SLOVENSKI STANDARD
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Mobile road construction machinery - Safety - Part 1: Common requirements

Mobile road construction machinery - Safety - Part 1: Common requirements

Bewegliche Straßenbaumaschinen - Sicherheit - Teil 1: Gemeinsame Anforderungen

Machines mobiles pour la construction de routes - Sécurité - Exigences communes

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents

Foreword

This European Standard was prepared by the Technical Committee CEN/TC 151 "Construction equipment and building material machines - Safety" of which the secretariat is held by DIN.

This European Standard 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).

The Annex A is normative and contains "List of mobile road construction machinery", the Annex B is normative and contains "Operator's seat dimension", the Annex C is normative and contains "Handle starting equipment" and the Annex D is normative and contains "Safety distances for openings for the lower limbs."

EN 500 "Mobile road construction machinery - Safety" comprises the following parts:

Part 1: Common requirements
Part 2: Specific requirements for road-milling machines
Part 3: Specific requirements for soil stabilization machines
Part 4: Specific requirements for compaction machines
Part 5: Specific requirements for joint cutters
Part 6: Specific requirements for paver-finishers.

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of an identical text or by endorsement, at the latest by Mars 1996, and conflicting national standards shall be withdrawn at the latest by Mars 1996.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

0 Introduction

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery shall comply as appropriate with EN 292:1991 for hazards which are not covered by this standard.

Those hazards that are relevant for all mechanical, electrical, hydraulic, pneumatic and other components of machinery and that are dealt with in standards for common use (type A-, B1- and B2-standards) are not covered by this standard. Reference to pertinent standards of this kind is made where such standards are applicable and so far necessary.

It is intended to revise the EN 500 series at an early date to take account of subsequent standards and legislation.

1 Scope

1.1 This part of this standard specifies the common safety requirements for mobile road construction machinery [1]. This standard is applicable to mobile construction machinery as listed in annex A.

It specifies common requirements for the design and construction of mobile road construction machinery, in order to protect employees from accidents and health hazards, which could occur during operation, loading, transport and maintenance.

Additional specific requirements for certain types of road construction machinery are given in parts 2 to 6 of this standard.

This part of this standard gives safety requirements for all types of road construction machinery and shall be used in conjunction with one of the parts 2 to 6. These machine specific parts do not repeat the requirements from part 1 but add to or replace the requirements for the type in question.

Machine specific requirements in parts 2 to 6 take precedence over the respective requirements of this standard.

For types of road construction machinery not dealt with in parts 2 to 6, EN 500-1:1995 applies.

1.2 This standard deals with the significant hazards pertinent to mobile road construction machinery, when used as intended and in conditions foreseen by the manufacturer (see clause 4).

NOTE 1: Due to absence of applicable standards, the hazards that may arise due to limited visibility, excessive noise and vibrations are left without consideration for the time being, awaiting directions for the measuring procedures.

NOTE 2: Hazards that may arise during use and handling of liquid gas butane / propane) are not covered in this standard, awaiting directions from CEN/TC 181.

1.3 This standard applies to machines which are manufactured after the date of publication of this standard

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[1] For travelling on traffic roads the national traffic regulations shall apply.

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.

EN 292-1:1991	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN 292-2:1991/ prA1:1993	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications
EN 294:1992	Safety of machinery - Safety distances to prevent danger zones being reached by upper limbs
EN 500-4: 1995	Mobile road construction machinery - Safety - Part 4: Specific requirements for compaction machines
EN 23411:1988	Earth-moving machinery - Human physical dimensions of operators and minimum operator space envelope
EN 25353:1988	Earth-moving machinery and tractors and machinery for agriculture and forestry - Seat index point
ENV 1070	Safety of machinery - Terminology
ISO 2860:1992	Earth-moving machinery - Minimum access dimensions
ISO 2867:1986	Earth-moving machinery - Access systems
ISO/DIS 3046-1:1993	Reciprocating internal combustion engines - Performance - Part 1: Standard reference conditions, declarations of power, fuel and lubricating oil consumptions, and test methods
ISO 3457:1986	Earth-moving machinery - Guards and shields - Definitions and specifications
ISO 3795:1989	Road vehicles and tractors and machinery for agriculture and forestry - Determination of burning behaviour of interior materials
ISO 5010:1992	Earth-moving machinery - Rubber-tyred machines - Steering requirements
ISO 6405-1:1991	Earth-moving machinery - Symbols for operator controls and other displays - Part 1: Common symbols
ISO 6682:1986	Earth-moving machinery - Zones of comfort and reach of controls
ISO 6750:1984	Earth-moving machinery - Operation and maintenance - Format and contents of manuals

ISO 9249:1989 Earth moving machinery - Engine test code - Net power

ISO 9533:1989 Earth-moving machinery - Machine-mounted forward and reverse audible warning alarm - Sound test method

3 Definitions

For the purposes of this standard the definitions of ENV 1070 and the following apply:

3.1 Mobile road construction machinery

Mobile road construction machinery are machines intended for construction, maintenance and marking of roads. The machines are listed in annex A of this standard.

3.2 Operating mass

The operating mass is equal to the weight of the basic machine including the mass of tools and attachments plus half-full fuel tank and full hydraulic oil tanks. When applicable, operating mass also includes half-full water tank (if provided with sprinkler system or similar) and furthermore an addition of 75 kg for the ride-on operator.

4 List of hazards

This clause contains all hazards, as far as they are treated in the set of standards for mobile road construction machinery identified by risk assessments significant for mobile road construction machinery defined in 1.1 and which require action to eliminate or reduce risk.

The risks arising from the hazards listed in table 1 are eliminated or minimised by combining the technical measures given in clause 5 of this standard and those given in the subsequent parts.

Table 1: List of hazards

Clause	Hazard
4.1	Crushing hazard
4.2	Shearing hazard
4.3	Cutting and severing hazard
4.4	Entanglement hazard
4.5	Drawing-in or trapping hazard
4.6	Impact hazard
4.7	High pressure fluid injection hazard
4.8	Hazards caused by ejection of parts (material / workpieces)
4.9	loss of stability (machinery and machine parts)

(continued)

Table 1: List of hazards (concluded)

Clause	Hazard
4.10	Slip, trip and fall hazard in relationship with machinery
4.11	Hazards caused by direct or indirect electrical contact
4.12	Hazards caused by thermal radiation such as projection of molten particles and by chemical effects from short-circuits and overload
4.13	Hazards resulting in burns and/or scalding by possible contact of persons, by flames or explosions and also by radiation of heat
4.14	Health damaging effects caused by hot or cold work environment
4.15	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dust
4.16	Hazards caused by fire and/or explosion
4.17	Unhealthy postures or excessive efforts
4.18	Hazards caused by inadequate human engineering, regarding hand-arm or foot-leg
4.19	Hazards caused by inadequate local lighting
4.20	Hazards caused by human error
4.21	Hazard combinations
4.22	Hazards caused by failure of energy supply (of energy control circuits)
4.23	Hazards caused by unexpected ejection of machine parts or fluids
4.24	Hazards caused by failure/malfunctioning of control system (unexpected start up or unexpected overrun)
4.25	Hazards caused by errors of fitting
4.26	Hazards caused by roll-over, unexpected loss of machine stability
4.27 4.27.1 4.27.2 4.27.3 4.27.4 4.27.5 4.27.6	Hazards caused by temporarily missing and/or incorrectly positioned safety related measures/means as: - Guards of all kinds - Safety related protection devices of all kinds - Starting and stopping devices - Safety signs and tags - Information and warning devices of all kinds - Essential equipment and accessories for safe adjusting and/or maintenance

5 Safety requirements

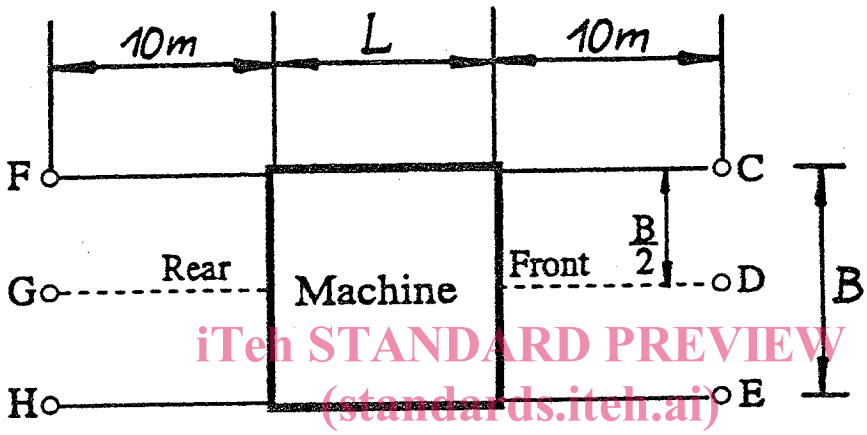
This clause gives the requirements and/or measures on those hazards for which particular action appears necessary.

So far applicable requirements/measures are already contained in other standards - specifically in EN 292:1991 parts 1 and 2 and Annex A of EN 292:1991 part 2 or in Type B-standards - reference is made to them, to relevant sub-clauses and/or to the applicable performance category.

5.1 Lighting

Mobile road construction machinery intended for ride-on operation, and with a rated power (see 7 g)) of more than 20 kW, shall be fitted with working lights. Stop lights and/or reversing lights are not required for mobile road construction machinery.

The illumination intensity shall be at least 15 lx at a distance of 10 m from the machine in the direction(s) of operation, and measured at ground level in points C, D, E and F, G, H according to figure 1.



L is the machine length without attachments.
B is the machine width without attachments.

Figure 1

5.2 Design of the machine in relation to its operation and handling

5.2.1 Attachments for lifting and loading

Appropriate attachments (holes, lugs, eyelets) shall be fitted to ensure safe loading, recovery and transportation.

For mobile road construction machinery with an operating mass of up to 40 kg, such attachments can have the form of a handle.

The attachments shall facilitate reliable fitting of the lifting tackles, and be arranged in such a way as to contribute to safe anchoring of the machine during lifting and recovery.

NOTE: Verifiable safety requirements for attachments for lifting and loading cannot be given at present.

5.2.2 Attachments for the tie down of the machine

Appropriate attachments shall be provided for the tie down of the machines during transportation. These may be identical with the attachments for lifting, loading and recovery.