.1 Starting

EN 17106-1:2021, 4.1.4.4, third paragraph applies with the following addition:

Automatic lifting of interchangeable equipment (e.g. snow ploughs, snow clearing machines with rotating tools) when starting reversing of the carrier vehicle/self-propelled machine is seen as intended actuation.

Automatic lowering of interchangeable equipment and starting of rotating tools when starting forward movement of the carrier vehicle/self-propelled machine shall not be possible.

EN 17106-1:2021, 4.1.4.4, fourth paragraph does not apply.

4.4.2 Stopping

4.4.2.1 Operational stop

EN 17106-1:2021, 4.1.4.5.2 applies with the following addition:

It shall be possible to stop the rotating plough or blower equipment without stopping the drive motor by means of a disengageable clutch between the equipment and the motor, or a braking device. This device shall be secured to prevent an unintentional re-start.

4.4.2.2 Emergency stop

EN 17106-1:2021, 4.1.4.5.3 applies with the following addition:

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 6682:2008.

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

Where the stopping time can be reduced by a controlled stop of a rotating tool can be achieved with power to the machine actuator(s), the category of the stop is allowed to be "Category 1" according to EN ISO 13850:2015, 4.1.4.

4.4.3 Safety and reliability of control systems

EN 17106-1:2021, 4.1.4.3 applies with the following addition:

NOTE The risk assessment for snow ploughs has identified no safety related function(s) and no protective measure(s) which are dependent on control systems. Therefore, there is no need to decide on any performance level required PL_r.

Table 3 — Required Performance level PL_r

Subclause	Function	Performance level required PL_r
4.4.1 Operational stop	prevention of unintentional re-start	d
4.4.2 Emergency stop	Stop	d

4.5 Guards

4.5.1 Rotating equipment

EN 17106-1:2021, 4.1.5 applies with the following addition(s):

Rotating equipment shall be covered by a guard with the exception of the operating volume.

The cutter drum shall fulfil the following requirement:

Either

— the cutter drum shall be covered on both sides;

or

— both ends of the cutter drum shall be solid-walled. In the edge zone of the ends, the solid-wall enclosure may be replaced by a maximum of two reject rings. The cavity between the solid-wall enclosure and the reject ring or between each reject ring shall not exceed 50 mm. No part of the