

Safety of woodworking machines — Tenoning machines

Part 1: Single end tenoning machines with sliding table

ICS 79.120.10

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee MTE/23, Woodworking machines.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Single end tenoning machines with sliding table

Sécurité des machines pour le travail du bois -
Tenonneuses - Partie 1: Tenonneuses simples alimentées
par table à rouleaux

Sicherheit von Holzbearbeitungsmaschinen -
Zapfenschneid- und Schlitzmaschinen - Teil 1: Einseitige
Zapfenschneid- und Schlitzmaschinen mit Schiebetisch

This European Standard was approved by CEN on 8 July 1999 and includes Amendment 1 approved by CEN on 23 July 2009.

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Foreword

This document (EN 1218-1:1999+A1:2009) 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of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

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 includes Amendment 1, approved by CEN on 2009-07-23.

This document supersedes EN 1218-1:1999.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

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 **A1** Machinery Directive **A1**.

A1 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which is an integral part of this document. **A1**

Organisations contributing to the preparation of this European standard include the European Committee of Woodworking Machinery Manufacturers Association "EUMABOIS".

Normative and informative annexes to this standard are listed in the Contents list.

The European Standards produced by CEN/TC 142 are particular to woodworking machines and complement the relevant A and B standards on the subject of general safety (see introduction of **A1** EN ISO 12100-1:2003 **A1** for a description of A, B and C standards).

A1 EN 1218 *Safety of woodworking machines — Tenoning machines* consists of the following parts:

Part 1: Single end tenoning machines with sliding table

Part 2: Double end tenoning and/or profiling machines fed by chain or chains

Part 3: Hand fed tenoning machines with sliding table for cutting structural timbers

Part 4: Edge banding machines fed by chain(s)

Part 5: One side profiling machines with fixed table and feed rollers or feed chain **A1**

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European standard has been prepared to be a harmonised standard to provide one means of conforming to the essential safety requirements of the Machinery Directive, and associated EFTA regulations. This European Standard is a type "C" standard as defined in [A1](#) EN ISO 12100-1:2003 [A1](#).

The extent to which hazards are covered is indicated in the scope of this standard.

The requirements of this standard concern designers, manufacturers, suppliers and importers of single end tenoning machines with sliding table.

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

Common requirements for tooling are given in [A1](#) EN 847-1:2005 [A1](#).

1 Scope

[A1](#) This document specifies all significant hazards, hazardous situations and events as listed in Clause 4 which are relevant to single end tenoning machines with sliding table, hereinafter referred to as "machines", designed to cut solid wood, chipboard, fibreboard, plywood and also these materials where they are covered with plastic laminate or edgings. [A1](#)

[A1](#) *deleted text* [A1](#)

This standard does not apply to:

- a) machines where the tenon is produced only by means of saw blades;
- b) machines where the design speed of any tool spindle exceeds 6000 min^{-1} ;
- c) machines where the average sliding table feed speed in either direction exceeds $25 \text{ m min}^{-1} + 5\%$;
- d) combined machines used for tenoning (see [A1](#) EN 940:2009 [A1](#));
- e) tenoning attachments on a vertical spindle moulding machine (see [A1](#) EN 848-1:2007 [A1](#)).

NOTE Single and double end tenoning machines fed by chain or chains are dealt with in [A1](#) EN 1218-2 [A1](#). Single end tenoning machines where the tenon is produced only by means of saw blades are dealt with in [A1](#) EN 1218-3 [A1](#).

This European Standard is primarily applicable to machines which are manufactured after the date of issue of this standard.

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. 

 *deleted text* 

EN 349:1993, *Safety of machinery — Minimum distances to avoid crushing of parts of the human body*

 *deleted text* 

 EN 614-1:2006, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles* 

 EN 847-1:2005 , *Tools for woodworking — Safety requirements — Part 1: Milling tools and circular sawblades*

 EN 848-1:2007 , *Safety of woodworking machines — One side moulding machines with rotating tool — Part 1: Single spindle vertical moulding machines*

 EN 894-1:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-2:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3:2000, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators* 

 EN 940:2009 , *Safety of woodworking machines — Combined wood-working machines*

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

EN 982:1996, *Safety requirements for fluid power systems and components — Hydraulics*

EN 983:1996, *Safety requirements for fluid power systems and components — Pneumatics*

 EN 1005-1:2001, *Safety of machinery — Human physical performance — Part 1: Terms and definitions*

EN 1005-2:2003, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 1005-3:2002, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1005-4:2005, *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*

EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up* 

EN 1088:1995, *Safety of machinery — Interlocking devices with and without guard locking — General principles and specifications for design*

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

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 529:1989)*

Ⓐ₁ EN 60947-4-1:2001 Ⓐ₁, *Low voltage switchgear and control gear — Part 4: Contactors and motor starters — Section 1: Electromechanical contactors and motor starters* Ⓐ₁ (IEC 60947-4-1:2000) Ⓐ₁

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

Ⓐ₁ EN 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals* (IEC 61310-1:2007) Ⓐ₁

EN ISO 3743-1:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering methods for small, moveable sources in reverberant fields — Part 1: Comparison method for hard walled test rooms* (ISO 3743-1:1994)

EN ISO 3743-2:1996, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for small, moveable sources in reverberant fields — Part 2: Method for special reverberation test rooms* (ISO 3743-2:1994)

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)

Ⓐ₁ EN ISO 3745:2003, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and semi-anechoic rooms* (ISO 3745:2003) Ⓐ₁

EN ISO 3746:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane* (ISO 3746:1995)

EN ISO 4871:1997, *Acoustics — Declaration and verification of noise emission values of machinery and equipment* (ISO 4871:1996)

EN ISO 9614-1:1995, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discreet points* (ISO 9614-1:1993)

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 11204:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at the workstation and at other specified positions — Method requiring environmental corrections* (ISO 11204:1995)

Ⓐ₁ 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) Ⓐ₁

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

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles* (ISO 12100-2:2003) Ⓐ₁

Ⓐ₁ EN ISO 13850:2006, *Safety of machinery — Emergency stop — Principles for design* (ISO 13850:2006) Ⓐ₁

Ⓐ₁ EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs* (ISO 13857:2008) Ⓐ₁

ISO 230:1996, *Test code for machine tools*

 deleted text 

ISO 7960:1995, *Airborne noise emitted by machine tools — Operating conditions for woodworking machines*

ISO 7988:1988, *Woodworking machines — Double-end tenoning machines — Nomenclature and acceptance conditions*

 deleted text 

 HD 21.1 S4:2002, *Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation — Part 1: General requirements* 

 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* 

3 Definitions

For the purposes of this European Standard the following definitions apply:

3.1

single end tenoning machine with sliding table

a machine designed for the production of a tenon on one end of a workpiece during one cycle. The tenon is cut by means of milling tools and saw blade(s) mounted on one or more spindles

3.2

tenon

the machined projections and slots on the end of a workpiece to facilitate the joining of workpieces. This includes profiled tenons

3.3

hand feed

the manual holding and/or guiding of the workpiece or of a machine element incorporating a tool. Hand feed includes the use of a hand operated carriage on which the workpiece is placed manually or clamped and the use of a demountable power feed unit

3.4

integrated feed

a feed mechanism for the workpiece or tool which is integrated with the machine and where the workpiece or machine element with incorporated tool are held and controlled mechanically during the machining operation

3.5

ejection

the unexpected movement of the workpiece, parts of it or part of the machine from the machine during processing

3.6

run-up time

the elapsed time from the actuation of the start control device until the spindle reaches the intended speed

3.7

information from the supplier

statements, sales literature, leaflets or other documents, where a manufacturer (or supplier) declares either the characteristics or the compliance of the material or product to a relevant standard

3.8

machine actuator

a power mechanism used to effect the motion of the machine

3.9

run-down time

the elapsed time from the actuation of the stop control device to spindle stand still

4 List of significant hazards

 This clause contains all significant hazards, hazardous situations and events (see EN 1050:1996) as far as they are dealt with in this document, identified by risk assessment as significant for the machines as defined in the scope and which require action to eliminate or reduce the risk. This document deals with these significant hazards by defining safety requirements and/or measures or by reference to relevant standards.

These hazards are listed in Table 1 in accordance with Annex A of EN 1050:1996.

Table 1 — List of significant hazards

No	Hazards, hazardous situations and hazardous events	EN ISO 12100		Relevant sub-clause of this document
		Part 1: 2003	Part 2: 2003	
1	Mechanical hazards related to:			
	- machine parts or work-pieces:			
	a) shape;	4.2	4.2.1, 4.2.2, 5	5.2.3, 5.2.6, 5.2.7, 5.2.8
	b) relative location;			5.1.2, 5.1.5
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion);			5.2.7, 6.3
	e) mechanical strength.			5.2.2
	- accumulation of energy inside the machinery:			
g) liquids and gases under pressure;	4.2	4.10, 5.5.4	5.3.7, 5.3.8	
1.1	Crushing hazard	4.2.1		5.2.1, 5.2.7, 5.2.8
1.2	Shearing hazard			5.2.7, 5.2.8
1.3	Cutting or severing hazard			5.2.2, 5.2.3, 5.2.7, 5.2.8
1.4	Entanglement hazard			5.2.3, 5.2.4, 5.2.6, 5.2.7
1.5	Drawing-in or trapping hazard			5.2.7, 5.2.8
1.6	Impact hazard			5.2.7
1.9	High pressure fluid injection or ejection hazard			5.3.7, 5.3.8

Table 1 — (continued)

2	Electrical hazards due to:			
2.1	Contact of persons with live parts (direct contact)	4.3	4.9, 5.5.4	5.3.4, 5.3.15
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	4.3	4.9	5.3.4, 5.3.15
4	Hazards generated by noise , resulting in:			
4.1	Hearing loss (deafness), other physiological disorders (loss of balance, loss of awareness)	4.5	4.2.2, 5	5.3.2
4.2	Interference with speech communication, acoustic signals			5.3.2
7	Hazards generated by materials and substances (and their constituent elements) processed or used by the machinery			
7.1	Hazards from contact with or inhalation of harmful fluids and dusts	4.8	4.3b, 4.4	5.3.3
7.2	Fire hazard	4.8	4.4	5.3.1
8	Hazards generated by neglecting ergonomic principles in machinery design related to:			
8.1	Unhealthy postures or excessive effort	4.9	4.7, 4.8.2, 4.11.12, 5.5.5, 5.5.6	5.1.2
8.2	Hand-arm or foot-leg anatomy	4.9	4.8.3	5.1.2
8.3	Neglected use of personal protection equipment		4.8.7	6.3
8.6	Human error, human behaviour		4.8, 4.11.8, 4.11.10, 5.5.2, 6	6.3
8.7	Design, location or identification of manual controls		4.8.7, 4.11.8	5.1.2
8.8	Design or location of visual display units		4.8.8, 6.2	5.1.2
9	Combination of hazards	4.11		5.1.7
10	Unexpected start up, unexpected overrun/overspeed (or any similar malfunction) from:			
10.1	Failure/disorder of the control system		4.11, 5.5.4	5.1.11
10.2	Restoration of energy supply after an interruption	4.9	4.11.4	5.1.10
10.3	External influences on electrical equipment		4.11.11	5.1.1, 5.3.4, 5.3.12
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)		4.8, 4.11.8, 4.11.10, 5.5.2, 6	5.1.1, 5.3.5, 6.3
11	Impossibility of stopping the machine in the best possible conditions		4.11.1, 4.11.3, 5.5.2	5.1.2, 5.1.4
13	Failure of the power supply		4.11.1, 4.11.4	5.2.10

Table 1 — (continued)

14	Failure of the control circuit		4.11, 5.5.4	5.1.1
15	Errors of fitting	4.9	4.7, 6.5	6.3
16	Break-up during operation	4.2.2	4.3	5.2.2
17	Falling or ejected objects or fluids	4.2.2	4.3, 4.10	5.2.5, 5.3.15
18	Loss of stability / overturning of machinery	4.2.2	5.2.6	5.2.1



5 Safety requirements and/or measures

For guidance in connection with risk reduction by design, see  4.1 of EN ISO 12100-2:2003  and in addition:

5.1 Controls

5.1.1 Safety and reliability of control systems

For the purpose of this standard safety related parts of control systems means the system from and including the initial manual control or position detector or other sensor to the point of input to the final actuator or element e.g. motor. The safety related control systems of this machine are those for:

- starting (see 5.1.3);
- normal stopping (see 5.1.4);
- emergency stop (see 5.1.5);
- interlocking (see 5.2.7);
- interlocking with guard locking (see 5.2.7);
- trip devices (see 5.2.7);
- opening or closing the guard during sliding table movement (see 5.2.7)

which:

- a) ensures that the workpiece remains clamped in the event of power failure (see 5.2.8); and
- b) on integrated fed machines prevents movement of the table if the workpiece is not clamped  *deleted text* .
- spindle positioning (see 5.2.3);
- the dumping of residual pressure (see 5.3.15);
- preventing unexpected start up in the event of power supply failure (see EN 1037:1995);
- mode selection (see 5.1.7);
- stopping the feed (see 5.1.6);

— initiating the braking system (see 5.2.4).

These control systems shall, as a minimum, be designed and constructed using “well tried” components and principles.

For the purpose of this standard “well tried” means for:

a) electrical components if they comply with relevant standards including the following:

-  EN 60947-5-1:2004  (section 3) for control switches with positive opening operation used as mechanically actuated position detectors for interlocking of guards and for relays used in auxiliary circuits;
-  EN 60947-4-1:2001  for electromechanical contactors and motor starters used in mains circuits;
-  HD 22.1 S4:2002  for rubber insulated cables;
-  HD 21.1 S4:2002  for polyvinyl chloride cable if these cables are additionally protected against mechanical damage by positioning (e.g. inside frames);

b) electrical principles if they comply with the first four measures listed in 9.4.2.1 of  EN 60204-1:2006 . The circuits shall be “hardwired”. Electronic components alone do not fulfil “well tried” principles. If electronic components are used in safety related control systems “well tried” is fulfilled if they are in accordance with 9.4.2.2 and 9.4.2.3 of  EN 60204-1:2006  (examples see informative annex C);

c) mechanical components if they comply with  4.5 of EN ISO 12100-2:2003 ;

d) mechanically actuated position detectors for guards if they are actuated in the positive mode and their arrangement/fastening and cam design/mounting comply with 5.2.2 and 5.3 of EN 1088:1995.

e) interlocking devices with guard locking if they satisfy the requirements of 5.2.7.1;

f) pneumatic and hydraulic components and systems if they comply with EN 983:1996 and EN 982:1996 respectively.

Verification: By checking the relevant drawings and/or circuit diagrams and inspection on the machine.
 ~~deleted text~~ 

 NOTE For components characteristics the information from the component supplier can be useful. 

5.1.2 Position of controls

The main controls of the machine for starting the tool spindles, for starting the feed on integrated fed machines, normal stopping and mode selection shall be located at the loading position.

For the position of the emergency stop controls see 5.1.5.

When power is supplied to a tool spindle motor this shall be indicated e.g. by a light signal. The means of indication shall be positioned near to the start control, integrated in the start button or be provided by using a two position switch.

Verification: by checking the relevant drawings and/or circuit diagrams, inspection and functional testing on the machine.

5.1.3 Starting

See 9.2.5.2 of  EN 60204-1:2006 .