



SLOVENSKI STANDARD
SIST-TS CEN/TS 13778:2004
01-november-2004

Mobile demolition machinery - Safety requirements

Mobile Abbruchmaschinen - Sicherheitsanforderungen

Engins mobiles de démolition - Exigences de sécurité

Ta slovenski standard je istoveten z: CEN/TS 13778:2004

ITEH STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: CEN/TS 13778:2004

[SIST-TS CEN/TS 13778:2004](https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004)

<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>

ICS:

53.100	Stroji za zemeljska dela	Earth-moving machinery
91.220	Gradbena oprema	Construction equipment

SIST-TS CEN/TS 13778:2004 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TS CEN/TS 13778:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>

TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CEN/TS 13778

September 2004

ICS 53.100; 91.220

English version

Mobile demolition machinery - Safety requirements

Engins mobiles de démolition - Exigences de sécurité

Mobile Abbruchmaschinen - Sicherheitsanforderungen

This Technical Specification (CEN/TS) was approved by CEN on 18 June 2004 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

High STANDARD PREVIEW
(standards.iteh.ai)

SIST-TS CEN/TS 13778:2004

<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Foreword	5
Introduction	6
1 Scope	7
2 Normative references	8
3 Terms and definitions	9
4 List of significant hazards	10
5 Safety requirements and/or measures	15
5.1 General	15
5.2 Operator's station	16
5.3 Pipes and hoses.....	16
5.3.1 General.....	16
5.3.2 Hydraulic systems	16
5.3.3 Pneumatic installations	16
5.4 Dust	16
5.5 Illumination of danger zone, working area and for travelling on site	16
5.6 Controls and indicators.....	16
5.6.1 General	16
5.6.2 Uncontrolled movement	17
5.6.3 Remote control.....	17
5.6.4 Indicators and control panel.....	17
5.7 Stability	17
5.8 Noise.....	17
5.8.1 General.....	17
5.8.2 Sound power level - exterior.....	17
5.8.3 Sound pressure level at the operator's station	17
5.9 Protective structures	17
5.9.1 General.....	17
5.9.2 Roll-over protective structure (ROPS)	18
5.9.3 Tipover protective structure (TOPS).....	18
5.9.4 Falling-object protective structure (FOPS).....	18
5.9.5 Front protective structure	18
5.9.6 Door and window protection	18
5.10 Sharp edges and acute angles	18
5.11 Protection devices	18
5.12 Electrical components.....	18
5.12.1 Base machine	18
5.12.2 Attachments	18
5.12.3 Electromagnetic compatibility	18
5.13 Visibility	18
5.14 Retrieval and transportation	19
5.15 Attachments and demountable fittings	19
5.16 Wire ropes.....	19
5.17 Object handling.....	19
5.17.1 General.....	19
5.17.2 Load hooking system	19
5.18 Warning and signalling devices	20
5.19 Maintenance	20
5.19.1 General.....	20
5.19.2 Lift-arm support devices	20

5.19.3	Illumination for maintenance	20
6	Verification of safety requirements and/or measures	20
7	Information for use	22
7.1	General	22
7.2	Warning signs	22
7.3	Accompanying documents	22
7.3.1	General	22
7.3.2	Operators manual	22
7.3.3	Maintenance manual	24
7.3.4	Spare parts list	25
7.4	Marking	25
7.4.1	Base machine	25
7.4.2	Equipment and attachment	25
Annex A	(normative) Instructions for the examination and checking of wire ropes, chains and blocks	26
A.1	Instructions for selecting and fitting wire rope grips	26
A.1.1	General	26
A.1.2	Installation	26
A.1.3	Number of grips	26
A.1.4	Tightening torque	26
A.2	Instructions for the examination and maintenance of travelling blocks and wire ropes	27
Annex B	(normative) Noise test methods for hydraulic hammers	29
B.1	Introduction	29
B.2	Scope	29
B.3	Definitions	29
B.3.1	A-weighted sound power level, L_{WA}	29
B.3.2	A-weighted emission sound pressure level, L_{pA}	29
B.3.3	Declared single-number noise emission value, $L_{2plus K}$	30
B.3.4	Background noise	30
B.4	Description of machinery family	30
B.5	Sound power level determination	30
B.5.1	Using EN ISO 3744 as a reference standard for the sound power level determination	30
B.5.2	Using other basic European standards as a reference for sound power level determination	31
B.5.3	Repetition of measurements and calculation of the result	31
B.5.4	Optional measurements	32
B.6	Emission sound pressure level determination	32
B.7	Installation and mounting conditions	32
B.7.1	Test block structure	32
B.7.2	Carrier	34
B.7.3	Mounting	34
B.7.4	Hammer stability and static hold force	34
B.7.5	Tool	34
B.8	Operating conditions	34
B.8.1	Hydraulic input power and oil flow	34
B.8.2	Adjustable components having effect on the hammer power	34
B.8.3	Quantities to be measured	34
B.8.4	Parameters to be evaluated from the measured operating parameters	35
B.8.5	Hydraulic supply line pressure measurement, p_s	35
B.8.6	Hammer inlet oil flow, Q	35
B.8.7	Measuring point of the oil temperature, T	35
B.9	Measurement uncertainties	35
B.10	Information to be recorded	35
B.11	Information to be reported	36
B.12	Declaration and verification of noise emission values	37

CEN/TS 13778:2004 (E)

B.12.1	General	37
B.12.2	Values to be declared	37
B.12.3	Verification of the declared noise emission values	37
Annex C (normative) Requirements for non-text safety signs for use on demolition machinery		
C.1	General	38
C.1.1	Introduction	38
C.1.2	Safety alert symbol (see Figure C.1)	38
C.1.3	Non-text hazard pictorials	38
C.1.4	Dimensions	38
C.1.5	Colours of safety signs	38
C.1.6	Location	38
Bibliography		40

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN/TS 13778:2004](https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004)
<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>

Foreword

This document (CEN/TS 13778:2004) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines — Safety”, the secretariat of which is held by DIN.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN/TS 13778:2004](https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004)

<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>

CEN/TS 13778:2004 (E)**Introduction**

This document is equivalent to a Type C-standard as stated in EN 1070.

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

Those hazards that are relevant for all mechanical, electrical, hydraulic, pneumatic and other equipment of machinery and that are dealt with in standards for common use are not covered by this document. Reference to pertinent standards of this kind is made where such standards are applicable and so far as is necessary.

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

[SIST-TS CEN/TS 13778:2004](https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004)

<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>

1 Scope

This document specifies the safety requirements for mobile demolition machinery that is designed for demolishing by pushing or pulling, or fragmenting by crushing or shearing, buildings and/or other civil engineering structures and their component parts and/or separating the resultant debris.

NOTE 1 Demolition machines can also be used for separating and sorting the resultant debris, but this is not their primary purpose.

NOTE 2 Where demolition machines are used on public roads, the national traffic regulations apply.

Mobile demolition machinery can be an earth-moving machine (see EN 474-1:1994, -3:1996, -4:1996, -5:1996 and prEN 474-12:1998) equipped with special equipment and attachments for demolition work, for example, ball, breaker, crusher, hydraulic or free-fall hammers, jaws. Mobile demolition machinery may be controlled either by a ride-on operator or by a remote control system (see Figure 1).

Machines for specific applications, for example, road surface breaking machines and remotely controlled demolition machines are also included in this document.

This document deals with all significant hazards pertinent to mobile demolition machinery (see Clause 4), when they are used as intended and under the conditions foreseen by the manufacturer. This document specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

The base machine can have the same safety requirements as other types of mobile construction machinery and these will therefore comply with the requirements of the European and International standards written for other machines (see normative references).

This document includes those requirements which are necessary for mobile machinery only when they are designed to be used in the demolition process.

This document applies primarily to the machines which are manufactured after the date of approval of the standard by CEN.

NOTE 3 Directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres can be applicable to the type of machine or equipment covered by this document. The present standard is not intended to provide means of complying with the essential health and safety requirements of Directive 94/9/EC.

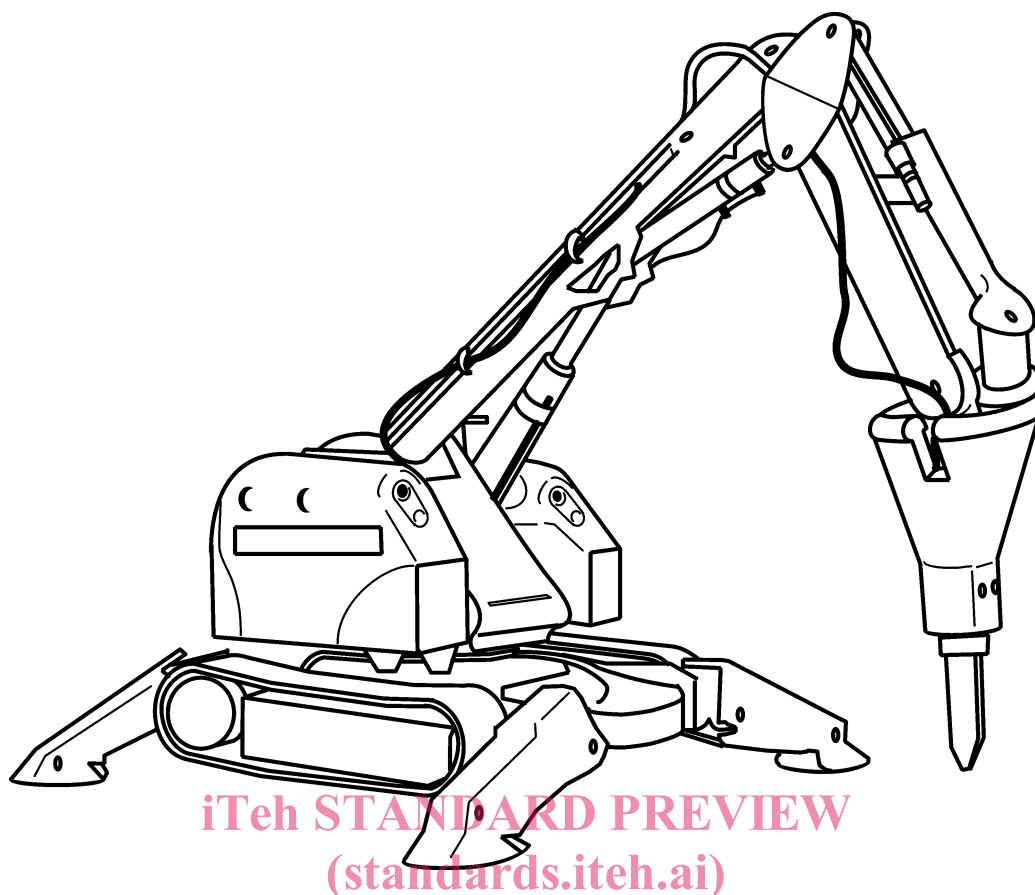


Figure 1 — Demolition machine operated by remote control system

<https://standards.iteh.ai/catalog/standards/sist/814ac0d7-3b17-4b51-a6d2-b9015c3ac8a3/sist-ts-cen-ts-13778-2004>

2 Normative references

The following referenced documents are indispensable for the application 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 474-1:1994, *Earth-moving machinery — Safety — Part 1: General requirements.*

EN 474-3:1996, *Earth-moving machinery — Safety — Part 3: Requirements for loaders.*

EN 474-4:1996, *Earth-moving machinery — Safety — Part 4: Requirements for backhoe loaders.*

EN 474-5:1996, *Earth-moving machinery — Safety — Part 5: Requirements for hydraulic excavators.*

prEN 474-12:1998, *Earth-moving machinery — Safety — Part 12: Requirements for cable excavators.*

EN 500-1, *Mobile road construction machinery — Safety — Part 1: Common requirements.*

EN 982, *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 13309:2001, *Construction equipment — Electromagnetic compatibility of machines with internal electrical power supply.*

EN 13627, *Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements (ISO 3449:1992 modified)*

EN 60204-1:1992, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements.*

EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals.*

EN 61310-2, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking.*

EN ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994).*

EN ISO 6165:2002, *Earth-moving machinery - Basic types - Vocabulary (ISO 6165:2001)*

EN ISO 9614-2, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning (ISO 9614-2:1996)*

EN ISO 11203, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level (ISO 11203:1995).*

EN ISO 12100-1, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles (ISO 12100-2:2003)*

ISO 4309:1990, *Cranes — Wire ropes — Code of practice for examination and discard.*

ISO 6395:1988 *Acoustics -- Measurement of exterior noise emitted by earth-moving machinery -- Dynamic test conditions*

ISO 6396:1992, *Acoustics -- Measurement at the operator's position of noise emitted by earth-moving machinery -- Dynamic test conditions*

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

ISO 9244:1995, *Earth-moving machinery — General principles*

ISO 10262, *Earth-moving machinery — Hydraulic excavators — Laboratory tests and performance requirements for operator protective guards.*

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

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 1070:1998 and the following apply.

Definitions used in EN and ISO standards referred to in this document are also valid for this document.

CEN/TS 13778:2004 (E)**3.1****mobile demolition machine**

machine, including equipment and attachment (working tool) (see EN ISO 6165:1999), which is purpose built to demolish, cut, loosen, separate, pick up, transport and distribute component parts of buildings, civil engineering structures, road works or other areas such as quarries

3.2**base machine**

machine without equipment or attachment, that includes the mountings necessary to secure equipment, as required, e. g. operator protective structures for demolition

3.3**equipment**

boom, arm and associated linkage which provides articulation and which is attached to the base machine and provides at its outer end a mounting either for direct fixing of an attachment or for fixing an attachment via an attachment bracket

3.4**attachment (working tool)**

removable device mounted either directly to the equipment or on an attachment bracket to fulfil the primary function of the machine or for a specific use

3.5**breaker**

attachment with tooth, teeth and/or cutting edges, used for breaking concrete or cutting steel

3.6**hydraulic hammer**

attachment with a hydraulically operated working tool (e. g. chisel) used to demolish structures. The working tool is impacted by a piston to penetrate the material

3.7**road surface breaker**

mobile demolition machine designed and built for the breaking of roads or similar surfaces

3.8**danger zone**

zone within and/or around demolition machinery in which a person risks being injured by movement of the base machine, its equipment or attachments, and flying and/or falling debris

3.9**working zone**

space around a machine in which the machine, its equipment and attachment are moved in order to carry out work

3.10**exposed person**

person wholly or partially in the danger zone

4 List of significant hazards

This Clause contains all significant hazards and hazardous situations, as far as they are dealt with in this document, identified by risk assessment significant for this type of machinery and which require action to eliminate or reduce risk.

Table 1 — List of significant hazards (continued)

No.	Hazards	EN ISO 12100		This document
		Part 1:2003	Part 2:2003	
Hazards, hazardous situations and hazardous events				
1	Mechanical hazards due to:			
	- machine parts or workpieces, e.g.:	4.2	4.2.1, 4.2.2, 5.1	
	a) shape; b) relative location; c) mass and stability (potential energy of elements which may move under the effect of gravity); d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion); e) inadequacy of mechanical strength;	4.2	4.10, 5.5.4	5.19.2 5.6.1 5.6.2 5.17.2
	- accumulation of energy inside the machinery e. g.: f) elastic elements (springs) g) liquids and gases under pressure; h) the effect of vacuum	4.2	4.10, 5.5.4	5.3
1.1	Crushing hazard	4.2.1		
1.2	Shearing hazard			5.11
1.3	Cutting or severing hazard			
1.4	Entanglement hazard			
1.5	Drawing-in or trapping hazard			5.11
1.6	Impact hazard			
1.7	Stabbing or puncture hazard			
1.8	Friction or abrasion hazard			
1.9	High pressure fluid injection or ejection hazard	4.2.1	4.10	5.3
2	Electrical hazards due to :			
2.1	Contact of persons with live parts (direct contact)	4.3	4.9, 5.5.4	5.12.1
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	4.3	4.9	