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Woodworking machines — Safety —

Part 1: Common requirements

Machines à bois — Sécurité —

Partie 1: Exigences communes

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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 39, *Machine tools*, Subcommittee SC 4, *Woodworking machines*.

A list of all parts in the ISO 19085 series can be found on the ISO website.

Introduction

The ISO 19085 series of International Standards provides technical safety requirements for the design and construction of woodworking machinery. It concerns designers, manufacturers, suppliers and importers of the machines specified in the Scope. It also includes a list of informative items that the manufacturer will need to give to the user.

This document is a type-C standard as stated in ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The full set of requirements for a particular type of woodworking machine are those given in the part of ISO 19085 applicable to that type, together with the relevant requirements from this document, to the extent specified in the Scope of the applicable part of ISO 19085.

For woodworking machines not covered by an applicable part, this document can be used as a guide. However, the designer will then need to perform a full risk assessment according to ISO 12100 and design the means for reducing the risks arising from relevant hazards.

As far as possible, in parts of ISO 19085 other than this document, safety requirements have been treated by way of reference to the relevant sections of this document, to avoid repetition and reduce their length. The other parts contain replacements and additions to the common requirements given in this document.

NOTE Requirements for tools are given in EN 847-1:2013 and EN 847-2:2013.

Woodworking machines — Safety —

Part 1: Common requirements

1 Scope

This document gives the safety requirements and measures to reduce risks related to woodworking machines arising during operation, adjustment, maintenance, transport, assembly, dismantling, disabling and scrapping and which are common to machines used in the woodworking industry. It is applicable to woodworking, stationary and displaceable machines when they are used as intended and under the conditions foreseen by the manufacturer.

NOTE 1 For relevant but not significant hazards, e.g. sharp edges of the machine frame, see ISO 12100:2010.

It is intended to be used in conjunction with the other parts of ISO 19085, applicable to specific machine types.

It is not applicable to machines intended for use in potential explosive atmospheres or to machines manufactured prior to the date of its publication.

NOTE 2 Machines for capturing and extracting dust are covered by EN 12779 and EN 16770.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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

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

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

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

ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning*

ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

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

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13851:2002, *Safety of machinery — Two-hand control devices — Functional aspects and design principles*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors*

ISO 13856-2:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars*

ISO 13856-3:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices*

ISO 14118:2000, *Safety of machinery — Prevention of unexpected start-up*

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

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

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

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60529:2013, *Degrees of protection provided by enclosures (IP Code)*

IEC 60825-1:2014, *Safety of laser products — Part 1: Equipment classification and requirements*

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

IEC 61439-1:2011, *Low-voltage switchgear and controlgear assemblies — Part 1: General rules*

IEC 61496-1:2012, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests. Corrected by Cor. 1:2015.*

IEC 61496-2:2013, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*

IEC 61496-3:2008, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*

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

IEC 62477-1:2016, *Safety requirements for power electronic converter systems and equipment — Part 1: General*

EN 847-1:2013, *Tools for woodworking — Safety requirements — Part 1: Milling tools, circular saw blades*

EN 847-2:2013, *Tools for woodworking — Safety requirements — Part 2: Requirements for the shank of shank mounted milling tools*

EN 847-3:2013, *Tools for woodworking — Safety requirements — Part 3: Clamping devices*

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 50525-2-21:2011, *Electric cables — Low voltage energy cables of rated voltages up to and including 450/750 V (U0/U) — Part 2-21: Cables for general applications — Flexible cables with crosslinked elastomeric insulation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 13849-1:2015 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
woodworking machine
machine designed to machine and/or process wood and material with similar physical characteristics to wood

3.2
material with similar physical characteristics to wood
wood-based material such as chipboard, fibreboard and plywood, including when covered with plastic or light alloy laminates/edges, as well as cork, bone, rigid rubber or plastics

Note 1 to entry: Examples for plastics are thermoplastic materials and thermoplastic resins, thermosetting resins, expanded plastic materials, polyurethane, phenol and polyvinylchloride (PVC).

3.3
easily machinable material
material, which, upon unexpected contact with a running tool, will not mechanically generate sparks and will not result in a damage of the tool

EXAMPLE Material with similar physical characteristics to wood or light alloy.

3.4
stationary machine
machine designed to be located on or fixed to the floor or other parts of the structure of the premises

3.5
displaceable machine
machine, stationary during use and equipped with a device, e.g. wheels, which allows it to be moved between locations

3.6
drive
machine actuator
power mechanism used to effect motion on the machine

3.7
run-up time
time elapsed from the actuation of the start control device until the spindle or machine part reaches the intended speed

3.8
run-down time
time elapsed from the actuation of the stop control device up to spindle or machine part standstill

3.9
automatic machine
machine, which, after initiation of start by the operator, is capable of running and/or autonomously repeating machining cycles, whereby the work-piece may be manually loaded and/or unloaded

3.10
cutting area
area where the tools can be involved in the cutting process

3.11
non-cutting area
area where the tools are not involved in the cutting process

3.12
feed
relative movement between work-piece and tools during machining

3.13
hand feed
manual feed
manual holding and/or guiding of the work-piece or machine element with incorporated tool during machining

Note 1 to entry: Hand feed includes the use of a hand-operated support on which the work-piece is placed manually or clamped and the use of a *demountable power feed unit* (3.15).

3.14
integrated feed
mechanical feed
feed (3.12) mechanism for the work-piece or tool which is integrated with the machine and where the work-piece or machine element with incorporated tool is held and controlled mechanically during the machining operation

3.15
demountable power feed unit
power *feed* (3.12) 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

3.16
climb cutting
cutting where the projection of the movement of the cutting knife in direction of the *feed* (3.12) movement shows in the same direction as the relative movement of the work-piece against the tool

Note 1 to entry: See Figure 1 a).

3.17
cutting against the feed
cutting where the projection of the movement of the cutting knife in direction of the *feed* (3.12) movement shows in the opposite direction as the relative movement of the work-piece against the tool

Note 1 to entry: See Figure 1 b).

3.18
boring tool
tool whose *feed* (3.12) movement during machining is only in direction of its axis of rotation

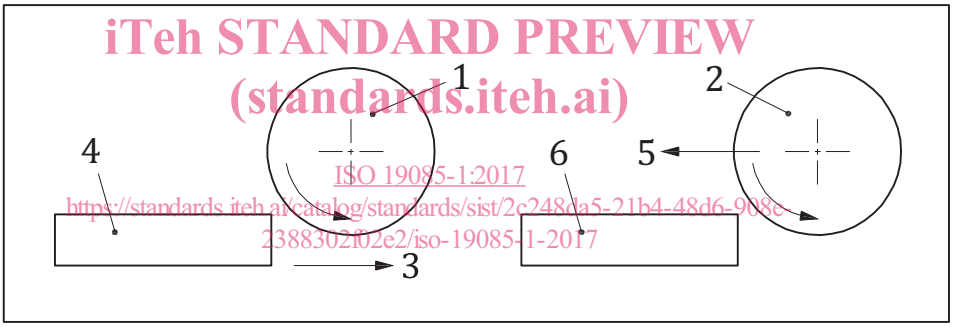
3.19
scoring
pre-cutting of a surface with a tool

3.20
scoring saw blade
saw blade mounted in front of the main saw blade which is used for *scoring* (3.19)

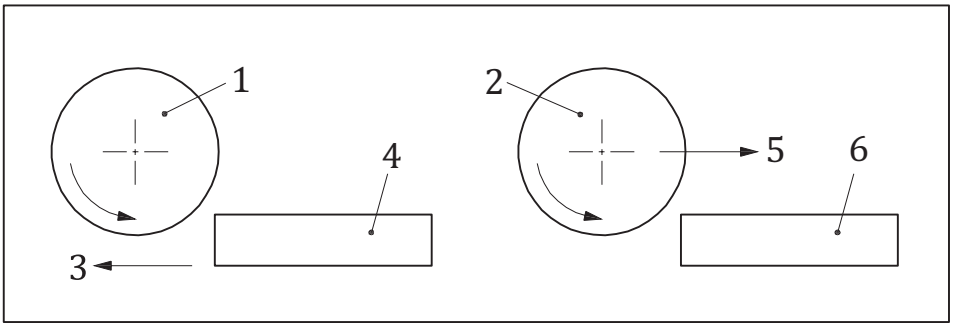
3.21
sanding wheel
tool where the active part is made of coated abrasive

3.22
grinding wheel
tool where the active part is made of bounded abrasive

3.23
ejection
uncontrolled movement of the work-piece or parts of it or part of the tool from the machine during processing



a) Climb cutting



b) Cutting against the feed

Key

1	tool, fixed axis	4	work-piece (moving)
2	tool, moving axis	5	feed direction (tool)
3	feed direction (work-piece)	6	work-piece (fixed)

Figure 1 — Climb cutting and cutting against the feed

3.24
kickback
particular form of *ejection* (3.23) describing the unexpected movement of the work-piece or parts of it opposite to the direction of *feed* (3.12) during processing

3.25
anti-kickback device
device which either reduces the possibility of *kickback* (3.24) or arrests the motion during kickback of the work-piece or parts of it

3.26
operational stop
stop for operational reasons without cutting off the energy supply to the actuators where the stop condition is monitored and maintained

3.27
electro-sensitive protective equipment
ESPE
assembly of devices and/or components working together for protective tripping or presence-sensing purposes, and comprising at a minimum:

— a sensing device,

— controlling/monitoring devices,

— output signal switching devices

[SOURCE: ISO 13855:2010, 3.1.4, modified — The abbreviation and Notes to entry have been added.]

Note 1 to entry: Safety-related control systems associated with the ESPE or the ESPE itself may include a secondary switching device, muting functions, stopping performance monitor, start/re-start interlock, etc.

Note 2 to entry: Examples are light beam (AOPD), laser scanner (AOPDDR), capacitive, active infrared, ultra-sonic and image monitoring equipment.

3.28
pressure-sensitive protective equipment
PSPE
assembly of devices and components triggered using the “mechanical activated trip” method to provide protection under hazardous situations

Note 1 to entry: Examples of PSPE are pressure-sensitive mats and floors, bumpers, pressure-sensitive edges and bars.

Note 2 to entry: PSPE generate a stopping signal by the use of different techniques, e.g. mechanical contacts, fibre-optic sensors, pneumatic sensors.

[SOURCE: ISO 13482:2014, 3.30]

4 List of significant hazards

This clause contains the correlation between hazards, their origin and potential consequences common to woodworking machines, as defined in the Scope and the relevant clauses of this document, to be taken into consideration during risk assessment. The extent to which all significant hazards are covered is indicated in the relevant specific parts of ISO 19085.

These hazards are listed in Table 1 as a guide for the full risk analysis to be performed when an applicable part of ISO 19085 does not exist.

Table 1 — List of significant hazards

No.	Type or group	Examples of hazards		ISO 12100:2010	Relevant section of ISO 19085-1:2017
		Origin[a]	Potential consequences[b]		
1	**Mechanical hazards**	Acceleration, deceleration (kinetic energy)	Being thrown	6.2.2.1	5.1
			Crushing	6.2.2.2	6.1
		Angular parts	Cutting or severing	6.2.10	6.2
		Approach of a moving element to a fixed part	Drawing-in or trapping	6.3	6.3
			Entanglement	6.3.5.4	6.4
		Cutting parts	Friction or abrasion		6.5
		Elastic elements	Impact		6.6
		Falling objects	Injection		6.7
		Gravity (stored energy)	Shearing		6.8
		Height from the ground	Stabbing or puncture		6.9
		High pressure			6.10
		Machinery mobility			7.8
		Moving elements			7.12
		Rotating elements			7.7
		Rough, slippery surface			7.13
		Stability			7.14
		Vacuum			
2	**Electrical hazards**	Arc	Burn	6.2.9	7.4
		Electromagnetic phenomena	Chemical effects	6.3.5.4	7.11
			Effects on medical implants		7.13
		Electrostatic phenomena			
		Live parts	Electrocution		
		Not enough distance to live parts under high voltage	Falling, being thrown		
			Fire		
		Overload	Projection of molten particles		
		Parts which have become live under fault conditions	Shock		
		Short-circuit			
		Thermal radiation			
3	**Thermal hazards**	Fire	Burn		7.1
		Flame	Dehydration		7.3
		Objects or materials with a high or low temperature	Discomfort		7.4
			Injuries by the radiation of heat sources		
		Radiation from heat sources			
			Scald		

[a] One origin of hazards can have several potential consequences.

[b] For each type or group of hazard, some potential consequences can be related with several origins of hazards.

Table 1 *(continued)*

No.	Type or group	Examples of hazards		ISO 12100:2010	Relevant section of ISO 19085-1:2017
		Origin[a]	Potential consequences[b]		
4	**Noise hazards**	Exhausting system	Discomfort	6.2.2.2	5.4.2
		Gas leaking at high speed	Loss of balance	6.2.3 c)	8.3
		Manufacturing process (stamping, cutting, etc.)	Permanent hearing loss	6.2.4 c)	
			Stress	6.2.8 c)	
		Moving parts	Tinnitus	6.3.1	
		Scraping surfaces	Tiredness	6.3.2.1 b)	
		Unbalanced rotating parts	Accidents (e.g. mechanical, electrical) as a consequence of an interference with speech communication or with acoustic signals	6.3.2.5.1	
		Whistling pneumatics		6.3.3.2.1	
		Worn parts		6.3.4.2	
		Rotating tools		6.4.3	
				6.4.5.1 b) and c)	
5	**Radiation hazards**	Ionising radiation source	Burn		7.10
		Low frequency electromagnetic radiation	Damage to eyes and skin		
		Optical radiation (infrared, visible and ultraviolet), including laser	Effects on reproductive capability		
		Radio frequency electromagnetic radiation	Genetic mutation		
			Headache, insomnia, etc.		
6	**Material/ substance hazards**	Aerosol	Breathing difficulties, suffocation	6.2.3	7.3
		Biological and microbiological (viral or bacterial) agent	Cancer	6.2.4	7.8
			Corrosion		
		Dust	Effects on reproductive capability		
		Fibre			
		Flammable	Fire		
		Fluid	Infection		
		Fume	Mutation		
		Oxidiser	Poisoning		
			Sensitisation		

[a] One origin of hazards can have several potential consequences.

[b] For each type or group of hazard, some potential consequences can be related with several origins of hazards.

Table 1 *(continued)*

No.	Type or group	Examples of hazards		ISO 12100:2010	Relevant section of ISO 19085-1:2017
		Origin[a]	Potential consequences[b]		
7	**Ergonomic hazards**	Access	Discomfort	6.2.7	5.2
		Design or location of indicators and visual displays units	Fatigue	6.2.8	7.5
			Musculoskeletal disorder	6.2.11.8	7.6
		Design, location or identification of control devices	Stress	6.2.11.12	7.14
			Any other (e.g. mechanical, electrical) as a consequence of human error	6.3.5.5	8.3
		Effort		6.3.5.6	
		Flicker, dazzling, shadow, stroboscopic effect			
		Local lighting			
		Mental overload/underload			
		Posture			
		Repetitive activity			
		Visibility			
8	**Hazards associated with environment in which the machine is used**	Dust	Burn	6.2.11	7.9
		Electromagnetic disturbance	Slight disease	6.2.11.4	
			Slipping, falling	6.2.11.7	
		Lightning	Suffocation	6.2.11.11	
		Moisture	Any other as a consequence of the effect caused by the sources of the hazards on the machine or parts of the machine	6.2.11.8	
		Pollution		6.2.11.10	
		Temperature		6.3.5.2	
		Water		6.3.5.4	
		Wind		6.4	

[a] One origin of hazards can have several potential consequences.

[b] For each type or group of hazard, some potential consequences can be related with several origins of hazards.

5 Safety requirements and measures for controls

5.1 Safety and reliability of control systems

For the design and implementation of any safety function, whether realized in electric, pneumatic, hydraulic or mechanic technology, the appropriate requirements of ISO 13849-1:2015 apply.

Machine safety functions are implemented and assured through safety-related parts of the control system (SRP/CS) that achieve a required performance level (PL_r). This requirement is given for each safety function in the relevant subclauses of Clause 5 and Clause 6.

Table A.1 summarizes PL_r for each safety function; however, the provisions of Clause 5 and Clause 6 remain the sole and complete normative set of requirements and explanations.

Other specific parts of ISO 19085 may introduce further safety functions not considered in this document or a PL_r different from that given in this document for the same safety function, depending on the risk assessment according to ISO 12100:2010. For machines for which no specific part of ISO 19085 exists, and where the risk assessment results in a PL_r higher than that of this document, the higher PL_r applies.