



NSAI
Standards

Irish Standard
I.S. EN 1870-4:2012

Safety of woodworking machines - Circular sawing machines - Part 4: Multiblade rip sawing machines with manual loading and/or unloading

I.S. EN 1870-4:2012

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English Version

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

Sécurité des machines pour le travail du bois - Machines à
scies circulaires - Partie 4: Scies circulaires à délogner
multilames à chargement et/ou déchargement manuel

Sicherheit von Holzbearbeitungsmaschinen -
Kreissägemaschinen - Teil 4:
Mehrablattrissägemaschinen für Längsschnitt mit
Handbeschickung und/oder Handentnahme

This European Standard was approved by CEN on 21 January 2012.

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Foreword

This document (EN 1870-4:2012) 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of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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

This document supersedes EN 1870-4:2001+A1:2009.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the Machinery Directive.

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

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

EN 1870 *Safety of woodworking machines — Circular sawing machines* consists of the following parts:

- *Part 1: Circular saw benches (with and without sliding table), dimension saws and building site saws;*
- *Part 3: Down cutting cross-cut saws and dual purpose down cutting cross-cut saws/circular saw benches;*
- *Part 4: Multi-blade rip sawing machines with manual loading and/or unloading;*
- *Part 5: Circular saw benches/up-cutting cross-cut sawing machines;*
- *Part 6: Circular sawing machines for firewood and dual purpose circular sawing machines for firewood/circular saw benches, with manual loading and/or unloading;*
- *Part 7: Single blade log sawing machines with integrated feed table and manual loading and/or unloading;*
- *Part 8: Single blade edging circular rip sawing machines with power driven saw unit and manual loading and/or unloading;*
- *Part 9: Double blade circular sawing machines for cross-cutting with integrated feed and with manual loading and/or unloading;*
- *Part 10: Single blade automatic and semi-automatic up-cutting cross-cut sawing machines;*
- *Part 11: Semi-automatic and automatic horizontal cross-cut sawing machines with one saw unit (radial arm saws);*
- *Part 12: Pendulum cross-cut sawing machines;*
- *Part 13: Horizontal beam panel sawing machines;*
- *Part 14: Vertical panel sawing machines;*

- *Part 15: Multi-blade cross-cut sawing machines with integrated feed of the workpiece and manual loading and/or unloading;*
- *Part 16: Double mitre sawing machines for V-cutting;*
- *Part 17: Manual horizontal cutting cross-cut sawing machines with one saw unit (manual radial arm saws);*
- *Part 18: Dimension saws;*
- *Part 19: Circular saw benches (with and without sliding table) and building site saws.*

The European Standards produced by CEN/TC142 are particular to woodworking machines and complement the relevant A and B Standards on the subject of general safety (see introduction of EN ISO 12100:2010 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, Croatia, 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, Turkey 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 defined in EN ISO 12100:2010.

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 multi-blade rip sawing machines. They are also useful for designers.

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

Common requirements for tooling are given in EN 847-1:2005+A1:2007.

1 Scope

This document deals with all significant hazards, hazardous situations and events as listed in Clause 4 which are relevant to stationary multi-blade rip sawing machines, hereinafter referred to as “machines”, designed to cut solid wood, chipboard, fibreboard, plywood and also these materials, if they are covered with plastic edging and/or plastic/light alloy laminates, when they are used as intended and under the conditions foreseen by the manufacturer including reasonably foreseeable misuse; see also 6.3.

This document does not apply to machines with vertical roller feed or vertical chain conveyor feed or machines designed to make the first rip cut on a log.

This document does not deal with any hazards relating to the combination of single machines with any other machine as part of a line.

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

NOTE Machines covered by this document are listed under 1.3 of the Machinery Directive.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 847-1:2005+A1:2007, *Tools for woodworking — Safety requirements — Part 1: Milling tools, circular saw blades*

EN 894-1:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-2:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3:2000+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 1005-1:2001+A1:2008, *Safety of machinery — Human physical performance — Part 1: Terms and definitions*

EN 1005-2:2003+A1:2008, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 1005-3:2002+A1:2008, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1005-4:2005+A1:2008, *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*

EN 1037:1995+A1:2008, *Safety of machinery — Prevention of unexpected start-up*

EN 1049-2:1993, *Textiles — Woven fabrics — Construction — Methods of analysis — Part 2: Determination of number of threads per unit length (ISO 7211-2:1984 modified)*

EN 1870-4:2012 (E)

EN 1088:1995+A2:2008, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1760-2:2001+A1:2009, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars*

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 60439-1:1999¹⁾, *Low-voltage switchgear and controlgear assemblies — Part 1: Type-tested and partially type-tested assemblies (IEC 60439-1:1999)*

EN 60529:1991²⁾, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60825-1:2007, *Safety of laser products — Part 1: Equipment classification and requirements (IEC 60825-1:2007)*

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

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

EN 61800-5-2:2007, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional (IEC 61800-5-2:2007)*

EN ISO 1421:1998, *Rubber- or plastics-coated fabrics — Determination of tensile strength and elongation at break (ISO 1421:1998)*

EN ISO 2060:1995, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method (ISO 2060:1994)*

EN ISO 2286-2:1998, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 2: Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate (ISO 2286-2:1998)*

EN ISO 3743-1:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small moveable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room (ISO 3743-1:2010)*

EN ISO 3743-2:2009, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering methods for small, moveable sources in reverberant fields — Part 2: Methods for special reverberation test rooms (ISO 3743-2:1994)*

1) EN 60439-1:1999 is impacted by EN 60439-1:1999/A1:2004.

2) EN 60529:1991 is impacted by EN 60529:1991/A1:2000.

EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 3745:2009, *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 3746:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

EN ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

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

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 9614-1:2009, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points (ISO 9614-1:1993)*

EN ISO 11202:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11204:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

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

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

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

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

ISO 4649:2010, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

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

3 Terms and definitions

3.1 General

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

3.2.5

loading the machine

manual or automatic placing of the workpiece onto a carriage, magazine, lift, hopper, moveable bed, conveyor or the presentation of the workpiece to an integrated feed device

3.2.6

ejection

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

3.2.7

kickback

particular form of ejection describing the unexpected movement of the workpiece or divided parts of it (or parts of the machine) opposite to the direction of feed during processing

Note 1 to entry The words in brackets are not applicable to the machine covered by this document.

3.2.8

anti-kickback fingers

moveable elements at the infeed or the outfeed of the machine to prevent kickback of the workpiece or divided parts of it

3.2.9

anti-splinter fingers

moveable elements at the infeed of the machine to prevent the ejection of splinters

3.2.10

run-up time

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

3.2.11

run-down time

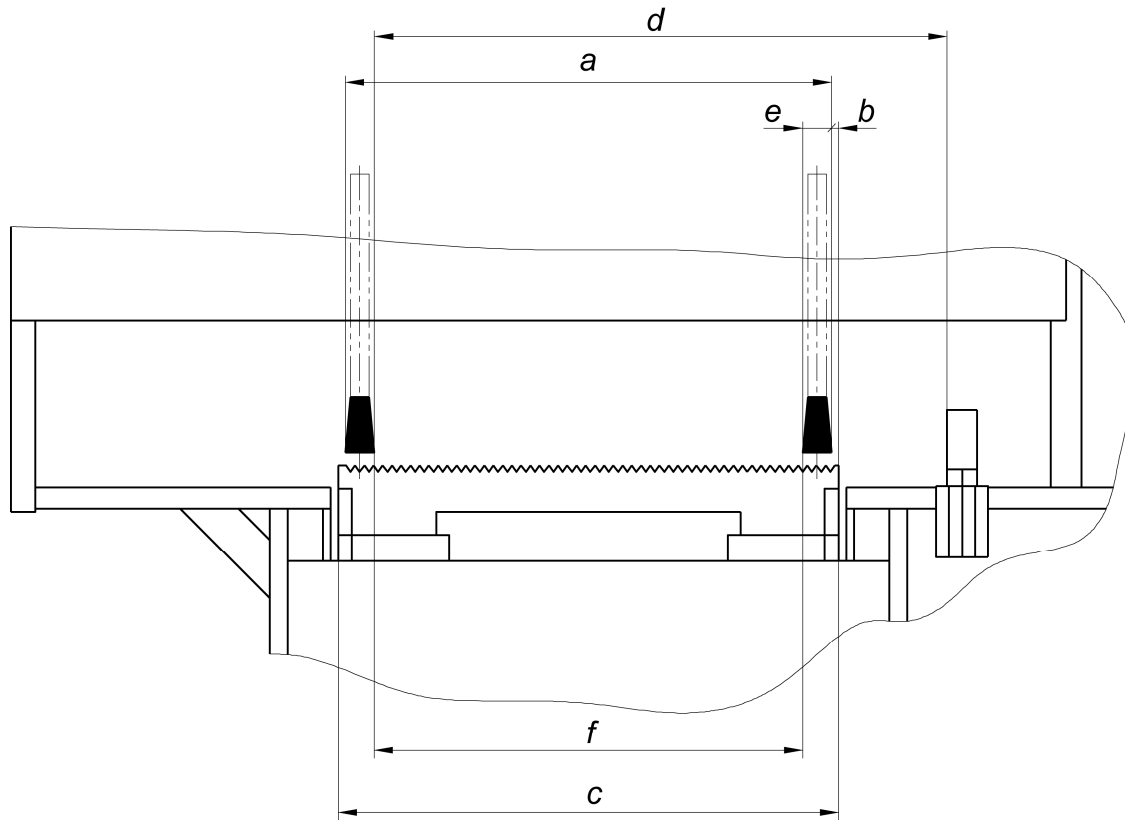
time elapsed from the actuation of the stop control device up to spindle standstill

3.2.12

cutting width capacity

maximum distance between external cutting surfaces of the two outside saw blades mounted at extreme positions on the saw spindle

Note 1 to entry See Figure 2, f.

**Key**

- a maximum distance between the two outer cutting planes of the outside saw blades
- b distance between the inner surface of the outside saw blade and the lateral limitation given by the feed system
- c width of the workpiece conveyor
- d maximum distance between saw blade and fence
- e cutting width of the saw blade
- f cutting width capacity, distance between the inner cutting planes of the outside saw-blades

Figure 2 — Cutting width capacity**3.2.13****manual loading of power fed machines**

where the workpiece is presented by the operator directly to the machine integrated feed, e.g. rotating feed rollers, chain conveyor or chain bed; i.e. for which there is no intermediate loading device to receive and transfer the workpiece from the operator to the integrated feed

3.2.14**manual unloading of power fed machines**

where the workpiece is removed by the operator directly from the machine outfeed, i.e. for which there is no intermediate unloading device to receive and transfer the workpiece from the machine outfeed to the operator

3.2.15**information of the supplier**

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

3.2.16**safety programmable logic controller (PLC)**

programmable logic controller dedicated to safety related application designed in the required PL according to EN ISO 13849-1:2008

3.2.17

safety related part of the control system (SRP/CS)

part of a control system that responds to safety-related input signals and generate safety-related output signals (EN ISO 13849-1:2008, 3.1.1)

3.2.18

Safety-related embedded software (SRESW)

firmware

system software

software that is part of the system supplied by the control manufacturer and is not accessible for modification by the user of the machine (EN ISO 13849-1:2008, 3.1.37)

Note 1 to entry Embedded software is usually written in full variability language (FVL) defined in 3.1.35 of EN ISO 13849-1:2008.

Note 2 to entry For example the operating system of a speed monitoring device.

3.2.19

safety-related application software (SRASW)

software specific to the application, that is implemented by the machine manufacturer, generally containing logic sequences, limits and expressions that control the appropriate inputs, outputs, calculations and decisions necessary to meet SRP/CS requirements (EN ISO 13849-1:2008, 3.1.36)

3.2.20

performance level PL

discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions (EN ISO 13849-1:2008, 3.1.23)

4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events (see EN ISO 12100:2010), 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 Tables 1.

Table 1 — List of significant hazards

No	Hazards, hazardous situations and hazardous events	EN ISO 12100:2010	Relevant sub-clause of this document
1	Mechanical hazards related to: - machine parts or workpieces:		
	a) shape;	6.2.2.1, 6.2.2.2, 6.3	5.3.2, 5.3.3, 5.3.5, 5.3.7, Annex A
	b) relative location;		5.2.2, 5.2.5, 5.2.10, 5.3.5, 5.3.7, 5.4.5
	c) mass and stability (potential energy of elements which may move under the effect of gravity)		5.2.7
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion);		5.2.8, 5.2.9, 5.3.5, 5.3.6
	e) mechanical strength.		5.3.2, 5.3.5
	- accumulation of energy inside the machinery:		
	f) liquids and gases under pressure;	6.2.10, 6.3.5.4	5.3.5.2, 5.4.7, 5.4.8
1.1	Crushing hazard		5.3.6, 5.3.7.2, 5.3.7.3
1.2	Shearing hazard		5.3.6, 5.3.7
1.3	Cutting or severing hazard		5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.3.7
1.4	Entanglement hazard		5.3.6, 5.3.7
1.5	Drawing-in or trapping hazard		5.3.6, 5.3.7
1.6	Impact hazard		5.3.2, 5.3.5
1.7	Stabbing and puncture hazard		5.3.2, 5.3.5
1.9	High pressure fluid injection or ejection hazard		6.2.10
2	Electrical hazards due to:		

2.1	Contact of persons with live parts (direct contact)	6.2.9, 6.3.5.4	5.4.4
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	6.2.9	5.4.4
2.4	Electrostatic phenomena	6.2.9	5.4.10
4	Hazards generated by noise , resulting in:		
4.1	Hearing loss (deafness), other physiological disorders (loss of balance, loss of awareness)	6.2.2.2, 6.3	5.4.2
4.2	Interference with speech communication, acoustic signals.		6.3
6	Hazards generated by radiation		
6.5	Lasers		5.4.9
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	6.2.3, 6.2.4	5.4.3, 6.3
7.2	Fire hazard	6.2.4	5.4.1
8	Hazards generated by neglecting ergonomic principles in machinery design related to:		
8.1	Unhealthy postures or excessive effort	6.2.7, 6.2.8, 6.2.11.12, 6.3.5.5, 6.3.5.6	5.2.2, 5.4.5
8.2	Hand-arm or foot-leg anatomy	6.2.8	5.2.2, 5.4.5
8.4	Local lighting	6.2.8	6.3
8.5	Mental overload and underload, stress	6.2.8	6.3
8.6	Human error, human behaviour	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	5.2.1, 5.4.5, 6.3
8.7	Design, location or identification of manual controls	6.2.8.f, 6.2.11.8	5.2.2, 5.4.5
8.8	Design or location of visual display units	6.2.8, 6.4.2	5.2.2, 5.4.5
10	Unexpected start up, unexpected overrun/overspeed (or any similar malfunction) from:		
10.1	Failure/disorder of the control system	6.2.11, 6.3.5.4	5.2.1, 5.2.11, 5.4.13

10.2	Restoration of energy supply after an interruption	6.2.11.4	5.2.10, 5.4.6, 5.4.7
10.3	External influences on electrical equipment	6.2.11.11	5.2.1, 5.4.8
10.5	Errors in the software	6.2.11.7	5.2.1
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	5.4.5, 6.3
11	Impossibility of stopping the machine in the best possible conditions	6.2.11.1, 6.2.11.3, 6.3.5.2	5.2.2, 5.2.4, 5.2.5
12	Variations in the rotational speed of tools	6.2.2.2, 6.2.3	5.2.9
13	Failure of the power supply	6.2.11.1, 6.2.11.4	5.2.10
14	Failure of the control circuit	6.2.11, 6.3.5.4	5.2.11
15	Errors of fitting	6.2.7, 6.4.5	5.4.11
16	Break-up during operation	6.2.3	5.3.2
17	Falling or ejected objects or fluids	6.2.3, 6.2.10	5.3.5, Annex D
18	Loss of stability / overturning of machinery	6.3.2.6	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 12100:2010 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 6.2 of EN ISO 12100:2010, and for safeguarding measures, see 6.3 of EN ISO 12100:2010.

5.2 Controls

5.2.1 Safety and reliability of control systems

5.2.1.1 General

5.2.1.1.1 Safety functions

For the purpose of this document safety-related parts of a control system (SRP/CS) start at the point where the safety-related input 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, for example, the main contacts of a contactor). For the implementation of any safety-related function the appropriate requirements of EN ISO 13849-1:2008 shall apply.

Safety-related parts of the control system of the machine are those concerning the functions listed in Table 2.

The design of the safety-related control system shall be such as to achieve the machine safety functions required in this document.

NOTE If monitoring systems are used for diagnostics, they are also considered as SRP/CS.

5.2.1.1.2 Performance level (PL)

For the safety-related parts of the control system (SRP/CS) with the functions listed in column 1 of Table 2 the minimum performance level (see EN ISO 13849-1:2008, 4.5) shall be in accordance with column 2 of Table 2.

Table 2 — Safety functions, Performance Levels (PL)

Function	Performance level (PL)	Relevant Clause(s) of this document
starting	= c	5.2.3
prevention of unexpected start-up	= c	5.2.10, 5.2.11, 5.3.6
normal stopping	= c	5.2.4
emergency stop	= c	5.2.5
interlocking of guards for drives	= c	5.3.7.3
interlocking of guards for tools with guard locking	= c	5.3.7.1, 5.3.7.2, 5.3.7.3
interlocking of functions	= c	5.2.4, 5.2.7, 5.2.8, 5.3.4, 5.3.5.1, 5.3.6, 5.3.7
feed speed indication/detection	= c	5.2.9
zero speed detection	= c	5.3.7.1
in setting mode: initiation of powered saw blades axial adjustment for positioning the saw blades, feed roller height and pressure board/shoes	= c	5.2.7
mode selection	= c	5.2.6, 5.3.6
hold-to-run control	= c	5.2.7, 5.2.8
mechanical operated trip device	= c	5.3.7.2
braking system	= b or = c	5.3.4
empty machine detection	= c	5.2.7, 5.3.5.1.2, 5.3.7.1
workpiece clamping	= c	5.2.6, 5.2.7, 5.3.6

NOTE The average probability of a dangerous failure per hour for the different performance levels is described in Table 3 of EN ISO 13849-1:2008.

If on machines designed for different modes of operation the same SRP/CS is used for all safety functions in the different modes the SRP/CS shall meet the requirements of the highest PL of the different modes.

Where a combination of SRP/CS is used the overall PL identified according 6.3 of EN ISO 13849-1:2008 shall comply at least with the PL required in Table 2.

SRP/CS for which a special standard exists shall fulfil all requirements of this document.

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