



# SLOVENSKI STANDARD

## SIST EN 12779:2005

01-april-2005

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

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

Machines pour le travail du bois - Installations fixes d'extraction de copeaux et de poussières - Performances relatives à la sécurité et prescriptions de sécurité

**Ta slovenski standard je istoveten z: EN 12779:2004**

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**ICS:**

79.120.10      Lesnoobdelovalni stroji      Woodworking machines

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ICS 79.120.10

English version

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

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This European Standard was approved by CEN on 20 October 2004.

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 Central Secretariat or to any CEN member.

This European Standard exists 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 Central Secretariat has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 12779:2004) has been prepared by Technical Committee CEN/TC 142 "Woodworking machines - Safety", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by June 2005 and conflicting national standards shall be withdrawn at the latest by June 2005.

This document has been prepared under a mandate 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.

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 12100-1:2003 for a description of A, B and C standards).

This standard for Chip and dust extraction systems with fixed installation will be followed by a separate standard for Semi-stationary chip and dust extraction machines.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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.

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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 12100-1:2003.

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 authorised representatives of chip and dust extraction systems. It is also useful for designers.

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

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## 1 Scope

This document sets out the safety related performance requirements and specifies the methods for elimination of hazards or the measures that shall be taken to minimise hazards, which cannot be eliminated, on chip and dust extraction systems with fixed installation as defined in 3.1.1 and 3.1.2, for the purpose of this standard, hereinafter referred to as extraction system, connected to woodworking machines, designed to process solid wood, chipboard, fibreboard, plywood and also these materials where these are covered with plastic laminate or edgings. The extraction and conveying system operates pneumatically by vacuum and/or pressure between  $\pm 0,3$  bar.

This standard does not:

- a) apply to fixed installations with an air flow capacity below  $6\ 000\ \text{m}^3\text{h}^{-1}$  installed indoors;
- b) apply to moveable units with an air flow capacity below  $6\ 000\ \text{m}^3\text{h}^{-1}$ ;
- c) apply to extraction equipment (e.g. extraction hoods, ducts) within a woodworking machine i.e. up to and including the outlet to which the extraction system is coupled;
- d) apply to extraction systems connected to machines processing non-wood materials, such as plastic, plastic laminates, metals, glass or stone;
- e) deal with the hazards from contact with or inhalation of dusts from wood coated with lacquer, plastic, aluminium and material with high additive contents or similar;
- f) deal with shop fresh air supply;
- g) apply to chip and dust extraction systems designed for  $K_{st}$  values above  $200\ \text{bar}\ \text{ms}^{-1}$ ;
- h) apply to the silo discharge system;
- i) cover the hazards related to Electromagnetic Compatibility (EMC) as required by the EMC Directive 89/336/EEC dated 3-5-89.

This document deals with the interaction with the silo discharge system if any.

This document covers the hazards relevant to these machines as stated in Clause 4. document

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 (EHSR) of Directive 94/9/EC.



## 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 294:1992, *Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs*

EN 418:1992, *Safety of machinery - Emergency stop equipment, functional aspects - Principles for design*

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

EN 954-1:1996, *Safety of machinery - Safety related parts of control systems - Part 1: General principles for design*

EN 982:1996, *Safety of machinery - Safety requirements for fluid power systems and their components – Hydraulics*

EN 983:1996, *Safety of machinery - Safety requirements for fluid power systems and their components – Pneumatics*

EN 1127-1:1997, *Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology*

EN 1366-1:1999, *Fire resistance tests on service installations - Part 1: Ducts*

EN 1366-2:1999, *Fire resistance tests for service installations - Part 2: Fire dampers*

EN 13284-1:2001, *Stationary source emissions - Determination of low range mass concentration of dust - Part 1: Manual gravimetric method*

EN 60204-1:1997, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:1997)*

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

EN 60947-4-1:2001, *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters (IEC 60947-4-1:2000)*.

EN 60947-5-1:2004, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:2003)*.

EN ISO 11202:1995, *Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Survey method in situ (ISO 11202:1995)*

EN ISO 11688-1:1998, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*

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

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

EN ISO 14122-2:2001, *Safety of machinery - Safety means of permanent access to machinery - Part 2: Working platforms and gangways (ISO 14122-2:2001)*

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

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EN ISO 14122-4:2004, *Safety of machinery - Permanent means of access to machinery - Part 4: Fixed ladders (ISO 14122-4:2004)*

ISO 7000:2004, *Graphical symbols for use on equipment - Index and synopsis*

ISO 10816-1:1995, *Mechanical vibration - Evaluation of machine vibration by measurements on non-rotating parts - Part 1: General guidelines*

HD 22.1 S4:2002, *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation - Part 1: General requirements.*

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### 3 Terms, definitions, terminology and symbols

#### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

##### 3.1.1

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

wood waste handling system including ducting, fans, filters, cyclones and storage facilities, including silo except its discharge system. The system is intended for conveyance, separation and storage of chips and dust from woodworking machines.

A typical example of an extraction system with fixed installation is illustrated as the shaded part of Figure 1

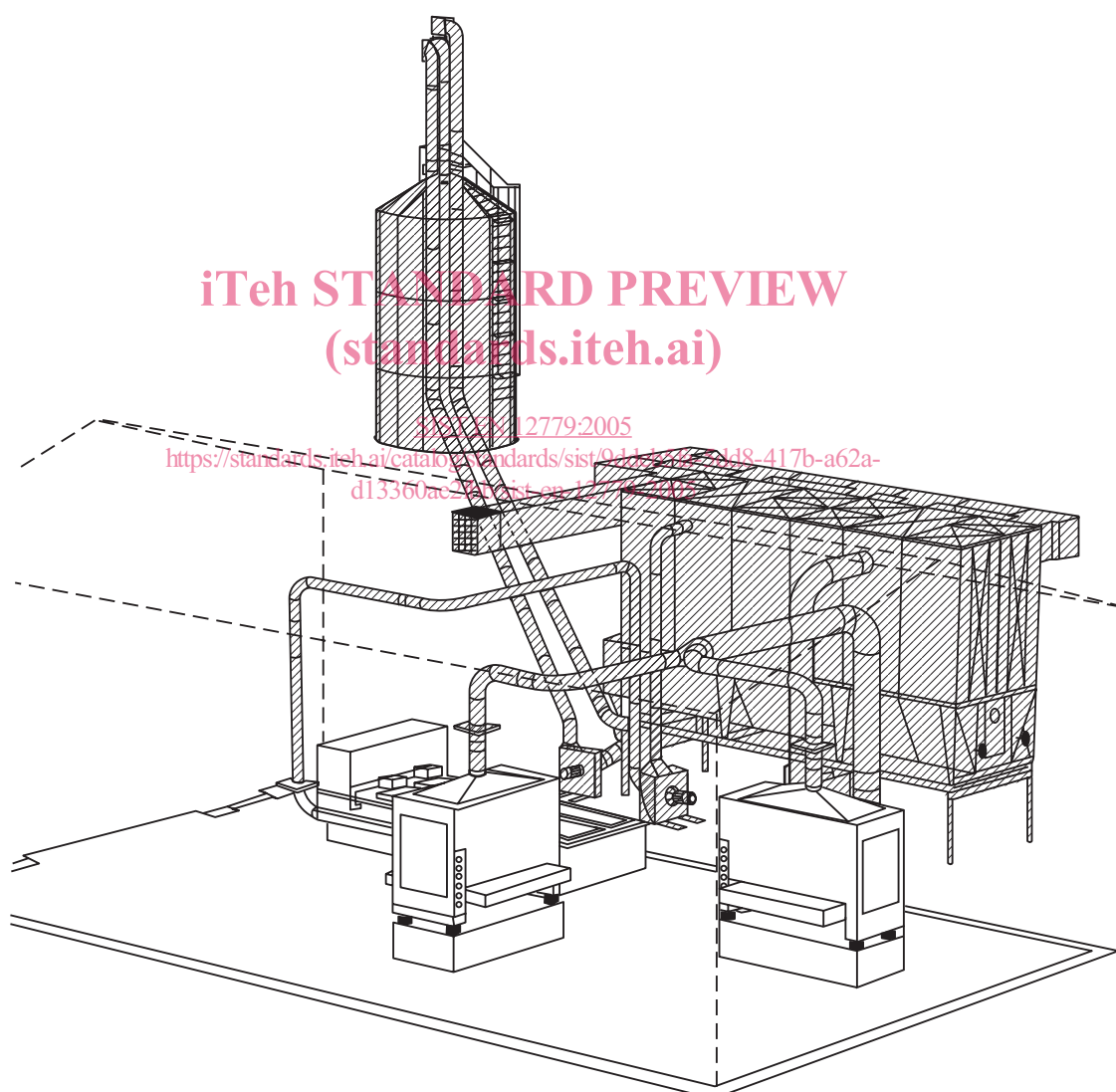


Figure 1 — Chip and dust extraction system

**3.1.2**

**fixed installation**

extraction system which is permanently located and installed, or a moveable extraction system with air flow capacity greater than 6 000 m<sup>3</sup>h<sup>-1</sup>

**3.1.3**

**chips**

particles of wood emanating from processing at woodworking machines. The particle size for chips is set to equal or greater than 0,5 mm

**3.1.4**

**dust**

particles of wood emanating from processing at woodworking machines. The particle size for dust is set to less than 0,5 mm

**3.1.5**

**ducting**

pipe-work, connecting woodworking machines to the fans and separators

**3.1.6**

**main duct**

duct to which branch ducts from a group of machines are connected

**3.1.7**

**fan**

component which produces the air flow for conveying chips and dust within the system

**3.1.8**

**separator**

device for separation of chips and dust from the conveying air

**NOTE**

Filters and cyclones are examples of separators.

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**3.1.9**

**silo**

fixed installed equipment for storage of chips and dust

**3.1.10**

**bin**

movable equipment with a volume up to 0,5 m<sup>3</sup> for storage of chips and dust

**3.1.11**

**container**

movable equipment with a volume over 0,5 m<sup>3</sup> for storage of chips and dust

**3.1.12**

**silo discharge system**

system which continually or intermittently empties chips and dust from silo/container

**3.1.13**

**emptying system**

system which continually or intermittently removes chips and dust from the separator

**3.1.14**

**transport system**

system to convey chips and dust from one or more separator or silo to other parts of the extraction system

**3.1.15****extraction vacuum**

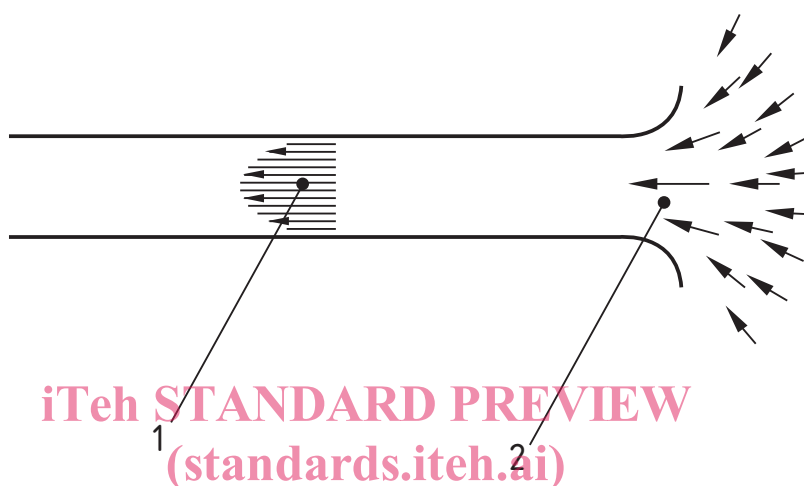
static vacuum in a duct connecting point of a pneumatic extraction system

**3.1.16****air velocity**

average velocity of the air inside a duct, calculated over the whole cross section and which allows the determination of the air flow rate (see Figure 2)

**3.1.17****capture velocity**

minimum air velocity that will draw the chips and dust towards the extraction hood (see Figure 2)

**Key**

1 Air velocity

2 Capture velocity

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**Figure 2 — Air velocities**

**3.1.18****concurrency factor**

ratio in percent between the actual planned maximum air flow and the total air flow demand of all machines connected to the extraction system

**3.1.19** **$K_{st}$  value**

explosive characteristic of combustible dust in air

NOTE  $K_{st}$  values are detailed in EN 26184-1.

**3.1.20****dust loaded part**

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

**3.1.21****clean air part**

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

**3.1.22****return air**

filtered air reintroduced into the working area

**3.1.23**

**servicing level**

level on which persons stand when operating or maintaining the equipment

**3.2 Terminology**

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

**3.3 Symbols and units**

Following symbols and units are used in this document:

Parameter	Symbol	Unit
Diameter	$D$	mm
Length	$L$	m
Area	$S$	$m^2$
Volume	$V$	$m^3$
Air velocity	$v$	$ms^{-1}$
Air flow	$Q_a$	$m^3h^{-1}$
Pressure	$p$	Pa
Pressure differential	$\Delta p$	Pa
Temperature	$t$	$^{\circ}C$
Power	$P$	kW
Material flow	$Q_m$	$kg h^{-1}$
$K_{st}$ value	$K_{st}$	$bar ms^{-1}$
Fan efficiency	$\eta$	%

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## 4 List of significant hazards

This standard deals with all the significant hazards relevant to the extraction system defined in the scope:

- for significant hazards, by defining safety requirements and/or measures or by reference to relevant B standards;
- for general, minor or secondary aspects, by reference to relevant A standards, especially EN ISO 12100-1.

These hazards are listed below in accordance with Annex A of EN 1050:1996 which is based on EN ISO 12100-1:2003 and EN ISO 12100-2:2003 with one additional item (7.4).

**Table 1 — List of significant hazards**

Number	Hazard	Relevant sub-clauses of this document
1	Mechanical hazards caused for example by: <ul style="list-style-type: none"> <li>- shape;</li> <li>- relative location;</li> <li>- mass and stability (potential energy of elements);</li> <li>- mass and velocity (kinetic energy of elements);</li> <li>- inadequacy of the mechanical strength.</li> </ul> Accumulation of potential energy by: <ul style="list-style-type: none"> <li>- elastic elements (springs); or</li> <li>- liquids or gases under pressure; or</li> <li>- vacuum.</li> </ul> of the machine parts or workpieces	
1.1	Crushing hazard	5.4.1.7; 5.3.7
1.2	Shearing hazard	5.4.1.7; 5.3.7
1.3	Cutting or severing hazard	5.4.1.7; 5.3.7
1.4	Entanglement hazard	5.4.1.7; 5.3.7
1.10	Ejection of parts of machinery and processed materials/workpieces	5.3.2
1.11	Loss of stability of machinery and machine parts	5.3.1; 5.10
1.12	Slip, trip and fall hazards in relationship with machinery (because of their mechanical nature)	5.4.1.7; 5.6.2
2	Electrical hazards caused for example by:	
2.1	Electrical contact (direct or indirect)	5.2.2; 5.5
2.2	Electrostatic phenomena	5.4.1.4; 5.12
3	Thermal hazards resulting in:	
3.1	Burns and scalds, by a possible contact of persons, by flames or explosion and also by the radiation of heat sources	5.4.1
4	Hazards generated by noise resulting in:	
4.1	Hearing losses (deafness), or other physiological disorders (e.g. loss of balance, loss of awareness)	5.4.2; 6.4.6