BRITISH STANDARD

BS EN
1870-6:2002
+A1:2009

Safety of woodworking machines — Circular 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

ICS 79.120.10

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 1870-6:2002+A1:2009. It supersedes BS EN 1870-6:2002 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by [A1] ⟨A1⟩.

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

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for their correct application.

Compliance with a British Standard cannot immunity from legal obligations.

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EN 1870-6:2002+A1

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Safety of woodworking machines - Circular 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

Sécurité des machines pour le travail du bois - Machines à scies circulaires - Partie 6: Scies circulaires à chevalet et/ou à table pour la coupe du bois de chauffage, avec chargement et/ou déchargement manuel

Sicherheit von Holzbearbeitungsmaschinen - Kreissägemaschinen - Teil 6: Brennholzkreissägemaschinen und kombinierte Brennholz- und Tischkreissägemaschinen, mit Handbeschickung und/oder Handentnahme

This European Standard was approved by CEN on 8 November 2001 and includes Amendment 1 approved by CEN on 13 August 2009.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Contents

Foreword

This document (EN 1870-6:2002+A1:2009) has been prepared by Technical Committee 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 March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

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

This document includes Amendment 1, approved by CEN on 2009-08-13.

This document supersedes EN 1870-6:2002.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟦A1⟩ ⟨A1⟧.

⟦A1⟩ This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the Machinery Directive.

For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟧

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

Annexes A, B, C, D, E, F and G are normative and ⟦A1⟩ Annexes ZA and ZB ⟨A1⟧ are informative.

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

⟦A1⟩ EN 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) A1

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

0 Introduction

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

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

The requirements of this European Standard concern designers, manufacturers, suppliers and importers of circular sawing machines for firewood and dual-purpose circular sawing machines for firewood/circular saw benches, with manual loading and/or unloading.

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

Common requirements for tooling are given in ⟩A1⟨ EN 847-1:2005 ⟩A1⟨.

1 Scope

⟩A1⟨ This document deals with all significant hazards, hazardous situations and events as listed in Clause 4 which are relevant to firewood and dual-purpose circular sawing machines for firewood/circular saw benches, with manual loading and/or unloading, hereinafter referred to as “machines”, designed to cut solid wood. ⟩A1⟨

On Combined circular sawing machines for firewood - Log splitting machines only the circular sawing machine for firewood is covered by this European Standard. For the requirements for the log splitting part of this machine see EN 609-1: 1999 and EN 609-2: 1999.

⟩A1⟨ *deleted text* ⟩A1⟨

For Computer Numerically Controlled (CNC) machines this European Standard does not cover hazards related to Electro-Magnetic Compatibility (EMC).

This European Standard does not apply to:

— log sawing machines where the saw unit moves to cut the workpiece;

— machines where the saw blade is capable of tilting;

— ⟩A1⟨ hand-held motor-operated electric tools or any adaptation permitting their use in a different mode, i.e. bench mounting; ⟩A1⟨

  ⟩A1⟨ NOTE 1 Hand-held motor-operated electric tools and saw benches to form an integrated whole with a hand-held motor-operated electric tools are covered by EN 60745-1:2006 together with EN 60745-2-5:2007. ⟩A1⟨

— machines driven by an internal combustion engine

This European Standard is primarily directed at machines which are manufactured after the date of issue of this European Standard.

⟩A1⟨ NOTE 2 ⟩A1⟨ Machines covered by this European Standard are listed under A.1.1 and/or A.1.2 of annex IV of the Machinery Directive

2 Normative references

[A1] 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. [A1]

[A1] *deleted text* [A1]

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

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

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

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

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

[A1] *deleted text* [A1]

EN 982, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

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

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

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

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

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

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

[A1] *deleted text* [A1]

[A1] 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* [A1]

[A1] EN 60204-1:2006 [A1], *Safety of machinery — Electrical equipment of machines — Part 1: General*

requirements [A1] *(IEC 60204-1:2005, modified)* [/A1]

[A1] EN 60439-1:1999, *Low-voltage switchgear and controlgear assemblies — Part 1: Type-tested and partially type-tested assemblies (IEC 60439-1:1999)* [/A1]

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

[A1] EN 60947-4-1:2001, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters (IEC 60947-4-1:2000)* [/A1]

[A1] EN 60947-5-1:2004, *Low voltage switchgear and control gear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:2003)* [/A1]

[A1] EN 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)* [/A1]

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

EN ISO 3743-2, [A1] *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 reverberation test rooms (ISO 3743-2:1994)* [/A1]

EN ISO 3744, *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)*

[A1] EN ISO 3745, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and semi-anechoic rooms (ISO 3745:2003)* [/A1]

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)*

[A1] EN ISO 4254-1:2005*, Agricultural machinery — Safety — Part 1: General requirements (ISO 4254-1:2005)* [/A1]

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

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

EN ISO 11202:1995, [A1] *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)* [/A1]

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

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

[A1] EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology and methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)* [/A1]

[A1] EN ISO 13849-1:2008, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2006)* [A1]

[A1] EN ISO 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)* [A1]

[A1] EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)* [A1]

[A1] *deleted text* [A1]

ISO 7960:1995, [A1] *Airborne noise emitted by machine tools — Operating conditions for woodworking machines* [A1]

[A1] HD 21.1 S4:2002, *Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation — Part 1: General requirements* [A1]

[A1] HD 22.1 S4:2002, *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation — Part 1: General requirements* [A1]

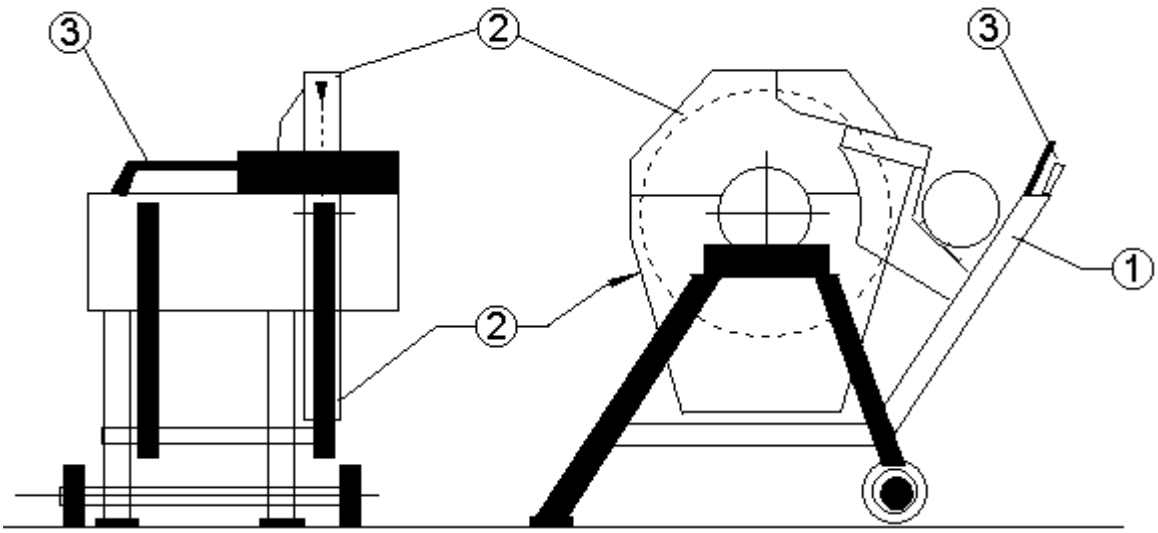
[A1] HD 22.4 S4:2004, *Cables of rated voltages up to and including 450/750 V and having crosslinked insulation — Part 4: Cords and flexible cables* [A1]

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

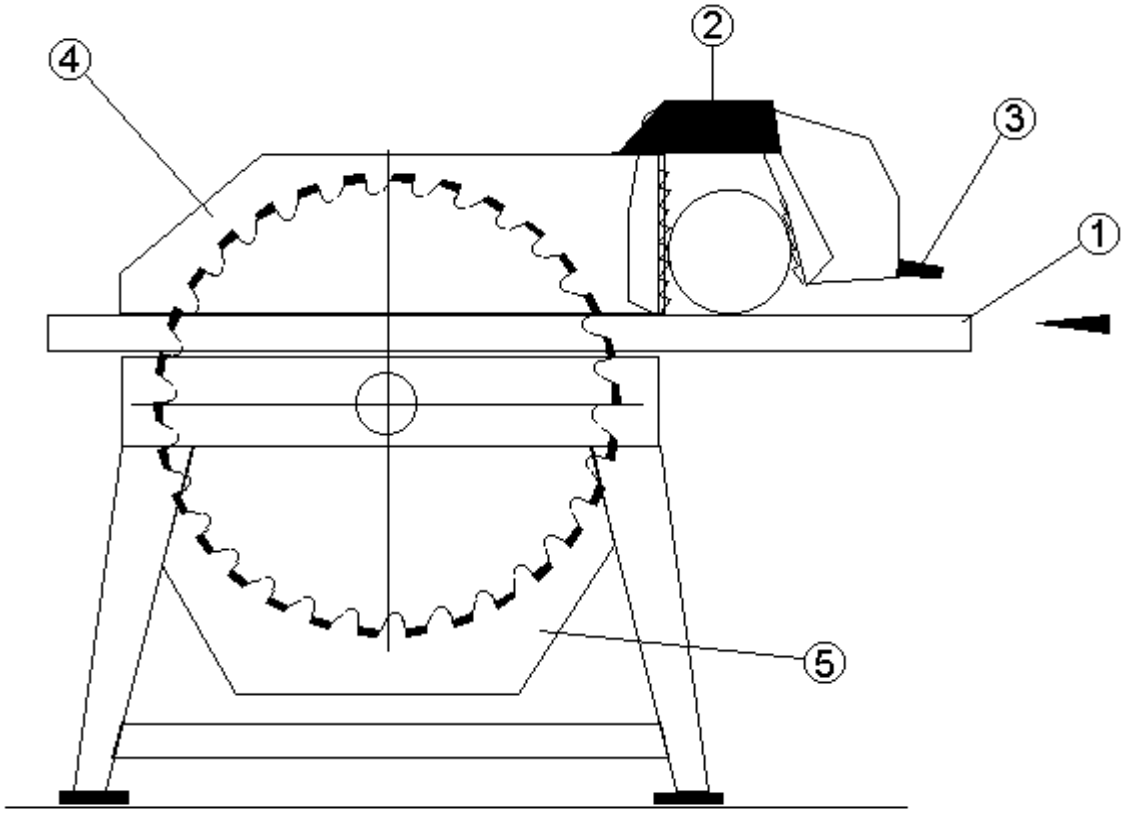
3.1 Terms

The different types of circular sawing machines for firewood and dual-purpose circular sawing machines for firewood/circular saw benches and there main parts of the machine are illustrated in the Figures 1, 2, 3 and 4.



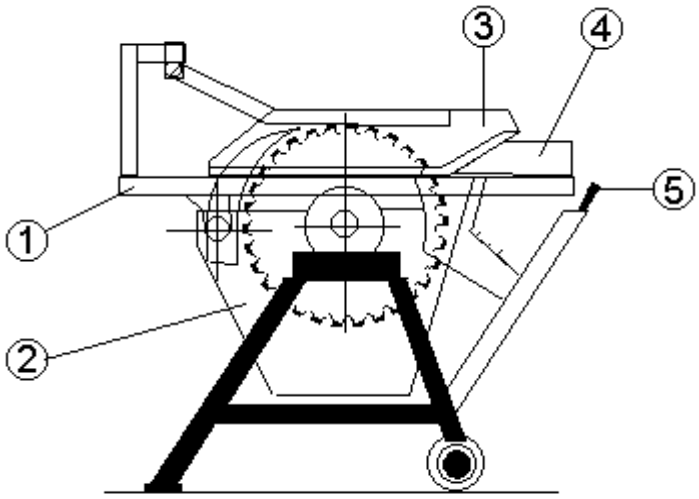
Key	1	Pivoting log carriage
	2	Saw blade guard
	3	Handle

Figure 1 — Example of a circular sawing machine for firewood with pivoting log carriage

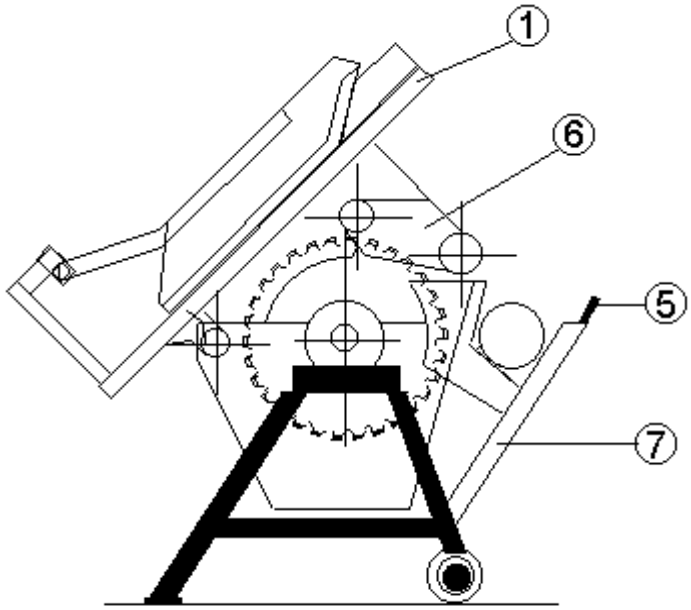


Key	1	Sliding table
	2	Workpiece holding device
	3	Operating handle
	4	Fixed guard above the table
	5	Fixed guard below the table

Figure 2 — Example of a circular sawing machine for firewood with sliding table



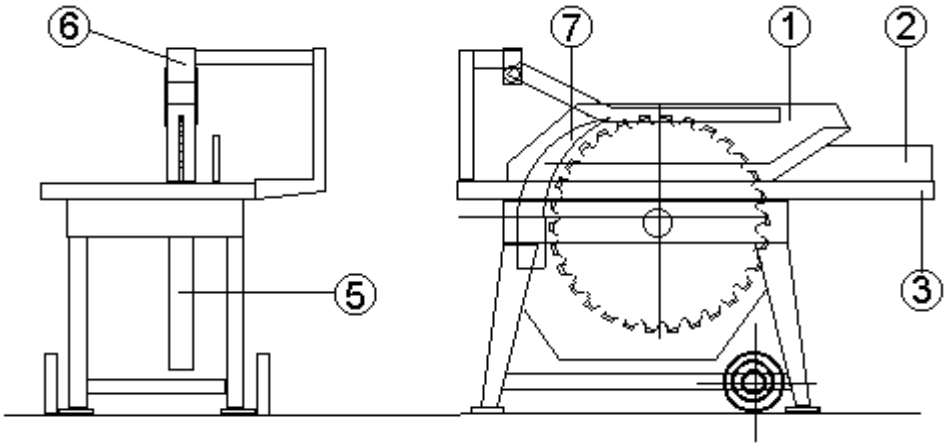
a) — Dual-purpose circular sawing machine for firewood/circular saw bench with pivoting log carriage in saw bench mode



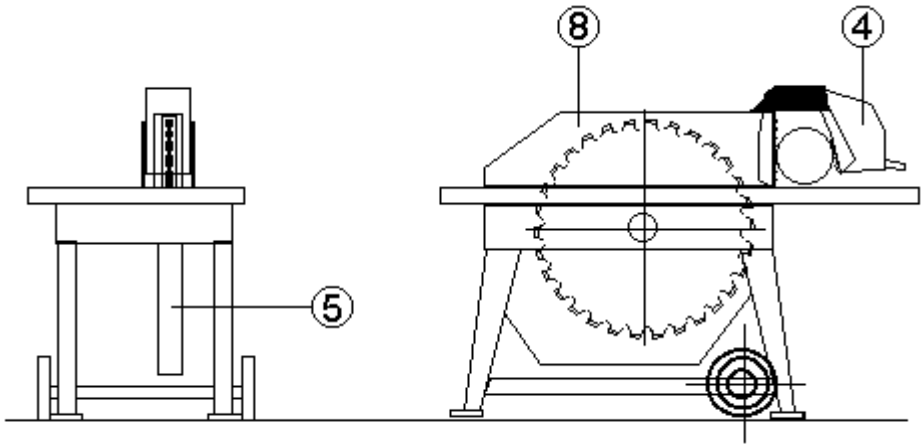
b) — Dual-purpose circular sawing machine for firewood/circular saw bench with pivoting log carriage in firewood sawing mode

Key	1	Tilting saw bench table
	2	Saw blade guard below the table
	3	Adjustable saw blade guard
	4	Rip fence
	5	Handle
	6	Saw blade guard – firewood cutting
	7	Pivoting log carriage

Figure 3 — Example of a dual-purpose circular sawing machine for firewood/circular saw bench with pivoting log carriage



a) — Dual-purpose circular sawing machine for firewood/circular saw bench with sliding table in saw bench mode



b) — Dual-purpose circular sawing machine for firewood/circular saw bench with sliding table in firewood sawing mode

Key	1	Adjustable saw blade guard
	2	Rip fence
	3	Saw bench table
	4	Workpiece holding device
	5	Saw blade guard with chip outlet
	6	Adjustable support for saw blade guard
	7	Riving knife
	8	Fixed saw blade guard – log sawing

Figure 4 — Example of a dual-purpose circular sawing machine for firewood/circular saw bench with sliding table

3.2 Definitions

3.2.1
cross-cutting
the operation of cutting across the grain of a wooden workpiece

3.2.2
circular sawing machine for firewood
a sawing machine for cross-cutting logs for firewood, with a single saw blade driven by either an electric motor or a Power Take Off (PTO) device and which has manual loading and/or unloading. The workpiece is moved manually to the saw blade either by:

a) a pivoting log carriage (circular sawing machine for firewood with pivoting log carriage - see Figure 1); or

b) a sliding table with a clamping device (circular sawing machine for firewood with sliding table - see Figure 2)

3.2.3
dual-purpose circular sawing machine for firewood/circular saw bench
a dual-purpose machine which is either:

a) a circular sawing machine for cross-cutting logs for firewood with a pivoting log carriage (see Figure 3b)); and a circular saw bench. When used as a circular sawing machine for firewood the saw bench table is tilted toward the rear of the machine (see Figure 3a)); or

b) a circular sawing machine for cross-cutting logs for firewood with sliding table (see Figure 4b)) and a circular saw bench. When used as a saw bench the sliding table is locked in position (see Figure 4a))

3.2.4
stationary machine
a 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

3.2.5
〈A1〉 displaceable machine 〈A1〉
a 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

3.2.6
machine actuator
a power mechanism used to effect motion of the machine

3.2.7
hand feed
the manual holding and/or manual guiding of the workpiece (or of a machine element incorporating a tool). Hand feed includes the use of a hand operated carriage on which the workpiece is placed manually or clamped, (and the use of a demountable power feed unit)

NOTE The words in brackets are not applicable to this machine.

3.2.8
safety appliance
an additional device which is not an integral part of the machine but which assists the operator in the safe feeding of the workpiece, e.g. see Figure 5

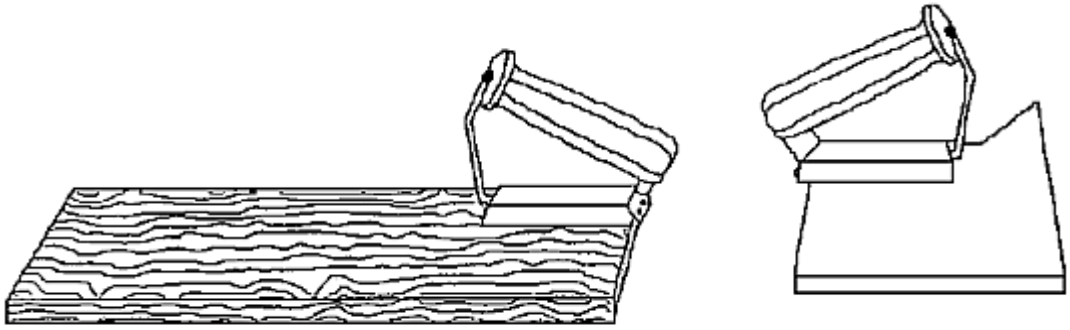


Figure 5b): Example of push block

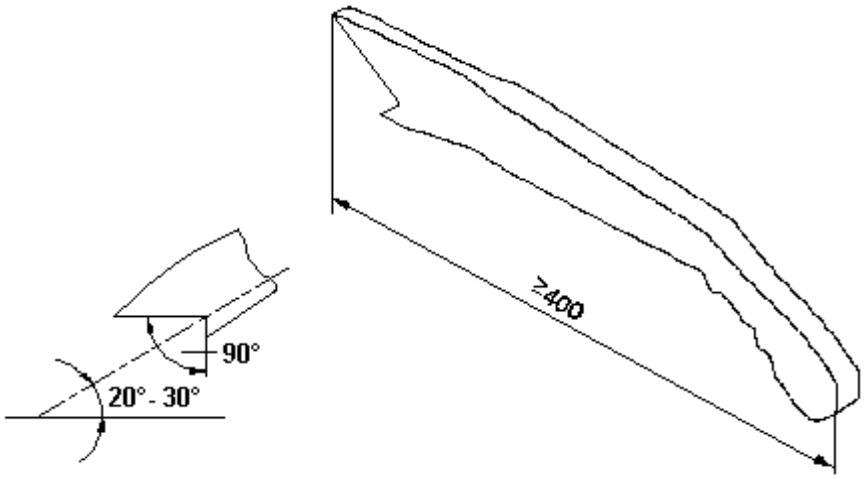


Figure 5a): Example of push stick

Figure 5 — Examples of a push stick and push block

3.2.9
ejection
the unexpected movement of the workpiece or parts of it or part of the machine from the machine during processing

3.2.10
run-down time
the time elapsed from the actuation of the stop control up to spindle standstill

3.2.11
〈A1〉 information from the supplier 〈A1〉
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

4 List of significant hazards

〈A1〉 This clause contains all significant hazards, hazardous situations and events (see EN 1050:1996) as far as they are dealt with in this document, identified by risk assessment as significant for the machines as defined in the scope and which require action to eliminate or reduce the risk. This document deals with these significant hazards by defining safety requirements and/or measures or by reference to relevant standards.

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

Table 1 — List of significant hazards

No	Hazards, hazardous situations and hazardous events	EN ISO 12100		Relevant sub-clause of this document
		Part 1: 2003	Part 2: 2003	
1	**Mechanical hazards** related to:			
	- machine parts or workpieces:			
	a) shape;	4.2	4.2.1, 4.2.2, 5	5.2.3, 5.2.5, 5.2.6, 5.2.7, 5.2.9
	b) relative location;			5.1.2, 5.2.5, 5.2.6, 5.2.7, 5.2.8
	c) mass and stability (potential energy of elements which may move under the effect of gravity)			5.2.6
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion);			5.2.6, 5.2.7
	e) mechanical strength.			5.2.1, 5.2.2, 5.2.3, 5.2.5, 5.2.6, 5.2.7, Annex A
	- accumulation of energy inside the machinery:			
	g) liquids and gases under pressure;	4.2	4.10, 5.5.4	5.3.7, 5.3.8
1.1	Crushing hazard	4.2.1		5.2.7, 5.2.8
1.2	Shearing hazard			5.2.7, 5.2.8
1.3	Cutting or severing hazard			5.2.2, 5.2.3, 5.2.4, 5.2.7
1.4	Entanglement hazard			5.2.7
1.5	Drawing-in or trapping hazard			5.2.7
1.9	High pressure fluid injection or ejection hazard			5.3.7, 5.3.8
2	**Electrical hazards** due to:			
2.1	Contact of persons with live parts (direct contact)	4.3	4.9, 5.5.4	5.3.4, 5.3.16
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	4.3	4.9	5.3.4, 5.3.16
4	**Hazards generated by noise**, resulting in:			
4.1	Hearing loss (deafness), other physiological disorders (loss of balance, loss of awareness)	4.5	4.2.2, 5	5.3.2
4.2	Interference with speech communication, acoustic signals.			5.3.2

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

6	**Hazards generated by radiation**			
6.5	Lasers	4.7		5.3.13
7	**Hazards generated by materials and substances** (and their constituent elements) processed or used by the machinery			
7.1	Hazards from contact with or inhalation of harmful fluids and dusts	4.8	4.3b, 4.4	5.3.3
7.2	Fire hazard	4.8	4.4	5.3.1, 5.3.3, 5.3.4, 6.3
8	**Hazards generated by neglecting ergonomic principles in machinery design** related to:			
8.1	Unhealthy postures or excessive effort	4.9	4.7, 4.8.2, 4.11.12, 5.5.5, 5.5.6	5.1.2
8.2	Hand-arm or foot-leg anatomy	4.9	4.8.3	5.1.2
8.4	Local lighting		4.8.6	6.3
8.6	Human error, human behaviour		4.8, 4.11.8, 4.11.10, 5.5.2, 6	6.3
8.7	Design, location or identification of manual controls		4.8.7, 4.11.8	5.1.2
8.8	Design or location of visual display units		4.8.8, 6.2	5.1.2
9	**Combination of hazards**	4.11		5.1.7
10	**Unexpected start up, unexpected overrun/overspeed** (or any similar malfunction) from:			
10.1	Failure/disorder of the control system		4.11, 5.5.4	5.1.1
10.2	Restoration of energy supply after an interruption		4.11.4	5.1.6, 5.3.7, 5.3.8
10.3	External influences on electrical equipment		4.11.11	5.1.1, 5.3.4, 5.3.12
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)	4.9	4.8, 4.11.8, 4.11.10, 5.5.2, 6	5.1.1, 5.1.2, 5.3.5, 6.3
11	**Impossibility of stopping the machine in the best possible conditions**		4.11.1, 4.11.3, 5.5.2	5.1.2, 5.1.4, 5.1.5, 5.2.4
13	**Failure of the power supply**		4.11.1, 4.11.4	5.1.6
14	**Failure of the control circuit**		4.11, 5.5.4	5.1.1
15	**Errors of fitting**	4.9	4.7, 6.5	5.2.3, 5.3.15
16	**Break-up during operation**	4.2.2	4.3	5.2.2
17	**Falling or ejected objects or fluids**	4.2.2	4.3, 4.10	5.2.2, 5.2.3, 5.2.5, 5.2.6, 5.2.8
18	**Loss of stability / overturning of machinery**	4.2.2	5.2.6	5.2.1

〈A1〉

5 Safety requirements and/or measures

For guidance in connection with risk reduction by design, see [A1] 4.1 of EN ISO 12100-2:2003 [A1], and in addition:

5.1 Controls

5.1.1 Safety and reliability of control systems

For the purposes of this European Standard a safety related control system is one from and including the initial manual control or position detector to the point of input to the final actuator or element e.g. motor. The safety related control systems of this machine (see [A1] EN ISO 13849-1:2008 [A1]) are those for:

— starting (see 5.1.3);

— normal stopping (see 5.1.4);

— emergency stopping (see 5.1.5);

— interlocking (see 5.1.3);

— clamping (see 5.2.8);

— the braking system (see 5.1.4, 5.1.5 and 5.2.4).

Unless otherwise stated in this European Standard these control systems shall, as a minimum be designed and constructed in accordance with category 1 as defined in [A1] EN ISO 13849-1:2008 [A1].

For the purposes of this European Standard "well tried components and principles" means:

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

   i) [A1] EN 60947-5-1:2004 [A1], section 3 for control switches with positive opening operation used as mechanical actuated position detectors for interlocking guards and for relays used in auxiliary circuits;

   ii) [A1] EN 60947-4-1:2001 [A1] for electromechanical contactors and motor-starters used in main circuits;

   iii) [A1] HD 22.1 S4:2002 [A1] for rubber-insulated cable;

   iv) [A1] HD 21.1 S4:2002 [A1] for polyvinyl chloride cable if this cable is additionally protected against mechanical damage by positioning (e.g. inside frames);

b) electrical principles if they comply with the first four measures listed in 9.4.2.1 of [A1] EN 60204-1:2006 [A1]. The circuits shall be either “hardwired”, or if electronic components are used in safety related control systems “well tried” is fulfilled if they are in accordance with 9.4.2.2 (i.e. redundancy with cross-monitoring) or 9.4.2.3 (i.e. diversity) of [A1] EN 60204-1:2006 [A1];

c) mechanical components if, for example they operate in the positive mode in accordance with the description given in [A1] 4.5 of EN ISO 12100-2:2003 [A1];

d) mechanically actuated position detectors for guards if they are actuated in the positive mode and their arrangement/fastening and cam design/mounting comply with the requirements of 5.2 and 5.3 of EN 1088:1995;

e) pneumatic and hydraulic components and systems if they comply with EN 983 and EN 982 respectively.

Time delay devices used in hardwired safety related control circuits can be of category B in accordance with the requirements of ⟨A1⟩ EN ISO 13849-1:2008 ⟨A1⟩ if the time delay device is designed for at least one million actuations.

Verification: By checking the relevant drawings and/or circuit diagrams and inspection of the machine. ⟨A1⟩ *deleted text* ⟨A1⟩

⟨A1⟩ NOTE For components characteristics the information from the component supplier can be useful. ⟨A1⟩

5.1.2 Position of controls

The start control and the stop control required by 5.1.3 and 5.1.4 of this European Standard shall be situated as follows:

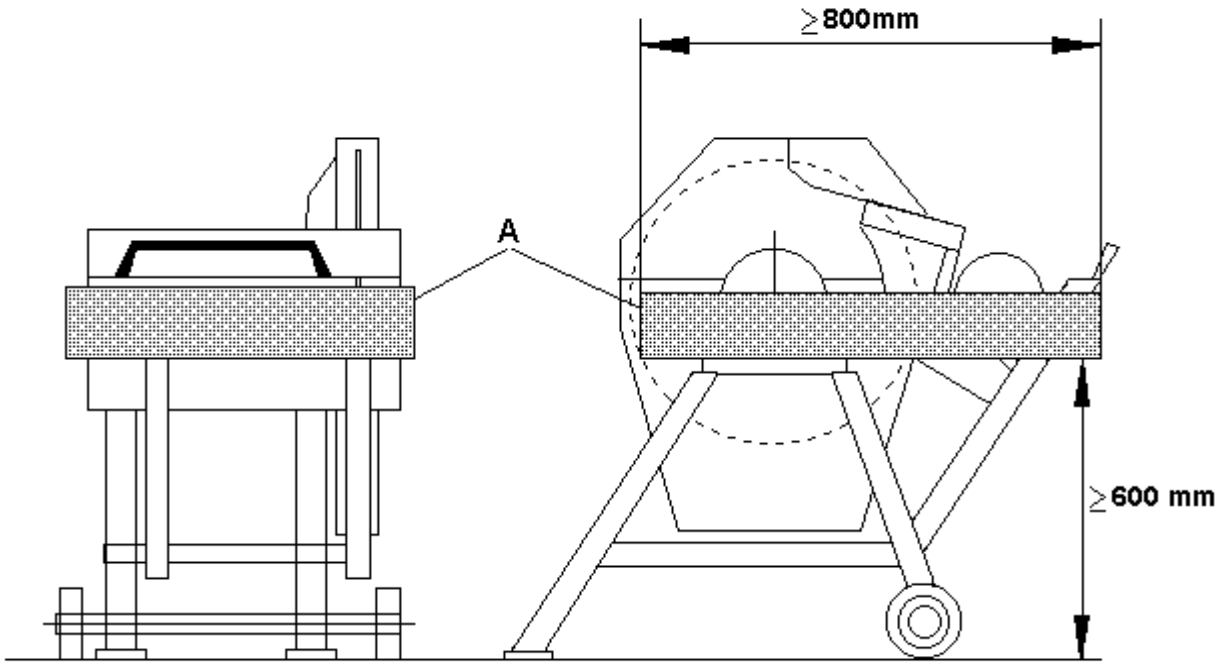
a) on firewood sawing machines with pivoting log carriage, at the machine frame within a maximum distance of 800 mm, measured from the front edge of the pivoting log carriage in its rest position and not less than 600 mm from the floor (see Figure 6);

b) on firewood sawing machines with sliding table, at the front of the machine frame (rest position) or at the longitudinal sides within a distance of 800 mm from the front edge of the sliding table in its start position and at least 50 mm below the table edge and not less than 600 mm from the floor (see Figure 7);

c) on PTO driven machines the start and stop control for the machine actuator (e.g. tractor) may be regarded as the start and stop control of the machine;

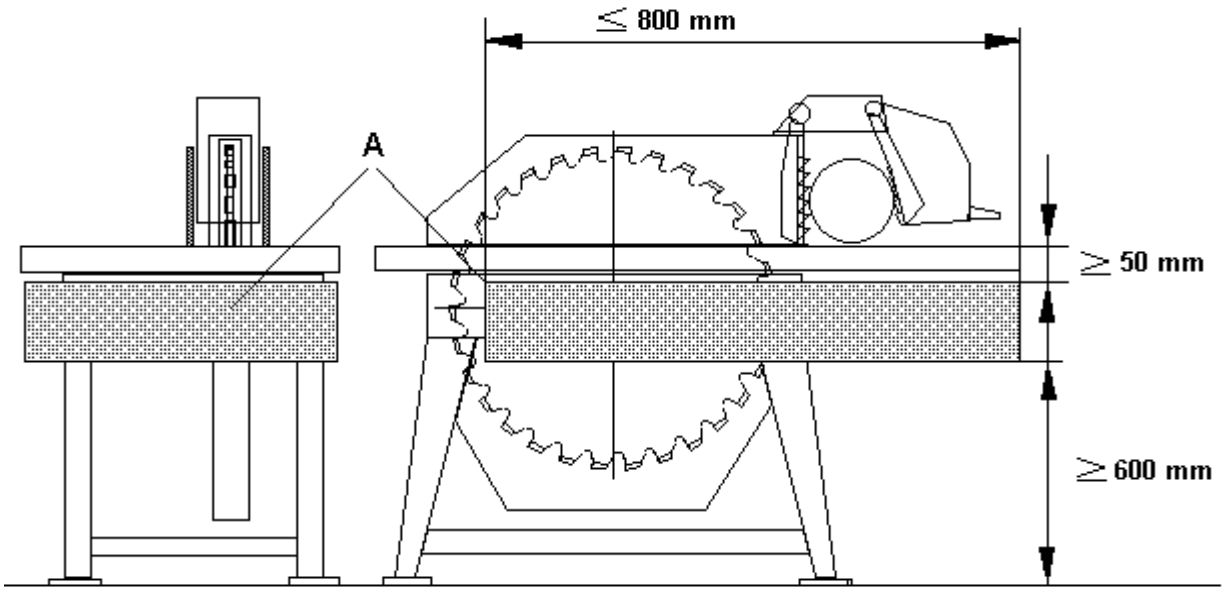
d) on dual-purpose circular sawing machines for firewood/circular saw benches, driven a PTO device, a normal stop control shall be provided at the saw bench operator position.

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



Key *A* Shaded areas indicate control positions

Figure 6 — Position of controls on a circular sawing machine for firewood with pivoting log carriage



Key *A* Shaded areas indicate control positions

Figure 7 — Position of controls on a circular sawing machine for firewood with sliding table

5.1.3 Starting

For electrically driven machines see 9.2.5.2 of ⟨A1⟩ EN 60204-1:2006 ⟨A1⟩ and in addition:

For the purpose of this European Standard "all of the safeguards in place and functional" is achieved by the interlocking arrangements described in 5.2.7 and "operation" means rotation of the saw spindle.

The exceptions described in 9.2.5.2 of [A1] EN 60204-1:2006 [A1] are not relevant.

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

5.1.4 Normal stopping

Electrically driven machines shall be fitted with a stop control which, when actuated, shall disconnect power from all the machine actuators and actuate the brake (if provided).

If the machine is fitted with a mechanical brake this stop control shall be of category 0 in accordance with the requirements of 9.2.2 of [A1] EN 60204-1:2006 [A1].

If the machine is fitted with an electrical brake, this stop control shall be of a category 1 in accordance with the requirements of 9.2.2 of [A1] EN 60204-1:2006 [A1]. When initiated the stopping sequence shall be:

a) cut power to all machine actuators and actuate the brake;

b) cut power to the brake after the braking sequence is complete.

The stopping sequence shall be satisfied at the level of the control circuits. 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.

NOTE A separate stop control as referred to in the first paragraph of this sub-clause is not required where the machine is fitted with an emergency stop which performs the same function.

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

5.1.5 Emergency stop

See [A1] EN ISO 13850:2008 [A1] in addition:

Electrically driven machines with more than one machine actuator, or where provision is made for use with more than one actuator, shall be fitted with an emergency stop control system which shall conform to the requirements of 9.2.5.4 and 10.7 of [A1] EN 60204-1:2006 [A1].

If the machine is fitted with a mechanical brake this stop control shall be of category 0 in accordance with the requirements of 9.2.2 of [A1] EN 60204-1:2006 [A1].

If the machine is fitted with an electrical brake this stop control shall be of category 1 in accordance with the requirements of 9.2.2 of [A1] EN 60204-1:2006 [A1]. When initiated the stopping sequence shall be:

a) cut power to all machine actuators and actuate the brake;

b) cut power to the brake after the braking sequence is complete.

The stopping sequence shall be satisfied at the level of the control circuits. 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.

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

5.1.6 Failure of the power supply

On electrically driven machines an automatic restart in the case of a supply interruption after the restoration of the supply voltage shall be prevented in accordance with 7.5 paragraphs 1 and 3 of ⟩A1⟨ EN 60204-1:2006 ⟩A1⟨.

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

5.1.7 Failure of the control circuits

See 5.1.1.

5.2 Protection against mechanical hazards

5.2.1 Stability

On machines fitted with a pivoting log carriage, the torsional resistance of the pivoting log carriage shall be such that it conforms to the requirements shown in clause A.1.

On dual-purpose circular sawing machines for firewood/circular saw benches the resistance to torsion of the bench saw table shall be such that it conforms to the requirements shown in clause A.2.

Machines fitted with a pivoting log carriage shall conform to the requirements shown in clause A.3.

⟩A1⟨ Displaceable machines ⟩A1⟨ shall have facilities to make them stable during cutting. Such facilities are e.g.:

a) a combination of wheels and stabilisers; or

b) a device to retract the wheels from the floor; or

c) a locking device for at least one wheel preventing it from turning: or

d) a locking device to ensure that the wheels are at right angles to the cutting plane.

Stabilisers or wheels shall have a bearing surface which transmits to the ground a maximum pressure of 400 kPa.

⟩A1⟨ Displaceable machines ⟩A1⟨ with wheels fitted with pneumatic tyres shall only use methods a) or b) above to provide stability.

Verification: By checking the relevant drawings, inspection, functional testing and by the relevant tests given in Annex A.

5.2.2 Risk of break-up during operation

The guards for the saw blade shall be manufactured from:

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 characteristics in accordance with Table 2;

Table 2 — Light alloy tool guard thickness and tensile strength

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;

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, measurement ⟩A1⟨ and ⟩A1⟨ inspection on the machine. ⟩A1⟨ *deleted text* ⟩A1⟨

⟩A1⟨ NOTE For the ultimate tensile strength a confirmation from the manufacturer of the material can be useful. ⟩A1⟨

5.2.3 Tool holder and tool design

5.2.3.1 Spindle locking

When it is necessary to hold the spindle stationary for tool changing, a spindle holding device shall be provided. e.g. this may be a double spanner arrangement, or an integral locking bar inserted through the spindle. This bar shall have a minimum diameter of 8 mm and be made from steel with an ultimate tensile strength of at least 350 N mm^{-2}.

Locking bars shall prevent the spindle from rotating if the spindle drive motor is inadvertently switched on.

Verification: By checking the relevant drawings, inspection measurement ⟩A1⟨ *deleted text* ⟩A1⟨ and functional testing of the machine. Alternatively on machines with locking bars by the following test: after starting the spindle drive motor with the locking bar in place the spindle shall remain stationary.

⟩A1⟨ NOTE For the ultimate tensile strength a confirmation from the manufacturer of the material can be useful. ⟩A1⟨

5.2.3.2 Saw blade fixing device

Saw flanges (or in the case of flush mounted saw blades - a flange) shall be provided.

For flanges other than those for flush mounted saw blades the clamping surface at the outside part of flange shall be at least 5 mm in width and recessed to the centre (see Figure 8).

Where two flanges are provided, both outside diameters shall be within a limit deviation of ± 1 mm.

The saw flange diameters shall be in accordance with Table 3.

Table 3 — Minimum outside flange diameter

Maximum saw blade diameter for which the machine is designed *D* mm	Minimum outside flange diameter mm
$D \leq 600$	0,2 x *D*
$600 < D \leq 800$	125
$D > 800$	150

Precautions shall be taken to ensure that the saw blade does not come loose during start-up, running, rundown or braking, e.g. by using a positive connection between the spindle and the saw blade, or by using a positive connection between the front saw flange and the saw spindle.

Saw spindles shall be manufactured in accordance with the tolerances given in Annex B.

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

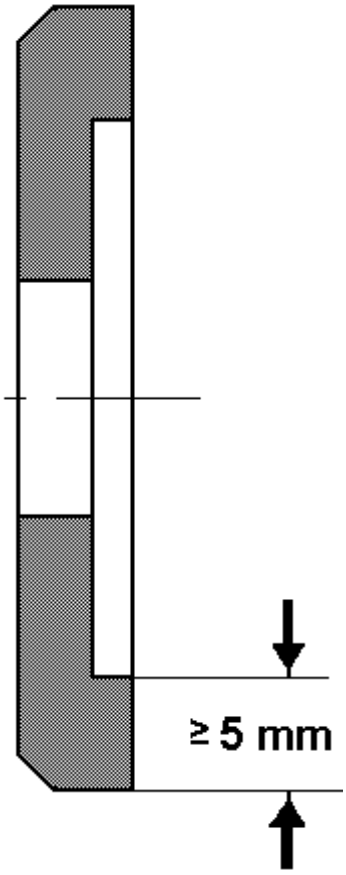


Figure 8 — Saw flange detail

5.2.4 Braking

5.2.4.1 General

On electrically driven machines an automatic brake shall be provided for the saw spindle where the unbraked run-down time is more than 10 s.

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

Electrical braking shall not be by reverse current.

Verification: For the determination of unbraked run-down time and braked run-down time, if relevant, see the appropriate test below.

5.2.4.2 Conditions for all tests

a) the spindle unit shall be set in accordance with the manufacturer's instructions (e.g. belt tension);

b) when selecting the speed and the saw blade, conditions shall be chosen which create the greatest kinetic energy for which the machine is designed;

c) warm up the spindle unit for at least 15 min by running the machine under no load before beginning the test;

d) verify that the actual spindle speed is within 10 % of the intended speed;

e) when testing a unit provided with manual star delta starting, the manufacturer's instructions for starting shall be observed;

f) the speed measuring equipment shall have an error limit of at least ± 1 % of full scale;

g) the time measuring equipment shall have an error limit of at least ± 0,1 s.

5.2.4.3 Tests

5.2.4.3.1 Unbraked run-down time

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

a) cut power to the saw spindle drive motor and measure the unbraked run-down time;

b) restart the saw spindle drive motor and allow it to reach the intended speed;

c) repeat steps a) and b) twice more.

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

5.2.4.3.2 Braked run-down time

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

a) cut power to the saw spindle drive motor and measure the braked run-down time;

b) allow the saw spindle to remain stationary for 1 min;

c) restart the saw spindle drive motor and run at no load for 1 min;

d) repeat steps a) to c) nine times.

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

5.2.5 Devices to minimise the possibility or the effect of ejection

Every dual-purpose circular sawing machine for firewood/circular saw bench shall be supplied with a riving knife / riving knives to accommodate the range of saw blades which are intended to be used with the machine as indicated in the instruction handbook.

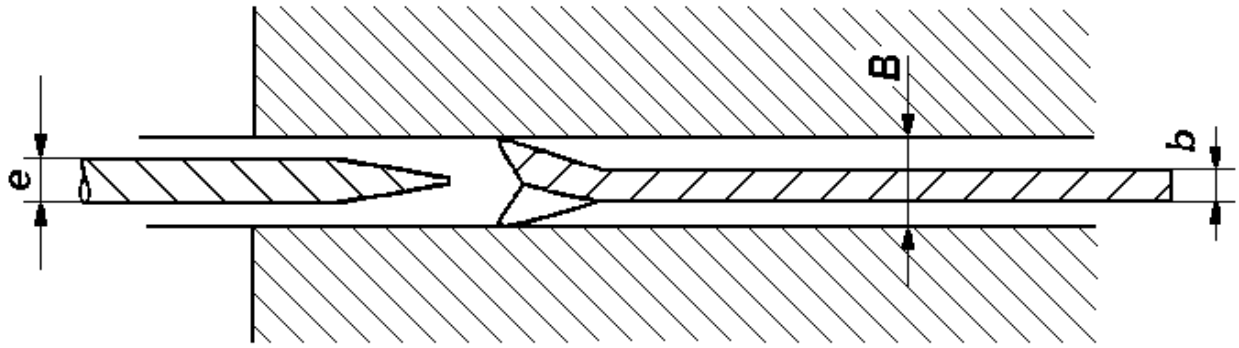
Verification: By checking the relevant drawings, instruction handbook and inspection of the machine.

The riving knife and its mounting arrangement shall meet the following requirements:

a) riving knives shall be manufactured from steel with an ultimate tensile strength of at least 580 N mm^{-2}, or of a comparable material, have flat sides (within 0,1 mm in 100 mm) and shall have a thickness between the width of the saw blade plate and the kerf (width of saw teeth) (see Figure 9).

Verification: By checking the relevant drawings [A1] and [A1] measurement. [A1] *deleted text* [A1]

[A1] NOTE For the ultimate tensile strength a confirmation from the manufacturer of the material can be useful. [A1]



Key		
	e	Riving knife thickness
	B	Width of cut
	b	Width of saw blade

Figure 9 — Thickness of riving knife in relation to saw blade dimensions

b) the leading edge of the riving knife shall be chamfered to provide a "lead-in" (see Figure 10) and the riving knife shall be of constant thickness (within ± 0,05 mm) throughout its working length.

Verification: By checking the relevant drawings, inspection and measurement;

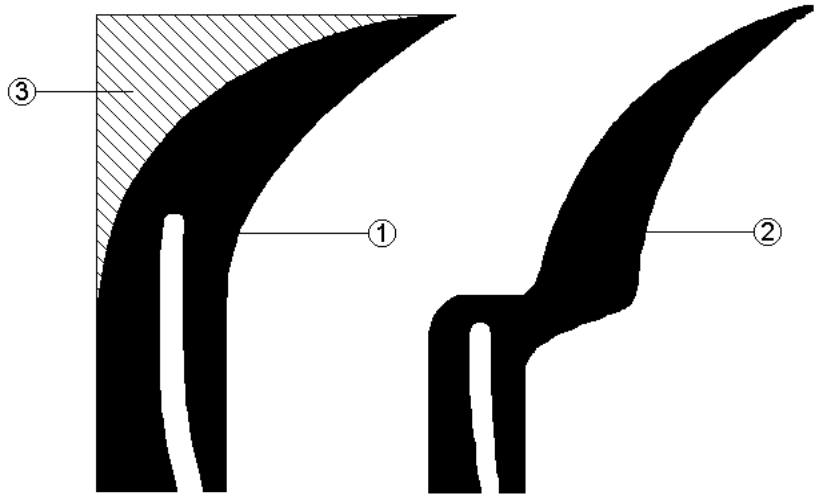


Figure 10 — Chamfered leading edge of riving knife

c) the riving knife shall be capable of vertical adjustment so that its tip reaches a point level with or higher than the highest point on the periphery of the saw blade when set in accordance with the requirements of this European Standard (see Figure 11).

Verification: By checking the relevant drawings, inspection and measurement;

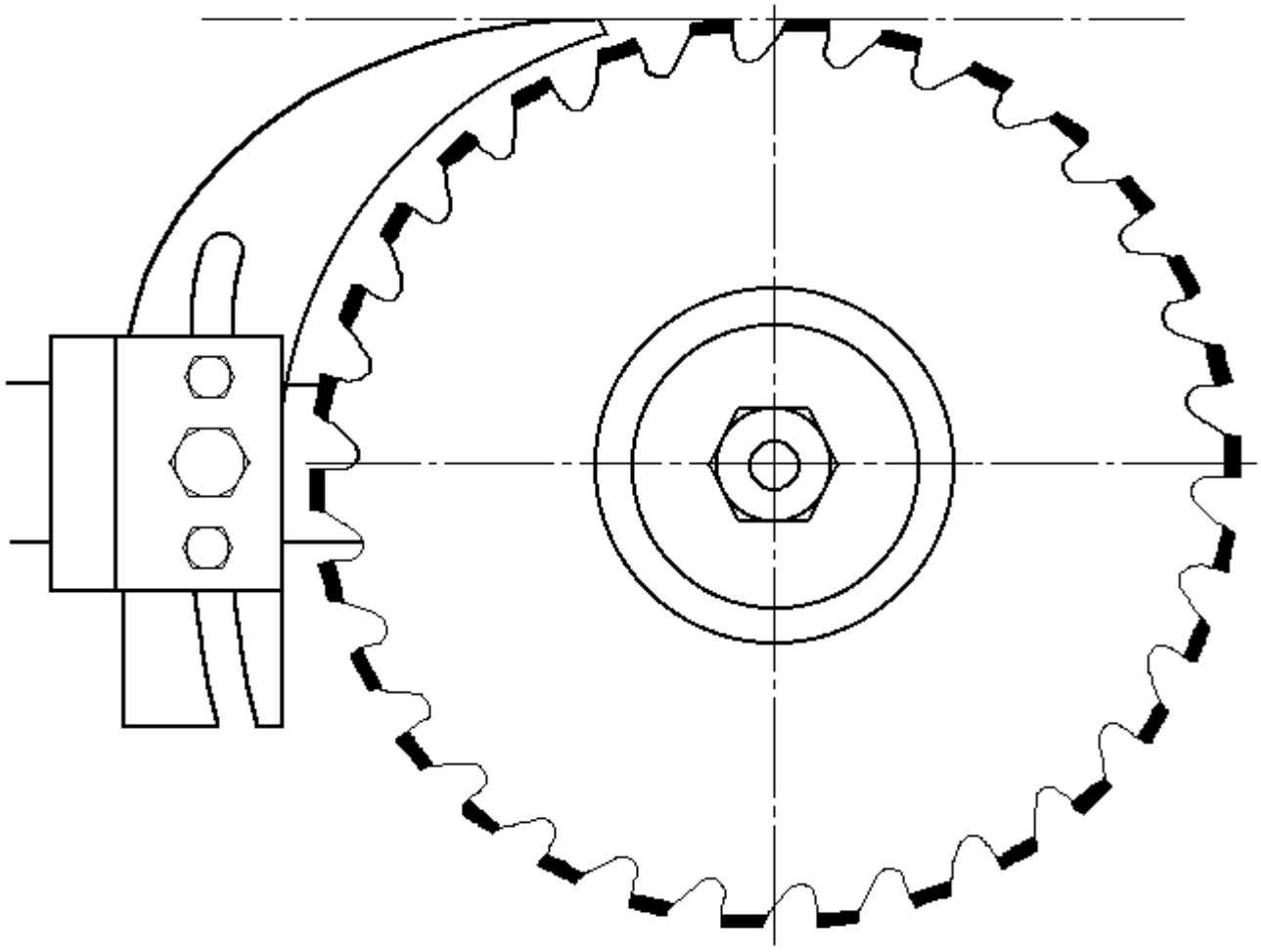
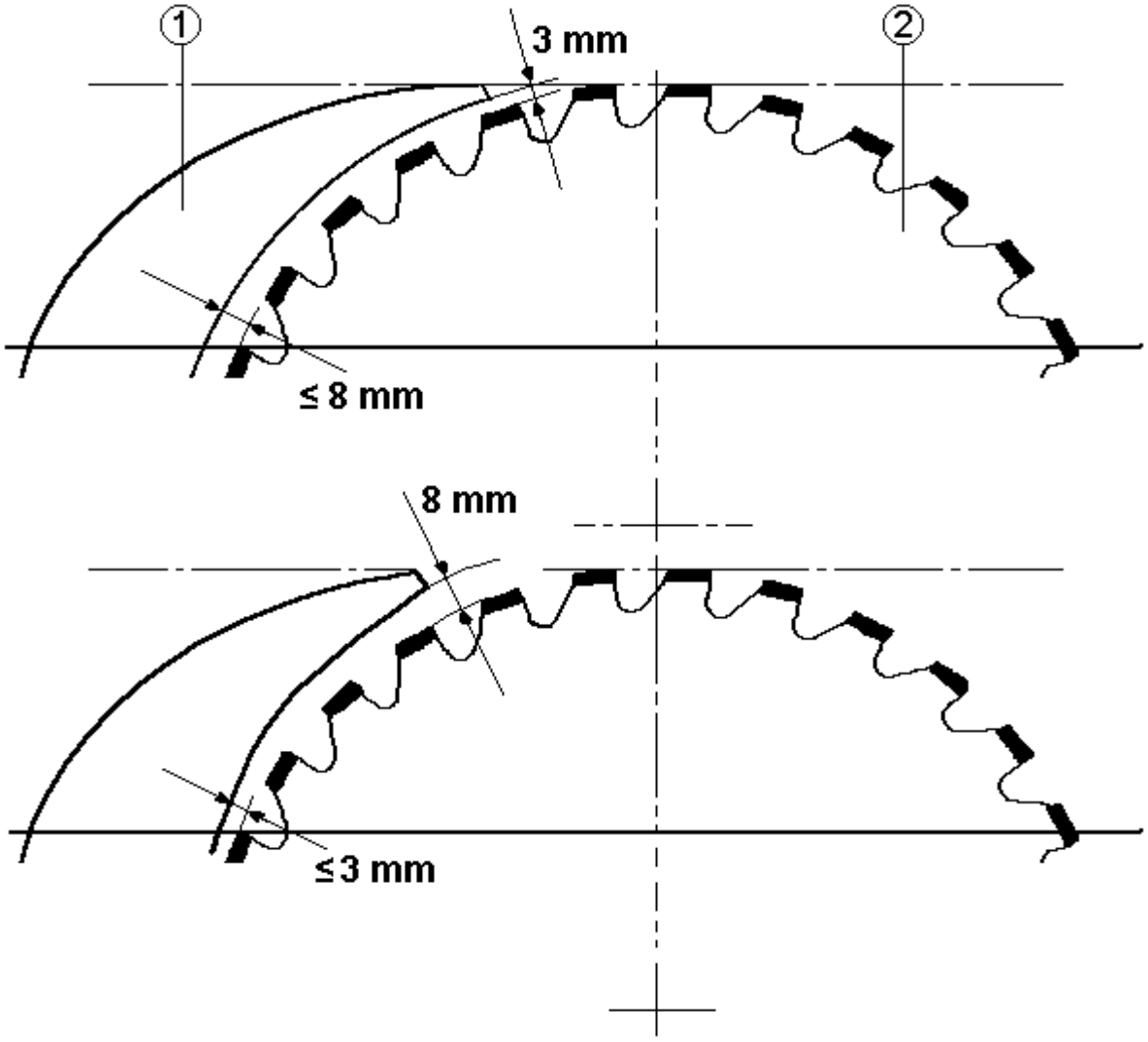


Figure 11 — Riving knife height adjustment

d) the riving knife shall be so designed that when it is mounted and adjusted so that its closest point to the saw blade is 3 mm from the saw blade, then at no point shall the gap between the saw blade and the riving knife exceed 8 mm, measured radially through the centre of the saw blade spindle (see Figure 12).

Verification: By checking the relevant drawings, inspection and measurement;



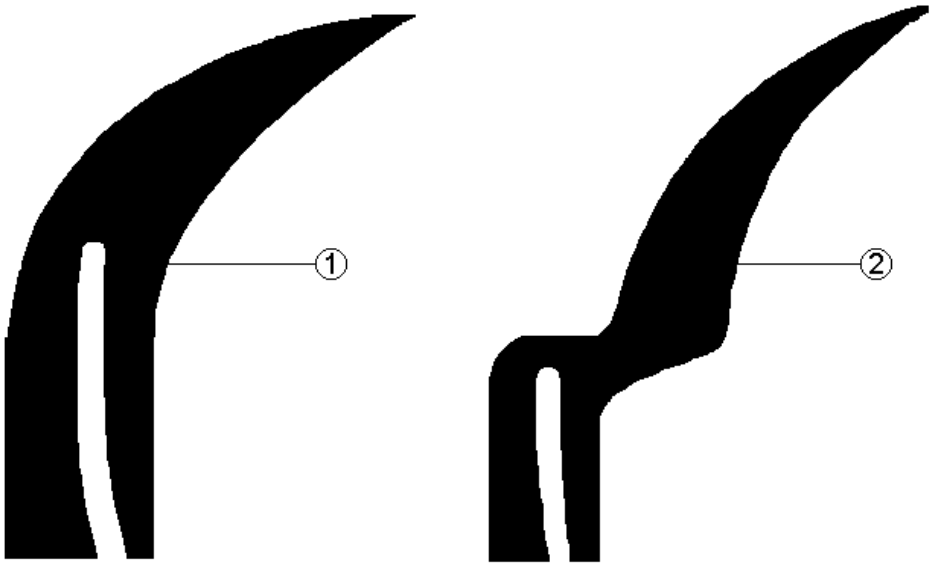
Key

	1	Riving knife
	2	Saw blade

Figure 12 — Positioning limits for riving knife design

e) the front and rear contours of the riving knife shall be continuous curves or straight lines, without any flexure which would weaken it (for example see Figure 13).

Verification: By checking the relevant drawings and inspection;

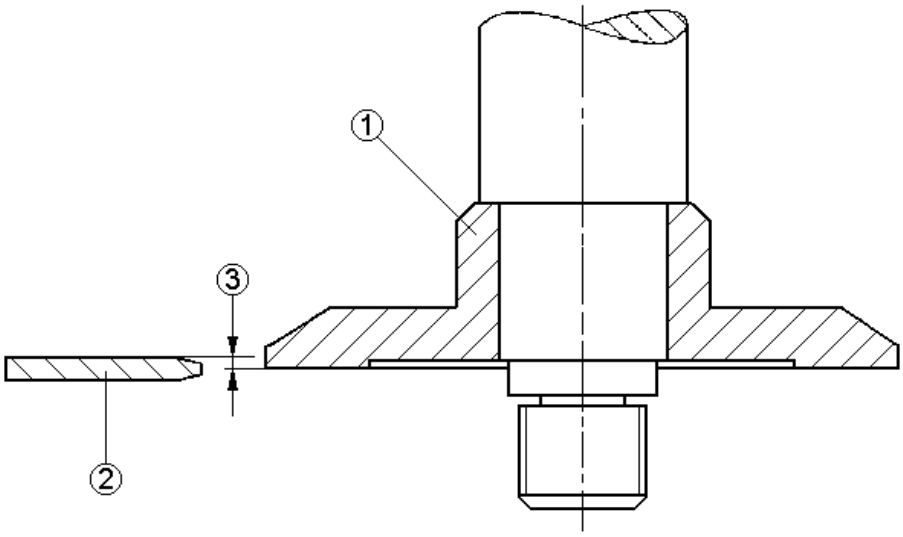


Key
1 Example of acceptable riving knife shape
2 Example of unacceptable riving knife shape

Figure 13 — Shape of riving knife

f) the riving knife fixing arrangement shall be such that the relative position of the riving knife and the fixed saw flange is in accordance with the tolerance shown in Figure 14. The relative position of the riving knife and the fixed saw blade flange shall be maintained with the rise and fall and tilt of the saw blade.

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



Key
1 Fixed saw flange
2 Riving knife
3 Maximum tolerance 0,2 mm

Figure 14 — Positioning of riving knife in relation to the fixed saw flange

g) the arrangement for fixing the riving knife shall be such that its stability is able to satisfy the requirements laid down in Annex C.

Verification: By checking the relevant drawings and carrying out the test in accordance with Annex C;

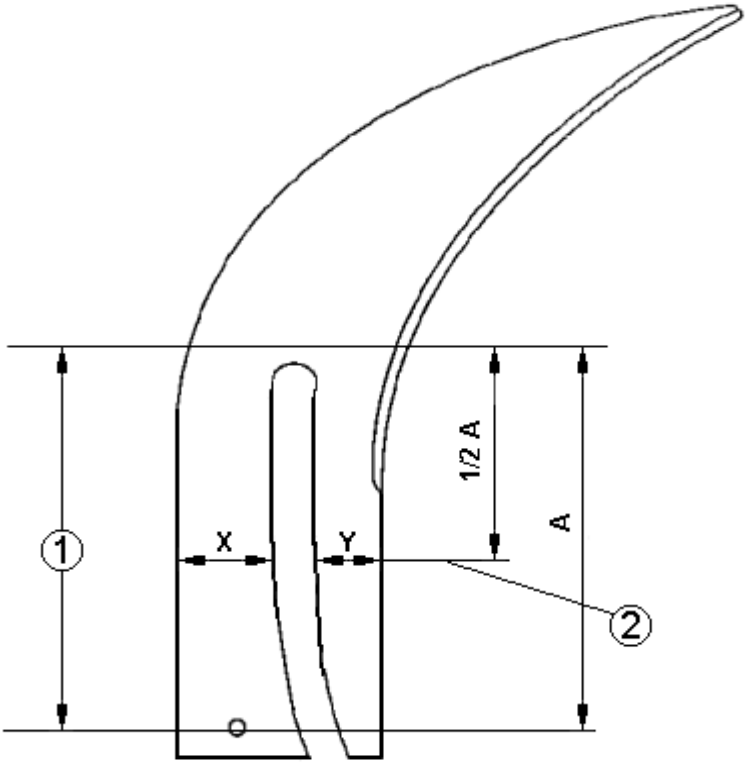
h) the riving knife shall either conform with the lateral stability test laid down in Annex D ,or the width of the riving knife on each side of the riving knife slot within the fixing area shall be designed in accordance with the requirements of the following formula:

$$X + Y \quad \frac{D_{max}}{6} \text{ where } X = Y \pm 0{,}5Y$$

where D_{max} is the saw blade diameter for which the machine is designed.

X and Y shall be measured midway along the riving knife fixing slot in the fixing area (see Figure 15).

Verification: Carry out, as appropriate, test at Annex D or check relevant drawings, inspection and measurement;



Key
1 Fixing area
2 Measuring point

Figure 15 — Width of riving knife at fixing slot

i) the riving knife shall be held in position by guiding elements, e.g. guiding pins (see Figure 16). The riving knife fixing slot shall be no more than 0,5 mm wider than the guiding elements.

Verification: By checking the relevant drawings, inspection and measurement;

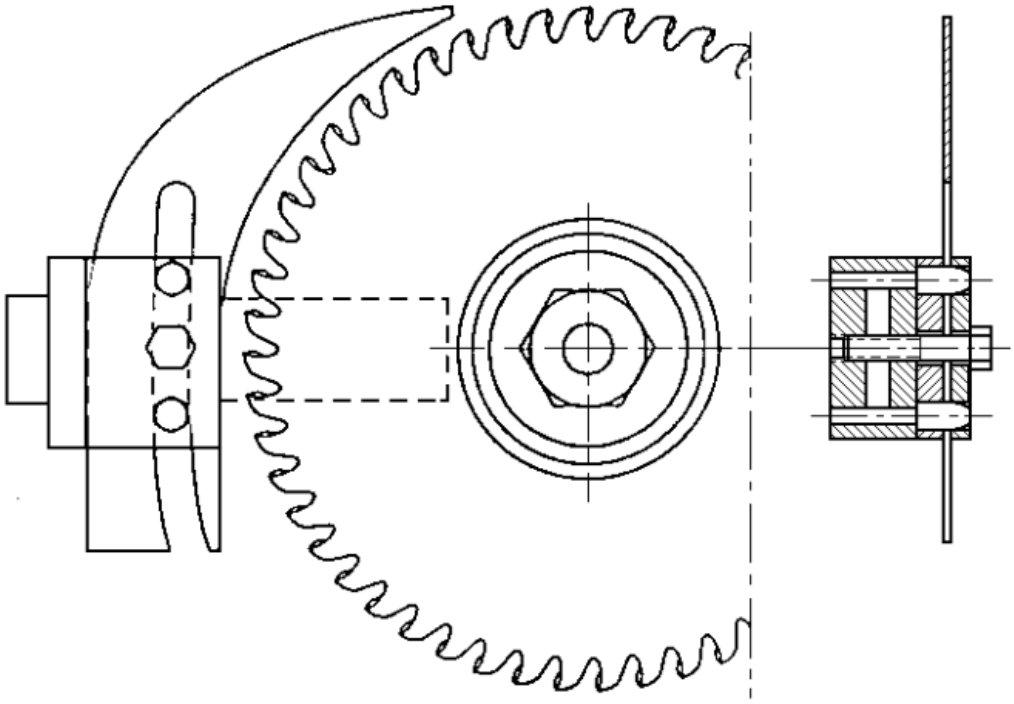


Figure 16 — Example of riving knife fixing arrangement

j) where it is necessary to change the riving knife to accommodate different widths of saw blade, the riving knife fixing slot shall be open ended.

Verification: By checking relevant drawings and inspection.

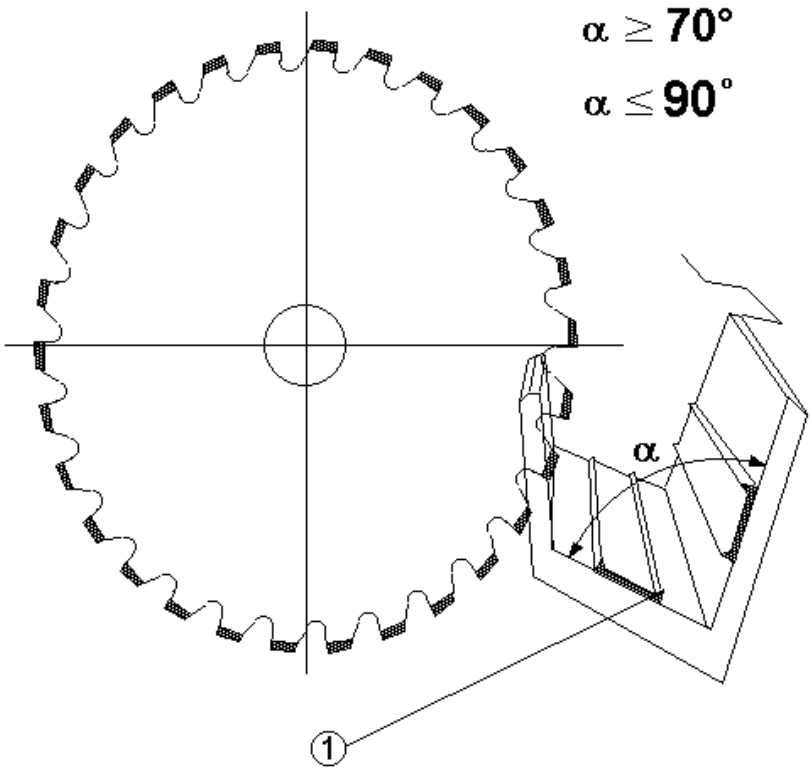
5.2.6 Workpiece supports and guides

5.2.6.1 Firewood sawing machines with pivoting log carriage

The machine shall be fitted with a pivoting log carriage that meets the following requirements:

a) the two parts of the workpiece support shall have an angle from 70° and 90° (see Figure 17);

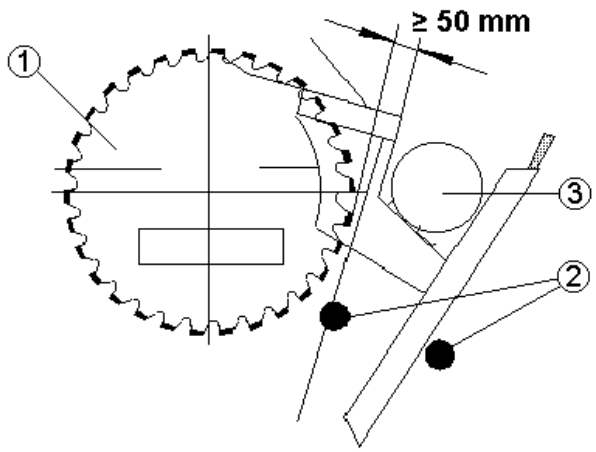
b) the workpiece support shall be so designed (e.g. have notches or teeth or a clamp) that turning of the workpiece during cutting is avoided (see Figure 17);



Key 1 Notches, teeth or clamp

Figure 17 — Detail of workpiece support of pivoting log carriage

c) in the rest position the workpiece support shall have a minimum distance of 50 mm to the circumference of the largest saw blade for which the machine is designed. (see Figure 18);



Key
1 Maximum saw blade diameter
2 End stops
3 Workpiece
4 Handle

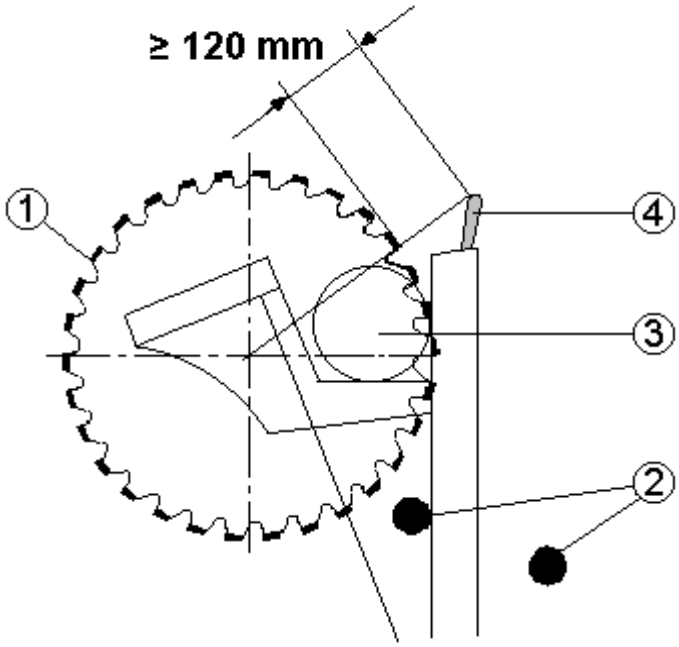
Figure 18 — Detail of pivoting log carriage

d) the pivoting log carriage shall have a handle at the infeed side in such a position that its distance to the nearest point of the saw blade is at least 120 mm when the pivoting log carriage is in the final cutting position (see Figure 19). The distance between the handle and the cutting line shall be ≥ 50 mm (see Figure 20);

e) the length of the pivoting log carriage on the infeed side of the cutting line shall be ≥ 500 mm (see Figure 20);

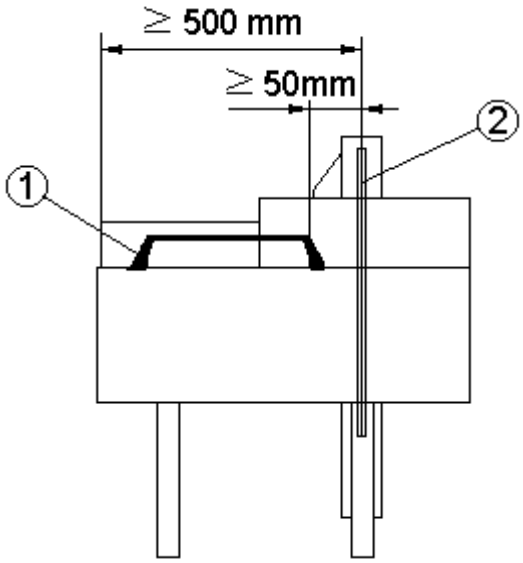
f) the movement of the pivoting log carriage towards the saw blade shall be limited by end stop(s) (see Figure 19) so that the largest saw blade for which the machine is designed does not come into contact with the guard required in the 3rd paragraph of 5.2.7.1;

g) the pivoting log carriage shall automatically return to its rest position. The rest position shall not be capable of adjustment without the aid of a tool.



Key	1	Maximum saw blade diameter
	2	End stops
	3	Workpiece
	4	Handle

Figure 19 — Position of handle relative to the saw blade



Key 1 Handle
2 Cutting line

Figure 20 — Detail of pivoting log carriage

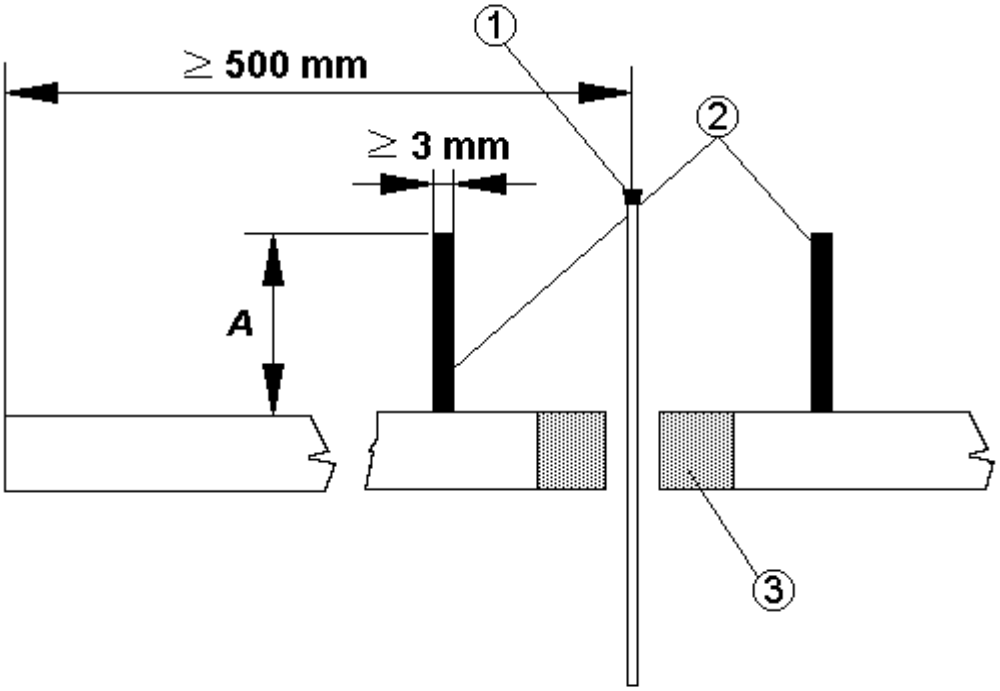
Verification: By checking the relevant drawings, inspection, measurement and relevant functional testing on the machine; for paragraph b) by the test given in Annex E.

5.2.6.2 Circular sawing machines for firewood with sliding table

An operating handle shall be provided at the infeed side of the machine and not in the cutting line of the saw blade unless the handle is part of the workpiece holding device as illustrated in Figure 28.

The machine shall be fitted with a sliding table that meets the following requirements:

a) the width of the table on the loading side of the cutting line shall be at least 500 mm (see Figure 21);



Key
1 Saw blade
2 Workpiece support fences
3 Table slot lining
A ≥ 80 % of the maximum cutting height

Figure 21 — Detail of workpiece support fence and table (circular sawing machines for firewood with sliding table)

b) the distance between the front edge of the table and the foremost tooth of the largest saw blade for which the machine is designed, shall be at least 200 mm when the table is in the rearmost position;

c) the sliding table shall be connected with its support in such a way that it cannot be lifted without the aid of a tool;

d) the movement of the sliding table shall be limited in both directions by end stops;

e) the forward (cutting) movement of the sliding table shall only be possible when the clamping device movement has been initiated;

f) the sliding table shall automatically return to its starting position;

g) where the sliding table is guided on its support with rollers having a diameter ≥ 20 mm, access to these rollers shall be prevented by fixed guards;

h) the sliding table shall be fitted on both sides of the cutting plane with workpiece vertical support fences having a minimum height of 80 % of the maximum cutting height for which the machine is designed and a thickness of material of ≥ 3 mm (see Figure 21);

i) the width of the slot in the sliding table for the saw blade shall not exceed 12 mm for saw blade diameters ≤ 500 mm and shall not exceed 16 mm for saw blade diameters > 500 mm;

j) the table slot shall be lined with e.g. polypropylene, polyamide, polyethylene or other plastics with similar characteristics, light alloy, wood, plywood or brass. The lining shall be replaceable and held in position such that it shall not be dislodged in the event of contact with the saw blade.

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

5.2.6.3 Dual-purpose firewood sawing machines/circular saw benches

5.2.6.3.1 General

For the use of a dual-purpose firewood saw with pivoting log carriage/saw bench in the firewood sawing mode the requirements of 5.2.6.1 shall be met.

For the use of a dual-purpose firewood sawing machine with sliding table/circular saw bench in the firewood sawing mode the requirements of 5.2.6.2 shall be met.

5.2.6.3.2 Circular saw bench table

The dimensions of the circular saw bench table shall meet the requirements of Annex F.

On a dual-purpose firewood sawing machine with pivoting carriage/circular saw bench the table shall be tiltable to the rear end of the machine and shall be capable of being locked in this position by a mechanical device without the aid of a tool.

On a dual-purpose firewood sawing machine with sliding table/circular saw bench the table shall be capable of being locked in position for use in the circular saw bench mode by a mechanical device not requiring the aid of a tool for release.

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

5.2.6.3.3 Rip fence

Dual-purpose firewood sawing machines/circular saw benches shall be provided with a rip fence which is adjustable at right angles to the saw blade at least over the whole of the width of the table on one side of the saw blade.

The workpiece guiding part of the fence shall:

a) be made from plastic, light alloy or wood if there is a possibility of contact with the saw blade;

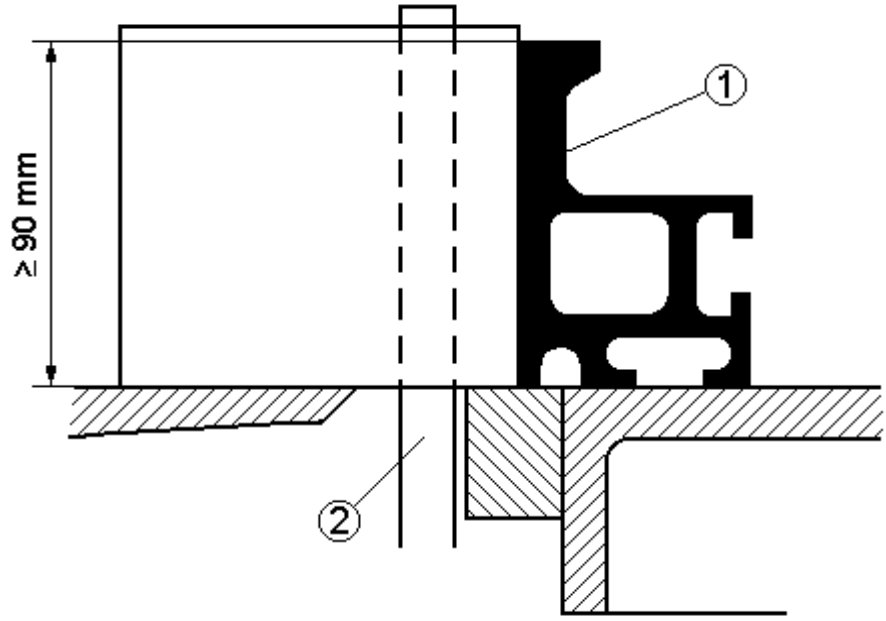
b) be adjustable parallel with the saw blade so that its outfeed end can be adjusted forward to a point in line within the front edge of the riving knife and rearwards to a point at table level which is in line with the first cutting tooth of the largest saw blade for which the machine is designed;

c) have two guiding surfaces with a high position for deep work (see Figure 22a)) and a low position for shallow cutting (see Figure 22b)). The minimum height of the fence in the high position shall be 90 mm and in the low position from 5 mm to 15 mm;

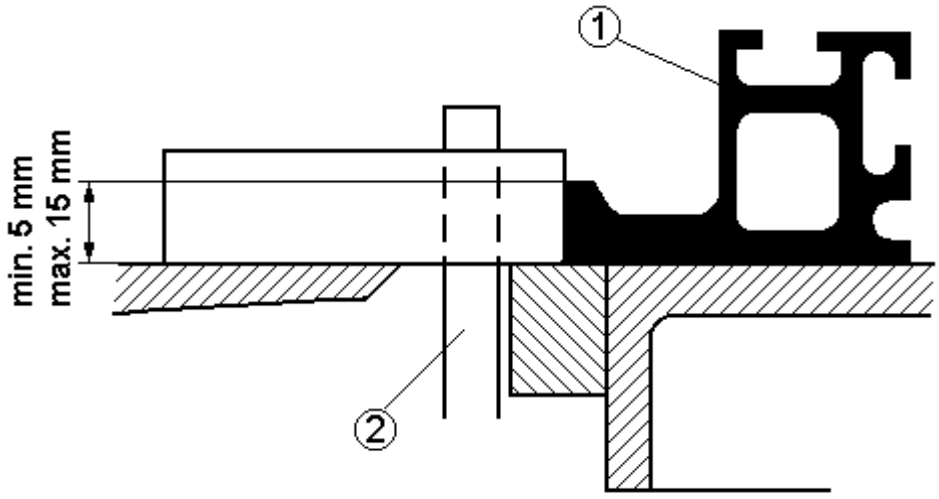
d) be so designed that when it is in its low position, the saw guard can be lowered to the minimum height of the workpiece guiding part of the fence.

All adjustments to the fence position shall be possible without the aid of a tool.

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



a) — Fence in high position



b) — Fence in low position

Figure 22 — Two position fence

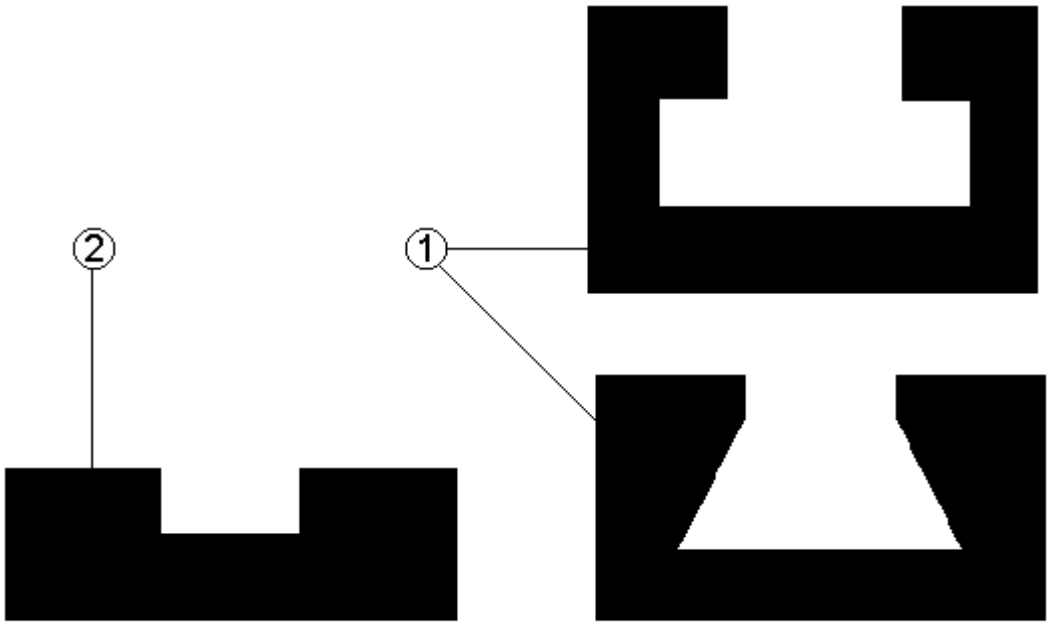
5.2.6.3.4 Cross-cutting fence

Where a dual-purpose circular sawing machine for firewood/circular saw bench is provided with a cross-cutting fence the fixing arrangement shall ensure that the cross-cutting fence cannot lift up or swing out of position during use (see Figure 23).

Where the cross-cutting fence extends beneath the saw guard then the height of this section of the fence shall not exceed 15 mm.

Where the workpiece guiding part of the fence is adjustable in length and if there is a possibility of contact between the fence and the saw blade, this part of the fence shall be made of light alloy, plastic or wood.

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



Key 1 Acceptable design
2 Unacceptable design

Figure 23 — Examples of shapes of slots for locating the cross-cut fence

5.2.7 Prevention of access to moving parts

5.2.7.1 Guarding of the saw blade on circular sawing machines for firewood with pivoting log carriage

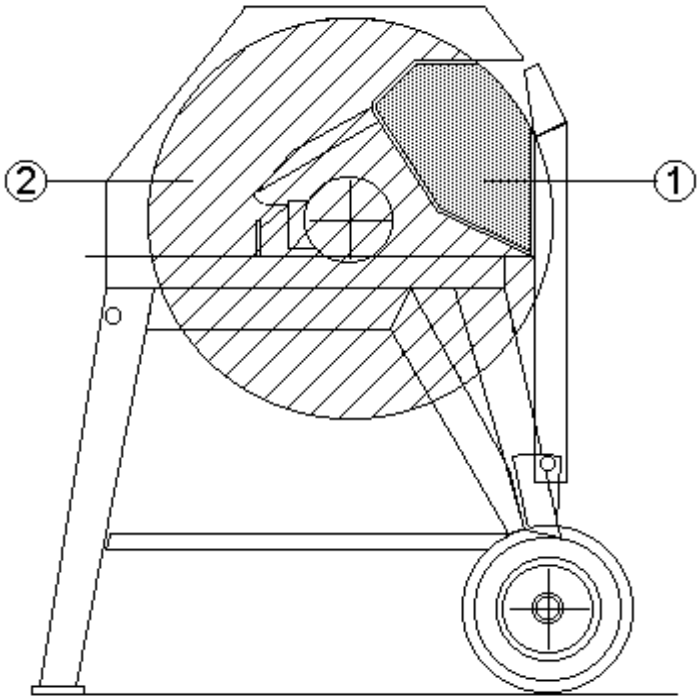
Access to that part of the saw blade not exposed for cutting i.e. the area not needed for cutting the largest workpiece for which the machine is designed (see Figure 24) shall be prevented by a fixed guard which shall enclose the periphery (outside diameter) of the saw blade and cover the saw teeth. The width of the guard opening shall not be greater than "*a*" ($a \leq 40$ mm). the distance between the edge of the opening and the bottom of the saw tooth gullet shall be ≥ "*a*" (see Figure 25a). This guard shall also cover the saw flanges and lock nut.

Access to that part of the saw blade exposed for cutting i.e. the area needed for cutting the largest workpiece for which the machine is designed (see Figure 24) shall in the rest position of the carriage be prevented by a guard on both sides of the saw blade which extends 50 mm beyond the periphery (outside diameter) of the saw blade, covering the saw teeth and extending below the bottom of the saw tooth gullet at least the distance "*a*". The distance between the two side plates shall not be greater than "*a*" ($a \leq 40$ mm) and at the outside edge be reduced to 16 mm by replaceable lips (see Figure 25b)). This guard shall either be part of, and move with, the pivoting log carriage, or shall be positively connected to the movement of the pivoting log carriage.

That part of the workpiece support nearest to the operator shall be fully enclosed i.e. shall not be mesh, and shall be at least 150 mm wide on both sides of the cutting line and have a minimum height $H \geq 40$ % of the largest saw blade diameter for which the machine is designed (see Figure 26).

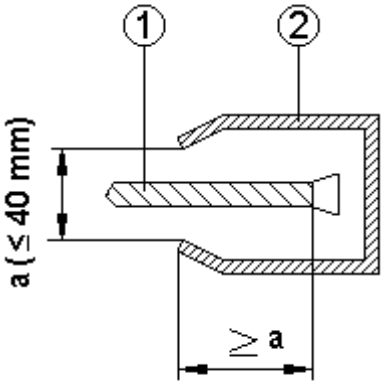
The width of the slot in the pivoting carriage shall not exceed 12 mm on machines with a maximum saw blade diameter ≤ 500 mm and 16 mm on machines with a maximum saw blade diameter > 500 mm. The material of the slot lining shall be light alloy, plastic or wood.

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



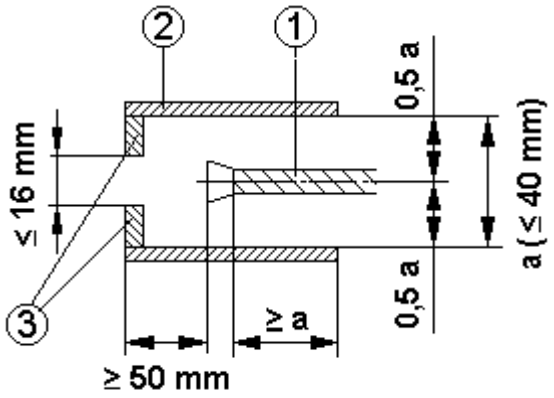
Key 1 Part of the saw blade exposed for cutting
2 Part of the saw blade not exposed for cutting

Figure 24 — Circular sawing machine for firewood with pivoting carriage - Exposed/not exposed areas of the saw blade



Key 1 Saw blade
2 Saw blade guard

a) — Detail of saw blade guard where the saw blade is not exposed during cutting

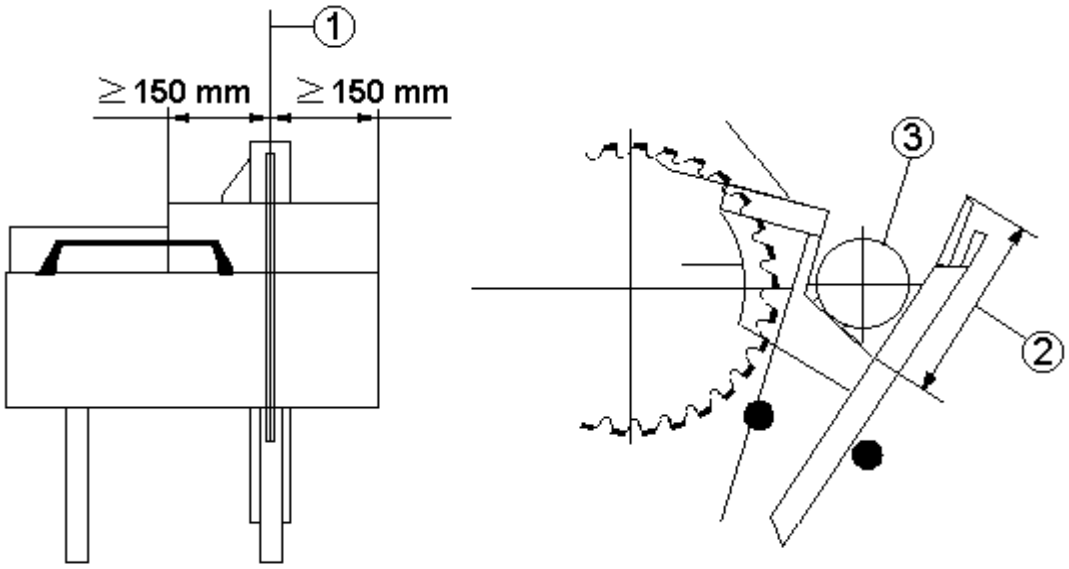


Key

	1	Saw blade
	2	Saw blade guard
	3	Replaceable lips

b) — Detail of saw blade guard where the saw blade is exposed during cutting

Figure 25 — Detail of saw blade guard on circular sawing machines for firewood with pivoting log carriage



Key

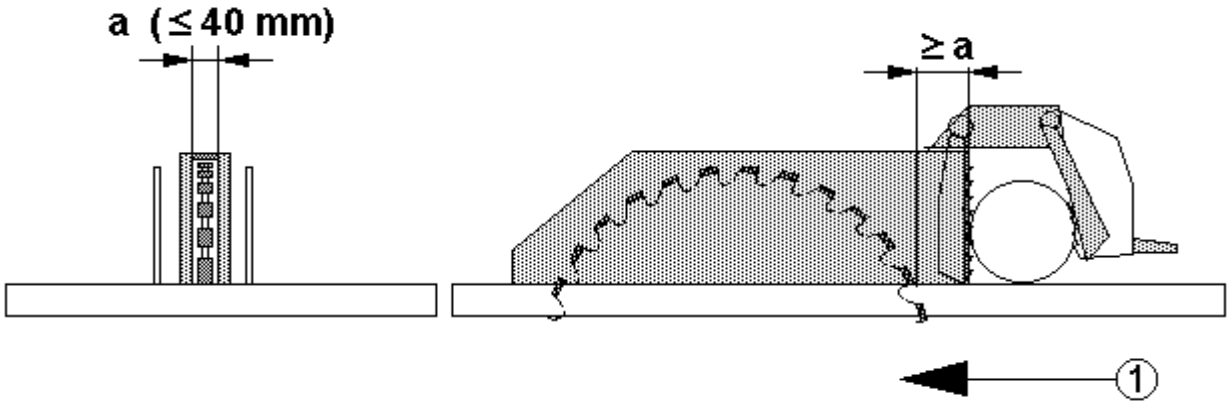
	1	Cutting line
	2	Minimum height of guard at front side of pivoting log carriage
	3	Workpiece

Figure 26 — Detail of fixed guard at front side of pivoting log carriage

5.2.7.2 Guarding of the saw blade on circular sawing machines for firewood with sliding table

When the sliding table is in the loading position, access to that portion of the saw blade above the table shall be prevented by a fixed guard fixed to the table, except for the front opening. The width of this front opening

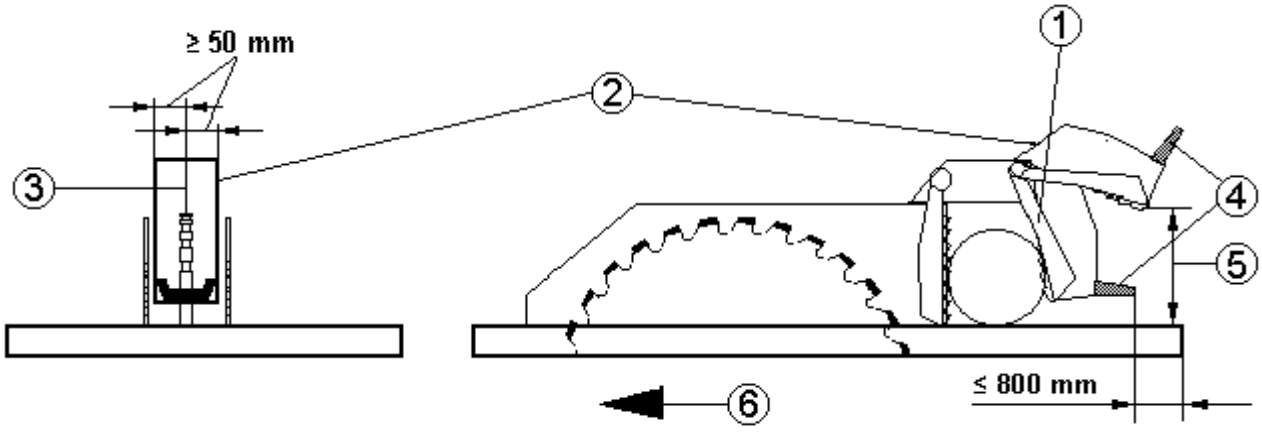
shall not be greater than "*a*" ($a \leq 40$ mm) where "*a*" is the distance between the foremost saw blade tooth on the largest saw blade for which the machine is designed and the front of the guard (see Figure 27).



Key 1 Cutting stroke

Figure 27 — Detail of fixed guard above the sliding table

The workpiece holding device required in 5.2.8 shall be fitted with a deterring/impeding device which prevents direct access to the saw blade from the operator's side over the whole height of the holding device and it shall have a minimum width of 50 mm on both sides of the cutting line (see Figure 28).



Key

	1	Workpiece holding device
	2	Deterring/impeding device
	3	Cutting line
	4	Handle
	5	Upper rest position *X*
	6	Cutting stroke

Figure 28 — Detail of workpiece holding device

Access to the saw blade beneath the table shall be prevented by a fixed guard. Where access doors are provided these shall be interlocked with the saw blade drive motor.

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

5.2.7.3 Guarding of the saw blade on dual-purpose circular sawing machines for firewood/circular saw benches

5.2.7.3.1 General

On dual-purpose circular sawing machines for firewood/circular saw benches with pivoting log carriage the guarding of the saw blade during use of the machine as a circular sawing machine for firewood with pivoting log carriage shall meet the requirements of 5.2.7.1.

On dual-purpose circular sawing machines for firewood/circular saw benches with sliding table the guarding of the saw blade during use of the machine as a circular sawing machine for firewood with sliding table the guarding shall meet the requirements of 5.2.7.2. However, this guard shall be capable of removal without the aid of a tool when the machine is used in the saw bench mode.

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

5.2.7.3.2 Guarding of the saw blade above the table in the saw bench mode

An adjustable saw blade guard shall be provided to prevent access to that portion of the saw blade above the table. This guard shall meet the following requirements:

a) it shall be mounted separately from the riving knife and cover the top and both sides of the saw blade. The support of the guard shall not be in-line with the riving knife;

b) it shall be designed to encompass the saw blade and shall extend beyond the first cutting tooth at table level when the saw blade is adjusted to its highest position;

c) its rigidity shall be in accordance with the requirements of Annex G;

d) it shall be capable of vertical adjustment so that when the machine is fitted with the largest diameter of saw blade for which it is designed, the bottom edge of the adjustable guard can be raised to a maximum height of 5 mm above the uppermost saw teeth, and the guard can be lowered to the table level;

e) the bottom of the adjustable saw blade guard need not remain parallel to the table at all times and may be a self-closing saw blade guard which rests on the table when the machine is not in use;

f) the maximum width of the base of the adjustable saw blade guard shall be:

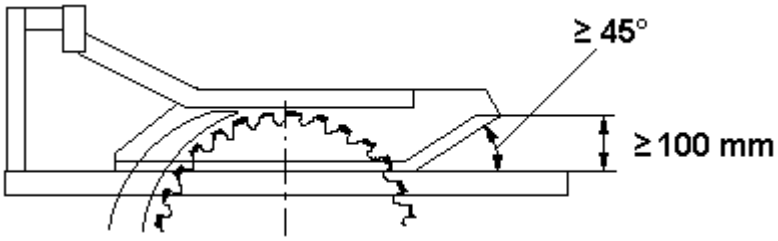
    i) 50 mm on machines with a maximum saw blade diameter $\leq$ 500 mm;

    ii) 70 mm on machines with a maximum saw blade diameter > 500 mm;

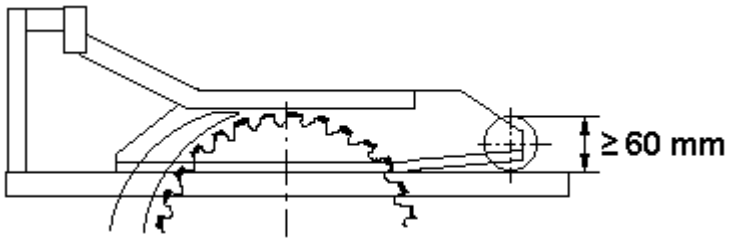
g) the infeed and outfeed ends of the base of the adjustable saw blade guard shall be designed to allow upward vertical movement of the adjustable guard in order to avoid mis-feeding should it be incorrectly set or the workpiece be uneven. This can be achieved by e.g.:

    i) designing the adjustable saw blade guard in accordance with the minimum dimensions given in Figure 29a); or

    ii) by equipping the adjustable saw blade guard with rollers in accordance with the dimensions given in Figure 29b);



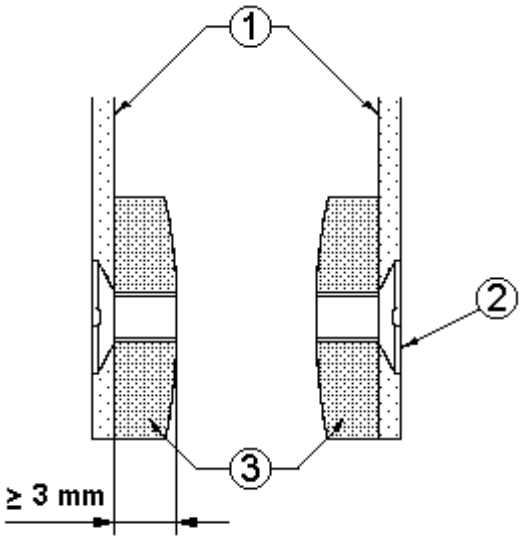
a) — Adjustable saw blade guard with lead in



b) — Adjustable saw blade guard with in-feed rollers

Figure 29 — Lead-in at front end of adjustable saw blade guard on dual-purpose circular sawing machines for firewood/circular saw benches

h) the lower inner edges of the sides of the adjustable saw blade guard shall be lined with a rib, made of plastic, light alloy, wood or wood based material. This rib shall be a minimum of 3 mm in width and shall be designed so as to prevent the saw blade teeth from cutting into the adjustable saw blade guard should it be displaced from the line of cut. If the rib is replaceable, the fixing arrangement shall be such that it does not damage the saw blade e.g. by using brass screws (see Figure 30);



Key		
	1	Side walls
	2	Fixing screws
	3	Ribbings

Figure 30 — Reinforcement to underside of adjustable saw blade guard side walls

i) the line of cut shall be indicated on non-transparent adjustable saw blade guards e.g. by a groove or line;

j) the adjustable saw blade guard shall be fitted with a device for adjusting its height e.g. a handle. This device may be the push stick if it is placed in a holder fixed on the adjustable saw blade guard;

k) it shall be capable of being removed without the aid of a tool for conversion of the machine to the firewood sawing mode.

Verification: By checking the relevant drawings, measurement, inspection and relevant functional testing of the machine; for the stability of the top saw blade guard by testing in accordance with the requirements of Annex G.

5.2.7.3.3 Guarding of the saw blade below the table during use in the saw bench mode

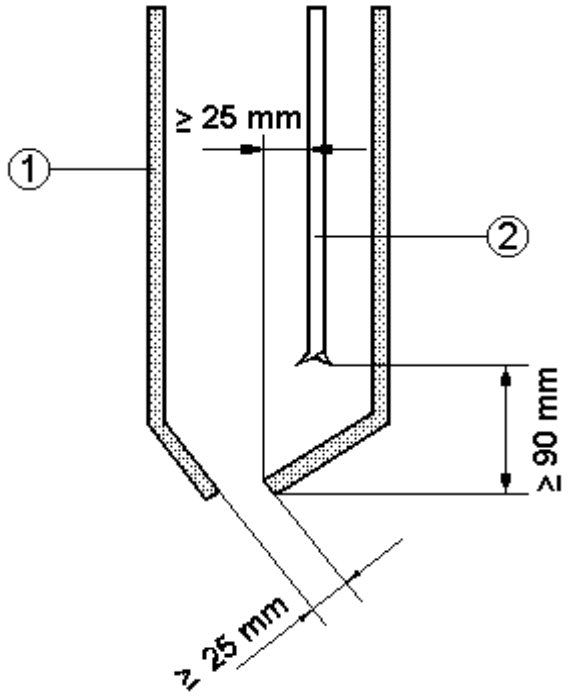
Access to the saw blade below the table shall be prevented by a fixed guard. Where access doors are provided these shall be interlocked saw blade drive motor.

On machines with pivoting log carriage and tilting saw bench table these guards shall meet the requirements of 5.2.7.1.

On machines with sliding table these guards shall meet the requirements of 5.2.7.2.

On machines designed solely for use outside, and not provided with an extraction outlet (see 5.3.3) the opening for chip removal shall either fulfil the safety distances in accordance with the requirements of Table 4 of [A1] EN ISO 13857:2008 [A1] or be in accordance with the dimensions given in Figure 31.

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



Key 1 Saw blade guard
2 Saw blade

Figure 31 — Dimensions for chip removal opening in saw guards below the table

5.2.7.3.4 Saw bench table insert

The saw bench table shall be fitted with a replaceable insert which is fixed to the table or positively connected to the table at least at the rear end of the opening. This insert shall be made from plastic e.g. polypropylene, polyamide, polyethylene or other plastics with similar characteristics, light alloy, wood, plywood or brass.

The total width of the slot for the saw blade shall not exceed 12 mm for saw blade diameters ≤ 500 mm and shall not exceed 16 mm for saw blade diameters > 500 mm.

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

5.2.7.4 Guarding of drives

On electrically driven machines access to the saw blade drive spindle shall be prevented by a fixed guard. Where access doors are provided these shall be interlocked with the spindle drive motor.

On Power Take Off (PTO) driven machines, access to the Power Input Connection (PIC) shall be prevented in accordance with the requirements of paragraph 4.3.2.3 of ⟨A1⟩ EN ISO 4254-1:2005 ⟨A1⟩.

Access to the drive from the PIC to the saw blade drive spindle shall be prevented by a fixed guard.

On PTO driven machines fitted with a PTO drive shaft, access to the PTO drive shaft shall be prevented in accordance with the requirements of 4.3.2.3 of ⟨A1⟩ EN ISO 4254-1:2005 ⟨A1⟩.

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

5.2.8 Clamping device

Circular sawing machines for firewood with sliding table shall be equipped with a manually operated workpiece holding device to hold the workpiece against the fence (see Figure 28). The design shall be such that:

a) clamping pressure is directed against the sliding table and fences;

b) contact with the saw blade during the cutting stroke is avoided (see 5.2.7.2);

c) the operating handle has, in all positions of the clamping device, a maximum distance of 800 mm to a vertical plane at the front edge of the sliding table (see Figure 28);

d) the upper rest position of the clamping surface shall be limited to a height *X* above the table which is equivalent to 1,5 times the maximum cutting height for which the machine is designed (see Figure 28);

e) the clamping device returns automatically to the upper rest position.

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

5.2.9 Safety appliances

A push stick and push block handle shall be provided for use with dual-purpose circular sawing machines for firewood/circular saw benches. Provision shall be made for storing the push stick and push block handle/push block on the machine.

Push sticks shall be made from plastic, wood or plywood.

The minimum length for push sticks shall be 400 mm and the mouth of the push stick shall be manufactured in accordance with the requirements of Figure 5a).

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

5.3 Protection against non-mechanical hazards

5.3.1 [A1] Fire [A1]

To [A1] *deleted text* [A1] minimise fire hazards, the requirements of 5.3.3 and 5.3.4 shall be fulfilled (also [A1] see 6.3 [A1]).

5.3.2 Noise

5.3.2.1 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 shall be taken into account. The most relevant noise source is the rotating saw blade.

5.3.2.2 Noise emission measurement

Operating conditions for the noise measurement of circular sawing machines for firewood or dual-purpose circular sawing machines for firewood/circular saw benches in the firewood sawing mode shall comply with the requirements of Annex N of ISO 7960:1995 with the following exceptions:

— the workpiece shall be round pine with a diameter equal to 80 % ± 5 % of the maximum sawing capacity for which the machine is designed and shall be dry, below 18 % moisture content.

Operating conditions for noise measurement for dual-purpose circular sawing machines for firewood/circular saw benches in the saw bench mode shall comply with Annex A of ISO 7960:1995.

For machines where Annex A or Annex N of ISO 7960:1995 is not applicable, e.g. for different spindle speeds and saw blade diameters, the detailed operating conditions used shall be given in the test report.

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.

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

a) the environmental indicator K_{2A} shall be equal to or less than 4 dB;

b) the 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) the accuracy of the test method shall be better than 3 dB;

g) the number of microphone positions shall be nine in accordance with Annex A and Annex N of ISO 7960:1995.

Alternatively, where the facilities exist and the measurement method applies to the machine type, emission sound power levels may also be measured according to a method with higher precision i.e. EN ISO 3743-1, EN ISO 3743-2, EN ISO 3744 and [A1] EN ISO 3745 [A1] without the preceding modifications.

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

Emission sound pressure level at the workstation shall be measured according to EN ISO 11202:1995 with the following modifications:

a) the environmental indicator K_{2A} and local environmental factor K_{3A} shall be equal to or less than 4 dB;

b) the difference between the background emission sound pressure level and the workstation sound pressure level shall be equal to or greater than 6 dB;

c) the correction of the local environmental factor K_{3A} shall be calculated in accordance with clause A.2 of EN ISO 11204:1995 with reference restricted to EN ISO 3746:1995 instead of the method given in Annex A of EN ISO 11202:1995, or in accordance with EN ISO 3743-1, EN ISO 3743-2, EN ISO 3744 or ▌A1⟩ EN ISO 3745 ⟨A1▐ where one of these standards has been used as the measuring method.

5.3.2.3 Declaration

See 6.3.

5.3.3 Emission of chips, dust and gases

All machines shall be equipped with a chip outlet.

Machines designed solely for use outside do not need provision for extraction (also see 5.2.7.3.3).

To ensure that chips and dust extracted from the point of origin are conveyed to the collection system, the design of the hoods, ducts and baffles shall 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 (moisture content 18 % or above).

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

5.3.4 Electricity

▌A1⟩ The requirements of EN 60204-1:2006 applies unless otherwise stated in this document.

In particular see 6.2 of EN 60204-1:2006 for the requirements regarding prevention of electric shock due to direct contact, 6.3 of EN 60204-1:2006 for information regarding the prevention of electric shock due to indirect contact and Clause 7 of EN 60204 -1:2006 for the requirements regarding protection against short circuits and overloading.

NOTE 1 The protection against electric shock due to indirect contact is normally ensured by automatic isolation of the electrical power supply (see the information provided by the manufacturer in the instruction handbook, 6.3 s)).

The degree of protection for electrical components shall be in accordance with 11.3 of EN 60204-1:2006, with the following exceptions:

a) for three phase motors the degree of protection shall be at least IP 54 in accordance with EN 60529;

b) the last sentence of 11.3 of EN 60204-1:2006 does not apply.

The power supply cord of transportable machines shall be at least of type H0 7 in accordance with the requirements of HD 22.4 S4:2004.

In accordance with 18.2 and 18.6 of EN 60204-1:2006 the test 1 for the continuity of the protective bonding circuit and functional tests apply.

Verification: by checking the relevant drawings, circuit diagrams, inspection and relevant test 1 for the continuity of the protective bonding circuit and functional tests (specified in test 1 of 18.2 and 18.6 of EN 60204-1:2006).

NOTE 2 For electrical components characteristics the information from the electrical component supplier can be useful. ⟨A1⟩

5.3.5 Ergonomics and handling

⟩A1⟨ The requirements of EN 614-1:2006 shall apply and in addition:

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 positioning, marking and illumination (if necessary) of control devices, and facilities for materials and tool set handling shall be in accordance with ergonomic principles in accordance with EN 894-1:1997, EN 894-2:1997, EN 894-3:2000, EN 1005-1:2001, EN 1005-2:2003, EN 1005-3:2002.

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

Machine components with a mass exceeding 25 kg shall include necessary attachments to accommodate the fitting of a lifting device e.g. lugs positioned such as to avoid their overturn or fall or move in an uncontrolled way during transport, assembly, dismantling, disabling and scrapping.

If the machine is fitted with a movable control panel, this panel shall be fitted with a facility to move it in the desired position.

If graphical symbols related to the operation of actuators are used, they shall be in accordance with Table A.1 of EN 61310-1:2008.

NOTE 1 Further guidance is given in EN 60204-1:2006, EN 614-1:2006 and EN 614-2:2000.

Also see 5.1.2 for position of controls, 6.3, EN 894-3:2000 and EN 1005-3:2002. ⟨A1⟩

On dual-purpose circular sawing machines for firewood/circular saw benches, the effort required to convert from one mode of operation to the other, e.g. lifting the saw bench table on a dual-purpose circular sawing machine for firewood/circular saw bench with a pivoting log carriage shall not exceed 250 N.

⟩A1⟨ NOTE 2 ⟨A1⟩ On ⟩A1⟨ displaceable machines ⟨A1⟩ the designer should consider its weight and ease of moving.

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

5.3.6 Lighting

⟩A1⟨ See 6.3 d) 2) ⟨A1⟩.

5.3.7 Pneumatic

In accordance with 5.1.1, 5.3.16 and EN 983.

5.3.8 Hydraulic

In accordance with 5.1.1, 5.3.16 and EN 982.

5.3.9 Heat

Not relevant.

5.3.10 Substances

See 5.3.3.

5.3.11 Vibration

Not relevant.

5.3.12 [A1] Electromagnetic compatibility [A1]

[A1] The machine shall have sufficient immunity to electromagnetic disturbances to enable it to operate correctly 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 are 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 Clause 1.

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

NOTE For the components' characteristics the information from the manufacturer of the component can be useful. [A1]

5.3.13 Laser

Not relevant.

5.3.14 Static electricity

Not relevant.

5.3.15 Errors of fitting

See 5.3.16, 5.3.17 [A1] and [A1] 6.3 [A1] *deleted text* [A1].

5.3.16 Isolation

[A1] The requirements of Clause 5 of EN 1037:1995 apply and in addition: [A1]

Electrical isolators shall be in accordance with the requirements of 5.3 of [A1] EN 60204-1:2006 [A1] with the exception that item d) of 5.3.2 is modified to increase the maximum power supply to 5.5 kW.

When fitted with a plug to connect the machine to a 3-phase electrical supply, this plug may incorporate a phase inverter.

Where pneumatic energy is used, pneumatic isolators shall be provided with a device for locking the isolator in the isolated condition. Where the pneumatic supply is used only for clamping, a quick action coupling (see EN 983) without the means for locking shall be acceptable.

Where residual energy is stored e.g. in a reservoir or pipe, means for dumping residual pressure shall be provided, for example using a valve. Dumping pressure shall not be by disconnection of a pipe.

Where hydraulic energy is used, hydraulic isolation shall be achieved by isolation of the electrical supply to the electrical motor.

On PTO driven machines, isolation shall be by disconnecting the PTO drive.

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

5.3.17 Maintenance

〚A1〛 The basic principles of 4.15 of EN ISO 12100-2:2003 shall be observed and in addition at least the information for maintenance listed in 6.5.1 e) of EN ISO 12100-2:2003 shall be provided. 〚A1〛

Verification: By checking the instruction handbook.

6 Information for use

See 〚A1〛 4.15 of EN ISO 12100-2:2003. 〚A1〛

6.1 Warning devices

Not relevant.

6.2 Marking

6.2.1 Marking of machine

〚A1〛 The basic 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 stickers or a plate permanently affixed to the machine e.g. by riveting:

a) business name and address of the machine manufacturer and, where applicable, of his authorised representative;

b) year of construction, that is the year in which the manufacturing process is completed;

c) designation of the machinery and designation of series or type;

d) machine identification or serial number (if any);

e) rating information (mandatory for electro-technical products: voltage, frequency);

f) where the machine is fitted with a pneumatic system the nominal pressure for the pneumatic circuits;

g) where the machine is fitted with a pneumatic isolator its function, location and operational position(s) e.g. by a label or a pictogram; 〚A1〛

h) maximum and minimum diameter and bore diameter of the saw blade for which the machine is designed;

i) on dual-purpose circular sawing machines for firewood/circular saw benches the width of the riving knife guiding elements.

In addition, on machines driven by a PTO shaft:

j) the required direction of rotation of the PTO shaft;

k) the maximum permissible PTO speed.

A1 The labels or pictograms for marking the nominal pressure and the isolators shall be fitted in a position in close proximity to the installed location of the isolators 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 the machine is equipped with scales the requirements of EN 894-2:1997 shall apply. A1

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

6.2.2 Riving knife marking

On dual-purpose circular sawing machines for firewood/circular saw benches, the following shall be permanently marked on the riving knife:

a) width of its mounting slot;

b) the thickness and range of saw blade diameters for which it is designed.

Permanently marked means for example engraving or etching.

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

6.3 Instruction handbook

A1 The 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 and, if necessary, information about their meaning as required in 6.1 and 6.2;

b) intended use of the machine;

c) warning regarding residual risks as:

1) Instructions on factors that influence exposure to noise. This includes:

i) the use of saw blades designed to reduce the emitted noise;

ii) saw blade and machine maintenance;

2) information on factors that influence exposure to dust. This includes:

i) type of material being machined;

ii) importance of local extraction (capture at source);

iii) proper adjustment of hoods/baffles/chutes;

d) instruction for safe use in accordance with 6.5.1 d) of EN ISO 12100-2:2003. This includes instructions on how the following points can be satisfied:

1) during operation the machine is standing on level, horizontal ground and that the floor area around the machine is level, well maintained and free from loose material e.g. chips and off-cuts;

2) adequate general or localised lighting to be provided;

3) stock and finished workpieces to be located close to the operators normal working position;

4) use a push block or push stick to avoid working with the hands close to the saw-blade when using a dual purpose circular sawing machine for firewood/circular saw bench in the saw bench mode;

5) refrain from cross cutting logs on a machine in the saw bench mode;

6) the wear of suitable personal protective equipment when necessary; this may include

iv) i) hearing protection to reduce the risk of induced hearing loss;

v) ii) respiratory protection to reduce the risk of inhalation of harmful dust;

vi) iii) gloves for handling saw blades (saw blades should be carried in a holder wherever practicable);

7) to stop the machine running whilst unattended;

8) to report faults in the machine, including guards or saw blades, as soon as they are discovered;

9) to adopt safe procedures for cleaning, maintenance and remove chips and dust regularly to avoid the risk of fire;

10) to follow manufacturers instructions for use, adjustment and repair of saw blades;

11) select the correct riving knife, depending on the saw-blade thickness and diameter, when using a dual purpose circular sawing machine for firewood/circular saw bench in the saw bench mode;

12) to observe the maximum speed marked on the saw blades;

13) to use correctly sharpened saw blades;

14) to ensure that flanges used are suitable for the purpose as stated by the manufacturer (see 5.2.3.2);

15) to refrain from removing any off-cut or other part of the workpiece from the cutting area whilst the machine is running except by using a push stick;

16) to ensure that guards and other safety devices necessary for machine operation are in position, in good working order and properly maintained.

e) information that operators are adequately trained in the use, adjustment and operation of the machine; ⟨A1⟩

⟨A1⟩ *deleted text* ⟨A1⟩

f) information on the maximum and minimum dimensions of the logs (workpiece) which the machine is designed to cut;

g) installation and maintenance requirements including a list of those devices e.g. braking which should be verified, how frequently the verification shall be carried out and by what method (see also 5.5.1e) of ⟨A1⟩ EN ISO 12100-1:2003 ⟨A1⟩);

h) the range of saw blade diameters and thicknesses for which the machine is designed, and on dual-purpose machines, guidance to the user on the selection of the correct riving knife for particular saw blade dimensions;

i) a statement that only saw blades made in conformity to [A1] EN 847-1:2005 [A1] shall be used on the machine;

j) on dual-purpose circular sawing machines for firewood/circular saw benches information concerning maintenance and repair of push block handles and push sticks;

k) on machines fitted with provision for extraction information as follows:

   i) required airflow in $m^3\ h^{-1}$;

   ii) pressure drop at each dust extraction connection outlet;

   iii) recommended conveying air velocity in the duct in $m\ s^{-1}$;

   iv) cross section dimensions and details of each connection outlet;

l) information that the machine during indoor use shall be connected to an external chip and dust extraction system;

NOTE External chip and dust extraction equipment with fixed installation are dealt within [A1] EN 12779:2004 [A1].

m) on PTO driven machines information regarding any special requirements when connecting the machine to an external prime mover;

n) a recommendation that a Residual Current Device (RCD) should be used with all electrically driven transportable machines;

o) [A1] a 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 5.3.2.2.

   1) A-weighted emission sound pressure levels at workstations;

   2) 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: [A1]

4 dB when using EN ISO 3746:1995 or EN ISO 11202:1995;
2 dB when using EN ISO 3743-1 or EN ISO 3743-2 or EN ISO 3744;
1 dB when using [A1] EN ISO 3745 [A1]

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, measurements shall be made using the same method and the same operating conditions as those declared.

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 workforce 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."

〈A1〉 NOTE Information on noise emission should also be provided in the sales literature. 〈A1〉

〈A1〉 p) information on conditions necessary to ensure that throughout the foreseeable lifetime the machine including its components cannot overturn or fall or move in an uncontrolled way during transport, assembly, dismantling, disabling and scrapping; 〈A1〉

〈A1〉 q) the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked; 〈A1〉

〈A1〉 r) the specifications of the spare parts to be used, when these affect the health and safety of operators; 〈A1〉

〈A1〉 s) information on how to provide protection of people against electrical shock due to indirect contact. 〈A1〉

Verification: By checking the instruction handbook and relevant drawings.

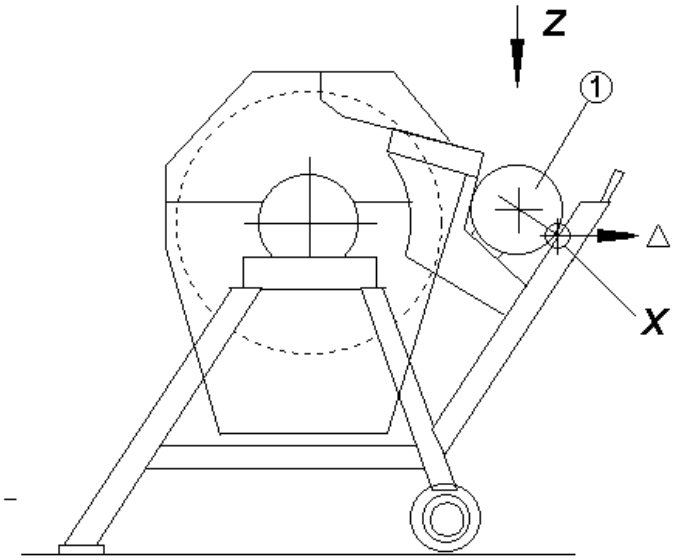
Annex A
(normative)

Stability test

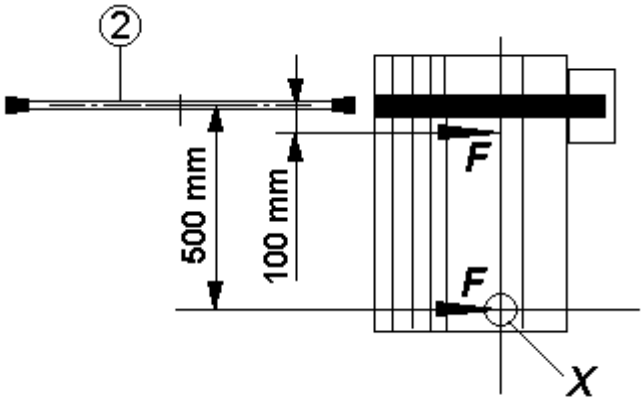
A.1 Torsional resistance test for the pivoting log carriage

The machine shall be fixed to the floor.

Apply a horizontal load of 700 N at the two positions F as shown in Figure A.1 in turn. The maximum deflection Δ measured at point *X* shall not be greater than 10 mm.



View in direction Z

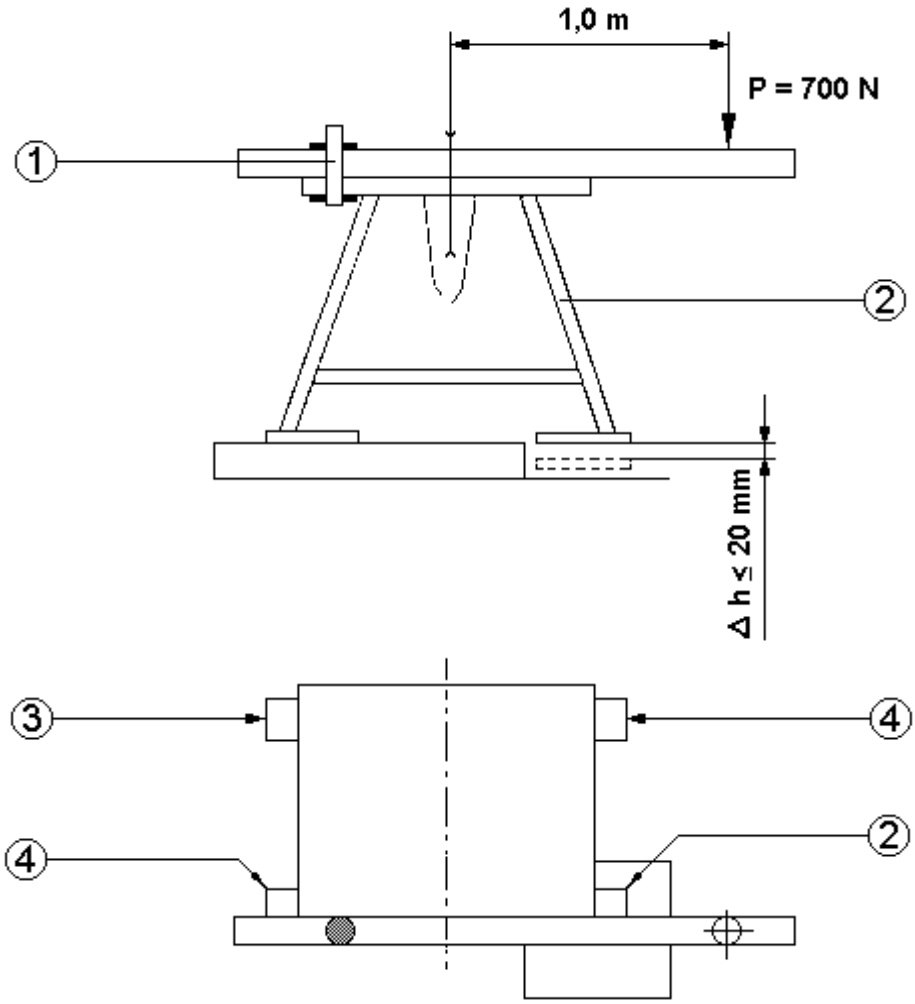


Key	1	Maximum log size
	2	Saw blade
	X	Measuring point

Figure A.1 — Torsional resistance test for the pivoting log carriage

A.2 Rigidity test for a dual-purpose circular sawing machine for firewood/circular saw bench machine set in the saw bench mode

Apply a load of 700N as shown in Figure A.2. The maximum vertical deflection Δh of the free table leg shall not be greater than 20 mm.



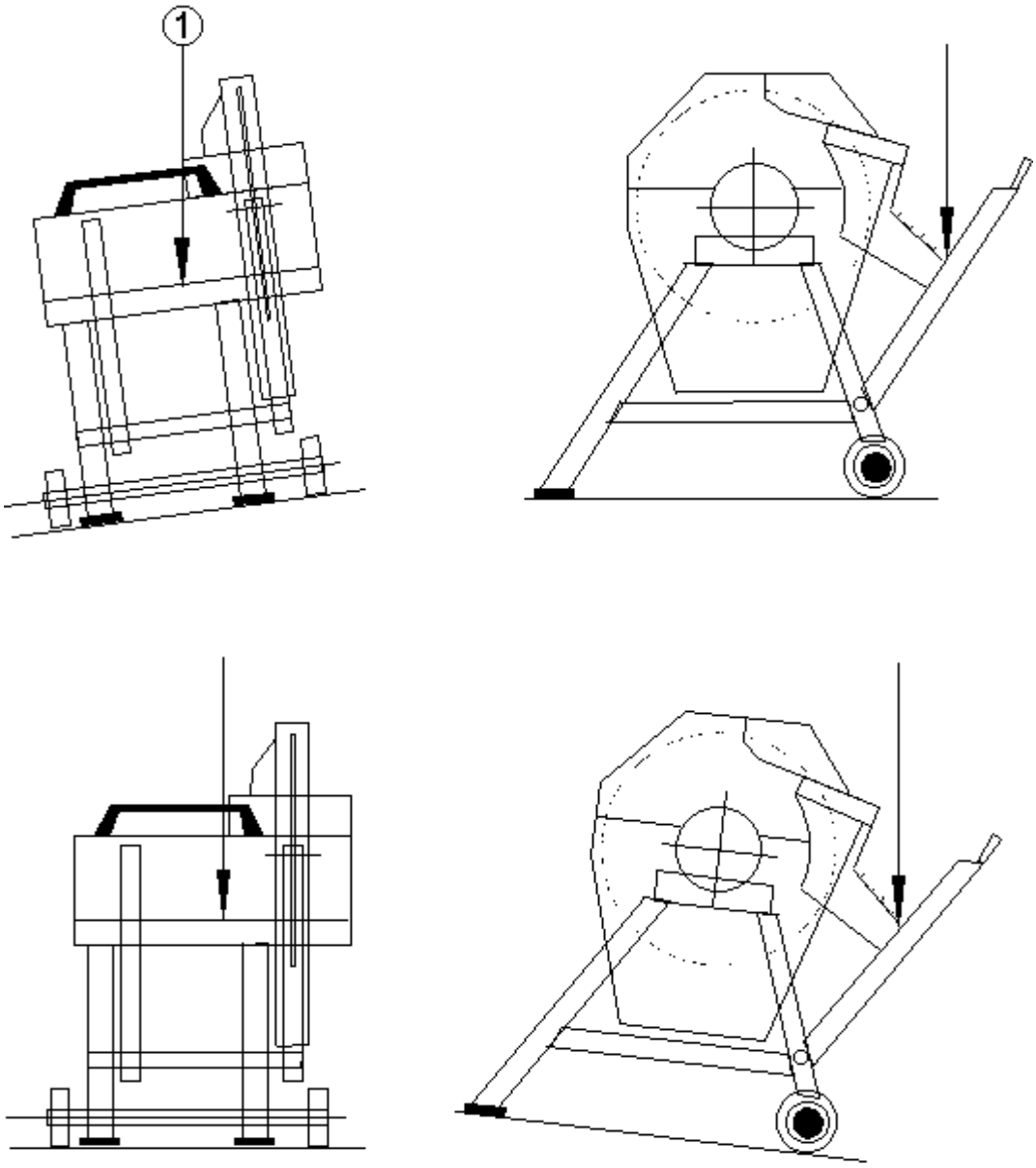
Key		
	1	Clamp
	2	Free table leg
	3	Clamped table leg
	4	Supported table leg

Figure A.2 — Rigidity test for a dual-purpose circular sawing machine for firewood/circular saw bench machine set in the saw bench mode

A.3 Stability test for pivoting log carriage machines

With the machine tilted at 8,5º as shown, and with an applied load P = 500 N for machines designed for a maximum saw blade diameter of 500 mm, and a load of 1 000 N for machines designed for a saw blade diameter above 500 mm, the machine shall not overturn.

The test shall be made in turn for each of the two directions shown in Figure A.3.

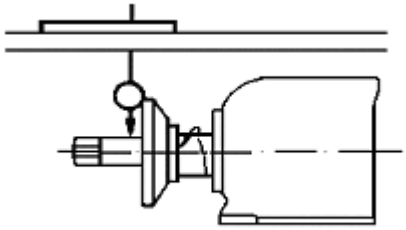
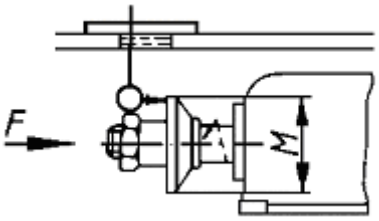


Key 1 Position of application of load *P*

Figure A.3 — Stability test for pivoting log carriage machines

Annex B
(normative)

Saw spindle dimensional tolerances

Diagram	Object	Limit deviation mm	Measuring instruments
 Measurement as close as possible to the saw flange	Measuring saw spindle run-out	0,03	Dial gauge
 Apply axial pressure *F* as recommended by manufacturer	Measuring camming saw flange	0,03 for $M \leq 100$ 0,04 for $M > 100$	Dial gauge

Annex C
(normative)

Riving knife mounting strength test

The machine shall be fitted with the largest saw blade for which it is designed set in its highest position. The riving knife shall be positioned so that its tip is at the same level as the highest point on the periphery of the saw blade and securely tightened with a tightening torque of 25 Nm. A horizontal load of 500 N is applied to the tip (see Figure C.1). In order to comply with this test, the deflection *A* shall not be greater than the values given in Table C.1.

Table C.1 — Riving knife deflection

Saw blade diameter for which riving knife is designed	≤ 315 mm	> 315 mm
Maximum deflection "*A*"	1,5 mm	2,0 mm

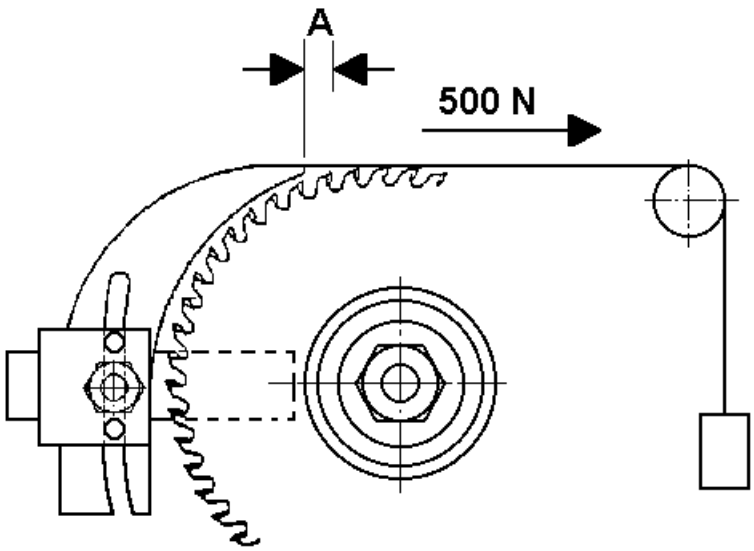


Figure C.1 — Riving knife mounting strength test

Annex D
(normative)

Riving knife lateral stability test

With the riving knife securely tightened in position to suit the maximum diameter saw blade for which the machine is designed, a horizontal load of 30 N is applied to the tip as shown in Figure D.1. The maximum deflection *d* shall not exceed 8 mm.

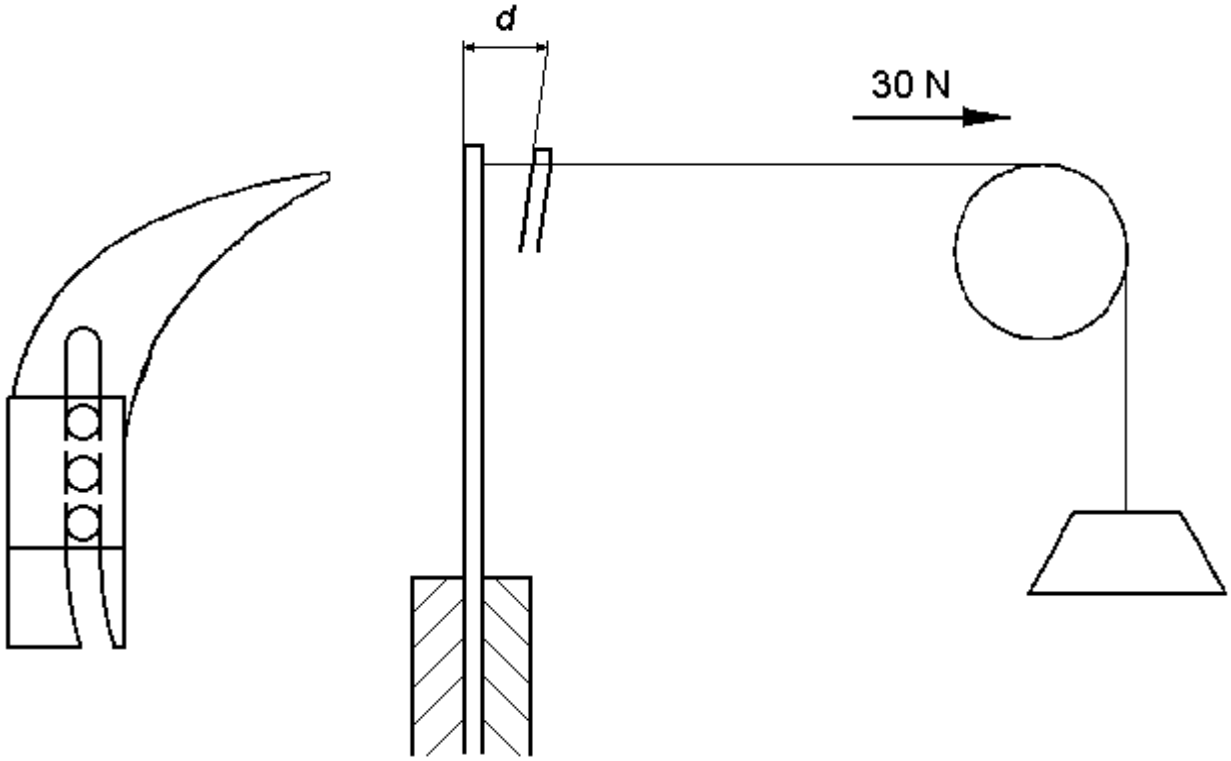


Figure D.1 — Riving knife lateral stability test

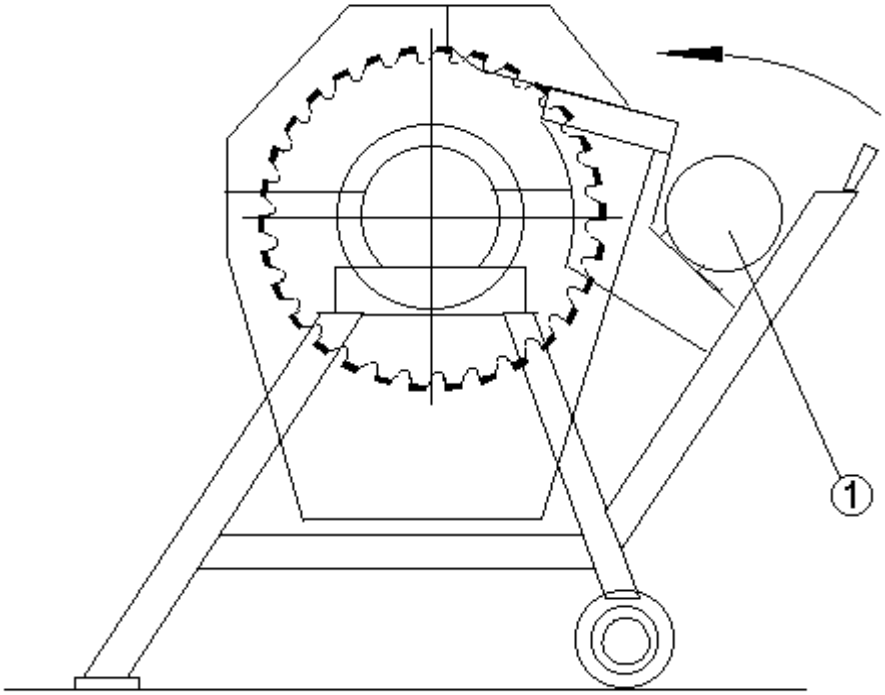
Annex E
(normative)

Test for safe log (workpiece) positioning on circular sawing machines for firewood with pivoting log carriage

The machine shall be equipped with a new, sharp saw blade to the machine manufacturer's recommendation.

Round-wood with a diameter of 70 mm, 300 mm long shall be positioned in the pivoting log carriage so that there is 100 mm of the log at the outfeed side of the saw-line. The log carriage is moved toward the saw blade, without holding the workpiece, and a cut of 10 mm depth is made (see Figure E.1).

The workpiece shall not rotate more than 180º during cutting.



Key 1 Log with 70 mm Ø

Figure E.1 — Test for safe log (workpiece) positioning on circular sawing machines for firewood with pivoting log carriage

Annex F
(normative)

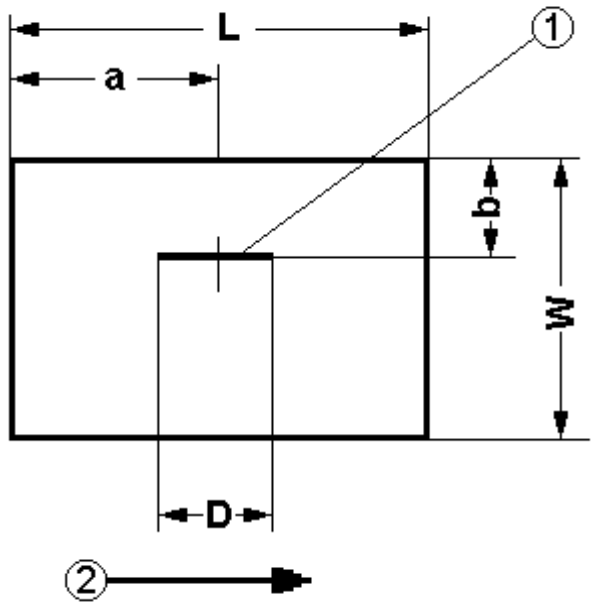
Saw bench table minimum dimensions on dual-purpose circular sawing machines for firewood/circular saw benches

The minimum dimensions of the saw bench table in relation to the saw blade diameter shall be in accordance with the requirements of Table F.1.

Table F.1 — Saw bench table dimensions

All dimensions in millimetres

Saw blade diameter *D*	315 > *D* ≤ 400	400 > *D* ≤ 500	*D* > 500
L	1000	1250	1250
W	850	850	850
a	≥ 500	≥ 625	≥ 750
b	≤ 280	≤ 280	≤ 280



Key
1 Saw blade
2 Feed direction

Figure F.1 — Saw bench table minimum dimensions on dual-purpose circular sawing machines for firewood/circular saw benches

Annex G
(normative)

Saw blade guard stability test for dual purpose circular sawing machines for firewood/circular saw benches

G.1 General

All tests shall be performed without a saw blade fitted to the machine.

G.2 Machines with saw blade guards with lead-in

The test loads shall be applied to the saw blade guard 40 mm above the furthermost point of lower edge which is parallel to the table (see Figure G.1).

The measuring point *A* shall be located at the same point where the test load is applied (see Figure G.1).

The measuring point *B* shall be located at a point on the top edge directly above the saw blade spindle axis (see Figure G.1).

The deflections of the saw blade guard shall be as follows:

a) ≤ 8 mm at measuring point *A*;

b) ≤ 3 mm at measuring point *B*.

G.3 Machines with saw blade guards with in-feed rollers

The test loads shall be applied to the saw blade guard at 40 mm higher than the lowest point of the first in-feed roller and directly above the furthermost point of the lower edge (excluding the in-feed roller support) which is parallel to the table (see Figure G.2).

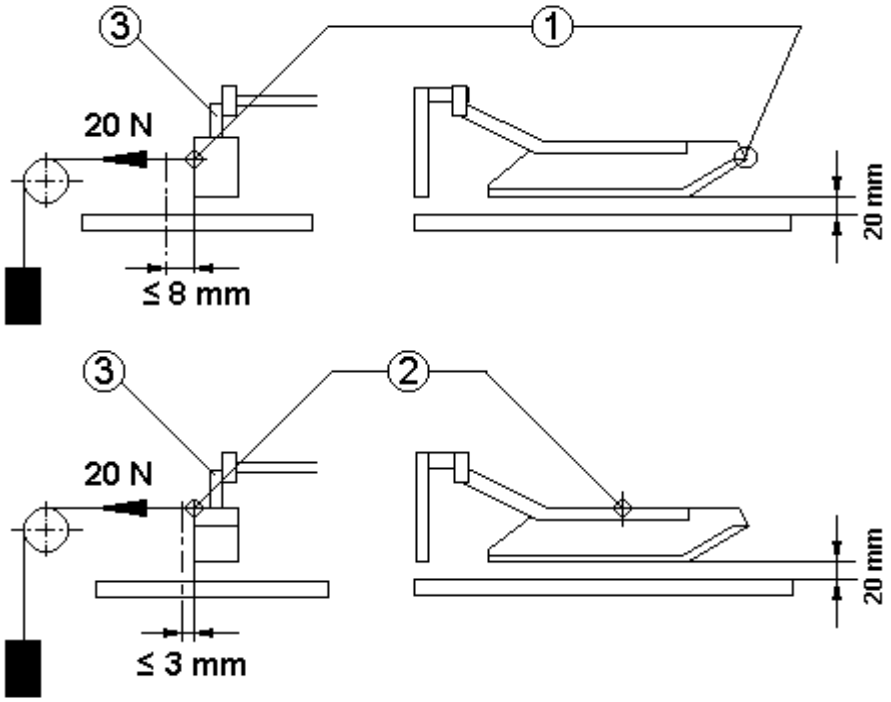
The measuring point *A* shall be located at the same point where the test load is applied (see Figure G.2).

The measuring point *B* shall be located at a point on the top edge directly above the saw blade spindle axis (see Figure G.2).

The deflections of the saw blade guard shall be as follows:

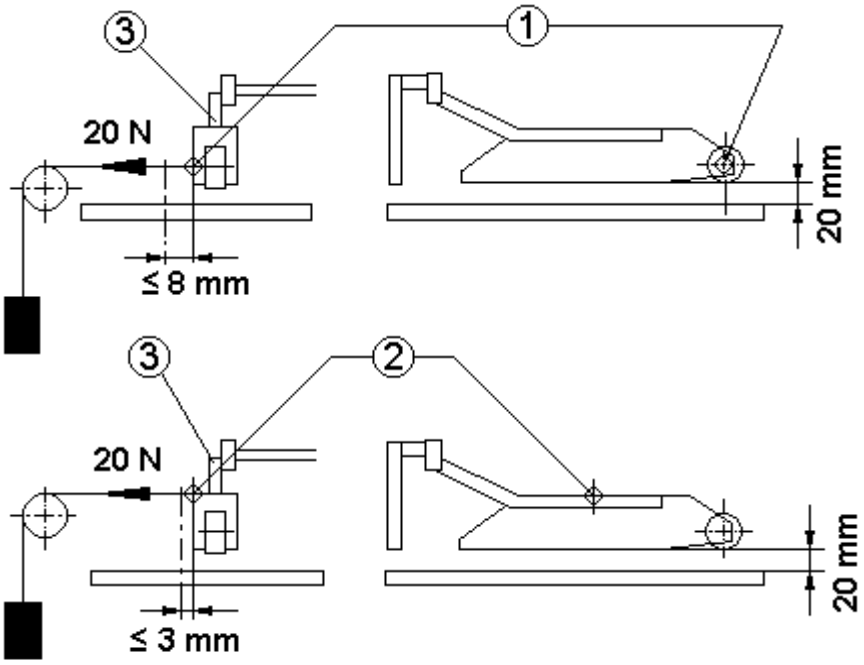
a) ≤ 8 mm at measuring point *A*;

b) ≤ 3 mm at measuring point *B*.



Key
1 Measuring point *A*
2 Measuring point *B*

Figure G.1 — Stability test for saw blade guards with lead-in



Key
1 Measuring point *A*
2 Measuring point *B*

Figure G.2 — Stability test for saw blade guards with in-feed rollers

〈A1〉 *deleted text* 〈A1〉

Annex ZA
(informative)

A1 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 the New Approach Directive 98/79/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses, except normative clause 6.3 d) indents 1), 3), 6), 7), 8), 9) and 15) of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements, except Essential Requirement 1.5.11 limited to EMC immunity for computer numerically controlled (CNC) machines, of that Directive and associated EFTA regulations.

WARNING - Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard. A1

Annex ZB
(informative)

A1 Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/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 2006/42/EC.

Once this standard is cited in the Official Journal of the European Union 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 normative clause 6.3 d) 1), 3), 8), 9) and 15), confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements, except Essential Requirements 1.5.11 limited to EMC immunity for computer numerically controlled (CNC) machines, of that Directive and associated EFTA regulations.

WARNING - Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard. A1

Bibliography

[1] EN 609-1, [A1] *Agricultural and forestry machinery — Safety of log splitters — Part 1: Wedge splitters* [A1]

[2] EN 609-2, [A1] *Agricultural and forestry machinery — Safety of log splitters — Part 2: Screw splitter* [A1]

[3] [A1] EN 12779:2004, *Safety of woodworking machines — Chip and dust extraction systems with fixed installation — Safety related performances and safety requirements.* [A1]

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