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French standard

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Safety of woodworking machines

Surface planing and thicknessing machines

F : Sécurité des machines pour le travail du bois — Machines combinées
à raboter et à dégauchir

D : Sicherheit von Holzbearbeitungsmaschinen — Kombinierte Abricht-
und Dickenhobelmaschinen

French standard approved

by decision of the Director General of AFNOR on August 1st, 2007 taking effect on
September 1st, 2007.

Replaces the approved standard NF EN 861, dated November 1997 which remains
in force until December 2008

Correspondence

The European standard EN 861:2007 has the status of French standard.

Analysis

This document was prepared in order to help conforming to the requirements of the
"Machinery" Directive 98/37/EC modified by the Directive 98/79/EC. It determines
the safety requirements for Surface planing and thicknessing machines.

Descriptors

Technical International Thesaurus: woodworking machinery, planing machines,
surface planing machines, combined machines, safety of machines, dangerous
machines, safety measures, design, safety devices, hazardous areas.

Modifications

With respect to document replaced:

- addition of the definition of fixed machines,
- addition of definitions and requirements related to electric command systems
associated with safety as well as those concerning the use of tested components,
- deletion of Annex B "*Special specification concerning the tools*",
- addition of Normative Annexes relating to stability tests of transportable
machines, and to impact tests of guards.

Corrections



National foreword

References to French standards

The correspondence between the standards figuring in the clause "Normative references" and the identical French standards is as follows:

EN 294	: NF EN 294 (classification index: E 09-010)
EN 847-1	: NF EN 847-1 (classification index: E 73-521-1)
EN 982	: NF EN 982 (classification index: E 48-202)
EN 983	: NF EN 983 (classification index: E 48-202)
EN 1005-2	: NF EN 1005-2 (classification index: X 35-106-2)
EN 1005-4	: NF EN 1005-4 (classification index: X 35-106-4)
EN 1037	: NF EN 1037 (classification index: E 09-053-2)
EN 1088	: NF EN 1088 (classification index: E 09-051)
EN 50178	: NF EN 50178 (classification index: C 53-200)
EN 50370-1	: NF EN 50370-1 (classification index: C 91-370-1)
EN 50370-2	: NF EN 50370-2 (classification index: C 91-370-2)
EN 60204-1	: NF EN 60204-1 (classification index: C 79-130)
EN 60439-1	: NF EN 60439-1 (classification index: C 63-421)
EN 60529	: NF EN 60529 (classification index: C 20-010)
EN 61496-1	: NF EN 61496-1 (classification index: C 79-151)
EN 61508-3	: NF EN 61508-3 (classification index: C 46-063)
EN 62061	: NF EN 62061 (classification index: C 79-170)
EN ISO 3743-1	: NF EN ISO 3743-1 (classification index: S 31-024-1)
EN ISO 3743-2	: NF EN ISO 3743-2 (classification index: S 31-024-2)
EN ISO 3744	: NF EN ISO 3744 (classification index: S 31-025)
EN ISO 3745	: NF EN ISO 3745 (classification index: S 31-026)
EN ISO 3746	: NF EN ISO 3746 (classification index: S 31-027)
EN ISO 4871	: NF EN ISO 4871 (classification index: S 31-075)
EN ISO 9614-1	: NF EN ISO 9614-1 (classification index: S 31-100-1)
EN ISO 11202	: NF EN ISO 11202 (classification index: S 31-502)
EN ISO 11204	: NF EN ISO 11204 (classification index: S 31-504)
EN ISO 11688-1	: NF EN ISO 11688-1 (classification index: S 31-510-1)
EN ISO 12100-1	: NF EN 12100-1 (classification index: E 09-001-1)
EN ISO 12100-2	: NF EN 12100-2 (classification index: E 09-001-2)
EN ISO 13849-1	: NF EN 13849-1 (classification index: E 09-025-1)
EN ISO 13849-2	: NF EN 13849-2 (classification index: E 09-025-2)
ISO 7960	: NF ISO 7960 (classification index: E 64-201)
HD 22.4 S4	: NF C 32-102-4 (classification index: C 32-102-4)



The correspondence between the standards figuring in the clause "Normative references" and French standards having the same scope, but which are not identical, is as follows:

ISO 7568 : NF E 64-054 (classification index E 64-054)

The regulations of the European Committee for Standardization (CEN) impose that the European standards adopted by its members be transposed into national standards at the latest within 6 months following their ratification and that conflicting national standards be cancelled.

Within the framework of this standard CEN has fixed a transitional period allowing the adaptation of products to this new standard, during which period CEN members are authorized to maintain the national standards in effect.

Consequently, the French standard NF EN 861 dated November 1997 remains in force until December 2008.





EUROPEAN STANDARD

EN 861

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2007

ICS 79.120.10

Supersedes EN 861:1997

English Version

Safety of woodworking machines - Surface planing and thicknessing machines

Sécurité des machines pour le travail du bois - Machines combinées à raboter et à dégauchir

Sicherheit von Holzbearbeitungsmaschinen - Kombinierte Abricht- und Dickenhobelmaschinen

This European Standard was approved by CEN on 10 May 2007.

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Foreword

This document (EN 861:2007) 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 December 2007, and conflicting national standards shall be withdrawn at the latest by December 2008.

This document supersedes EN 861:1997.

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 the Machinery Directive.

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

Organisation contributing to the preparation of the European Standard include the European Association of Manufacturer of Woodworking Machines "EUMABOIS".

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

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 document 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 document is a type “C” standard as stated in EN ISO 12100-1:2003.

The machinery concerned and the extent to which hazards, hazardous situations and events are 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 according to the provisions of this type C standard.

The requirements of this document are directed to manufacturers and their authorised representatives of surface planing and thicknessing machines. They are also useful for designers and importers.

This document also includes provision and examples of information to be provided by the manufacturer to the user.

Common requirements for tooling are given in EN 847-1:2005.



1 Scope

This document deals with the significant hazards, hazardous situation and events as listed in Clause 4 relevant to stationary and displaceable surface planing and thicknessing machines with an integrated feed in thicknessing mode, (with or without demountable power feed unit in planing mode) and with manual loading and unloading of the work-piece, hereinafter referred to as "machines". The cutterblock is fixed in position and for thicknessing an integrated feed is provided. The machines are designed to cut solid wood, chipboard, fibreboard and plywood when they are used as intended and under the conditions foreseen by the manufacturer.

This document does not deal with any hazards which result from the attachment of an optional mortising unit. These hazards are covered by prEN 940:2007.

This document does not apply to:

- a) machines set up on a bench or a table similar to a bench, which are intended to carry out work in a stationary position, capable of being lifted by one person by hand;

NOTE 1 Transportable motor-operated electric tools are covered by the requirements of EN 61029-1:2000 together with prEN 61029-2-3:2004.

- b) surface planing and thicknessing machines where the cutterblock is adjustable for depth of cut setting in thicknessing mode;
- c) machines where the conversion from planing to thicknessing mode or vice versa is achieved by mounting or demounting parts/units;
- d) machines where surfacing and thicknessing can be performed at the same time.

This document is not applicable to surface planing and thicknessing machines which are manufactured before the date of its publication as EN.

NOTE 2 Machines covered by this document are listed under A.5 of Annex IV of the Machinery Directive.

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 distance to prevent danger zones being reached by the upper limbs*

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

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



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 associated with guards — Principles for design and selection*

EN 50178:1997, *Electronic equipment for use in power installations*

EN 50370-1:2005, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 1: Emission*

EN 50370-2:2003, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 2: Immunity*

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

EN 60439-1:1999, *Low-voltage switchgear and controlgear assemblies — Part 1: Type-tested and partially type-tested assemblies (IEC 60439-1:1999)*

EN 60529:1991, *Degree of protection provided by enclosure (IP code) (IEC 60529:1989)*

EN 61496-1:2004, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

EN 61508-3:2001, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements (IEC 61508-3:1998 + Corrigendum 1999)*

EN 62061:2005, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005)*

EN ISO 3743-1:1995, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for small, movable 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 using sound pressure — Engineering methods for small, movable sources in reverberant fields — Part 2: Methods for special reverberant 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)*

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)*

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 4871:1996, *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 discrete 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 a work station and at other specified positions — Method requiring environmental corrections (ISO 11204:1995)*

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, 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)*

EN ISO 13849-1:2006¹⁾, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13849-2:2003, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation (ISO 13849-2:2003)*

ISO 7568:1986, *Woodworking machines — Thickness planing machines with rotary cutterblock for one-side dressing — Nomenclature and acceptance conditions*

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

HD 22.4 S4:2004; *Cables of rated voltages up to and including 450/750 V and having crosslinked insulation — Part 4: Cords and flexible cables*

3 Terms and definitions

3.1 General

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

3.2 Definitions

3.2.1

surface planing and thicknessing machine

combined machine designed to plane a surface of a work-piece and to give it in a following operation a set thickness by means of a horizontally rotating cutterblock, a cylindrical shaped complex tool equipped with blades with horizontal straight cutting line that cuts while rotating (see for a description of the complex tool also EN 847-1:2005)

NOTE The work-piece is fed into the machine against the direction of the cut.

When surfacing, the work-piece is passed over the cutterblock located between two tables which are used to position and support the work-piece and the lower surface is planed. The infeed table of the surface planing unit is adjustable in height.

When thicknessing, both of the surfacing tables are raised. The work-piece rests on the thicknessing table the distance between it and the cutting circle diameter is adjustable. The upper surface of the work-piece is planed

¹⁾ Superseded EN 954-1:1996

3.2.2**thicknessing table**

table used to support the work-piece during thicknessing at the machine which may comprise an assembly of rollers, belts or other fixed or moving mechanical elements

3.2.3**surface planing tables**

tables in front and behind the cutterblock used to support the work-piece at the machine during planing the lower surface

3.2.4**integrated feed**

feed mechanism for the work-piece which is integrated with the machine and where the work-piece is held and controlled mechanically during the machining operation

3.2.5**loading of a surface planing and thicknessing machine in the thicknessing mode**

manual placing of the work-piece on the thicknessing table at the infeed side with the following presentation to the integrated feed device

3.2.6**stationery machine**

machine designed to be located on or fixed to the floor or other parts of the structure of the premises and to be stationary during use

3.2.7**displaceable machine**

machine which is located on the floor, stationary during use and equipped with a device, normally wheels, which allows it to be moved between locations

3.2.8**safety appliance**

additional device which is not an integral part of the machine but which assists the operator in the safe feeding of the work-piece e.g. push block or push stick

3.2.9**demountable power feed unit**

feed mechanism which is mounted on the machine so that it can be moved from its working position to a rest position and vice versa without the use of a spanner or similar additional device

3.2.10**kickback**

particular form of ejection describing the uncontrolled movement of the work-piece or parts of it or parts of the machine opposite to the direction of feed during processing

3.2.11**anti-kickback device**

device which either reduces the possibility of kickback or arrests the motion during kickback of the work-piece parts of it

3.2.12**run-down time**

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

3.2.13**run-up time**

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



3.2.14

information from the supplier

statement, sales literature, leaflet or other documents in which a manufacturer (or supplier) declares either the characteristics of e.g. a material or product or the conformity of the material or product to a relevant standard

3.2.15

operator position

position in which the operator stands to feed the work-piece to the tool

3.2.16

machine actuator

power mechanism used to effect motion of the machine

3.2.17

safety related electrical control system (SRECS)

electrical part of a control system whose failure can result in a hazard (3.2.4 of EN 62061:2005)

3.2.18

embedded software

software that is part of the system supplied by the manufacturer and is not accessible for modification by the end user

NOTE 1 Embedded software is also referred to as firmware or system software (3.2.47 of EN 62061:2005).

NOTE 2 Manufacturer means manufacturer of the system.

EXAMPLE The operating system of a speed monitoring device.

3.2.19

application software

software specific to the application specifically implemented for the SRECS

NOTE In general it contains logic sequences, limits and expressions that control the appropriate outputs, decisions necessary to meet SRECS functional requirements (see 3.2.46 of EN 62061:2005).

EXAMPLE The PLC program to run a machine.

3.2.20

safety related part of a control system (SRP(CS))

part or subpart(s) of a control system that responds to input signals and generates safety-related output signals

NOTE The combined safety-related parts of a control system start at the point where the safety-related signals are initiated (including e.g. the actuating cam and the roller of the position switch) and end at the output of the power control elements (including e.g. the main contacts of the contactor). This also includes monitoring systems (3.1 of EN ISO 13849-1:2006).

3.3 Terms

The names of the main parts of the machine are shown in Figures 1 a) and 1 b).



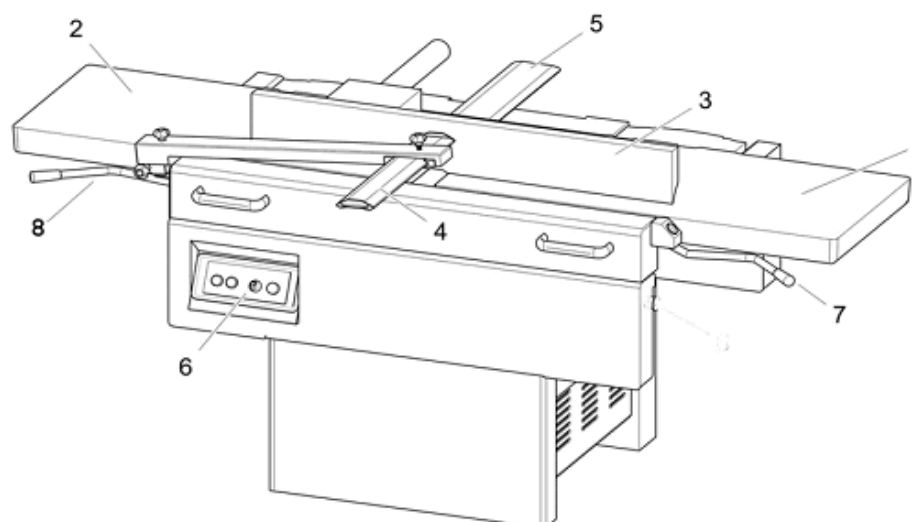


Figure 1 a) — Example of surface planing and thicknessing machine (set up for planing)

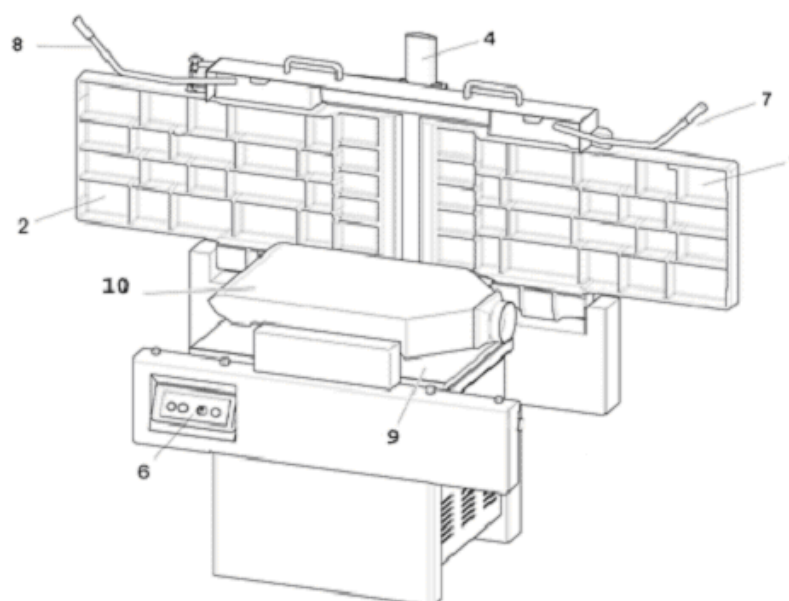
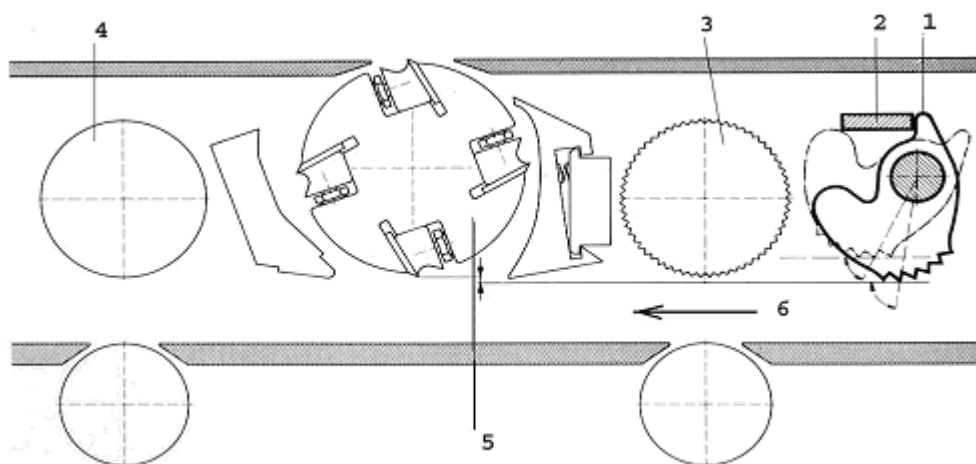


Figure 1 b) — Example of surface planing and thicknessing machine (set up for thicknessing)

Key

1	infeed table	6	controls
2	outfeed table	7	infeed table height adjustment
3	tiltable fence	8	bridge guard adjustment
4	bridge guard	9	thicknessing table
5	guard rear the fence	10	guard for thicknessing mode

Figure 1 — Example of surface planing and thicknessing machine



Key

- 1 anti kickback fingers
- 2 stop for the rotation of the finger
- 3 infeed roller
- 4 outfeed roller
- 5 cutterblock
- 6 direction of feed

Figure 2 — Example of internal of a one side planing and thicknessing machine

The most usual working operations when using the machine in the surface planing mode are shown in Figure 3.

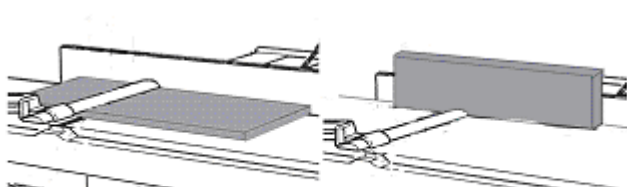


Figure 3 — Planing (left) and edging (right)

4 List of significant hazards

This clause contains the 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 clause of this document
		Part 1: 2003	Part 2: 2003	
1	Mechanical hazards related to: - machine parts or work-pieces due to:			
	a) shape;	4.2	4.2.1, 4.2.2, 5	5.3.3, 5.3.5, 5.3.6, 5.3.7
	b) relative location;			5.2.2, 5.2.5, 5.3.5, 5.3.6, 5.3.7
	c) mass and stability (potential energy of elements which may move under the effect of gravity);			5.3.1, 5.3.6, 5.3.7
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion);			5.2.3, 5.3.7
	e) mechanical strength;			5.3.2, 5.3.3, 5.3.5, 5.3.6, 5.3.7, 5.3.8, 5.3.9, Annex A, Annex B, Annex E
	- accumulation of energy inside the machinery by:			
	f) elastic elements (springs);	4.2	4.10, 5.5.4	5.3.6, 5.3.7, 5.4.5
	g) liquids and gases under pressure;			5.4.6, 5.4.7
1.1	Crushing hazard	4.2.1		5.3.7
1.2	Shearing hazard		5.3.7	
1.3	Cutting or severing hazard		5.3.3, 5.3.7, 6.3	
1.4	Entanglement hazard		5.3.7	
1.5	Drawing-in or trapping hazard		5.3.7	
to be continued				



Table 1 — List of significant hazards (*continued*)

No	Hazards, hazardous situations and hazardous events	EN ISO 12100		Relevant clause of this document
		Part 1: 2003	Part 2: 2003	
1.6	Impact hazard			5.3.6
1.9	High pressure fluid injection or ejection hazard	4.2.1	4.10	5.4.7
2	Electrical hazards due to:			
2.1	Contact of persons with live parts (direct contact)	4.3	4.9, 5.5.4	5.4.4
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	4.3	4.9	5.4.4
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	5.4.2
4.2	Interference with speech communication, acoustic signals			5.4.2
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	5.4.3
7.2	Fire	4.8	4.4	5.4.1
8	Hazards generated by neglecting ergonomic principles in machinery design:			
8.1	Unhealthy postures or excessive effort	4.9	4.7, 4.8.2, 4.11.12, 5.5.5, 5.5.6	5.2.2, 5.4.5, 6.3
8.2	Hand-arm or foot-leg anatomy	4.9	4.8.3	5.2.2, 5.3.7, 5.4.5
8.4	Local lighting		4.8.6	6.3
8.6	Human error, human behaviour	4.9	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	5.2.2
8.8	Design or location of visual display units		4.8.8, 6.2	5.4.5, 5.4.9, 6.1, 6.2
<i>to be continued</i>				

Table 1 — List of significant hazards (*concluded*)

No	Hazards, hazardous situations and hazardous events	EN ISO 12100		Relevant clause of this document
		Part 1: 2003	Part 2: 2003	
9	Combination of hazards	4.11		5.2.3, 5.2.5, 5.2.6, 5.2.7, 5.3.5, 5.4.9, 5.4.10
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	5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 5.2.7
10.2	Restoration of energy supply after an interruption		4.11.4	5.2.6
10.3	External influences on electrical equipment		4.11.11	5.4.8, Annex G
10.5	Errors in the software		4.11.7	Annex G
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)	4.9	4.8, 4.11.8, 4.11.10, 5.5.2, 6	5.4.5, 5.4.10, 6.3
11	Impossibility of stopping the machine in the best possible conditions		4.11.1, 4.11.3, 5.5.2	5.2.4, 5.2.5, 5.3.4
13	Failure of the power supply		4.11.1, 4.11.4	5.2.6
14	Failure of the control circuit		4.11, 5.5.4	5.2.1, 5.2.7, 5.3.4
15	Errors of fitting	4.9	4.7, 6.5	6.2
16	Break-up during operation	4.2.2	4.3	5.3.2, 5.3.8, 5.3.9, Annex A, Annex B, Annex C
17	Falling or ejected objects or fluids	4.2.2	4.3, 4.10	5.3.2, 5.3.3, 5.3.6
18	Loss of stability / overturning of machinery	4.2.2	5.2.6	5.3.1



5 Safety requirements and/or measures

5.1 General

The machine shall comply with the safety requirements and/or protective measures of Clause 5.

NOTE 1 In addition, the machine should be designed according to the principles of EN ISO 12100:2003 (parts 1 and 2) for hazards relevant but not significant, which are not dealt with by this document (e.g. sharp edges of the machine frame).

NOTE 2 For guidance in connection with risk reduction by design see Clause 4 of EN ISO 12100-2:2003 and for safeguarding measures see Clause 5 of EN ISO 12100-2:2003.

5.2 Controls

5.2.1 Safety and reliability of control systems

5.2.1.1 General

For the purpose of this document safety related part of a control system means the system from the initial device, e.g. push button, detector or sensor up to and including the power control element of the final machine actuator, e.g. motor or brake. Safety related parts of the control system of this machine comprise parts concerning the following functions and they shall fulfil the requirements of the categories given below according to EN ISO 13849-1:2006:

- starting: category 1 or 3 (see 5.2.3);
- normal stopping: category 1 or 3 (see 5.2.4);
- emergency stop: category 1 or 3 (see 5.2.5);
- interlocking: category 1 (see 5.2.3, 5.2.6, 5.3.7, 5.3.8);
- interlocking with guard locking: category 1 (see 5.2.4, 5.2.5, 5.3.7, 5.3.8);
- braking: category 1 or 2 (see 5.3.4);
- preventing of unexpected start up in the event of power supply failure: category 1 or 3 (see 5.2.6, 5.2.7);
- brake release: category B (see 5.3.4.1, 5.3.4.2);
- motor switching off (where a mechanical brake is fitted and in certain conditions): category 1 (see 5.3.4.1);
- for interlocking of the power supply to a socket for the de-mountable power feed unit with cutterblock: category 1 (see 5.2.3, 5.3.10);
- interlocking between the feed drive motor and the cutterblock drive motor: category 1 (see 5.2.3);
- hold to run control: category 1 or 3 (see 5.2.3, 5.3.6);
- planing table(s) powered adjustment initiation (s): category B, 1 or 3 (see 5.2.3, 5.3.6.2.1);
- thicknessing table powered adjustment: category B, 1 or 3 (see 5.2.3).

Any combination of safety related parts of control systems of different categories which achieve at least the same level of fault resistance is acceptable according to 6.3 of EN ISO 13849-1:2006.

Where more than one category is given further information about the necessary type is specified in the quoted clauses.

Where category 1 is required categories 3 and 4 also fulfil the requirement. Where category 2 is required categories 3 and 4 also fulfil the requirements, where category 3 is required category 4 also fulfils the requirement.

NOTE 6.3 of EN 13849-1:2006 gives useful information on combination of safety-related parts to the same or different categories.

Verification: By checking the relevant drawings and/or circuit diagrams and inspection of the machine.

5.2.1.2 Use of well-tried components

Components are considered well-tried if they comply with 6.2.4 of EN ISO 13849-1:2006 (see Annex F).

NOTE 1 Well-tried electrical components are listed in Table D.3 of EN ISO 13849-2:2003.

NOTE 2 EN ISO 13849-2:2003 gives useful information on assessment of well-tried components, possible exclusion of faults etc.

Verification: By checking the relevant drawings and/or circuit diagrams and inspection of the machine.

5.2.1.3 Use of electronic components

If electronic components are used the requirements given in Annex G shall be met.

Verification: By checking the relevant drawings and/or circuit diagrams, inspection of the machine, measurement and functional testing of the machine.

5.2.2 Position of controls

The electrical control actuator for starting, normal stopping, emergency stop and powered table adjustment (if fitted-see 5.2.3) shall be located either:

- a) on the machine at the infeed side of the machine at least 600 mm from the floor and at least 50 mm below the upper surface of the surfacing table reachable from the infeed side of the thicknesser, or
- b) at a fixed or moveable control panel fixed to the machine at the loading position, the controls of which are not more than 1 800 mm from the floor and the front face is at a maximum of 650 mm from the infeed edge. The front face of the panel shall not protrude beyond the machine at the operator position side.

An additional emergency stop actuator, if required in accordance to 5.2.5, shall be located at least 600 mm from the floor and at the outfeed side of the thicknesser.

Verification: By checking the relevant drawings, measurement and inspection of the machine.

5.2.3 Starting

Before starting or restarting the machine all the safeguards shall be in place and functional. This is achieved by the interlocking arrangement described in 5.3.7. For non interlocked guards, guides adjustments' provisions before starting see 6.3 h 4)).

Start or restart shall only be possible by actuation of the start control device provided for that purpose.



For electrically operated machines the requirements of 9.2.5.2 of EN 60204-1:2006 shall apply and in addition:

- for the purpose of this document "operation" means rotation of the cutterblock and/or the integrated feed and/or powered adjustment;
- start of the feed motor shall be possible only where the tool spindle motor is running at full speed e.g. by using a time delay of fail safe technique e.g. of capacity type conforming to the requirements of category 3 according to EN ISO 13849-1:2006. For a machine with one motor only the start of the feed shall be possible only if the tool spindle drive has been activated;
- design of the control circuits shall be such as to satisfy the starting sequence requirements. If a time delay device is used the time delay shall be at least equal to the run-up time. The time delay shall be fixed or the time delay device adjustment shall be sealed.

When adjustment of the table(s) for planing and/or the table for thicknessing is powered, the control shall be of the hold to run control type.

For machines with adjustment preset electronic control of table(s) for planing and/or of table for thicknessing:

- either the table(s) adjustment speed shall not exceed 10 mm s^{-1} and the start command may be category B according to EN ISO 13849-1:2006, or
- adjustment for the table(s) shall be initiated by a start command from the operator (e.g. push button) the control circuit of which conforms to category 1 or to category 3 in accordance with the requirements of EN ISO 13849-1:2006.

At the end of programmed adjustment the power shall be cut to the adjustment actuator. A new initiation shall be necessary to perform additional adjustment.

The category of the control circuits (also see 5.2.1) for start and restart of the machine and for the integrated feed motor shall be in accordance with the requirements of EN ISO 13849-1:2006 and at least:

- a) category 1 if the control circuits are hardwired;
- b) category 3 if the control circuits include electronic components.

The category of the control circuit (also see 5.2.1) for hold-to-run control shall be in accordance with the requirements in EN ISO 13849-1:2006 and at least:

- 1) category 1 if the control circuits are hardwired;
- 2) category 3 if the control circuits include electronic components.

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

5.2.4 Normal stopping

The machine shall be fitted with a stop control system, where by the machine and – if fitted – a demountable power feed unit-can be brought safely to a complete stop. The stopping action shall include disconnection from energy supply of all machine actuators and actuate the brake (if fitted see 5.3.4).

The normal stop control system shall be of:

- a) category 1 in accordance with the requirements in 9.2.2 of EN 60204-1:2006 where the machine is fitted with an electric brake, or



b) category 0 in accordance with the requirements in 9.2.2 of EN 60204-1:2006 where the machine is fitted with a mechanical brake or the brake is not fitted.

For a category 1 normal stop control system, the stopping sequence shall be:

- 1) cut at the same time power to the socket for connection of a demountable power feed unit, to integrated feed if driven by a separate motor and to the cutterblock motor and to the table(s) adjustment(s) if under preset electronic control; and apply the brake;
- 2) cut power to the brake after the tool has come to rest e.g. by a time delay of fail safe technique e.g. of capacity type conforming to the requirements of category 3 according to EN ISO 13849-1:2006.

The design of the control circuits shall be such as to satisfy the normal stopping sequence requirements. If a time delay device is used the time delay shall be at least equal to the braking time. The time delay shall be fixed or the time delay adjustment device shall be sealed.

The category of the control circuits (also see 5.2.1) for normal stopping shall be in accordance with the requirements of EN ISO 13849-1:2006 and at least:

- i) category 1 if the control circuits are hardwired;
- ii) category 3 if the control circuits include electronic components.

For machines designed to be used with de-mountable power feed unit or if a socket for a demountable power feed unit is fitted a separate category 1 stop control device in accordance with the requirements in 9.2.2 of EN 60204-1:2006 shall be provided for the de-mountable power feed unit only.

Verification: By checking the relevant drawings and/or circuits diagrams, inspection of the machine and functional testing of the machine.

5.2.5 Emergency stop

An emergency stop device shall be provided and be accessible from the operator's position at the infeed side of the machine.

For machines with separate feed motors and/or a working width greater than 500 mm and /or with preset electronic control for adjusting the height of the thickening table, a second emergency stop device accessible at the outfeed shall be provided.

If the machine is fitted with a mechanical brake without integrated feed driven by a separate motor and/or without guard locking the emergency stop function shall conform to category 0 in accordance with the requirements in 4.1.4 of EN ISO 13850:2006 and the emergency stop control circuit shall conform to category 0 in accordance with the requirements in 9.2.2 of EN 60204-1:2006 and shall fulfil the requirements of 9.2.5.4.2 of EN 60204-1:2006.

If the machine is fitted with an electrical brake and/or with integrated feed driven by a separate motor and/or guard locking the emergency stop function shall conform to category 1 in accordance with the requirements in 4.1.4 of EN ISO 13850:2006 and the emergency stop control circuit shall conform to category 0 in accordance with the requirements in 9.2.2 of EN 60204-1:2006 and shall fulfil the requirements of 9.2.5.4.2 of EN 60204-1:2006.

The emergency stop devices shall conform to 10.7 of EN 60204-1:2006 and shall be at any time of self latching type.

When initiated the emergency stopping sequence shall be the same as for normal stopping (see 5.2.4).



The design of the control circuits shall be such as to satisfy the emergency stopping sequence requirements. If a time delay device is used the time delay shall be at least the maximum run-down time. Either the time delay shall be fixed or the time delay adjustment device shall be sealed.

The category of the control circuits (also see 5.2.1) for emergency stop shall be in accordance with the requirements of EN ISO 13849-1:2006 and at least:

- a) category 1 if the control circuits are hardwired;
- b) category 3 if the control circuits include electronic components.

Verification: By checking the relevant drawings and/or circuits diagrams, inspection of the machine and functional testing of the machine.

5.2.6 Failure of the power supply

The restoration of the energy supply after a supply interruption shall not result in a restart of any machine actuator in accordance with the requirements of EN 1037:1995. For electrically driven machines this is achieved e.g. by providing an undervoltage protection at a predetermined undervoltage level in accordance with the requirements in 7.5, paragraphs 1 and 3 of EN 60204-1:2006.

In the case of pneumatic and/or hydraulic supply interruption and where a dangerous movement is possible after the restoration of the supply pressure re-starting of any dangerous movement of the machine shall be prevented.

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

5.2.7 Failure of the control circuit

The requirements of Clause 6 of EN 1037:1995 shall apply and in addition:

The control circuits shall be designed so that a line rupture in any circuit (e.g. broken wire, pipe or hose) will not result in the loss of a safety function e.g. involuntary start in accordance with EN 60204-1:2006, EN 982:1996 and EN 983:1996.

For requirements for the control circuits see 5.2.1.

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

5.3 Protection against mechanical hazards

5.3.1 Stability

It shall be possible to fix stationary machines to a suitable stable structure e.g. floor. Facilities for fixing are e.g. fixing holes or the necessary fixing devices in the machine frame (also see 6.3 f) and g)).

Where the surface table(s) is (are) opened for thickening, it (they) shall be stable in opened position e.g. by spring or a mechanical locking device.

Displaceable machines shall have the facility to make them stable during machining (e.g. by providing brakes for the wheels or a device to retract the wheels from the floor).

Verification: By checking the relevant drawings and inspection of the machine and for displaceable machines performing the test in Annex D.

5.3.2 Hazard of break up during operation

To reduce the probability of break up during operation the requirements of 5.3.3, 5.3.5 and 5.3.6 apply. To reduce the effect of break up during operation the requirements of 5.3.9 apply.

The design of the feed roller(s) and pressure bar(s) (if provided) shall be such that their contact with the tool is impossible.

Verification: By checking the relevant drawings and inspection of the machine.

5.3.3 Tool holder and tool design

The cutterblock shall be of a round form complex cylindrical type and marked MAN in accordance with EN 847-1:2005.

A gauge for the correct positioning of the knives shall be provided for machines where the knives are not automatically positioned.

Verification: By checking relevant drawings and inspection of the machine.

5.3.4 Braking

5.3.4.1 General

An automatic brake shall be provided for tool spindle exceeding an unbraked run-down time of 10 s.

The braked run-down time shall be less than 10 s.

Where a mechanical brake is fitted the last paragraph of 9.3.4 of EN 60204-1:2006 does not apply and It shall not be possible to release the brake during spindle run-down time (e.g. by a time delay of failsafe technique e.g. of capacity type or conforming to category 3 in accordance with EN ISO 13849-1:2006 between control actuation and brake release).

For electrical braking systems, reverse current injection braking shall not be used.

— Where an electrical braking system is used and contains electronic components the control system for braking shall fulfil at least the requirements of category 2 of EN ISO 13849-1:2006. The control system shall be tested periodically e.g. by monitoring the braked run-down time or by monitoring the braking current circuit during starting (short braking). The test shall work:

- a) independently of the control system for braking;
- b) independently of the intention of the operator;
- c) at least once per shift.

A negative test shall be indicated. Where the test result is negative more than three times in sequence it shall not be possible to operate the machine.

As an exception to 5.2.1 a simple electronic brake (not using programmable logic) may be designed in category B in accordance with the requirements of EN ISO 13849-1:2006 if the probability of a failure in high demand mode (PFH) is less than $3 \times 10^{-6} \text{ h}^{-1}$.

For calculating the probability of a dangerous failure (PFH) for a simple electronic brake component with no fault tolerance and no testing capability (Category B) the procedure described in Annex D of EN ISO 13849-1:2006 shall be used.



Verification: By testing the unbraked run-down time and braked run-down time, if relevant, according to the tests given in Annex H.

5.3.4.2 Brake release

Where a control is provided to release the cutterblock brake in order to enable rotation by hand and adjustment of the cutterblock, release of the brake shall only be possible when the cutterblock has stopped turning (e.g. by time delay device or fail safe technique e.g. of capacity type or shall conform to the requirements of category 3 according to EN ISO 13849-1:2006 between control actuation and brake release). The actuator of the brake release shall be interlocked with the cutterblock drive motor so that it is not possible to start the motor if the brake is released. The safety related part of the control system for brake release shall conform to category 1 or 3 in accordance with the requirements of EN ISO 13849-1:2006 (see also 5.2.1).

Unexpected start-up shall be prevented by the following:

- a) it shall only be possible to start the machine after the brake has been reset;
- b) reset for the brake shall not initiate a start up of the machine.

The category of the control circuits (also see 5.2.1) for the interlocking function shall be category 1 or 3 in accordance with the requirements of EN ISO 13849-1:2006.

Verification: By checking the relevant drawings, inspection of the machine and functional testing of the machine.

5.3.5 Devices to minimise the possibility or the effect of ejection

The machine shall be fitted with an anti-kickback device of the finger type covering the full working width of the machine. The anti-kickback device shall be capable to meet the requirements of Annex A.

The anti-kickback fingers shall be designed, manufactured and set so as to fulfil the following requirements:

- a) shall be located before the infeed roller and be situated inside the table when seen from above;
- b) shall have a resilience of at least 15 J cm^{-2} and a superficial hardness of at least 100 HB;
- c) their thickness shall be between 8 mm and 15 mm for machines with a useful working width equal to or more than 260 mm and between 3 mm and 8 mm for machines with useful working width less than 260 mm;
- d) tip radius of the fingers shall not exceed 0,3 mm;
- e) angle α shall conform to the values given in Figure 4 for any cutting depth for which the machine is designed, the angle β shall be more than 32° and less than 45° ;
- f) total lateral movement of the anti-kickback fingers that can move freely shall not exceed 1 % of the machine's useful working width;
- g) fingers shall fall under their own weight to their rest position. Stops shall be provided preventing their rotation around the shaft except for an angular sector corresponding to the minimum and maximum thicknessing capacity;
- h) rest position of the finger tips shall be at least 2 mm below the horizontal tangent to the cutting circle outside diameter;
- i) locking devices which render the anti-kickback fingers ineffective are not permitted.

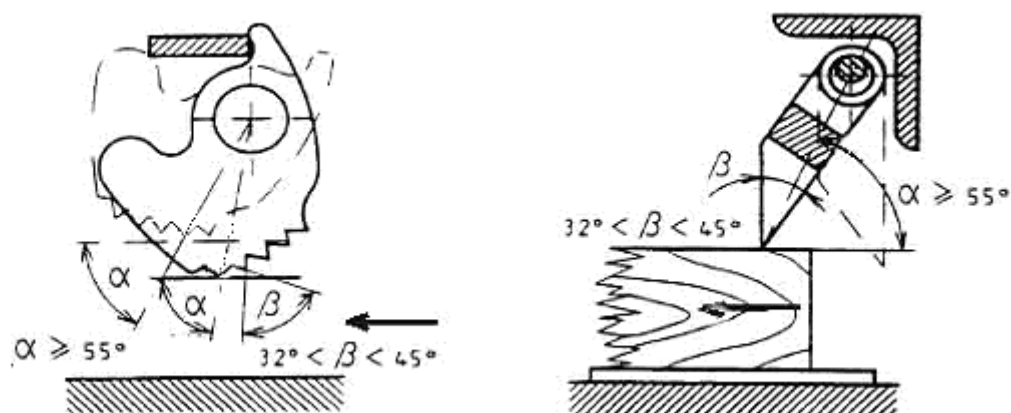


Figure 4 — Anti-kickback fingers (the arrows indicate the direction of the feed)

Verification: By checking the relevant drawings, inspection of the machine, measurement, functional testing of the machine and the test in Annex C shall be performed.

NOTE For the components resilience and hardness a confirmation from the components' manufacturers can be useful.

5.3.6 Work-piece supports and guides

5.3.6.1 General

Movable tables shall be lockable in position (for thicknessing and surface planing) unless the movement is self locking.

The conversion from surface planing to thicknessing (and the reverse) shall be possible without dismantling and without the aid of a tool (e.g. a spanner).

When opening the surface planing table(s) is done manually grip(s) or handle(s) shall be provided. The maximum force to open or close shall be 300 N. Counterbalancing via spring/air cushion or via distribution of the weight shall be provided if necessary to respect the limit value.

When the opening and closing of the surface planing table(s) is powered the speed shall be limited so that time for each operation is greater than 5 s and the movements shall be via an enabling device on the frame and an hold to run control on the moveable table(s) or an hold to run control on the frame associated to a reverse movement of 2 cm when released during closing.

The category of the safety related control system for powered opening and closing the surface planing table(s) shall be in accordance with the requirements of EN ISO 13849-1:2006 and at least:

- a) category 1 if the control circuit is hardwired;
- b) category 3 if the control circuit includes electronic components.

Verification: By checking the relevant drawings and/or circuit diagrams and functional testing and inspection of the machine.



5.3.6.2 Work-piece support

5.3.6.2.1 Surface planing tables

The machine design shall be such that rebating at the cutterblock end is not possible.

The surfacing planing tables shall be in accordance with the following requirements:

- a) adjustment of the machine outfeed table in the vertical direction shall be limited to 1,1 mm below the cutting circle diameter;
- b) machines designed to have a depth of cut exceeding 1 mm shall be provided with vertical infeed table adjustment;
- c) both infeed and outfeed tables shall be flat;
- d) where the infeed table is provided with vertical adjustment, it shall remain parallel to the outfeed table throughout the full range of adjustment. The range of adjustment shall be limited such that the depth of cut cannot exceed 8 mm;
- e) Tables shall be made of light alloy, cast iron or steel having a minimum ultimate tensile strength of 150 N mm^{-2} ;
- f) table lips shall be resistant;
- g) both table(s) shall be such that:
 - 1) distance between the table lips and the cutting circle diameter is $3 \text{ mm} \pm 2 \text{ mm}$ whatever height the tables are set at (see Figure 5);

Dimensions in millimetres

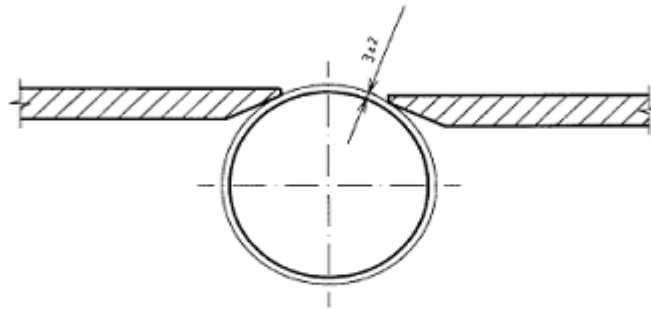
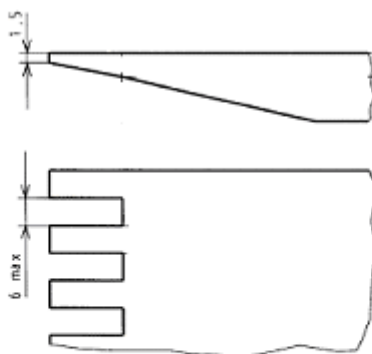


Figure 5 — Distance between table lips and cutting circle diameter

- 2) where the table or table lips are slotted (for the purpose of noise reduction), the slots shall not exceed 6 mm in width. The minimum tooth thickness shall be 1,5 mm at the tip (see Figure 6);
- 3) where the table or table lips are drilled (for the purpose of noise reduction), the bores shall not allow for the passage of a 6 mm in diameter cylindrical pin;

Dimensions in millimetres

**Figure 6 — Example of slots in table lips**

h) table dimensions shall be such that the requirements given in Table 2 are met;

Table 2 — Table dimensions

Cutting width (W) (mm)	Minimum distance (L) (mm) (infeed and outfeed) between each table end and the vertical plane containing the cutterblock rotational axis
$W \leq 600$	$2 \times W$
$W > 600$	1 200

i) if the machine is designed for use with a demountable power feed unit which shall be fitted to the machine table, the fixing shall not limit the fence adjustment on the full adjustment range.

Verification: By checking the relevant drawings, measurement, inspection of the machine, functional testing of the machine and the tests G.1 and G.2 of ISO 7471:1986 and resistance tests in Annex B shall be performed.

NOTE For the ultimate tensile strength a confirmation from the material manufacturer can be useful.

5.3.6.2.2 Thicknessing table

The thicknessing table shall be flat.

A mechanical end stop shall be provided to prevent contact between the table and the anti-kickback device or the cutterblock in any position.

A device to limit the depth of cut shall be located at the infeed side of the machine in order to prevent the feeding of oversized (too thick) work-pieces.

Verification: By checking the relevant drawings and/or circuit diagrams, inspection of the machine, measurement, the test G1 of ISO 7568:1986 shall be performed and functional testing of the machine.



5.3.6.3 Work-piece guiding

5.3.6.3.1 Work-piece guiding during planing

The machine shall be equipped with a fence for use during surface planing which complies with the following requirements:

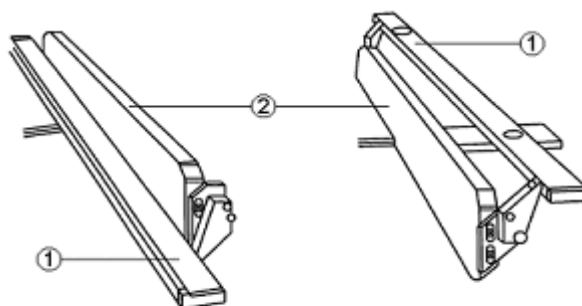
- a) it shall be attached to the machine and shall, on machines with a useful working width above 160 mm, be laterally adjustable over the whole cutterblock length without the aid of a tool;
- b) if a tiltable fence is fitted, its normal position shall be at 90° to the face of the table and limited by an end stop. Its movement shall be limited to 45° in a clockwise direction from its normal position when viewed from the infeed end of the machine. No movement in an anticlockwise direction from normal position when viewed from the infeed end of the machine shall be possible;
- c) free distance between the tiltable fence and the outfeed table in front of the fence shall not exceed 5 mm in all positions of the tiltable fence (e.g. where positioned for bevel at 45°);
- d) it shall be capable of being locked in any position;
- e) minimum fence height and length, related to the useful working width, shall be as given in Table 3;

Table 3 — Fence dimensions

Useful working width (<i>W</i>) (mm)	Minimum fence length ^a on both side of spindle axis (<i>b</i>) (mm)	Fence height (<i>c</i>) (mm)
$W \leq 260$	$b \geq 1,15 \times W$	$c \geq 120$
$W > 260$	550	$c \geq 150$
^a Fence length shall not exceed table length.		

- f) gap between the outfeed table and the lower surface of the fence shall not exceed 5 mm where the fence is in vertical position and 10 mm in any other position of the fence;
- g) where an integral auxiliary fence is provided for shallow work, e.g. hinged to the main fence (see Figure 7) its height shall not be less than 20 mm and not greater than 25 mm, its width shall exceed 55 mm and its length shall be equal at least to the length of the fence. If it is hinged to the main fence, provision shall be made that it cannot fall from its rest position inadvertently into the working position e.g. by fitting a locking device or by gravity. The auxiliary fence shall not be able to come into contact in any position with the cutterblock.

If the machine is designed to be used with a demountable power feed unit it's fixing shall not limit the fence adjustment over the whole fence adjustment range.

**Key**

- 1 auxiliary fence
- 2 main fence

Figure 7 — Example of an auxiliary fence

Verification: By checking the relevant drawings, measurements, inspection of the machine and functional testing of the machine.

5.3.6.3.2 Work-piece guiding during thicknessing

The table shall be provided on both sides with lateral guides to limit the dimension of the work-piece and to maintain the work-piece on the table.

The width of the table between the lateral guides shall be less than or equal to the cutting width and its length shall at least extend from the cut limiting device to the outfeed roller.

Verification: By checking the relevant drawings, inspection of the machine, measurement and functional testing of the machine.

5.3.7 Prevention of access to moving parts**5.3.7.1 Tool guarding during planing****5.3.7.1.1 General**

The guards in front and behind the fence shall be designed so that they cannot be removed from the machine without the aid of a tool.

Access to the tool below the surfacing table(s) shall be prevented by moveable interlocked guard(s) interlocked with cutterblock and feed.

The category of the control circuits (also see 5.2.1) for the interlocking shall be in accordance with the requirements of EN ISO 13849-1:1996 and at least:

- a) category 1 if the control circuits are hardwired;
- b) category 3 if the control circuits include electronic components.

Verification: By checking the relevant drawings, inspection of the machine and functional testing of the machine.



5.3.7.1.2 Safeguarding at the front section of the fence

Access to the cutterblock shall be prevented by an adjustable guard of the bridge type (see Figure 8) with or without self adjusting facility fixed to the machine, e.g. to the machine frame on the outfeed table side.

The bridge type guard shall satisfy the following requirements:

- a) it shall be adjustable without the aid of a tool;
- b) it shall be capable of being adjusted manually or automatically so as to reduce the gap between the fence and the guard to at most 6 mm and to cover the total exposed length of the cutterblock in front of the fence, regardless of the position of the fence and tables (see 5.4.5);
- c) bridge of the bridge type guard shall be convex or flat in shape and so designed that contact of a part of the hand with the work-piece is maintained during planing (e.g. see Figure 8). Its upper surface shall be smooth, and without projecting parts;
- d) lower surface of the bridge of the bridge type guard shall be so designed that there is no contact with the cutterblock when the guard is pressed down on to the table;
- e) its design shall allow for blade changing without dismounting the guard;
- f) bridge of the bridge type guard or the bridge type guard shall be strong, shock and compression resistant;
- g) bridge of the bridge type guard shall be manufactured from a material such that in the event of contact with the cutterblock, neither the guard, nor the cutterblock will disintegrate (e.g. plywood, light alloy);
- h) it shall be possible to lock horizontal adjustment of the bridge of the bridge type guard in any position without the aid of a tool and the bridge of the bridge type guard shall remain in its locked position when a horizontal force of 80 N is applied towards the fence;
- i) it shall be adjustable in height from 0 mm to 75 mm maximum above the outfeed table and this adjustment shall be stepless and it shall return automatically to its pre-set position (for example by spring loading) after being pressed down;
- j) in the lowest position and over the whole range of adjustment:
 - 1) it shall totally cover the area between two vertical planes tangent to the table lips when they are set the maximum width apart taking account also the possible deflection;
 - 2) in the lowest position the bridge of the bridge type guard shall cover the area between the table lips plus at least 5 mm at the infeed and outfeed side;
 - 3) edge of the bridge at infeed table side shall be at a maximum of 2 mm from the work-piece upper surface (see Figure 8);
 - 4) edge of the bridge at outfeed table side shall be at a maximum of 4 mm from the work-piece upper surface (see Figure 8);

Dimensions in millimetres

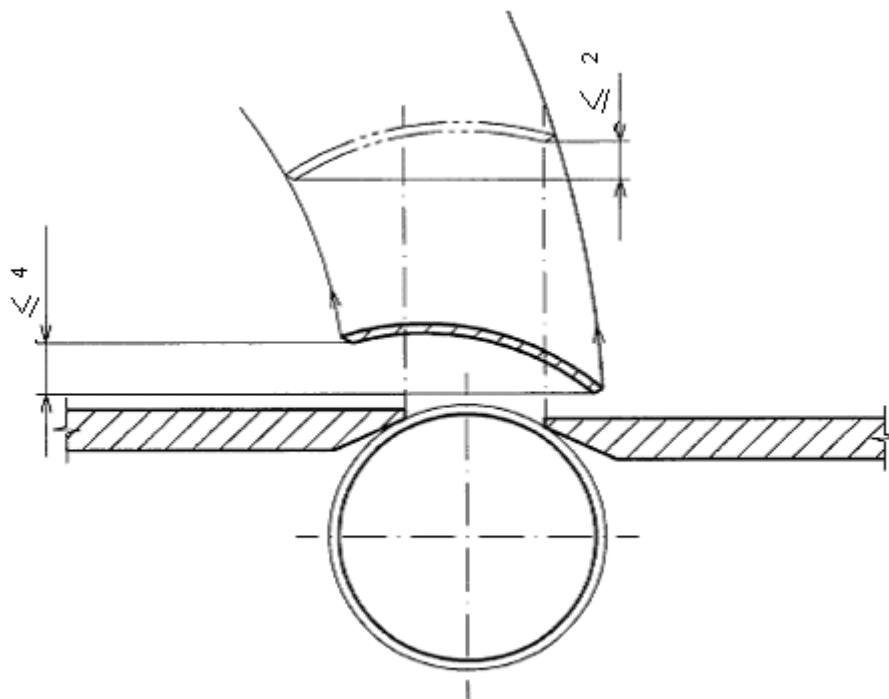


Figure 8 — Example of bridge type guard

- k) guard adjustment devices shall be accessible from the operator position and within 1 m from the cutterblock axis;
- l) its lower surface shall be so designed that there is no obstruction to the passage of the work-piece through the machine;
- m) its projection from the machine frame shall not exceed 550 mm;
- n) maximum width of the bridge of the bridge type guard shall be:
 - 1) 100 mm for a cutterblock length up to and including 350 mm;
 - 2) 120 mm for a cutterblock length exceeding 350 mm.
- o) automatic adjustable (self-adjusting) bridge-type guards shall be equipped at the infeed side with a leading-in device designed in a way that a horizontal force between 15 N and 30 N is applied to the work-piece during self-adjusting.

In order to achieve smooth guiding of the work-piece with the required force, leading-in devices shall:

- be fixed to the guard;
- not protrude more than 30 mm from the fence or from the table as illustrated in Figure 9;
- either be equipped with a leading edge according to the dimension given in Figure 10 or to the dimensions given in Figure 11.

Dimensions in millimetres

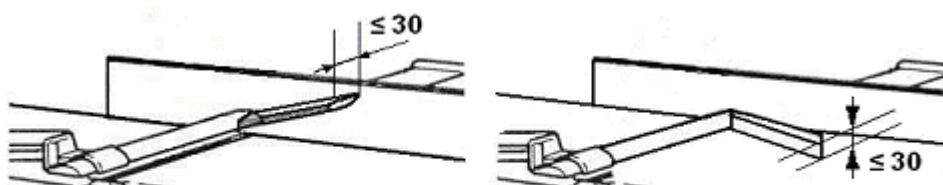


Figure 9 — Examples of leading in devices

Dimensions in millimetres

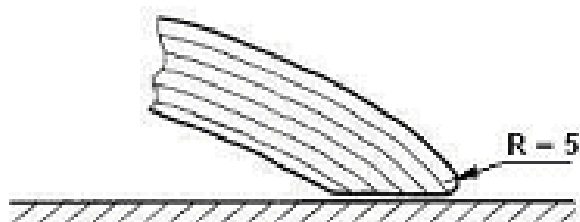


Figure 10 — Example 1 for bridge type leading edge design

Dimensions in millimetres

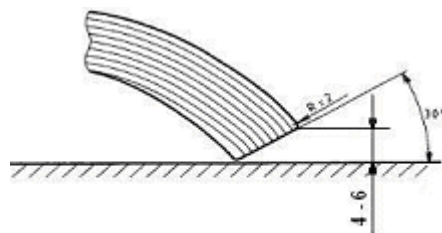


Figure 11 — Example 2 for bridge type leading edge design

Other requirements relevant for ergonomic aspects of the bridge type guard are given in 5.4.5.

Verification: By checking the relevant drawings and inspection of the machine, measurement, functional testing of the machine and the relevant tests A1, A2, A3 described in Annex A shall be performed.

5.3.7.1.3 Safeguarding at the rear of the fence

Access to the cutterblock at the rear of the fence shall be prevented by a fixed guard attached either to the fence or to the fence support.

The fixed guard shall be designed:

- a) to move with the fence;
- b) to be capable of covering the full length and diameter of the cutterblock;
- c) not to come into contact with the blades;
- d) gap(s) at the rear between the fence and the fixed guard e.g. created by the tilting of the fence shall be in accordance with the requirements of Table 4 of EN 294:1992.

Verification: By checking the relevant drawings, measurements, inspection of the machine and functional testing of the machine.

5.3.7.2 Safeguarding the cutterblock and feed mechanism when thickening

Access to moving parts of the machine (that is the cutterblock and the feed mechanism) with the exception of infeed opening and outfeed opening shall be prevented by means of fixed guard(s) and, at least for the change of the blades, by a moveable guard(s).

This/these guard(s) shall be interlocked with the cutterblock and/or feed drive mechanism. If this moveable guard is on the top of the machine it shall be stable in the open position.

This/these guard(s) shall be in accordance with the requirements of 5.3.9.

The interlocking device(s) shall comply with the requirements of EN 1088:1995.

The category of the control circuits (also see 5.2.1) for the interlocking shall be in accordance with the requirements of EN ISO 13849-1:2006 and at least:

- a) category 1 if the control circuits are hardwired;
- b) category 3 if the control circuits include electronic components.

Verification: By checking the relevant drawings and/or circuits diagrams, inspection of the machine and functional testing of the machine.

5.3.8 Guarding of drives

Access to all drive mechanisms (e.g. for the cutterblock and work-piece feed and for the powered vertical table(s) adjustment (where fitted) shall be prevented by:

- a) fixed guard(s), or
- b) moveable guard interlocked with the drive mechanism(s) where frequent access to the drives is provided for maintenance or adjustment purposes, i.e. more than once per shift.

The category of the control circuits (also see 5.2.1) for the interlocking shall be in accordance with the requirements of EN ISO 13849-1:2006 and at least:

- 1) category 1 if the control circuits are hardwired;
- 2) category 3 if the control circuits include electronic components.

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

5.3.9 Characteristics of tool guards

The tool guards shall be manufactured from one of the following materials:

- a) steel having an ultimate tensile strength of at least 350 N mm^{-2} and a wall thickness of at least 1,5 mm;
- b) light alloy with the characteristics shown in Table 4:

Table 4 — Light alloys tool guards tensile strength and thickness

Ultimate tensile strength N mm^{-2}	Minimum thickness mm
180	5
240	4
300	3

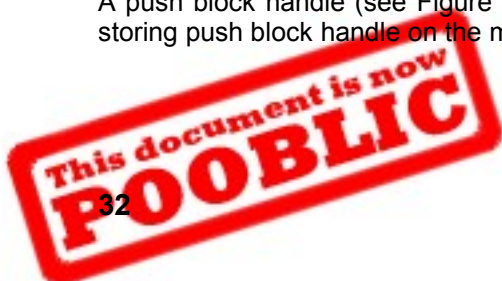
- c) polycarbonate with a wall thickness of at least 3 mm or other plastic material with such a wall thickness that the impact strength is equal to or better than that of polycarbonate of 3 mm thickness (e.g. polyethylene, polyester, polyvinylchloride, polymethylmetacrylate);
- d) cast iron with an ultimate tensile strength of at least 200 N mm^{-2} and a wall thickness of at least 5 mm.

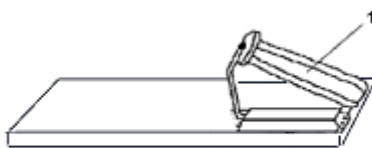
Verification: By checking the relevant drawings measurements and where materials are used with other characteristics than those given above the test in Annex E shall be performed.

NOTE For the ultimate tensile strength a confirmation from the manufacturer of the material can be useful.

5.3.10 Safety appliances

A push block handle (see Figure 12) shall be provided for use on all machines. Provision shall be made for storing push block handle on the machine.



**Key**

1 push block handle

Figure 12 — Example of push block

Verification: By checking the relevant drawings and inspection of the machine.

5.3.11 Demountable power feed

The fixing of the demountable power feed, when provided, shall be at the rear side of the machine. See also 5.3.5.2.

Verification: By checking the relevant drawings and inspection of the machine.

5.4 Protection against non-mechanical hazards

5.4.1 Fire

To minimise the risk of fire the requirement in 5.4.3 and 5.4.4 shall be met (see also 6.3 h 4)).

The requirements in 5.3.6.2.1 g) 1) apply for avoiding sparks as result of contact between cutting blades and the table lips.

Verification: By checking the relevant drawings, inspection of the machine and functional testing of the machine.

5.4.2 Noise

5.4.2.1 Noise reduction at the design stage

When designing machinery the information and technical measures to control noise at source given in EN ISO 11688-1:1998 shall be taken into account. Also the information given in EN ISO 11688-2:2000 may be taken into account. The most relevant noise source is the rotating cutterblock.

5.4.2.2 Noise emission measurement

Operating conditions for noise measurement shall comply with Annexes B and C of ISO 7960:1995.

Mounting and operating conditions of the machine shall be identical for the determination of emission sound pressure levels at the work station and sound power levels.

For machines where Annex B or Annex C of ISO 7960:1995 is not applicable e.g. for fence position, cutting width or cutting depth the detailed operating and mounting conditions used shall be given in the test report.

Emission sound power levels shall be measured in accordance to the enveloping surface measuring method shown in EN ISO 3746:1995 with the following modifications:



- a) environmental indicator K_{2A} shall be equal to or less than 4 dB;
- b) difference between the background sound pressure level and the machine sound pressure level at each measuring point shall be equal to or greater than 6 dB. The correction formula for this difference (see 8.2 of EN ISO 3746:1995) shall apply up to a difference of 10 dB;
- c) only the parallelepiped measurement surface shall be used at 1,0 m from the reference surface;
- d) where the distance from the machine to an auxiliary unit is less than 2,0 m the auxiliary unit shall be included in the reference surface;
- e) measuring time requirement in 7.5.3 of EN ISO 3746:1995 referring to 30 s shall be excluded;
- f) accuracy of the test method shall be better than 3 dB;
- g) number of microphone positions shall be 9 in accordance with Annex B and C of ISO 7960:1995.

Alternatively, where the facilities exist and the measurement method applies to the machine emission sound power levels may also be measured in accordance with a method with higher precision i.e. EN ISO 3743-1:1995, EN ISO 3743-2:1996, EN ISO 3744:1995 and EN ISO 3745:2003 without the preceding modifications.

For determination of the emission sound power level by sound intensity method, use EN ISO 9614-1:1995 (subject to agreement between the supplier and the purchaser).

Emission sound pressure levels at the workstation shall be measured in accordance with EN ISO 11202:1995 with the following modifications:

- 1) environmental indicator K_{2A} and the local environmental correction K_{3A} shall be equal to or less than 4 dB;
- 2) difference between the background emission sound pressure level and the workstation sound pressure level shall be equal to or greater than 6 dB;
- 3) local environmental correction K_{3A} shall be calculated in accordance with A.2 of EN ISO 11204:1995 with the reference restricted to EN ISO 3746:1995 instead of the method given in of EN ISO 11202:1995, or in accordance with EN ISO 3743-1:1995, EN ISO 3743-2:1996, EN ISO 3744:1995 or EN ISO 3745:2003 where one of these standards has been used as the measuring method.

For noise declaration 6.3 m) shall be met.

5.4.3 Emission of chips and dust

Provision shall be made for the extraction of chips and dust from the machine providing a chip and dust extraction hood to enable the machine to be connected to a separate chip and dust collection system.

To ensure that the chips and dust extracted from their point of origin are conveyed to the collection system, the design of the hoods, ducts and baffles should be based on a conveying velocity of extracted air in the duct of 20 m s^{-1} for dry chips and 28 m s^{-1} for wet chips (18 % or above, moisture content).

For static electricity see 5.4.10.

NOTE A low dust emission can be expected if the following features shown in Table 5 are ensured:



Table 5 — Low dust emission design

Design characteristics	Minimum diameter of extraction outlet mm	Minimum conveying air velocity m s^{-1}	Minimum airflow $\text{m}^3 \text{h}^{-1}$
Planing/thicknessing width w			
$w \leq 300 \text{ mm}$	100	20	565
$300 < w \leq 520 \text{ mm}$	120	20	815
$w > 520 \text{ mm}$	140	20	1 110

See also 6.3 k) and l).

Verification: By checking the relevant drawings and inspection of the machine. Run the machine (disconnected from the chips and dust extraction system) under the conditions given in Annex B and C of ISO 7960:1995. Check if the machine creates an air flow from the inlet(s) of the capture device(s) to the connection outlet(s) to the chips and dust extraction system by use of smoke at the connection outlet(s). Measure the pressure drop (machine connected to the chips and dust extraction system) at the given air flow rate by measurements under conditions given in Annex B and C of ISO 7960:1995.

5.4.4 Electricity

The requirements of EN 60204-1:2006 apply unless otherwise stated in this document.

In particular the following clause requirements of EN 60204-1:2006 shall be fulfilled:

- Clause 6 for prevention of electric shock;
- Clause 7 for protection of equipment;
- Clause 8 for equipotential bonding;
- Clause 12 for conductors and cables;
- Clause 13 for wiring practices;
- Clause 14 for electrical motors and associated equipment.

Electrical enclosures shall not be exposed to risk from the ejection of cutterblocks and work-pieces. Live parts shall not be accessible in accordance with 6.2.2 of EN 60204-1:2006. Fire risk is not present where power circuits is protected against over current in accordance with 7.2.2 of EN 60204-1:2006.

The degree of protection of all electric components out of the enclosure(s) and the enclosure(s) for electrical components itself/themselves shall be at least IP 54 accordance with the requirements of EN 60529:1991.

The power supply cable (if provided) of displaceable machines shall be at least of type H0 7 in accordance with the requirements of HD 22.4 S4:2004.

The tests for the continuity of the protective bonding circuit according to 18.2 of EN 60204-1:2006 and for functional testing according to 18.6 of EN 60204-1:2006 apply.



Verification: By checking the relevant drawings, circuit diagrams and inspection of the machine. The tests for the continuity of the protective bonding circuit and functional tests shall be done in accordance with 18.2 and 18.6 of EN 60204-1:2006.

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

5.4.5 Ergonomics and handling

The machine and its controls shall be designed according to ergonomic principles in accordance with EN 1005-4:2005 for work posture which is not fatiguing.

The maximum force necessary for the raising or tilting of the surface planing table to set the machine for thicknessing shall be 300 N.

The height of the surfacing table(s) shall be between 750 mm and 900 mm above the floor level.

The force necessary to move the bridge guard in its support when unlocked for adjustment shall be less than or equal to 5 N.

The maximum angular movement of the control lever for the adjustment of the bridge guard in height shall not exceed 35°.

The force necessary to adjust the bridge up and down shall be less than or equal to 35 N.

Parts of the machine which weigh more than 25 kg and require to be lifted for normal use with a lifting device shall include necessary attachments to accommodate the fitting of a lifting device in accordance with EN 1005-2:2003.

If the machine is fitted with a scale for indicating the cutting depth when planing, it shall be so designed and positioned that the adjusted cutting width is indicated directly and easy legible e.g. by fitting a magnifying glass.

The machine shall be fitted with a scale for indicating the work-piece thickness to be cut. This scale shall be so designed and positioned that the adjusted work-piece thickness is indicated directly and easy legible e.g. by fitting a magnifying glass.

The maximum force or torque for the control of adjusting the height of the table shall be respectively 35 N or 2,5 Nm.

Tanks containing hydraulic fluid, compressed air drainers and lubricators shall be placed or oriented in such a way that the filler and drain pipes can be easily reached.

Verification: By checking the relevant drawings, measurements and inspection of the machine.

5.4.6 Pneumatics

For machines fitted with pneumatic equipment the requirements of EN 983:1996 shall apply.

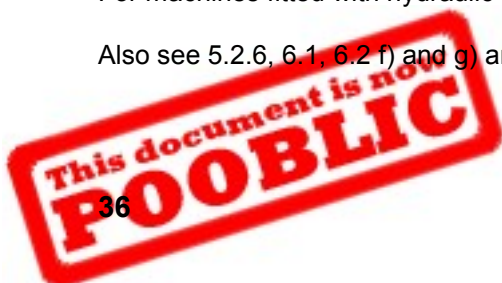
Also see 5.2.6, 6.1, 6.2 f) and g) and 6.3 r).

Verification: By checking the relevant drawings and/or circuit diagrams and inspection of the machine.

5.4.7 Hydraulics

For machines fitted with hydraulic equipment the requirements of EN 982:1996 shall apply.

Also see 5.2.6, 6.1, 6.2 f) and g) and 6.3 r).



Verification: By checking the relevant drawings and/or circuit diagrams and inspection of the machine.

5.4.8 Electromagnetic compatibility

The machine shall have sufficient immunity to electromagnetic disturbances to enable it to operate safely in accordance with EN 60439-1:1999, EN 50370-1:2005 and EN 50370-2:2003.

NOTE Machines which incorporate CE-marked electrical components and where such components and cabling is installed in accordance with their respective manufacturers instructions, are generally considered to be protected against external electromagnetic interference.

For control systems with electronic components see Annex G.

Verification: By checking the relevant drawings and/or circuit diagrams and inspection of the machine.

5.4.9 Supply disconnection (isolation)

The electric power supply to the machine shall be controlled by a supply disconnecting device (isolator) which is in accordance with the requirements of 5.3 of EN 60204-1:2006.

If the machine is fitted with an electrical brake, the electric isolator shall be equipped either:

- a) with a blocking device and it shall only be possible to switch off the isolator after manually overriding the blocking device, or
- b) isolator shall not be situated on the same side of the machine or on the same side of the pendant as the start and stop control.

Where the pneumatic supply is used a quick action coupling in accordance with EN 983:1996 without the means for locking shall be acceptable when the isolated machine (or part of machine) is so small that the disconnected coupling can all the time easily be under the control of the person making some intervention on the machine in accordance with 5.2 of EN 1037:1995.

Where the machine has a hydraulic system, isolation of the hydraulic system shall be achieved either:

- 1) by isolation of the electrical supply to the hydraulic drive motor in accordance with 5.3 of EN 60204-1:2006, or
- 2) by fitting a disconnection device e.g. valve with mechanical locking in the off position in accordance with EN 982:1996.

Where residual energy is stored, e.g. in a reservoir or pipe, means for dumping of residual pressure shall be provided. Such means may include a valve but does not include disconnection of any pipe.

Verification: By checking the relevant drawings and/or circuits diagrams, inspection of the machine and functional testing of the machine.

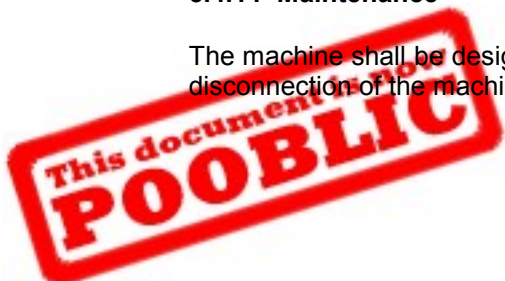
5.4.10 Static electricity

If the machine is fitted with flexible hoses for chip and dust extraction, the hoses shall be able to lead charge to earth potential.

Verification: By checking the relevant drawings and inspection of the machine.

5.4.11 Maintenance

The machine shall be designed so that maintenance and cleaning can be whenever possible undertaken after disconnection of the machine from all energy sources (see also 6.3 j), n) and o)).



The exterior of the machine shall be designed with smooth surfaces in order to ease the daily cleaning for chips and dust with vacuum cleaner. Where cleaning for chips and dust is required with movable guards open, such guards shall be in accordance with the requirements of 5.3.7.

Verification: By checking the relevant drawings, inspection of the machine and functional testing of the machine.

6 Information for use

6.1 General

The principles of Clause 6 of EN ISO 12100-2:2003 shall be observed and the requirements of Clause 8 of EN 847-1:2005 apply.

Information on negative test result of braking system shall be displayed.

Verification: By checking the relevant drawings and inspection of the machine.

6.2 Marking

The principles of 6.4 of EN ISO 12100-2:2003 shall be observed and in addition:

The following information shall be marked legibly and indelibly throughout the expected life of the machine either directly on the machine e.g. by engraving, etching or by using labels or plates permanently fixed to the machine e.g. by riveting or stickers:

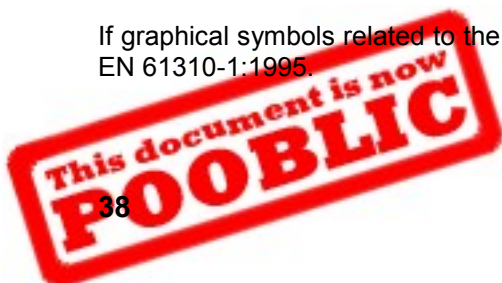
- a) name and address of the manufacturer;
- b) year of construction;
- c) designation of series or type;
- d) serial or identification number, if any;
- e) rating information (mandatory for electrotechnical products: voltage, frequency, power in accordance with 16.4 of EN 60204-1:2006);
- f) where fitted with a pneumatic/hydraulic system with the nominal pressure for the pneumatic/hydraulic circuits;
- g) where fitted with pneumatic/hydraulic isolators their function, location and operational position(s) e.g. by a label or a pictogram.

If the machine is equipped with a pneumatic/hydraulic supply and isolation of the pneumatic/hydraulic energy is not achieved by the electrical isolation a permanent warning label shall be placed on or close to the electrical supply disconnection device, warning that the pneumatic/hydraulic supply is not isolated by isolation of the electrical supply.

The labels or pictograms for marking the nominal pressure and the isolators (if fitted) shall be fitted in a position in close proximity to the installed location of the corresponding isolator on the machine.

The markings shall either be in the language of the country in which the machine is to be used or wherever possible by using pictograms.

If graphical symbols related to the operation of actuators are used they shall be in accordance with Table 6 of EN 61310-1:1995.



If the machine is equipped with scales the requirements of EN 894-2:1997 shall apply.

For marking of the tool the requirements of EN 847-1:2005 apply.

Verification: By checking the relevant drawings and inspection of the machine.

6.3 Instruction handbook

The basic principles of 6.5 of EN ISO 12100-2:2003 shall be observed, and in addition the instruction handbook shall include at least:

- a) repetition of the markings, pictograms and other instructions on the machine as required in 6.1 and 6.2 and, if necessary, information about their meaning;
- b) intended use of the machine;
- c) warning regarding residual risks: dust, noise, contact with the tool from infeed or outfeed opening, kickback and ejection;
- d) instructions for safe use in accordance with 6.5.1 d) of EN ISO 12100-2:2003;
- e) description of the range, type and dimensions of blades which are suitable for the machine. This includes the precautions during machining to use sharp knives;
- f) where necessary on stationary machines the instructions on how to fix the machine to the floor;
- g) on displaceable machines information how transportation shall be handled and how to make the machine stable during machining;
- h) information that operators shall be adequately trained in the use, adjustment and operation of the machine including the correct use. This includes precautions during setting and machining as:
 - 1) to stop the machine whilst unattended;
 - 2) to ensure that the floor area around the machine is level, well maintained and free from loose material e.g. chips;
 - 3) to report faults in the machine, including guards or tools as soon as they are discovered;
 - 4) to adopt safe procedures for cleaning, maintenance and remove chips and dust regularly to avoid the risk of fire; the principle of machine setting and operation including correct use and adjustment of bridge guard and work-piece guiding devices;
 - 5) how to set the machine for thicknessing;
 - 6) safe handling of work-piece when cutting;
 - 7) to use an auxiliary fence when planing and edging small work-pieces;
 - 8) principle of machine setting and operation;
 - 9) how to isolate the machine from the power source;
 - 10) how to perform fixing and positioning of blades and particularly to pay attention to the maximum projection of the blades and the optimum torque for blades fixing screws;
 - 11) to verify before work that the fence is blocked in position;

- 12) how to use of a push block and how to adapt the shape of push block;
 - 13) to use of appropriate jigs for special work-pieces;
 - 14) to use of personal protective equipment e.g. for ear protection according the local relevant legislation;
 - i) instruction that adequate general or localised lighting shall be provided;
 - j) installation and maintenance requirements including a list of those devices which shall be inspected, how frequently the verification shall be carried out and by what method. This shall include at least the following:
 - 1. emergency stop(s) - by functional test;
 - 2. interlocked guards - by opening each guard in turn to stop the machine and by proving the inability to start the machine with each guard in the open position;
 - 3. brake - by functional testing to check that the machine is braked within the specified time and if the machine is fitted with mechanical brake that the brake shall be tested after any intervention of the overload protection;
 - 4. antikickback fingers - by inspection at least once every working shift that they are in good working condition e.g. the contact face for impact damage and that the fingers fall freely under their own weight;
 - 5. that the machine shall not be used unless all these conditions are met;
 - k) recommendation to use the machine only if it is connected to an effective chip and dust extraction system;
- NOTE External chip and dust extraction equipment with fixed installations are dealt within EN 12779:2004.
- l) Information regarding the dust extraction equipment to be connected to the machine as follows:
 - necessary air flow in $\text{m}^3 \text{h}^{-1}$;
 - pressure drop at each connection outlet at the recommended conveying air velocity;
 - recommended conveying air velocity in the duct in m s^{-1} ;
 - cross section dimensions and details of each outlet connection;
 - m) declaration concerning airborne noise emissions by the machinery, either the actual value or a value established on the basis of measurements made on identical machinery, measured in accordance with the methods given in 5.4.2.2.

A-weighted emission sound pressure levels at workstations.

A-weighted sound power level emitted by the machinery.

The declaration shall be accompanied by a statement of the measuring method used and the operating conditions applied during the test and values for associated uncertainty K using the dual-number form of declaration in accordance with EN ISO 4871:1996 as follows:

4 dB when using EN ISO 3746:1995 and EN ISO 11202:1995;

2 dB when using EN ISO 3743-1:1995 or EN ISO 3743-2:1996 or EN ISO 3744:1995;

1 dB when using EN ISO 3745:2003;



for example, for a sound power level $L_{WA} = 93$ dB (measured value);

associated uncertainty $K = 4$ dB;

measurement made in accordance with EN ISO 3746:1995.

If the accuracy of the declared emission values is to be checked, the same method and the same operating conditions as those declared for measurements are to be used.

The noise declaration shall be accompanied by the following statement:

"The figures quoted are emission levels and are not necessarily safe working levels. Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required. Factors that influence the actual level of exposure of the work-force include the characteristics of the work room, the other sources of noise, etc. i.e. the number of machines and other adjacent processes. Also the permissible exposure level can vary from country to country. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.";

- n) information that whenever possible maintenance shall be only done if the machine is isolated from all energy sources;
- o) instruction for maintenance listed in 6.5.1 e) of EN ISO 12100-2:2003 including a time table;
- p) information that before changing any tool, the machine shall be isolated;
- q) information about safe cleaning;
- r) if fitted with a pneumatic/hydraulic system and relevant, the method for the safe dissipation of residual energy (see 5.4.9);
- s) maintenance in good condition of noise attenuation material fitted to the machine structure, in accordance with the manufacturer's instructions.

Verification: By checking the instruction handbook and the relevant drawings.



Annex A (normative)

Tests for bridge type guards for planing machines

A.1 Compression test

The bridge type guard lying flat on a table convex side uppermost shall be subjected to a vertical force F of 400 N by means of a rest probe with a flat surface of 75 mm in length.

The bridge type guard passes this test if it remains in position and does not show permanent distortion after the test and is capable of passing tests A.2 and A.3 and fulfils the requirements of 5.3.7.1.2 and 5.4.5.

A.2 Shock test

The bridge type guard lying flat on a table, convex side to uppermost shall be subjected to a shock load resulting from a mass of 8 kg falling from a height of 500 mm.

The contact face of the test mass shall be made of pine wood with dimensions 200 mm × 100 mm (200 mm in the direction corresponding to the cutterblock axis). The face of the mass which contacts the guard shall be flat and have chamfered edges.

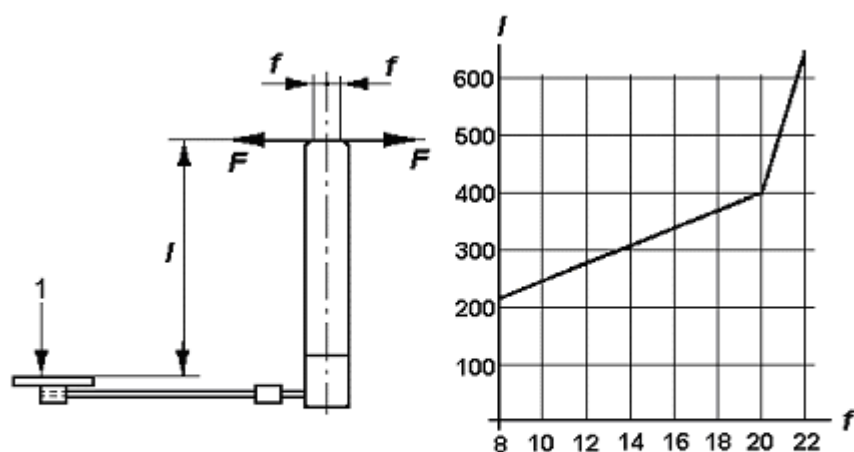
The bridge type guard passed this test if it does not show any signs of visible damage and is capable of passing the tests shown A.3 and fulfils the requirements of 5.3.7.1.2 and 5.4.5.

A.3 Strength test for bridge type guard

The end of the bridge type guard shall be subject to a force F of 135 N perpendicular to the cutterblock axis in the table plane. The maximum deflection f of the bridge during the test shall not exceed the values shown in Figure A.1.

After the test, the bridge type guard shall fulfil the requirements of 5.3.7.1.2 and 5.4.5.

Dimensions in millimetres

**Key**

- 1 fixing of the bridge type guard at the machine
- F strength test force
- f deflection

Figure A.1 — Maximum deflection of bridge type guard

Annex B (normative)

Table lip resistance test

B.1 General

The test consists of the planing a special work-piece to reproduce the ejection of timber hitched during machining and to verify that lips or teeth are not damaged or distorted.

B.2 Work-piece

The work-piece consists of an assembly of a support and 10 inserts (see Figure B.1).

Support: softwood first choice;

moisture content 8 % to 14 %;

dimensions $L \times l \times h = 800 \text{ mm} \times 90 \text{ mm} \times 90 \text{ mm}$;

the support is machined on four faces.

Insert: Beechwood corrugated 10 mm diameter pin (see Figure B.1);

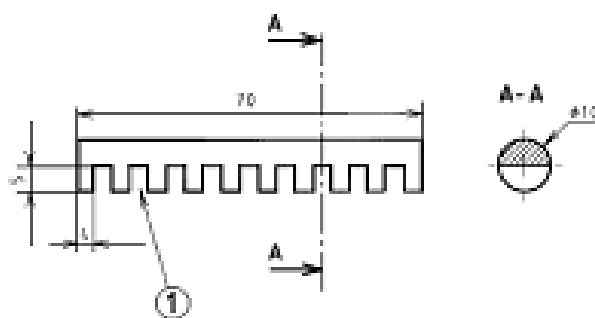
length 70 mm;

hafted in blind holes of support;

grooved square to the axis on 5 mm depth with a standard saw blade with hard metal tips of 3,2 mm thick;

the pins shall be completely inserted (see Figure B.2).

Dimension in millimetres

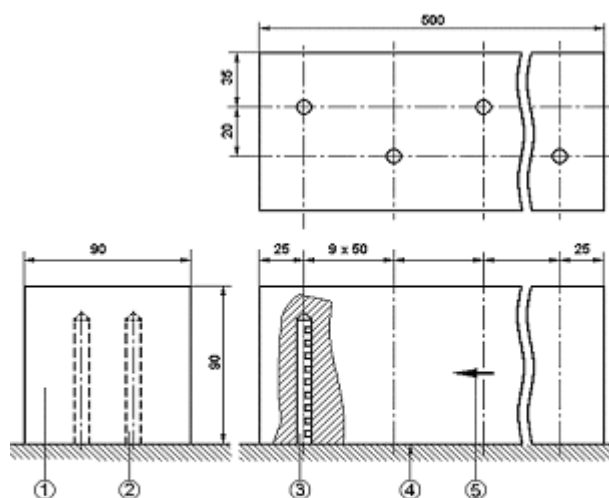


Key

1 9 slots of 3,2 mm width, 4 mm apart

Figure B.1 — Insert

Dimensions in millimetres



Key

- 1 support
- 2 blind holes
- 3 insert
- 4 side of the assembly to be machined
- 5 feed direction

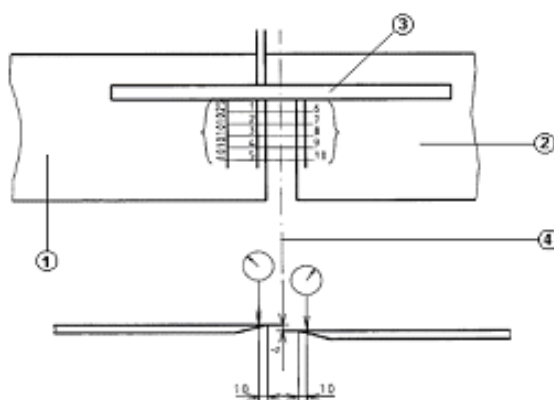
Figure B.2 — Assembly and feed direction

B.3 Measurements

Each measuring point is noted on infeed and outfeed table lip as shown in Figure B.3. A dial gauge with an accuracy of 0,01 mm is used to measure at each point.

Where lips have teeth the dial gauge point is located at the centre of each tooth.

Dimensions in millimetres



- Key**
- 1 outfeed table
 - 2 infeed table
 - 3 fence
 - 4 axis of tool holding spindle

Figure B.3 — Measuring points

B.4 Test

Fix the fence in position and measure at each point as indicated in Figure B.3.

Set the infeed table to perform a depth of cut of 4 mm (or to the maximum depth of cut).

Perform the test with a feed speed of $(6 \pm 2) \text{ m min}^{-1}$.

Planing is performed on the face where the pins are visible and groves in the direction of the cutterblock.

Perform 10 planing operations in these conditions.

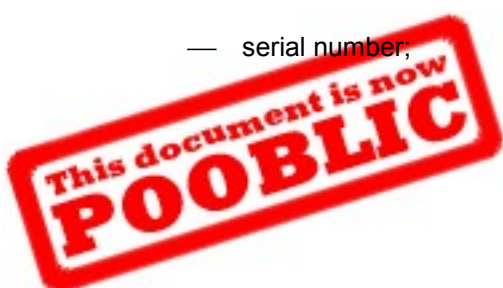
Measure at the same points as in B.3.

B.5 Result

The test is passed if there is no distortion greater than 0,2 mm and no visual damage.

The test report shall contain the following information:

- date;
- machine manufacturer;
- type of machine;
- serial number;



- working width (mm);
- maximum depth of cut (mm).

Table B.1 – Test Report

	Outfeed table lips	Infeed table lips
Measuring point	1 2 3 4 5	6 7 8 9 10
Measurement before test		
Measurement after test		

Annex C (normative)

Kickback test

This test verifies the static strength of the anti-kickback device. The test is performed with the cutterblock stationary. The test force is applied in opposite direction of the feed.

The test block shall be made of beech wood and be 60 mm wide, with height D and shall have been, previously planed on both surfaces. The machine infeed table shall be set to a height of $D + 1,5$ mm and the test block placed under the anti-kickback device in the centre position. A test force F depending from the useful working width (see Table C.1) shall be applied to the test block within 1 s.

Table C-1 — Test force F in relation to the useful working width W

Useful working width W mm	Force F N
$W < 260$	300
$W \geq 260$	500

The test shall be repeated with the table set to a height of D - maximum depth of cut.

The anti-kickback device is considered to have passed the test if it holds the test block and there is not permanent deformation.



Annex D (normative)

Stability test for displaceable machines

D.1 Stability test in the surfacing mode

The machine shall be set in the surface planing mode on a chipboard fixed on the floor and the brakes for the wheels applied (where fitted) or the wheels retracted from the floor (if a device for retracting them is fitted). A horizontal force $F_1 = 500$ N shall be applied in the centre and within a distance of ≤ 30 mm of the cutterblock in the direction as shown in Figure D.1.

Subsequently a horizontal force $F_2 = 500$ N shall be applied at the middle of the front face of the infeed surfacing table and a vertical force $F_3 = 500$ N shall be applied at the middle of the infeed table within 30 mm of the edge in the direction as shown in Figure D.1.

In any cases the machine shall not move or tilt.

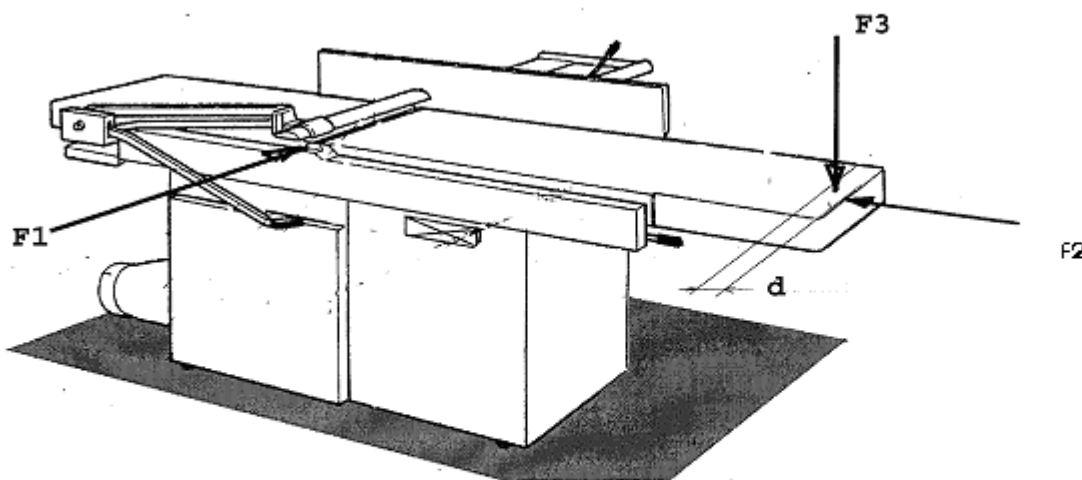


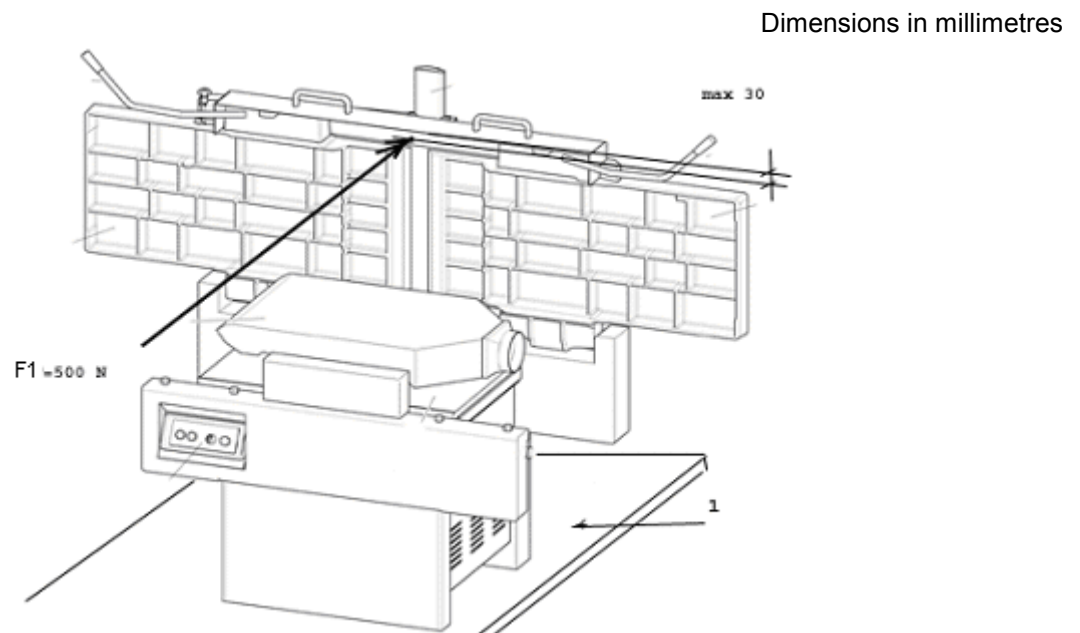
Figure D.1 — Stability test for displaceable machines (in surface setting)

D.2 Stability test in the thickening mode

The machine shall be set in its thickening mode on chipboard fixed on the floor and the brakes for the wheels applied (where fitted), or the wheels retracted from the floor (if a device for retracting them is fitted). A

horizontal force $F = 500 \text{ N}$ shall be applied in the middle and within 30 mm of the uppermost edge of the infeed surfacing table in the direction as shown in Figure D.2.

In any cases the machine shall not move or tilt.



Key

1 chipboard

Figure D.2 — Stability test for displaceable machines (in thicknessing setting)

Annex E (normative)

Impact test method for guards

E.1 General

This annex defines tests for guards used in order to minimise risks of ejection of parts of tools or of work-pieces out of the working zone.

This annex applies to guards as well as on samples of guards' materials.

E.2 Test method

E.2.1 Preliminary remarks

This test method reproduces the hazard of the ejection of tools parts or of work-pieces. The test allows to estimate the resistance/strength of guards and/or samples of guard materials against penetration and dislodgement from the machine by ejected parts from machine or work-piece.

E.2.2 Testing equipment

The testing equipment comprises a propulsion device, a projectile, a support for the test object and a system that allows to measure or record the impact speed with an accuracy of $\pm 5\%$.

E.2.3 Projectile for guards

The projectile shall be a ball of 8 mm diameter made from steel with the following properties:

- a) tensile strength: $R_m = 560 \text{ N mm}^{-2}$ to 690 N mm^{-2} ;
- b) yield strength: $R_{0,2} \geq 330 \text{ N mm}^{-2}$;
- c) elongation at rupture: $A \geq 20\%$;
- d) hardened to 56^{+4}_0 HRC over depth of at least 0,5 mm.

E.2.4 Sampling

The test is carried out with the guard and/or a sample of the guard material. The guard support shall be equivalent to the guard mounting on the machine. For testing guard materials samples may be used, fixed on a frame with an inner opening of 450 mm $\times$ 450 mm. The frame shall be sufficiently rigid. The mounting of the sample shall be by non positive clamping.

E.2.5 Test procedure

The impact test shall be executed with projectile indicated in E.2.3 and an impact speed of 70 m s^{-1} .

Impact shall be as square to the material sample surface or the guard surface as possible. The targets for the projectiles shall be the weakest and most unfavourable spot on material sample or on the guard.

E.3 Results

After the impact damages found on the guard or material shall be assessed as follows:

- a) buckling/bulging (permanent deformation without crack);
- b) incipient crack (visible only on one surface);
- c) through crack (crack visible from one surface to the other);
- d) penetration (projectile penetrating the test object);
- e) guard window loosened from its fixing;
- f) guard loosened from guard support.

E.4 Assessment

The test is passed if there is no through crack or penetration of the test object and if there are no damages e) and f) in accordance with the requirements of E.3.

E.5 Test report

The test report shall give the following minimum information:

- a) date, place of the test and name of the testing institute;
- b) projectile mass, dimensions, speed;
- c) machine manufacturer, type, maximum spindle speed;
- d) design, material and dimensions of the test object;
- e) clamping or fixing of the test object;
- f) direction of shock, point of impact of the projectile;
- g) test result.

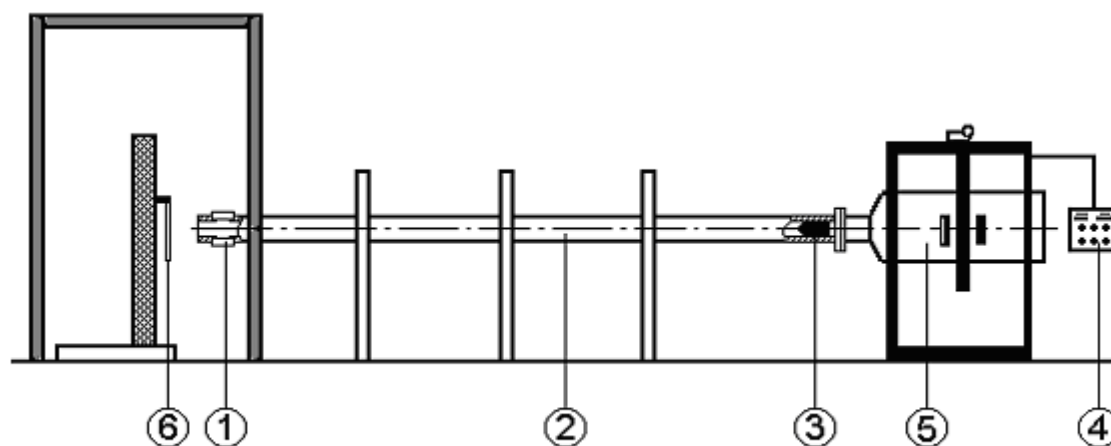
E.6 Test equipment for impact test

The propulsion device consists of a compressed air vessel with flanged gun barrel (see Figure E.1). The compressed air may be released by a valve to accelerate the projectile toward the test object.

The air gun is fed by an air compressor. The speed of the projectile may be controlled by the pressure of the air.

The projectile speed is measured near the nozzle of the gun barrel by a suitable speedometer e.g. by proximity sensor or photocell.





Key

- 1 speedometer
- 2 gun barrel
- 3 projectile
- 4 control panel
- 5 compressed-air vessel
- 6 test object

Figure E.1 — Example of equipment for impact test

Annex F (informative)

Use of well-tried components

In particular the requirements of the following relevant standards should be applied when considering safety related parts to be well-tried in accordance with the requirements of 6.2.2 of EN ISO 13849-1:2006:

- a) for electrical components (see also Tables D.1 to D.17 of EN ISO 13849-2:2003):
 - 1) EN 60947-5-1:2004 for control switches with positive opening operation used as mechanically actuated position detectors for interlocking of guards and for relays used in auxiliary circuits;
 - 2) EN 60947-4-1:2001 for electromechanical contractors and motor starters used in mains circuits;
 - 3) HD 22.1 S4:2002 for rubber insulated cables;
 - 4) HD 21.1 S4:2002 for polyvinyl chloride cables if these cables are additionally protected against mechanical damage by positioning (e.g. inside frames).
- b) electrical control circuits if they also are in accordance with the first four measures listed in 9.4.2.1 of EN 60204-1:2006 (see also Tables D.1 and D.2 of EN ISO 13849-2:2003);
- c) mechanical components if, for example they operate in the positive mode in accordance with the description given in 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 the cam design/mounting complies with 5.2 and 5.3 of EN 1088:1995 (see also Tables A.1 to A.5 of EN ISO 13849-2:2003);
- e) pneumatic and hydraulic components and systems if they comply with EN 983:1996 and EN 982:1996 respectively (see also Tables B.1 to B.18 and Tables C.1 to C.12 of EN ISO 13849-2:2003).

For all components exposed to environmental conditions, e.g. dust and/or gases, these conditions should be taken into account.

NOTE EN ISO 13849-2:2003 gives useful information on the assessment of well-tried components, possible exclusion of faults etc.



Annex G (normative)

Use of electronic components

G.1 General

For the implementation of any safety related function with electronic equipment the appropriate requirements of EN ISO 13849-1:2006 shall apply.

The design of the SRECS shall be such as to achieve the machine safety functions required in this document on base of the categories. Depending on the safety specifications the safety functions shall be achieved in category 2, 3 or 4 in accordance with the requirements of EN ISO 13849-1:2006.

NOTE 1 The categories for the machine safety functions are listed in 5.2.1.

The SRECS shall be designed to be capable to fulfil the highest category in accordance with the requirements of EN ISO 13849-1:2006 required for the corresponding machine safety function.

On machines designed for different modes of operation the control system shall meet the safety requirements for the machine safety functions for each mode of operation.

Unless SRECS being part of a component for which a special standard exists they shall fulfil the environmental requirements in accordance with the requirements of 6.1 and 6.2 of EN 50178:1997.

Unless SRECS to category 2 being part of a component for which a special standard exists they shall fulfil the EMC requirements for type 2 in accordance with the requirements of EN 61496-1:2004. Unless SRECS to category 3 or 4 being part of a component for which a special standard exists they shall fulfil the EMC requirements for type 4 in accordance with the requirements of EN 61496-1:2004.

NOTE 2 See also 5.4.8 for the EMC requirements on the complete machine.

Verification: By checking the relevant drawings and/or circuit diagrams, inspection of the machine, measurement and functional testing of the machine.

NOTE 3 For the components characteristics a confirmation from the components' manufacturers can be useful.

G.2 SRECS design

G.2.1 Components, hardware

SRECS hardware components (including sensors, actuators, PLC's, CNC systems, logic solvers etc.) shall be designed and constructed in accordance with the requirements of the relevant standards and EN ISO 13849-1:2006.

SRECS hardware components (including sensors, actuators, PLC's, CNC systems, logic solvers etc.) shall be selected, assembled, combined and installed in accordance with the requirements of the technical instruction (including application and installation instructions) of the component's manufacturer.

A PLC fulfilling category 3 or 4 in accordance with the requirements of EN ISO 13849-1:2006 may be used in control systems for the implementation of the safety functions listed in 5.2.1.

NOTE 1 If a PLC is used, note that the overall response time could change in a defined range. The reaction time caused by the PLC depends mainly on the cycle time of the program. To consider the worst case it is necessary to calculate with the double cycle time if no alarms or interrupts are used for faster switch off.

A PLC not fulfilling category 3 or 4 in accordance with the requirements of EN ISO 13849-1:2006 may only be a part of a SRECS up to category 3 e.g. as one channel of a dual channel system or as a testing device in category 2.

Verification: Verification has to be carried out against the specification(s) by checking relevant drawings and/or circuit diagrams, calculation and inspection of the machine.

NOTE 2 For the components characteristics a confirmation from the components' manufacturers can be useful.

G.2.2 Safety related software

G.2.2.1 Embedded software

SRECS embedded software shall be in accordance with Clauses 6 and 7 of EN 61508-3:2001.

Access to the embedded software of standard components shall not be possible.

Verification: Verification has to be carried out against the specification(s) by checking relevant drawings and/or circuit diagrams, calculation and inspection of the machine.

NOTE For the embedded software a confirmation from the components' manufacturers can be useful.

G.2.2.2 Application software

Programming of the SRECS shall fulfil the instructions (technical manual) of the component's manufacturer.

The safety related software shall be clearly separated from the functional software to avoid inadvertent alteration of the safety related software.

It shall only be possible for authorised persons to modify the application software of the SRECS. Where access to programmable functions at the numerical control or SRECS is provided during production and/or setting mode (e.g. for position stops, work-piece support), unauthorised access to programmed data or programmable functions shall be prevented. In particular it shall not be possible for the user to suspend the operation of safety functions (e.g. Electro-sensitive protective equipment (ESPE) using active opto-electronic devices (AOPD)) by means of sequences inserted in or called up by the application programme. This may be achieved in the form of a password.

Clauses 6 and 7 of EN 61508-3:2001 or as far as applicable 6.11.3 of EN 62061:2005 shall be taken into account for the application software development.

NOTE 1 These requirements for application software may be achieved by use of techniques such as defensive programming, structured programming, modularity (i.e. logic/function blocks, sequence diagrams etc.), re-use of software modules that satisfy the above requirements, depending of the programming tool available with the SRECS.

NOTE 2 It is recommended to apply pre-certified software modules (e.g. emergency stop) if available.

Verification: Verification has to be carried out against the specification(s) by checking the relevant drawings and/or circuits diagrams, calculation and inspection of the machine.

G.2.2.3 Validation

A SRECS shall be validated to ensure that the specified machine safety function performance is achieved. This validation shall show that all parts interact correct to perform the safety function and that unintended functions do not occur.



Validation of the SRECS shall be according to EN ISO 13849-2:2003, e.g. by checking the relevant drawings and/or diagrams, flow charts, simulation of faults, inspection, measurement, confirmation from the component manufacturers and functional testing of the machine.

NOTE Validation includes the use of testing and analysis techniques (e.g. static, dynamic or failure analysis). These analysis techniques may be used to reduce the number of test cases.



Annex H (normative)

Braking tests

H.1 Conditions for all tests

- a) The spindle unit shall be set in accordance with the intended use of the machine according to the manufacturers instructions (e.g. belt tension) (see 6.3).
- b) Before beginning the test the spindle unit shall be running for at least 15 min at idle speed.
- c) Verify that the actual spindle speed is the intended speed $\pm 10\%$.

H.2 Unbraked run-down time

The unbraked run-down time shall be measured as follows:

- a) start the cutterblock spindle drive motor and run at the intended speed (no load) for 1 min;
- b) cut power to the cutterblock spindle drive motor and measure the unbraked run-down time;
- c) repeat steps a) and b) twice more.

The unbraked run-down time is the average of the 3 measurements taken.

H.3 Braked run-down time

The braked run-down time shall be measured as follows:

- a) start the cutterblock spindle drive motor and run at the intended speed (no load) for 1 min;
- b) initiate the cutterblock spindle drive motor stop and measure the braked run-down time;
- c) allow the spindle to remain stationary for 1 min;
- d) re-start the cutterblock spindle drive motor and run under no load for 1 min;
- e) repeat steps b) to d) nine more times.

The braked run-down time is the average of the ten measurements taken.



Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Machinery Directive 98/37/EC, amended by Directive 98/79/EC.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard (except Annex G, 6.3 h indent 2 to 4) confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 – Correspondence between this European Standard and Directive 98/37/EC

Clause(s)/subclause(s) of this EN	Essential Requirements (ERs) of Directive 98/37/EC
	1.1.2 Principles of safety integration
5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 5.2.7, 5.4.10, 6.3	a) fitted for its function
Clause 5, 6	b) eliminate the risks, give measures, inform
Clause 5, 6	c) use
5.4.5	d) ergonomics
5.4.5, 6.3	e) constraint in use
5.3.1, 6.3	f) equipment
5.3.2, 5.4.3	1.1.3 Materials and products
6.3	1.1.4 Lighting
5.2.2, 5.3.6, 5.4.5	1.1.5 Design of machinery to facilitate its handling
5.2.1, 5.2.7, 5.2.6, 5.4.10	1.2.1 Safety and reliability of control systems
5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.3.6, 5.3.7, 5.4.5, 6.3	1.2.2 Control devices

5.2.2, 5.2.3	1.2.3 Starting
5.2.4, 5.2.5	1.2.4 Stopping device (normal stopping – emergency stop – complex installations)
5.2.7	1.2.6 Failure of the power supply
5.2.1 – 5.2.8	1.2.7 Failure of the control circuit
6.3, Annex G	1.2.8 Software
5.3.1	1.3.1 Stability
5.3.2, 5.3.9, 6.3	1.3.2 Risk of break-up during operation
5.3.3, 5.3.7, 5.3.10	1.3.3 Risks due to falling or ejected objects
5.1	1.3.4 Risk due to surfaces, edges or angles
5.2.6	1.3.5 Risks related to combined machinery
5.2.7, 5.3.7	1.3.7 Prevention of risks related to moving parts
5.3.7	1.3.8 Choice of protection against risks related to moving parts (A moving transmission parts – B moving parts directly involved in the process)
5.3.7, 5.3.9	1.4.1 General requirements
5.3.7, 5.3.9	1.4.2.1 Fixed guards
5.3.7, 5.3.9	1.4.2.2 Movable guards (type A – type B)
5.3.7	1.4.2.3 Adjustable guards restricting access
5.2.7, 5.4.4	1.5.1 Electricity supply
5.4.6, 5.4.7	1.5.3 Energy supply other than electricity
6.3	1.5.4 Errors of fitting
5.4.1	1.5.6 Fire
5.4.2	1.5.8 Noise



5.4.8	1.5.11 External radiation
5.4.3	1.5.13 Emission of dust, gases etc.
5.4.11	1.6.1 Machinery maintenance
5.2.2, 5.3.7, 5.4.10	1.6.2 Access to operating position and servicing
5.4.4 – 5.4.9	1.6.3 Isolation of energy sources
5.2.2, 5.3.7, 5.4.5, 5.4.10, 6.3	1.6.4 Operator intervention
5.4.3, 6.3	1.6.5 Cleaning of internal parts
5.4.5, 6.3	1.7.0 Information devices
6.1	1.7.1 Warning devices
6.3	1.7.2 Warning of residual risks
6.2	1.7.3 Marking
6.3	1.7.4 instructions
	2.3 Machinery for working wood and analogous materials
5.3.6	a) guiding
5.3.5	b) ejection
5.3.4	c) brake

WARNING: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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