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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

Self-loading mobile concrete mixers - Safety requirements and verification

Malaxeurs à béton mobiles avec autochargeur -
Exigences de sécurité et vérification

Selbstladende mobile Betonmischer -
Sicherheitsanforderungen und Überprüfung

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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European foreword

This document (prEN 18142:2025) 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 has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

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

Introduction

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

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 the 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 specifies general safety requirements for self-loading mobile concrete mixers (here-after referred to as “SLMs”) as defined in ISO 18650-1:2021, with rigid or articulated wheeled chassis.

This document applies to SLMs which are designed for front or rear loading and can be provided with a slewing and/or tilting frame where the rotating drum and the self-loading equipment (lift arms and bucket) are mounted on. SLMs can also be fitted with accessories such as water dosing means and a weighing system.

This document is not applicable to the following:

- machines designed primarily for earth moving, such as loaders or dumpers (see applicable parts of the EN 474 series);
- truck mixers (see EN 12609).

This document deals with all significant hazards, hazardous situations and events relevant to SLMs, whether used as intended and under conditions foreseen or under conditions of misuse reasonably foreseeable by the manufacturer (see Annex A).

This document does not address hazards that can occur:

- during manufacture;
- when using SLMs on public roads, where specific local road regulations can apply;
- when operating in potentially explosive atmospheres.

This document does not address hazards specifically related to:

- SLMs designed to operate with varying levels of autonomy or when SLMs have embedded safety-systems with fully or partially self-evolving behaviour or logic using machine learning approaches, including collaborative applications;
- SLMs when intended to be connected to the internet or to an external network or device that communicates with it.

This document is not applicable to SLMs 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 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

EN 60529:1991,¹ *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN ISO 2860:2008, *Earth-moving machinery — Minimum access dimensions (ISO 2860:1992)*

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

¹ As impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/AC:2016-12, EN 60529:1991/corrigendum May 1993 and EN 60529:1991/A2:2013/AC:2019-02.

EN ISO 3164:2013,² *Earth-moving machinery — Laboratory evaluations of protective structures — Specifications for deflection-limiting volume*

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

EN ISO 3449:2008, *Earth-moving machinery — Falling-object protective structures — Laboratory tests and performance requirements (ISO 3449:2005)*

EN ISO 3450:2011, *Earth-moving machinery — Wheeled or high-speed rubber-tracked machines — Performance requirements and test procedures for brake systems (ISO 3450:2011)*

EN ISO 3457:2008, *Earth-moving machinery — Guards — Definitions and requirements (ISO 3457:2003)*

EN ISO 3471:2008, *Earth-moving machinery — Roll-over protective structures — Laboratory tests and performance requirements (ISO 3471:2008)*

EN ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 5010:2019, *Earth-moving machinery — Wheeled machines — Steering requirements (ISO 5010:2019)*

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

EN ISO 6683:2008, *Earth-moving machinery — Seat belts and seat belt anchorages — Performance requirements and tests (ISO 6683:2005)*

EN ISO 7096:2020, *Earth-moving machinery — Laboratory evaluation of operator seat vibration (ISO 7096:2020)*

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

EN ISO 13766-1:2018, *Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 1: General EMC requirements under typical electromagnetic environmental conditions (ISO 13766-1:2018)*

EN ISO 13766-2:2018, *Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 2: Additional EMC requirements for functional safety (ISO 13766-2:2018)*

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)*

² As impacted by EN ISO 3164:2013/A1:2024.

EN ISO 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

EN ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

EN ISO 19014-1:2018, *Earth-moving machinery — Functional safety — Part 1: Methodology to determine safety-related parts of the control system and performance requirements (ISO 19014-1:2018, Corrected version 2019-02)*

ISO 3776-1:2006, *Tractors and machinery for agriculture — Seat belts — Part 1: Anchorage location requirements*

ISO 3776-2:2013, *Tractors and machinery for agriculture — Seat belts — Part 2: Anchorage strength requirements*

ISO 3776-3:2009, *Tractors and machinery for agriculture — Seat belts — Part 3: Requirements for assemblies*

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

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

ISO 6011:2023, *Earth-moving machinery — Visual display of machine operation*

ISO 6750-1:2019, *Earth-moving machinery — Operator's manual — Part 1: Contents and format*

ISO 7000:2019, *Graphical symbols for use on equipment — Registered symbols*

ISO 9244:2008,³ *Earth-moving machinery — Machine safety labels — General principles*

ISO 9533:2010, *Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria*

ISO 10263-3:2009, *Earth-moving machinery — Operator enclosure environment — Part 3: Pressurization test method*

ISO 10263-4:2009, *Earth-moving machinery — Operator enclosure environment — Part 4: Heating, ventilating and air conditioning (HVAC) test method and performance*

ISO 10264:1990, *Earth-moving machinery — Key-locked starting systems*

ISO 10532:1995,⁴ *Earth-moving machinery — Machine-mounted retrieval device — Performance requirements*

ISO 10533:1993,⁵ *Earth-moving machinery — Lift-arm support devices*

ISO 10570:2004, *Earth-moving machinery — Articulated frame lock — Performance requirements*

ISO 10968:2020, *Earth-moving machinery — Operator's controls*

³ As impacted by ISO 9244:2008/Amd 1:2016.

⁴ As impacted by ISO 10532:1995/Amd 1:2004 and ISO 10532:1995/Cor 1:2006.

⁵ As impacted by ISO 10533:1993/Amd 1:2005

ISO 11112:1995,⁶ *Earth-moving machinery — Operator's seat — Dimensions and requirements*

ISO 11862:1993, *Earth-moving machinery — Auxiliary starting aid electrical connector*

ISO 12508:1994, *Earth-moving machinery — Operator station and maintenance areas — Bluntness of edges*

ISO 12509:2023, *Earth-moving machinery — Lighting, signalling and marking lights, and reflex-reflectors*

ISO 14990-1:2016, *Earth-moving machinery — Electrical safety of machines utilizing electric drives and related components and systems — Part 1: General requirements*

ISO 14990-2:2016, *Earth-moving machinery — Electrical safety of machines utilizing electric drives and related components and systems — Part 2: Particular requirements for externally-powered machines*

ISO 14990-3:2016, *Earth-moving machinery — Electrical safety of machines utilizing electric drives and related components and systems — Part 3: Particular requirements for self-powered machines*

ISO 15817:2012, *Earth-moving machinery — Safety requirements for remote operator control systems*

ISO 15818:2017, *Earth-moving machinery — Lifting and tying-down attachment points — Performance requirements*

ISO 21507:2010, *Earth-moving machinery — Performance requirements for non-metallic fuel tanks*

3 Terms and definitions

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

ISO and IEC maintain terminology 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/>

3.1

self-loading equipment

integral mounted bucket-supporting structure and linkage permanently fitted to the SLM, enabling it to fill its own rotating drum with material

Note 1 to entry: Self-loading equipment has been excluded from EN 474-6:2022.

3.2

rated capacity

volume in cubic meters of ready concrete, produced per each cycle, declared by the manufacturer, in working conditions on flat ground with slump class S1 according to EN 206:2013+A2:2021, measured in non-vibrated formwork

⁶ As impacted by ISO 11112:1995/Amd 1:2001.

3.3

operating mass

mass of the SLM, with rotating drum and self-loading equipment (3.1) empty, and with the operator (75 kg), full fuel tank and all fluid systems (i.e. hydraulic oil, transmission oil, engine oil, engine coolant) at the levels specified by the manufacturer and with empty water tank(s)

3.4

Compact SLM

SLM with a rated capacity less than 2,5 m³

3.5

operator's station

area from which the operator can control all or specific SLM functions

4 Safety requirements and/or protective/risk reduction measures

4.1 General

SLMs shall comply with the safety requirements and/or protective/risk reduction measures of this clause. In addition, the SLM 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.

4.2 Access systems

4.2.1 General requirements

Access systems shall be provided to the operator's station(s) and to routine maintenance points. Access systems shall conform to EN ISO 2867:2011.

4.2.2 Access to articulated SLMs

On SLMs with articulated frames and in the fully articulated steering position, a minimum clearance of 150 mm shall be provided between firm structures and components with relative movement in the path of the access systems to the operator's station, as illustrated in Figure 1.

Dimensions in millimetres

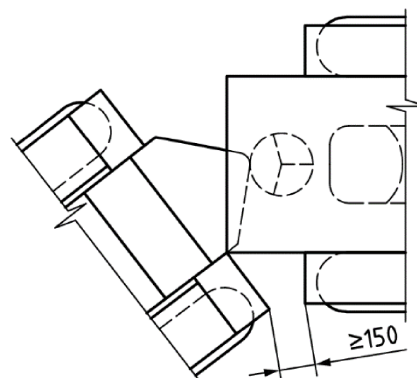


Figure 1 — Minimum clearance for access to operator's station on SLMs with articulated frame

4.3 Operator's station

4.3.1 General requirements

4.3.1.1 SLM equipment

SLMs excluding compact SLMs shall have provisions for fitting an enclosed cab.

4.3.1.2 Minimum space

The minimum space available to the operator shall be as defined in EN ISO 3411:2007, with the following exceptions:

- dimension R_1 as defined in EN ISO 3411:2007, Table 1, may be reduced to a minimum of 920 mm;
- the internal operator's space envelope width from the lower end of upper side walls of enclosure as defined in EN ISO 3411:2007 may be reduced to a minimum of 650 mm.

The minimum space and location of the controls at the operator's station shall meet the requirements of EN ISO 6682:2008.

4.3.1.3 Moving parts

The SLM shall be designed so as to avoid accidental contact from the operating position with moving parts (e.g. wheels, tracks, working equipment, attachments) in accordance with 4.13.2.

4.3.1.4 Engine exhaust

The engine exhaust system shall release the exhaust gas away from the operator and the air inlet of the cab.

4.3.1.5 Instruction storage

If the operator's manual and other instructions are provided in paper form, a space intended for their safekeeping shall be provided near the operator's station.

4.3.1.6 Sharp edges

The operator's working space within the operator's station (e.g. ceiling, inner walls, instrument panels, access to the operator's station) shall not present any sharp exposed edges or acute angles/corners. The radius of corners and the bluntness of edges shall conform to ISO 12508:1994, in order to avoid sharp edges.

4.3.2 Operator's station equipped with a cab

4.3.2.1 Climatic conditions

The cab shall protect the operator against foreseeable adverse climatic conditions. Provisions shall be made to install a ventilation system, an adjustable heating system and a system for defrosting windows. For details, see 4.3.2.5 to 4.3.2.7.

4.3.2.2 Pipes and hoses

Pipes and hoses that contain fluids at pressures exceeding 5 MPa or temperatures above 60 °C located inside the cab shall be guarded in accordance with EN ISO 3457:2008, Clause 9. See also 4.17.3.

Parts or components placed between pipes or hoses and the operator, which divert a hazardous spray of fluid, may be considered as a sufficient protection device.

4.3.2.3 Primary opening

A primary access opening shall be provided. The dimensions shall be in accordance with EN ISO 2867:2011.

4.3.2.4 Alternative opening (emergency exit)

An alternative opening shall be provided on a side other than that of the primary opening. The dimensions shall be in accordance with EN ISO 2867:2011. A window panel or another door is acceptable if they are easy to open or remove without the use of keys or tools. Latches may be used if they can be opened from the inside without the use of keys or tools. The breaking of a suitable size of glass pane is considered to represent a suitable alternative opening, provided that the necessary pane hammer, immediately accessible to the operator, is provided and stored in a position adjacent to the relevant pane.

The emergency exit shall be marked in accordance with ISO 7010:2019, Table 2, symbol E001 or E002 or E008 as appropriate.

4.3.2.5 Heating system

A heating system, if fitted, shall be in accordance with ISO 10263-4:2009. If the cab is not equipped with a pressurization system, then ISO 10263-4:2009, 6.1.1 is not applicable.

4.3.2.6 Ventilation system

The ventilation system shall be capable of providing the cab with fresh air at a minimum of 43 m³/h.

4.3.2.7 Defrosting system

A defrosting system shall provide facilities for defrosting the front and rear windows, for example, by means of a heating system or a particular defrosting device.

NOTE A test method for windscreen defrosting systems is given in ISO 10263-5.

4.3.2.8 Pressurization system

Where a cab is provided with a pressurization system, it shall be tested according to ISO 10263-3:2009 and shall provide an interior relative pressure of at least 50 Pa.

4.3.2.9 Air conditioning system

Where a cab is provided with an air conditioning system, it shall comply with ISO 10263-4:2009.

4.3.2.10 Doors and windows

Doors, windows and flaps shall be securely held in their intended operating positions. Doors shall be retained at their intended operating positions by a positive engagement device in accordance with EN ISO 2867:2011, 5.6.

Windows shall be made of safety glass or other material that provides similar safety performance (see, for example, ECE R43).

The front window shall be fitted with motorized windscreen wipers and washers.

The rear window shall be fitted with motorized windscreen wipers and washers if direct or indirect visibility in this direction is required by the visibility requirements in 4.8.

The windscreen washer reservoir/tank shall be accessible in accordance with EN ISO 2867:2011.

4.3.2.11 Interior lighting

The cab shall be fitted with a fixed interior lighting system and shall be able to function with the engine stopped, so that it is possible to illuminate the operator's station such that the operator's manual can be read in darkness.

4.3.3 Operator-protective structures

4.3.3.1 General

Operator-protective structures shall conform to 4.3.3.2 and 4.3.3.3, except that structural members of the falling-object protective structure (FOPS) and the roll-over protective structure (ROPS) and the mounts which attach them to the SLM frame when made from steel shall have one of the following Charpy V- notch impact strengths (see ISO 148-1 and ISO 148-2):

10 mm × 10 mm specimen: 11 J at –10 °C

10 mm × 7,5 mm specimen: 9,5 J at –10 °C

10 mm × 5 mm specimen: 7,5 J at –10 °C

10 mm × 2,5 mm specimen: 5,5 J at –10 °C

4.3.3.2 Roll-over protective structure (ROPS)

SLMs shall be equipped with a roll-over protective structure (ROPS). The ROPS shall conform to EN ISO 3471:2008. Table 1 shall be applied to determine the values to be met when testing the ROPS.

Table 1 — Force and energy equations

Lateral load force, F_l [N]	Lateral load energy, U [J]	Vertical load force, F_v [N]	Longitudinal load force, F_L [N]
$60\,000 \left[\frac{0,66(M + M_C)}{10\,000} \right]^{1,2}$	$12\,500 \left(\frac{M + 0,25M_C}{10\,000} \right)^{1,25}$	$19,61 \frac{(M + M_C)}{2}$	Not applicable
Key M SLM operating mass [kg] M_C ready-concrete mass [kg] considering a concrete density of 2 300 kg/m ³ and the rated capacity of the SLM			

The test procedure of EN ISO 3471:2008 may be modified for lateral loading by EN ISO 3164:2013, 4.4.

4.3.3.3 Falling-object protective structure (FOPS)

SLMs shall be equipped with a falling-object protective structure (FOPS). The fitted FOPS shall be in accordance with level I of EN ISO 3449:2008.

4.4 Operator's seat

4.4.1 General requirements

SLMs shall be fitted with an adjustable seat that supports the operator in a position that allows the operator to control the SLM under the intended operating conditions.

4.4.2 Dimensions

The seat dimensions shall be in accordance with ISO 11112:1995.

4.4.3 Adjustment

All adjustments to accommodate the operator's size shall conform to ISO 11112:1995 with the exception that the fore and aft adjustment may be reduced to ± 35 mm and the vertical adjustment is not required. Adjustments shall be possible without the use of any tool.