



# SLOVENSKI STANDARD

## SIST EN 12779:2016

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**Varnost lesnoobdelovalnih strojev - Nepremični odsesovalni sistemi za lesne odrezke in prah - Varnostne zahteve**

Safety of woodworking machines - Chip and dust extraction systems with fixed installation - Safety requirements

Sicherheit von Holzbearbeitungsmaschinen - Ortsfeste Absauganlagen für Holzstaub und Späne - Sicherheitstechnische Anforderungen

Sécurité des machines pour le travail du bois - Installations fixes d'extraction de copeaux et de poussières - Prescriptions de sécurité

**Ta slovenski standard je istoveten z: EN 12779:2015**

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EUROPEAN STANDARD

EN 12779

NORME EUROPÉENNE

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ICS 79.120.10

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English Version

## Safety of woodworking machines - Chip and dust extraction systems with fixed installation - Safety requirements

Sécurité des machines pour le travail du bois -  
Installations fixes d'extraction de copeaux et de  
poussières - Prescriptions de sécurité

Sicherheit von Holzbearbeitungsmaschinen - Ortsfeste  
Absauganlagen für Holzstaub und Späne -  
Sicherheitstechnische Anforderungen

This European Standard was approved by CEN on 26 September 2015.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**EN 12779:2015 (E)****European foreword**

This document (EN 12779:2015) has been prepared by Technical Committee CEN/TC 142 "Woodworking machines - Safety", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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

This document supersedes EN 12779:2004+A1:2009.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the basic requirements of EU Directive(s).

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

The European Standards produced by CEN/TC 142 are particular to woodworking machines and compliment the relevant "A" and "B" standards on the subject of general safety (see Introduction of EN ISO 12100:2010 for a description of A, B and C standards).

NOTE Extraction systems as a whole are not intended to be installed in areas, where the presence of potentially explosive atmosphere needs to be taken into account.

In relation to the previous version of the standard, the following main modifications have been made:

- The scope has been adjusted to meet the fields of application of the standard;
- The requirements for safety related controls have been modified for clarification;
- The requirements for electrical equipment and installations have been modified for clarification;
- The requirements for fire and explosion protection have been modified for clarification;
- The requirements for noise protection have been modified for clarification;
- The requirements for protection against hazardous substances have been modified for clarification;
- The requirements for silos have been modified for clarification;
- A new annex for examples of extraction systems have been added for clarification;
- A new annex for the classification of places where explosive atmosphere may occur have been added for clarification.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta,

Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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## Introduction

This standard has been prepared to be a harmonized standard to provide one means of conforming to the Essential Health and Safety Requirements of the Machinery Directive and associated EFTA Regulations. This document is a type “C” standard as defined 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 and events 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 other standards, for machines that have been designed and built in accordance with the provisions of this type C standard.

The requirements of this document are directed to manufacturers and their authorized representatives of chip and dust extraction systems.

This document also includes information to be provided by the manufacturer to the user.



## 1 Scope

This European Standard deals with the significant hazards, hazardous situations and events relevant for chip and dust extraction systems for fixed installation and for connection with machines for working on solid wood (including hard wood), wood-based materials and wood-like materials, when they are used as intended and under the conditions foreseen by the manufacturer, including reasonably foreseeable misuse.

This European Standard deals also with the technical requirements to minimize the hazards in connection with the temporary storage of wood dust, chips and shavings in a silo, bin or container including charging and discharge systems.

This European standard does not apply to:

- a) chip and dust extraction systems with filters installed indoors (covered by prEN 16770);
- b) extraction equipment (e.g. extraction hoods, ducts) within a woodworking machine including the outlet to which the extraction system is connected;
- c) chip and dust extraction systems designed for  $K_{ST}$  values above 200 bar ms<sup>-1</sup>;
- d) mechanical conveying systems between filter and storage facility;
- e) extraction systems and conveying systems with underpressure below 0,3 bar or overpressure above 0,3 bar;
- f) storage devices for pressed wood products (e.g. pellets) and humid shavings.

Requirements for containers are not dealt with in this standard.

This European Standard is not applicable to machines which are manufactured before the date of its publication as EN.

## 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 617:2001+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for the equipment for the storage of bulk materials in silos, bunkers, bins and hoppers*

EN 953:1997+A1:2009, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1093-7:1998+A1:2008, *Safety of machinery — Evaluation of the emission of airborne hazardous substances — Part 7: Separation efficiency by mass, ducted outlet*

EN 1127-1:2011, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 1366-1:2014, *Fire resistance tests for service installations — Part 1: Ventilation ducts*

EN 1366-2:2015, *Fire resistance tests for service installations — Part 2: Fire dampers*

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EN 1366-7:2004, *Fire resistance tests for service installations — Part 7: Conveyor systems and their closures*

EN 1870-4:2012, *Safety of woodworking machines — Circular sawing machines — Part 4: Multiblade rip sawing machines with manual loading and/or unloading*

EN 1991-4:2006, *Eurocode 1 — Actions on structures — Part 4: Silos and tanks*

EN 12750:2013, *Safety of woodworking machines — Four sided moulding machines*

EN 13463-1:2009, *Non-electrical equipment for use in potentially explosive atmospheres — Part 1: Basic method and requirements*

EN 14373:2005, *Explosion suppression systems*

EN 14460:2006, *Explosion resistant equipment*

EN 14491:2012, *Dust explosion venting protective systems*

EN 14797:2006, *Explosion venting devices*

EN 14986:2007, *Design of fans working in potentially explosive atmospheres*

EN 15089:2009, *Explosion isolation systems*

EN 16009:2011, *Flameless explosion venting devices*

EN 16020:2011, *Explosion diverters*

EN 16447:2014, *Explosion isolation flap valves*

EN 60079-14:2014, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14:2013)*

EN 60204-1:2006,<sup>1)</sup> *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60529:1991,<sup>2)</sup> *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 62305-1:2011, *Protection against lightning — Part 1: General principles (IEC 62305-1:2010, modified)*

EN ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414:2010)*

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

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

1) This document is impacted by the stand-alone amendment EN 60204-1:2006/A1:2009.

2) This document is impacted by the stand-alone amendments EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013, and by the corrigendum EN 60529:1991/corrigendum May 1993.

EN ISO 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

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

EN ISO 14122-2:2001,<sup>3)</sup> *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3:2001,<sup>4)</sup> *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

EN ISO 14122-4:2004,<sup>5)</sup> *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)*

### 3 Terms, definitions, terminology, symbols and units

#### 3.1 Terms and definitions

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

##### 3.1.1

##### **chip and dust extraction system**

system used for extraction, conveyance, separation and temporary storage of chips and dust from woodworking

Note 1 to entry: Examples of extraction systems are illustrated in Annex A.

##### 3.1.2

##### **fixed installation**

extraction system which is permanently located and installed

##### 3.1.3

##### **chip**

<woodworking> particles with a size > 0,5 mm

##### 3.1.4

##### **dust**

<woodworking> fine particles with a size ≤ 0,5 mm

##### 3.1.5

##### **shaving**

<woodworking> chip with a typical length of above 15 mm and a low thickness compared to other dimensions

##### 3.1.6

##### **extraction ducting**

all parts of the ducting between the extraction points and the filter consisting of main and branch and machine connection ducts, gate valves, fire gates and back pressure flap

3) This document is impacted by the stand-alone amendment EN ISO 14122-2:2001/A1:2010.

4) This document is impacted by the stand-alone amendment EN ISO 14122-3:2001/A1:2010.

5) This document is impacted by the stand-alone amendment EN ISO 14122-4:2004/A1:2010.

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Note 1 to entry: Back pressure flaps can also be a part of the filter.

**3.1.7****main duct**

duct to the filter to which branch ducts or connection ducts are connected

**3.1.8****separator**

device for separation of chips and dust from the conveying air

Note 1 to entry: Filters and cyclones are examples of separators.

**3.1.9****silo**

fixed installed closed structure for temporary storage of chips and dust, part of a continuous handling system, with a filling height of at least 1,5 m

Note 1 to entry: Silo is usually charged from the top and discharged from the bottom or the side.

Note 2 to entry: See also Figures A.1 and A.2 in Annex A.

**3.1.10****supporting fan**

additional fan to compensate a high pressure loss

**3.1.11****bin**

movable equipment with a volume up to 1,0 m<sup>3</sup> for temporary storage of chips and dust

**3.1.12****container**

movable equipment with a volume over 1,0 m<sup>3</sup> for temporary storage of chips and dust

**3.1.13****discharge system**

system which continually or intermittently removes chips and dust from separators or silos

**3.1.14****conveying system**

system to convey chips and dust from one or more separators to other parts of the extraction system or into silo(s)

**3.1.15****extraction vacuum**

static vacuum in a duct connecting point

**3.1.16****air velocity**

average velocity of the air inside a duct, calculated or measured over the entire cross section

**3.1.17****concurrency factor**

ratio in percent between the nominal volume flow rate of the extraction system and the total volume flow rate of all machines connected

**3.1.18****crude air part**

dust loaded interior of the extraction system including ducting, silo, container, bin, separator etc. from the duct inlet connected to the filter element surface, where the air filtration is performed

**3.1.19****clean air part**

interior of the extraction system from the filter element surface, where the air filtration is performed, to the air outlet

**3.1.20****recirculation air**

filtered air reintroduced into the working area

**3.1.21****recirculation air duct**

duct through which filtered air is reintroduced to the working area

**3.1.22****exhaust air**

airflow discharged to the atmosphere

[SOURCE: EN 13779:2007, 6.1, Table 2, number 7]

**3.1.23****filter**

device for the removal of particulate contaminants from the air, consisting of filter housing, inlets and outlets, filter element and cleaning device

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[SOURCE: EN 12792:2003, Clause 3, Table 1, n°168, reference modified – device for removing particulate material from a fluid or gas]

**3.1.24****filter element**

part of the filter for the removal of chips and dust from the air

**3.1.25****cleaning device**

device for the reduction of a dust layer on filter elements

Note 1 to entry: The cleaning can be obtained e.g. by vibration, reversed airflow or compressed-air blast.

**3.1.26****back pressure flap**

flap valve kept open by airflow in normal operation, closed by interruption or reversed airflow

**3.1.27****wood based material**

material with similar physical characteristics to wood

Note 1 to entry: This includes MDF (Medium Density Fibreboard), OSB ((Oriented Strand Board), plywood, chipboard, fibreboard, and also these materials when they are covered with plastic or light alloy laminates and or edges.

### 3.2 Terminology

List of corresponding terms in English, French and German is included in Annex B.

### 3.3 Symbols and units

Following symbols and units are used in this document:

**Table 1 — Symbols and units**

Parameter	Symbol	Unit
Diameter	$d$	mm
Height	$h$	m
Length	$l$	m
Width	$w$	m
Volume	$V$	m <sup>3</sup>
Air velocity	$v$	ms <sup>-1</sup>
Volume flow rate	$q_v$	m <sup>3</sup> h <sup>-1</sup>
Pressure	$p$	Pa
Pressure difference	$\Delta p$	Pa
Maximum explosion overpressure	$P_{max}$	bar
Reduced maximum explosion overpressure	$P_{redmax}$	bar
Material flow rate	$q_m$	kg/h
$K_{ST}$ value	$K_{ST}$	bar ms <sup>-1</sup>
Minimum ignition energy	MIE	mJ
Minimum ignition temperature	MIT	°C
Lower explosion level	LEL	g m <sup>-3</sup>

## 4 List of significant hazards

This clause contains all significant hazards, hazardous situations and events (see EN ISO 12100:2010), identified by risk assessment as significant for the extraction systems as defined in the scope and which require action to eliminate or reduce the risk. This European Standard deals with these significant hazards by defining safety requirements and/or measures or by reference to relevant standards.

These hazards are listed in Table 2 in accordance with EN ISO 12100:2010, Annex B.

If gaseous pollutants occur at the working area, they will be partly removed from the working area by the extraction system for wood dust and chips. But the gaseous pollutants are not separated by the extraction system for dust and chips.

Table 2 — List of significant hazards

No	Type or group	Examples of hazards		Specific Requirements Applicable clauses of this standard	Subclause of EN ISO 12100:2010
		Origin <sup>a</sup>	Potential consequences <sup>b</sup>		
1	<b>Mechanical hazards</b>	<ul style="list-style-type: none"> <li>— height from the ground;</li> <li>— instability;</li> <li>— moving parts;</li> <li>— rotating parts;</li> <li>— rough, slippery surface;</li> <li>— stored energy;</li> <li>— explosion venting (ejection of parts);</li> <li>— gravity (bridges of dust and chips);</li> </ul>	<ul style="list-style-type: none"> <li>— crushing;</li> <li>— drawing-in or trapping;</li> <li>— entanglement;</li> <li>— shearing;</li> <li>— slipping, tripping and falling;</li> <li>— impact;</li> <li>— sinking into wood dust and chips;</li> <li>— being buried under wood dust and chips;</li> </ul>	<ul style="list-style-type: none"> <li>5.3. ff</li> <li>5.8 ff</li> <li>5.2.1</li> <li>5.2.2</li> <li>5.2.3</li> </ul>	<ul style="list-style-type: none"> <li>6.2.3 a)</li> <li>6.2.6</li> <li>6.2.10</li> <li>6.3.5.2</li> <li>6.3.5.4</li> </ul>
2	<b>Electrical hazards</b>	<ul style="list-style-type: none"> <li>— electrostatic phenomena;</li> <li>— parts which have become live under fault conditions;</li> </ul>	<ul style="list-style-type: none"> <li>— electrocution;</li> <li>— fire;</li> <li>— electric shock;</li> </ul>	<ul style="list-style-type: none"> <li>5.7 ff</li> <li>5.2.3</li> </ul>	<ul style="list-style-type: none"> <li>6.2.9</li> <li>6.3.3.2</li> <li>6.3.5.4</li> <li>6.4.4</li> <li>6.4.5</li> </ul>
3	<b>Thermal hazards</b>	<ul style="list-style-type: none"> <li>— explosion;</li> <li>— flame;</li> <li>— objects or materials with a high temperature;</li> </ul>	<ul style="list-style-type: none"> <li>— burn;</li> <li>— fire spreading;</li> <li>— pressure shockwave</li> </ul>	<ul style="list-style-type: none"> <li>5.4 ff</li> <li>5.2.1</li> <li>5.2.3</li> </ul>	<ul style="list-style-type: none"> <li>6.2.4 b)</li> <li>6.2.8 c)</li> </ul>
4	<b>Noise hazards</b>	<ul style="list-style-type: none"> <li>— exhausting system;</li> <li>— scraping surfaces;</li> <li>— unbalanced rotating parts;</li> <li>— whistling pneumatics;</li> <li>— compressed air;</li> </ul>	<ul style="list-style-type: none"> <li>— discomfort;</li> <li>— permanent hearing loss;</li> <li>— stress;</li> <li>— tinnitus;</li> <li>— tiredness;</li> </ul>	<ul style="list-style-type: none"> <li>5.5</li> </ul>	<ul style="list-style-type: none"> <li>6.2.3 c)</li> <li>6.2.8 c)</li> <li>6.3.1</li> <li>6.3.4.2</li> <li>6.4.3</li> <li>6.4.5.1 b) and c)</li> </ul>
7	<b>Material/substance hazards</b>	<ul style="list-style-type: none"> <li>— biological and microbiological (viral or bacterial) agent;</li> <li>— dust;</li> <li>— flammable materials;</li> </ul>	<ul style="list-style-type: none"> <li>— breathing difficulties, suffocation;</li> <li>— cancer;</li> <li>— explosion;</li> <li>— fire;</li> <li>— fire spreading;</li> <li>— poisoning;</li> <li>— sensitization.</li> </ul>	<ul style="list-style-type: none"> <li>5.6 ff</li> <li>5.2.1</li> </ul>	<ul style="list-style-type: none"> <li>6.2.3 b)</li> <li>6.2.3 c)</li> <li>6.2.4 a)</li> <li>6.3.4.4</li> <li>6.4.5.1 c)</li> <li>6.4.5.1 g)</li> </ul>
8	<b>Ergonomic hazards</b>	<ul style="list-style-type: none"> <li>— access;</li> <li>— visibility;</li> </ul>	<ul style="list-style-type: none"> <li>— stress;</li> <li>— any other (for example, mechanical, electrical) as a consequence of a human error;</li> </ul>	<ul style="list-style-type: none"> <li>5.3.3</li> <li>5.8.1</li> <li>5.8.2</li> <li>5.8.3</li> </ul>	<ul style="list-style-type: none"> <li>6.2.7</li> <li>6.2.8</li> <li>6.2.11.8</li> </ul>