BRITISH STANDARD

BS EN
1870-5:2002

Safety of woodworking machines — Circular sawing machines —

Part 5: Circular sawbenches/up-cutting cross-cut sawing machines

The European Standard EN 1870-5:2002 has the status of a British Standard

ICS 79.120.10

British Standards

National foreword

This British Standard is the official English language version of EN 1870-5:2002.

The UK participation in its preparation was entrusted to Technical Committee MTE/23, Woodworking machinery — Safety, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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This British Standard, having been prepared under the direction of the Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 23 July 2002

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Safety of woodworking machines - Circular sawing machines - Part 5: Circular sawbenches/up-cutting cross-cut sawing machines

Sécurité des machines pour le travail du bois - Machines à scier circulaires - Partie 5: Scies circulaires combinées à table et à coupe transversale ascendante

Sicherheit von Holzbearbeitungsmaschinen - Kreissägemaschinen - Teil 5: Kombinierte Tischkreissägemaschinen/von unten schneidende Kappsägemaschinen

This European Standard was approved by CEN on 8 November 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document (EN 1870-5:2002) has been prepared by Technical Committee TC 142 "Woodworking machines - Safety", the secretariat of which is held by BSI.

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 October 2002, and conflicting national standards shall be withdrawn at the latest by October 2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

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

Annexes A, B, C, D and E are normative and Annexes F, G and ZA 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 EN 292-1:1991 for a description of A, B and C standards).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the 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 EN 292-1:1991.

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 sawbenches/up-cutting cross-cut sawing machines.

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

Common requirements for tooling are given in EN 847-1:1997.

Electrically driven machines excluded by the scope of this European Standard are covered by the requirements of EN 61029-1:1995.

1 Scope

This European Standard specifies the requirements and/or the measures to remove the hazards and limit the risk on circular sawbenches/up-cutting cross-cut sawing machines, hereinafter referred to as “machines”, designed to cut solid wood, chipboard, fibreboard, plywood and also these materials where they are covered with plastic edging and/or plastic/light alloy laminates.

This European Standard does not apply to :

— hand held woodworking machines or any adaptation permitting their use in a different mode, i.e. bench mounting;

— machines set up on a bench or a table similar to a bench, which is intended to carry out work in a stationary position, capable of being lifted by one person by hand.

This European Standard covers the hazards relevant to these machines as stated in clause 4.

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

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

NOTE Circular sawbenches are dealt with in EN 1870-1:1999.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991	*Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology*
EN 292-2:1991 EN 292-2:1991/A1:1995	*Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications*
EN 294:1992	*Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs*
EN 847-1:1997	*Tools for woodworking - Safety requirements - Part 1: Milling tools and circular sawblades*
EN 954-1:1996	*Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design*
EN 982:1996	*Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics*
EN 983:1996	*Safety of machinery - Safety requirements for fluid power systems and their components - Pneumatics*
EN 1088:1995	*Safety of machinery - Interlocking devices associated with guards - Principles for design and selection*

EN 60204-1:1992	*Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:1992, modified)*
EN 60529	*Degree of protection provided by enclosures (IP code) (IEC 60529:1989)*
EN 60825-1	*Safety of laser products - Part 1: Equipment classification, requirements and users guide (IEC 60825-1:1993)*
EN 60947-4-1	*Low voltage switchgear and control gear - Part 4: Contactors and motor starters - Section 1: Electromechanical contactors and motor starters (IEC 60947-4-1:1990)*
EN 60947-5-1:1997	*Low voltage switchgear and control gear - Part 5: Control circuit devices and switching elements - Section 1: Electromechanical control circuit devices (IEC 60947-5-1:1990)*
EN 61029-1:1995	*Safety of transportable motor operated electric tools - Part 1: General requirements (IEC 1029-1:1990 modified)*
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 wall test rooms (ISO 3743-1:1994)*
EN ISO 3743-2	*Acoustics - Determination of sound power levels of noise sources - Engineering methods for small, moveable sources in reverberant fields - Part 2: Method for special reverberation test rooms (ISO 3743-2:1994)*
EN ISO 3744	*Acoustics - Determination of sound power levels of noise sources using sound pressure engineering methods in an essentially free field over a reflecting plane (ISO 3744:1994)*
EN ISO 3746:1995	*Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method employing an enveloping measurement surface over a reflecting plane (ISO 3746:1995)*
EN ISO 4871:1996	*Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*
EN ISO 9614-1	*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	*Acoustics - Noise emitted by machinery and equipment - Measurement method of emission sound pressure levels at the workstation and at other specified positions survey method in situ (ISO 11202:1995)*
EN ISO 11204:1995	*Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at the workstation and at other specified positions - Method requiring environmental corrections (ISO 11204:1995)*
EN ISO 11688-1	*Acoustics - Recommended practice for the design of low noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*
ISO 3745	*Acoustics - Determination of sound power levels of noise sources - Precision methods for anechoic and semi-anechoic rooms*
ISO 7960:1995	*Airborne noise emitted by woodworking machine tools - Operating conditions for woodworking machines*
HD 21.1 S3	*Polyvinyl chloride insulated cables of rated voltages up to and including 450/750v - Part 1: General requirements*

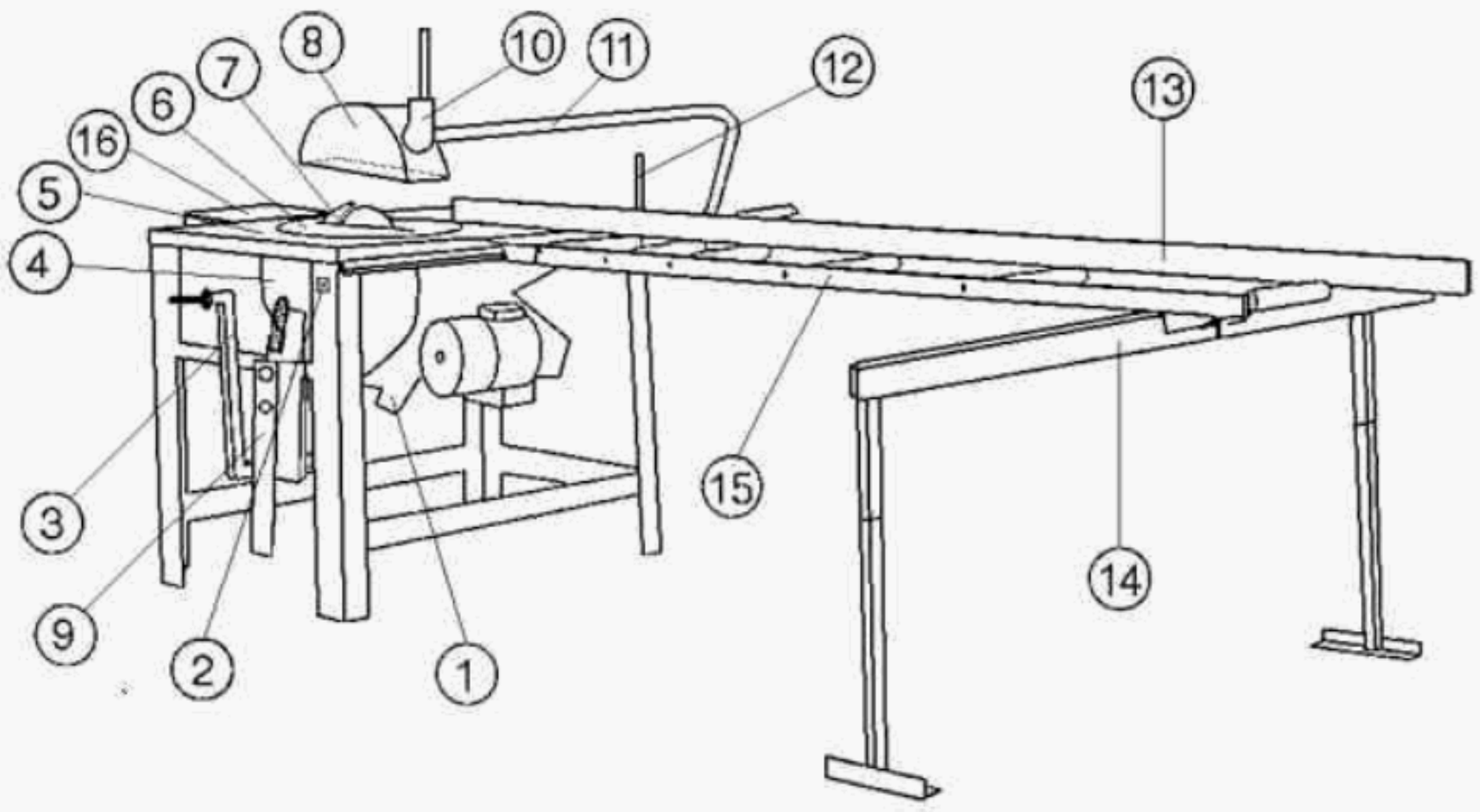
HD 22.1 S3	*Rubber insulated cables of rated voltages up to and including 450/750v - Part 1: General requirements*
HD 22.4 S3	*Rubber insulated cables of rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables (IEC 60245-4:1994, modified)*

3 Terms and definitions

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

3.1 Terms

The main parts of the machine and their terminology are illustrated in Figure 1.



Key

1	Under table extraction point
2	Controls
3	Elevation arm
4	Fixed guard beneath table
5	Table
6	Rotating part of table
7	Riving knife
8	Sawblade guard
9	Push stick
10	Sawblade guard exhaust outlet
11	Saw guard support
12	Moveable roller table locking clamp
13	Rip- and cross-cut fence
14	Moveable roller table support
15	Moveable roller table
16	Extension table

Figure 1 — Terminology

3.2 Definitions

3.2.1
circular sawbench/up-cutting cross-cut sawing machine
circular sawing machine with a single sawblade. The sawblade spindle has one fixed rotational speed. The saw unit is situated below the workpiece support (table) and the machine may be used in three modes :

a) for ripping, with the sawblade set parallel to the fence. The workpiece is fed manually or by a demountable power feed (see Figure 2); or

b) for cross-cutting, with the saw unit set at 90º to the fence. The workpiece is fed manually by use of a sliding infeed table which moves at 90º to the fence (see Figure 3); or

c) for cross cutting where the saw unit is raised manually e.g. by a hand lever, to cut through the stationary workpiece (see Figure 4)

In addition, in each mode the saw unit may be tilted about the horizontal axis of the saw spindle to produce an angled cut on the workpiece. In the cross-cutting modes the saw unit can be additionally rotated about a vertical axis to produce a bevelled cut.

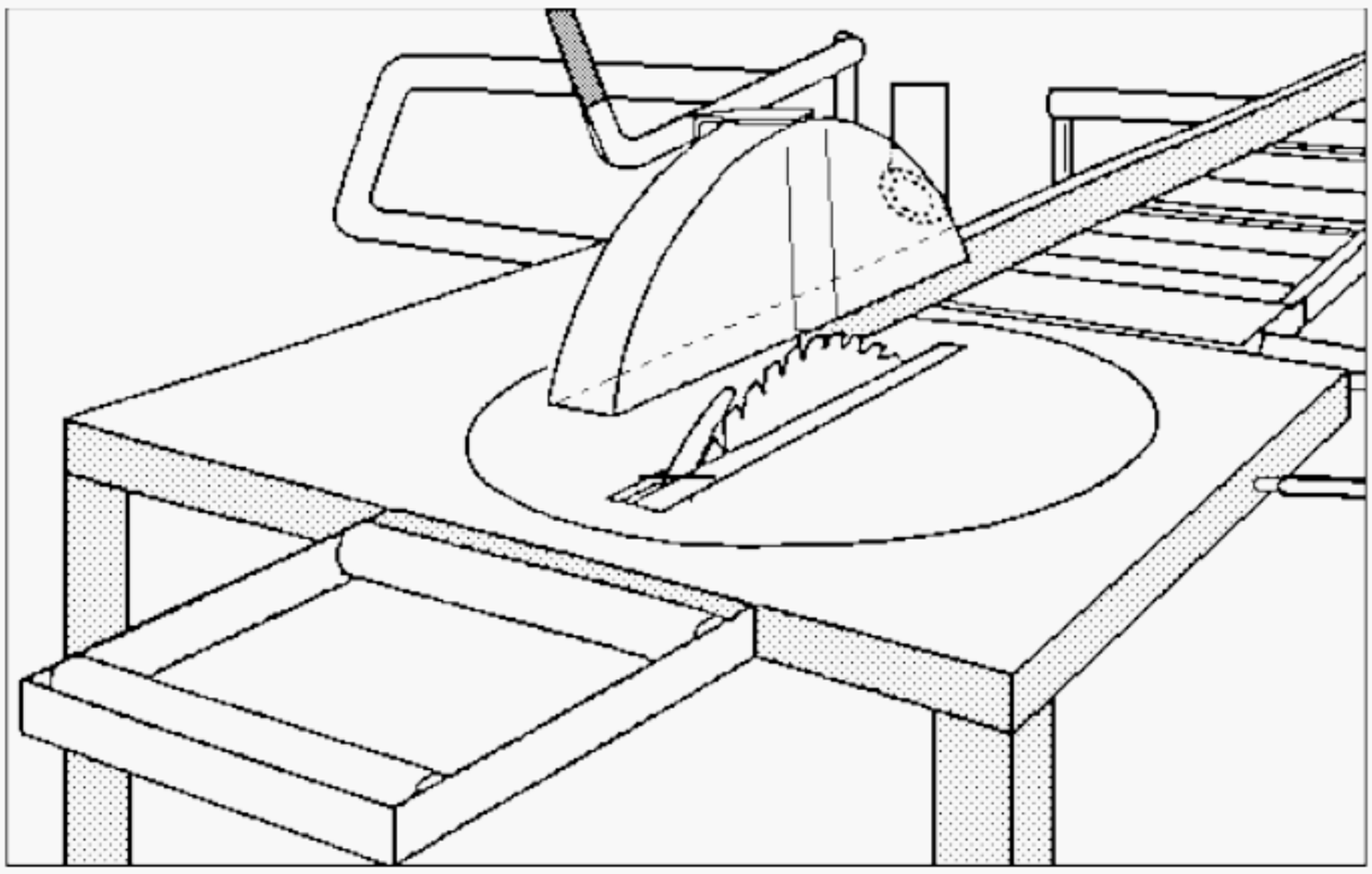


Figure 2 — Example of a machine in the ripping mode

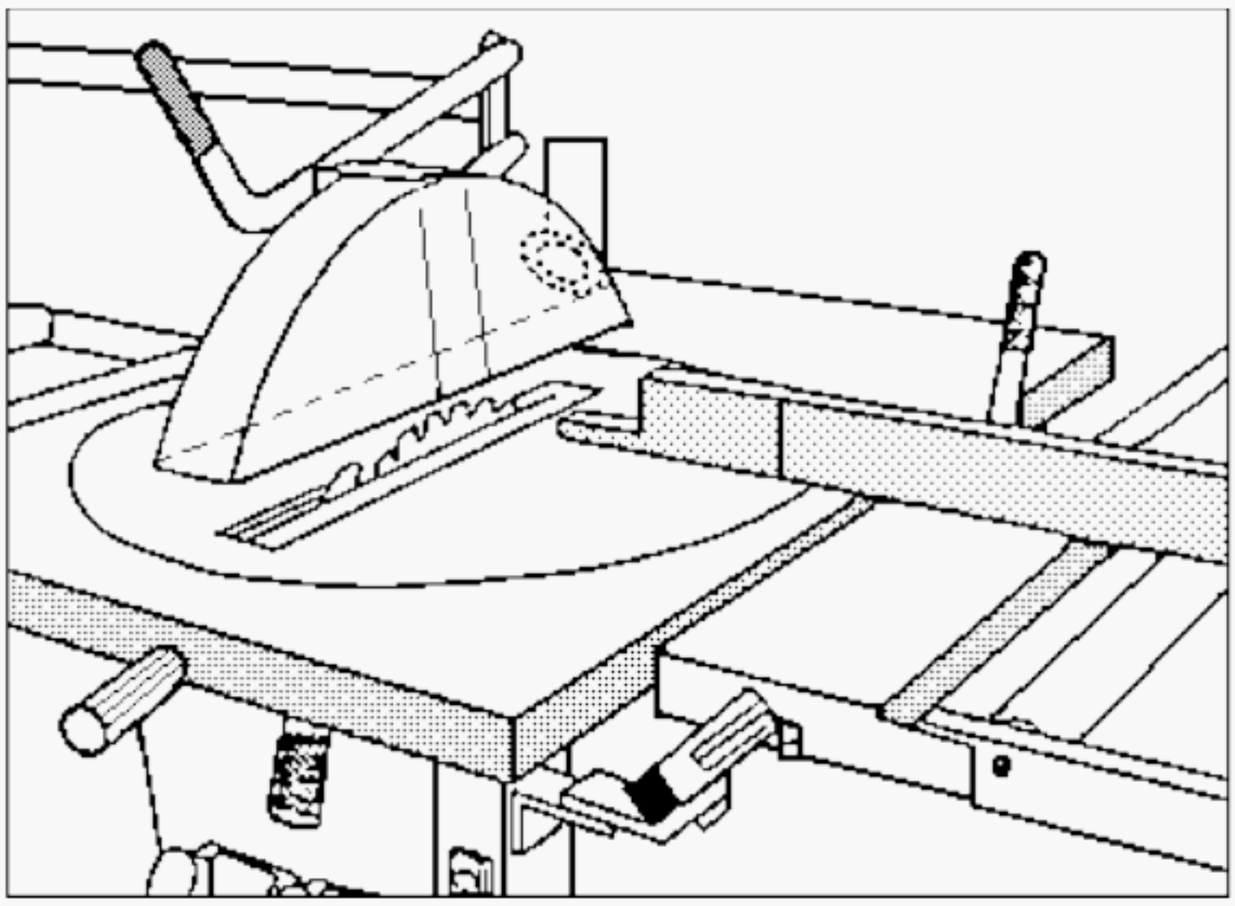


Figure 3 —Example of a machine in the cross-cutting mode with moved workpiece

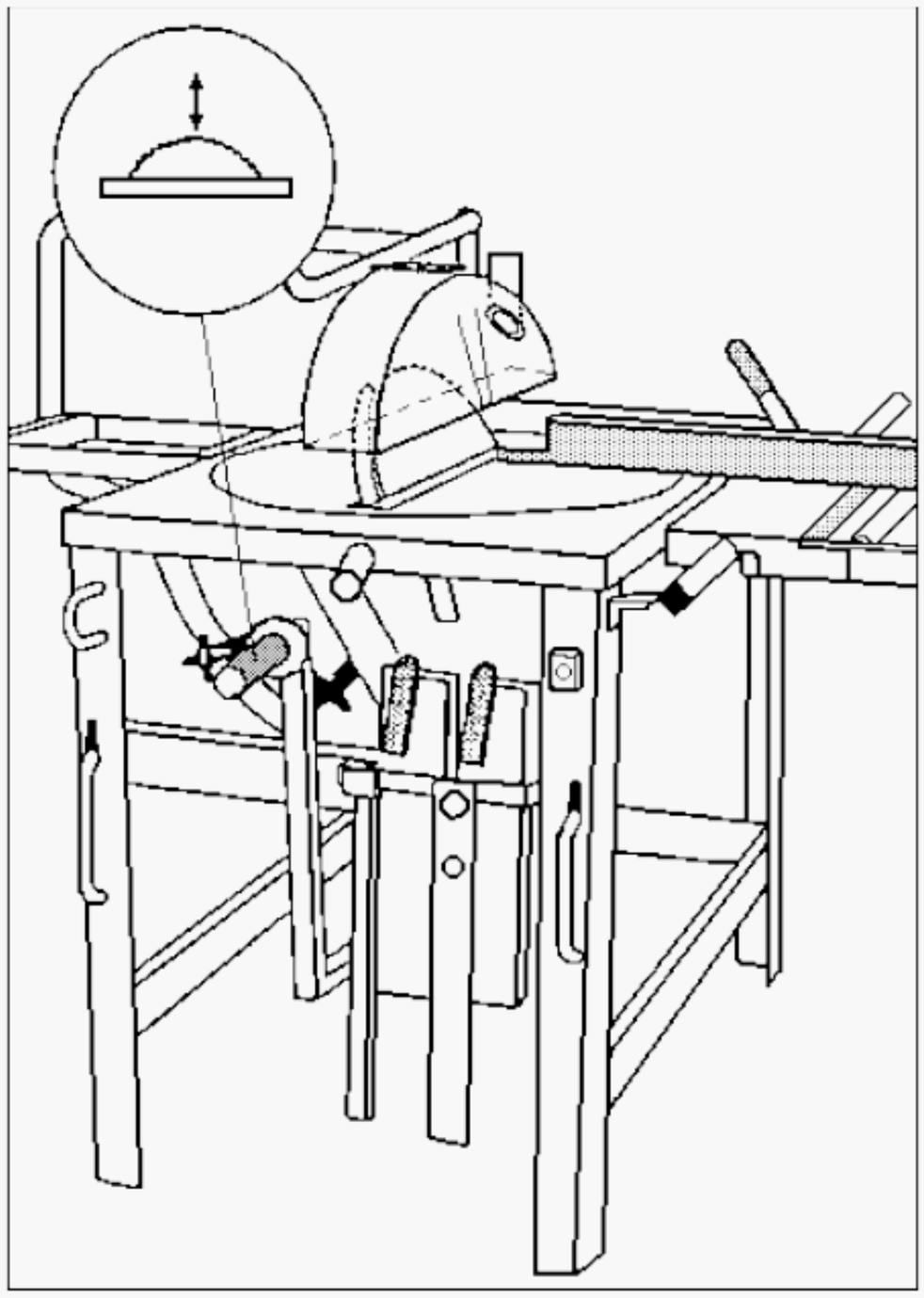


Figure 4 — Example of a machine in the cross-cutting mode with stationary workpiece

3.2.2
infeed table
additional table at the infeed of the machine, used as :

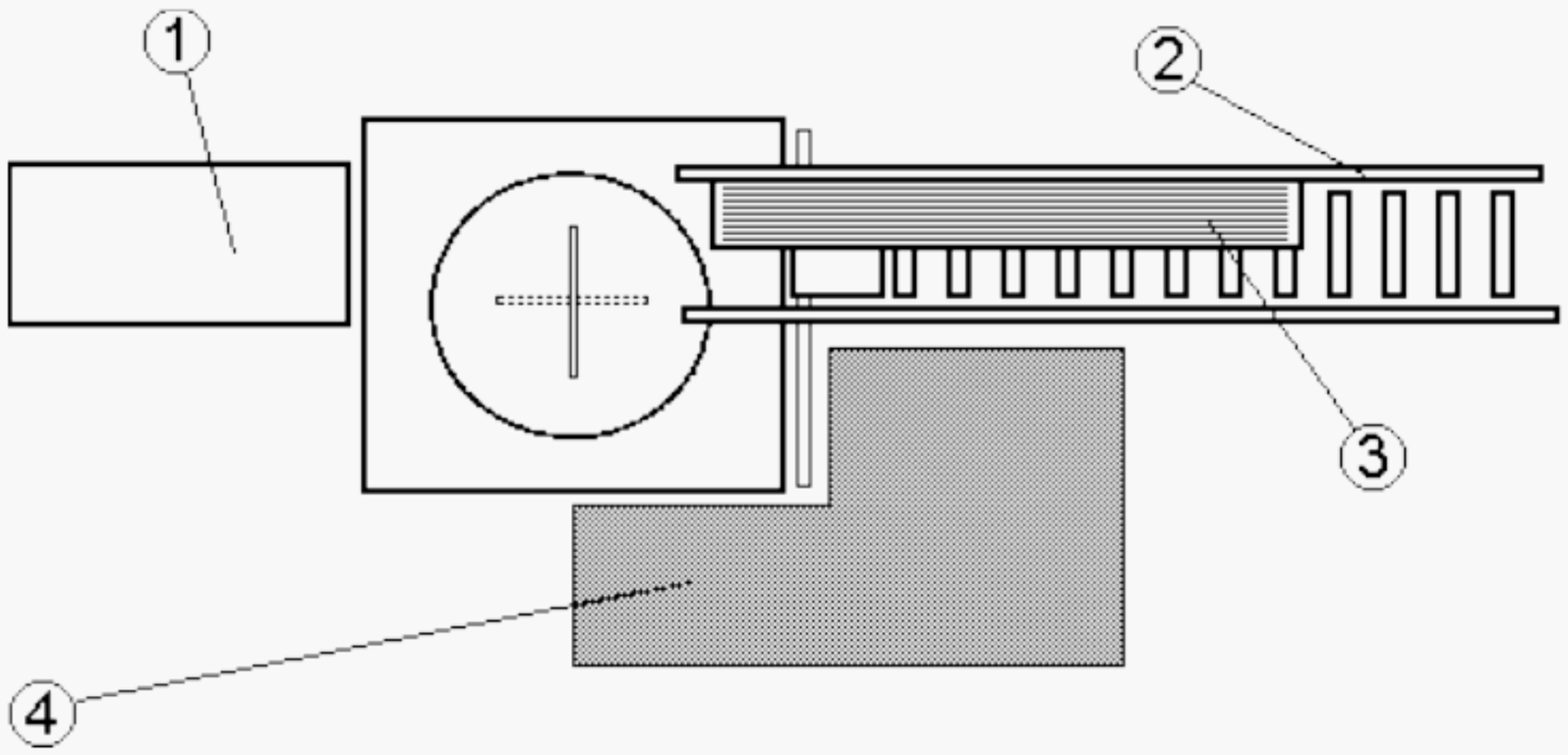
a) a support for the rip fence and to facilitate feeding the workpiece for ripping during use of the machine as a circular sawbench;

b) a sliding table for cross-cutting with the sawblade unit in a fixed position;

c) additional fixed position workpiece support during use of the machine as an up-cutting cross-cut sawing machine

3.2.3
operator position
that area occupied by the operator for use in the bench sawing mode and for use in both cross-cut sawing modes, as shown in Figure 5

Plan view of machine



Key
1 Outfeed table
2 Infeed table
3 Workpiece
4 Operating area for ripping and cross-cutting modes

Figure 5 — Operating position

3.2.4
transportable machine
machine which is located on the floor, stationary during use and equipped with a device, normally wheels, which allows it to be moved between locations

3.2.5
machine actuator
power mechanism used to effect motion of the machine

3.2.6
hand feed
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.

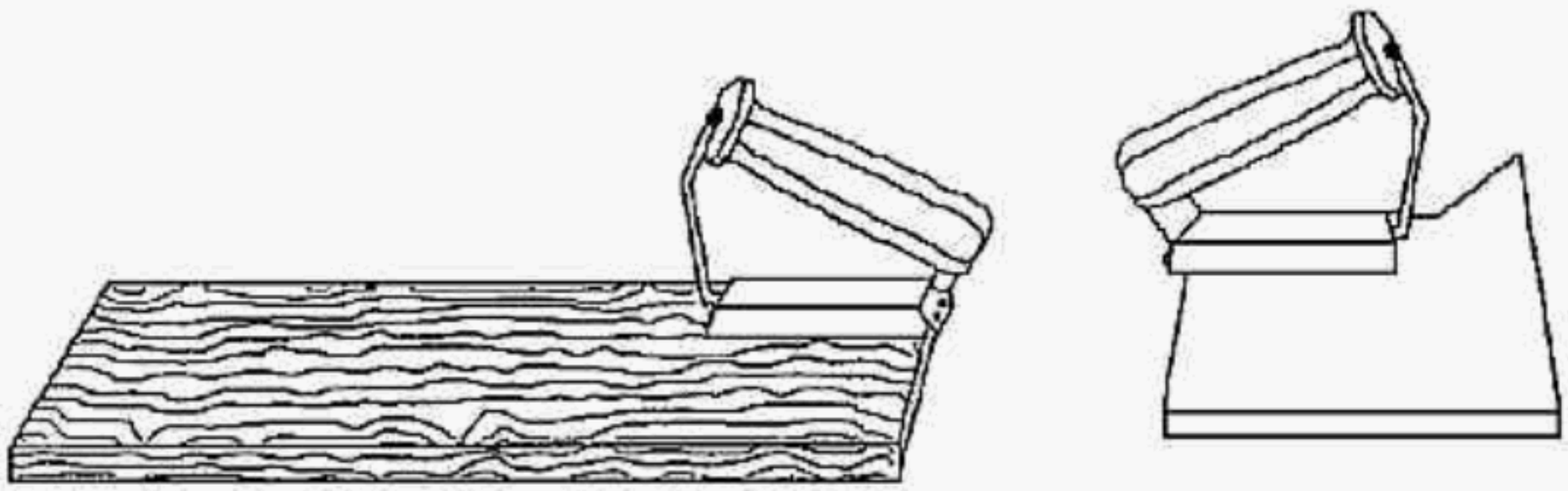
3.2.7
demountable power feed unit
feed mechanism which is mounted on the machine so that it can be moved from the working position without the use of a spanner or similar additional device

3.2.8
ejection
unexpected movement of the workpiece or parts of it or part of the machine from the machine during processing

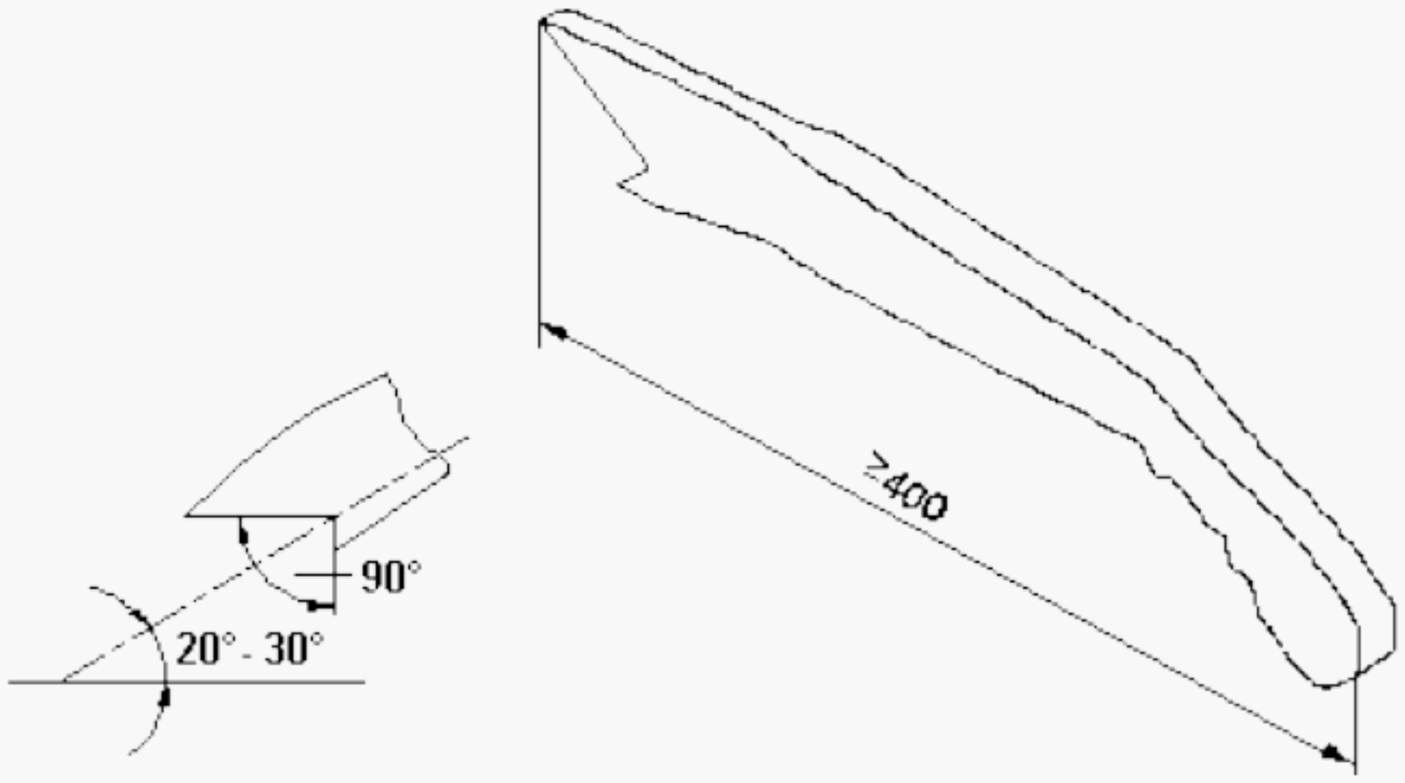
3.2.9
kickback
particular form of ejection and is describing the unexpected movement of the workpiece or parts of it or parts of the machine opposite to the direction of feed during processing

3.2.10
anti-kickback device
device which either reduces the possibility of kickback or arrests the motion during kickback of the workpiece or parts of it or parts of the machine

3.2.11
safety appliance
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 6



b) — Example of push block



a) — Example of push stick

Figure 6 — Examples of a push stick and push block

3.2.12
run-down time
time elapsed from the actuation of the stop control up to spindle standstill

3.2.13
confirmation
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

This European Standard deals with all hazards listed and relevant to the machines as defined in the scope :

— for significant hazards by defining safety requirements and/or measures or by reference to relevant type B standards;

— or hazards which are not significant e.g. general, minor or secondary hazards by reference to relevant type A or B standards, especially EN 292-1:1991 and EN 292-2:1991/A1:1995.

These hazards are listed in Table 1 in accordance with Annex A of EN 292-2:1991/A1:1995.

Table 1 — List of significant hazards

Number	Significant hazard	Relevant clauses of this European Standard
1	Mechanical hazards caused for example by : - shape; - relative location; - mass and stability (potential energy of elements); - mass and velocity (kinetic energy of elements); - inadequacy of the mechanical strength. Accumulation of potential energy by : - elastic elements (springs); or - liquids or gases under pressure; or - vacuum of the machine parts or workpieces.	
1.1	Crushing hazard	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
1.6	Impact hazard	Not relevant
1.7	Stabbing or puncture hazard	Not relevant
1.8	Friction or abrasion hazard	Not relevant
1.9	High pressure fluid ejection hazard	5.3.7
1.10	Ejection of parts (of machinery and processed materials/workpieces)	5.2.2, 5.2.3, 5.2.5, 5.2.6, 5.2.8
1.11	Loss of stability of machinery and machine parts	5.2.1
1.12	Slip, trip and fall hazards in relationship with machinery (because of their mechanical nature)	Not relevant
2	Electrical hazards caused for example by :	
2.1	Electrical contact (direct or indirect)	5.3.4, 5.3.16
2.2	Electrostatic phenomena	Not relevant
2.3	Thermal radiation or other phenomena such as ejection of molten particles and chemical effects from short circuits, overloads etc.	Not relevant
2.4	External influences on electrical equipment	5.1.1, 5.3.4, 5.3.12
3	Thermal hazards resulting in :	
3.1	Burns and scalds, by a possible contact of persons, by flames or explosion and also by the radiation of heat sources	Not relevant
3.2	Health damaging effects by hot or cold work environment	Not relevant
4	Hazards generated by noise resulting in :	
4.1	Interference with speech communication, acoustic signals etc.	5.3.2
4.2	Hearing losses (deafness), or other physiological disorders (e.g. loss of balance, loss of awareness)	5.3.2
5	Hazards generated by vibration (resulting in a variety of neurological and vascular disorders)	Not relevant

(continued)

Table 1 — List of significant hazards (concluded)

Number	Significant hazard	Relevant clauses of this European Standard
6	Hazards generated by radiation, especially by :	
6.1	Electric arcs	Not relevant
6.2	Lasers	5.3.13
6.3	Ionising radiation sources	Not relevant
6.4	Machines making use of high frequency electrical fields	Not relevant
7	Hazards generated by materials and substances processed, used or exhausted by machinery for example:	
7.1	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dust	5.3.3
7.2	Fire or explosion hazard	5.3.1, 5.3.3, 5.3.4, Annex F
7.3	Biological and microbiological (viral or bacterial hazards)	Not relevant
8	Hazards generated by neglecting ergonomic principles in machine design (mismatch of machinery with human characteristics and abilities) caused for example by :	
8.1	Unhealthy postures or excessive efforts	5.1.2
8.2	Inadequate consideration of human hand-arm or foot-leg anatomy	5.1.2
8.3	Neglect of use of personal protection equipment	6.3, Annex F
8.4	Inadequate area lighting	Annex F
8.5	Mental overload or underload, stress etc	Not relevant
8.6	Human error	6.3, Annex F
9	Hazard combinations	5.1.7
10	Hazards caused by failure of energy supply breaking down of machinery parts and other functional disorders, for example :	
10.1	Failure of energy supply (of energy and/or control circuits)	5.1.1, 5.1.5, 5.1.6
10.2	Unexpected ejection of machine parts or fluids	5.2.5
10.3	Failure, malfunction of control systems (unexpected start up, unexpected overrun)	5.1.1
10.4	Errors of fitting	5.2.3, 5.3.15
10.5	Overturn, unexpected loss of machine stability	5.2.1
11	Hazards caused by (temporary) missing and/or incorrectly positioned safety related measures/means for example :	
11.1	All kinds of guard	5.2.7
11.2	All kinds of safety related (protection) devices	5.1.1, 5.2.7
11.3	Starting and stopping devices	5.1.2, 5.1.3, 5.1.4, 5.2.4
11.4	Safety signs and signals	6.2
11.5	All kinds of information and warning devices	6.2, 6.3
11.6	Energy supply disconnection devices	5.3.16
11.7	Emergency devices	Not relevant
11.8	Feeding/removal means of workpieces	5.2.6
11.9	Essential equipment and accessories for safe adjusting and/or maintaining	5.3.17
11.10	Equipment evacuating gases etc	5.3.3

5 Safety requirements and/or measures

For guidance in connection with risk reduction by design, see clause 3 of EN 292-2:1991/A1:1995, 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 EN 954-1:1996) are those for :

— starting (see 5.1.3);
— normal stopping (see 5.1.4);
— interlocking (see 5.2.7.3, 5.2.7.4);
— the braking system (see 5.1.4, 5.2.4).

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

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) EN 60947-5-1:1997, 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) EN 60947-4-1 for electromechanical contactors and motor-starters used in main circuits;

iii) HD 22.1 S3 for rubber-insulated cables;

iv) HD 21.1 S3 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 EN 60204-1:1992. 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 EN 60204-1:1992;

c) mechanical components if, for example, they operate in the positive mode in accordance with the description given in 3.5 of EN 292-2:1991/A1:1995;

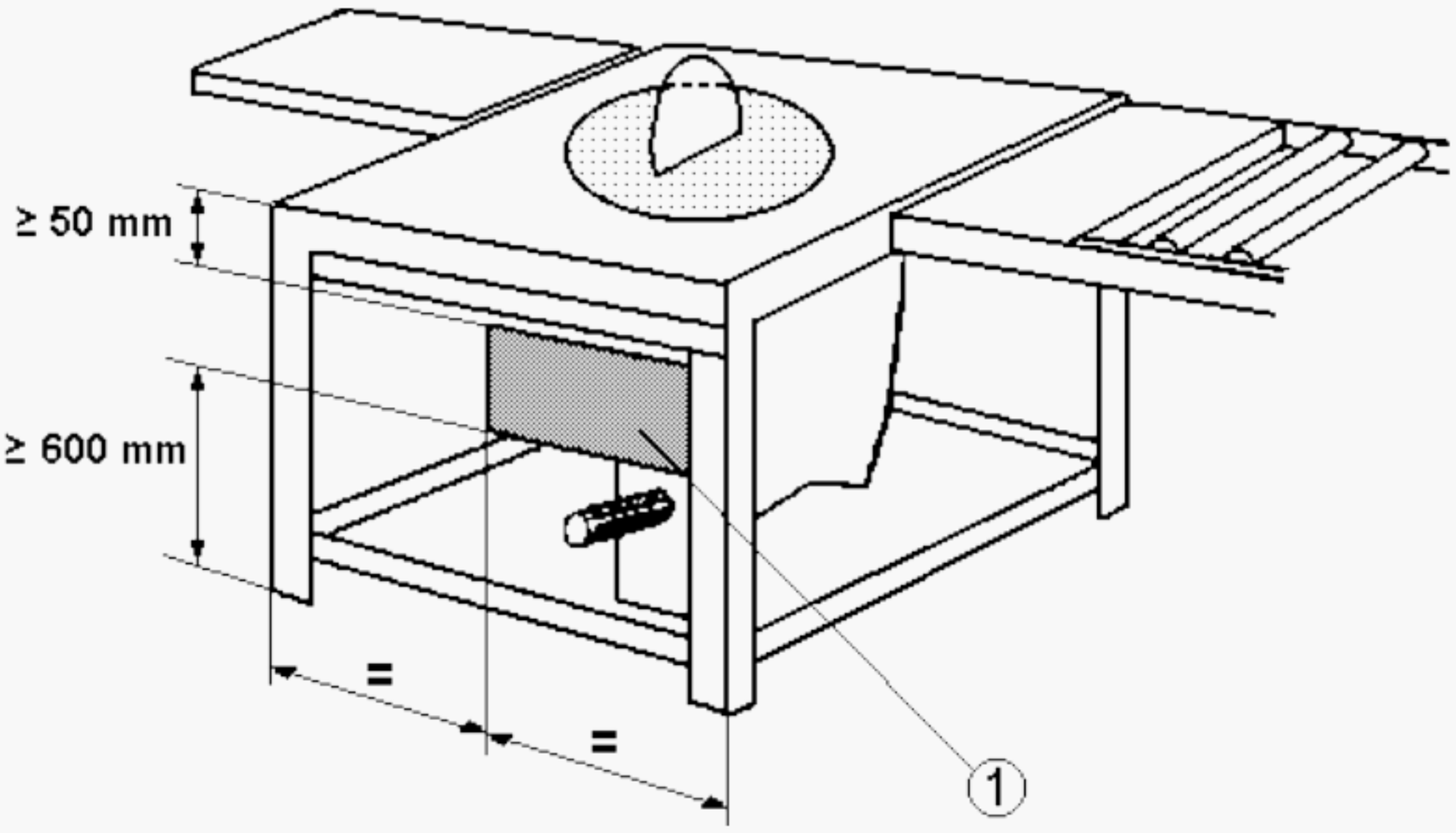
d) mechanically actuated position detectors for guards if they are actuated in the positive mode and their arrangement/fastening and cam design/mounting comply with the requirements of 5.2 and 5.3 of EN 1088:1995.

Time delay devices used in hardwired safety related control circuits can be of category B in accordance with the requirements of EN 954-1:1996 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, for electrical components by requiring confirmation from the manufacturer of the component which declares conformity with the relevant standards.

5.1.2 Position of controls

The start control and the stop control shall be located in the shaded area *X* of Figure 7.



Key 1 Area *X*

Figure 7 —Position of controls

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

5.1.3 Starting

See 9.2.5.2 of EN 60204-1:1992 and in addition :

For the purposes 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 EN 60204-1:1992 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

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 a category 0 in accordance with the requirements 9.2.2 of EN 60204-1:1992.

If the machine is fitted with an electrical brake this stop control shall be of category 1 in accordance with the requirements 9.2.2 of EN 60204-1:1992. When initiated the stopping sequence shall be :

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

b) cut power to brake after stopping sequence is complete.

The stopping sequence shall be satisfied at the level of the control circuits. If a time delay device is used, 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.

5.1.5 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 EN 60204-1:1992.

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

5.1.6 Failure of the control circuits

See 5.1.1.

5.2 Protection against mechanical hazards

5.2.1 Stability

Machines shall be equipped with a facility to fix the machine to the floor, e.g. by providing fixing holes in the machine frame.

The machine rigidity shall be in accordance with the requirements of Annex A.

Machines intended to be moved using a crane or hoist shall be equipped with provision for lifting devices, e.g. lifting eyes, correctly positioned relative to the machine centre of gravity.

Transportable machines fitted with wheels shall have facilities to make them stable during cutting e.g. brakes for the wheels or a device to retract the wheels from the floor.

NOTE The requirements for a stability test for transportable machines with wheels, both when moved from location to location and when in use, will be considered at the first revision of this standard.

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

5.2.2 Risk of break-up during operation

The guards for the sawblade 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.

Verification : By checking the relevant drawings, measurement, inspection on the machine and for the ultimate tensile strength a confirmation from the manufacturer of the material.

5.2.3 Tool holder and tool design

5.2.3.1 General

It shall not be possible to mount a sawblade in the machine of a greater diameter than the sawblade for which the machine is designed.

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

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

5.2.3.2 Spindle locking

When it is necessary to hold the spindle stationary for tool changing, a spindle holding device shall be provided. This may be e.g. 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, confirmation from the steel bar manufacturer and relevant 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.

5.2.3.3 Sawblade fixing device

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

For sawblades with a diameter ≤ 450 mm the diameter of both flanges (or flange for flush mounting) shall be at least *D*/4 (where *D* = the maximum diameter of the sawblade for which the machine is designed).

For sawblades with a diameter > 450 mm, the diameter of the flanges (or flange for flush mounting) shall be at least *D*/6, but not less than 115 mm.

For flanges other than those for flush mounted sawblades 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.

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

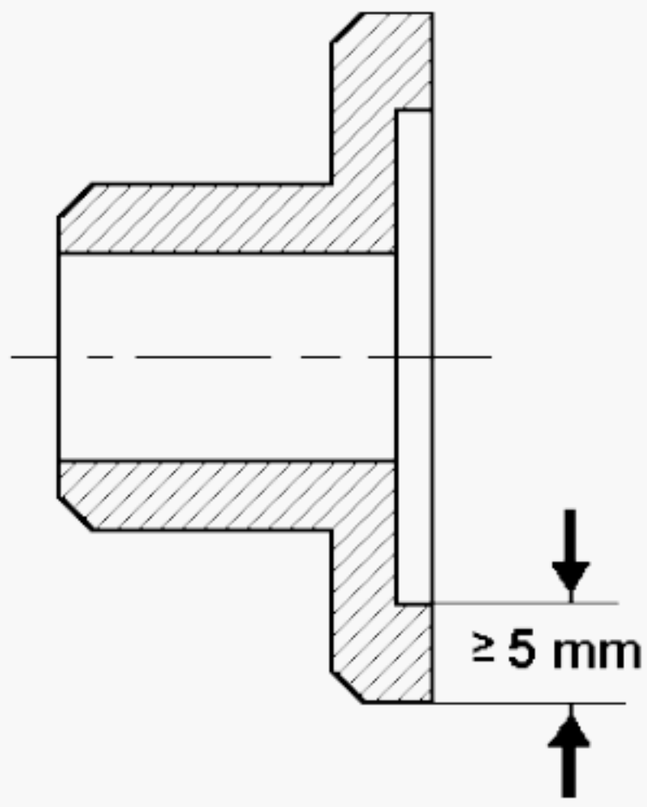


Figure 8 — Saw flange detail

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

5.2.4 Braking

5.2.4.1 General

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 sawblade, 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 ± 1,0 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 spindle drive motor and measure the unbraked run-down time;

b) restart the 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 spindle drive motor and measure the braked run-down time;

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

c) restart the 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

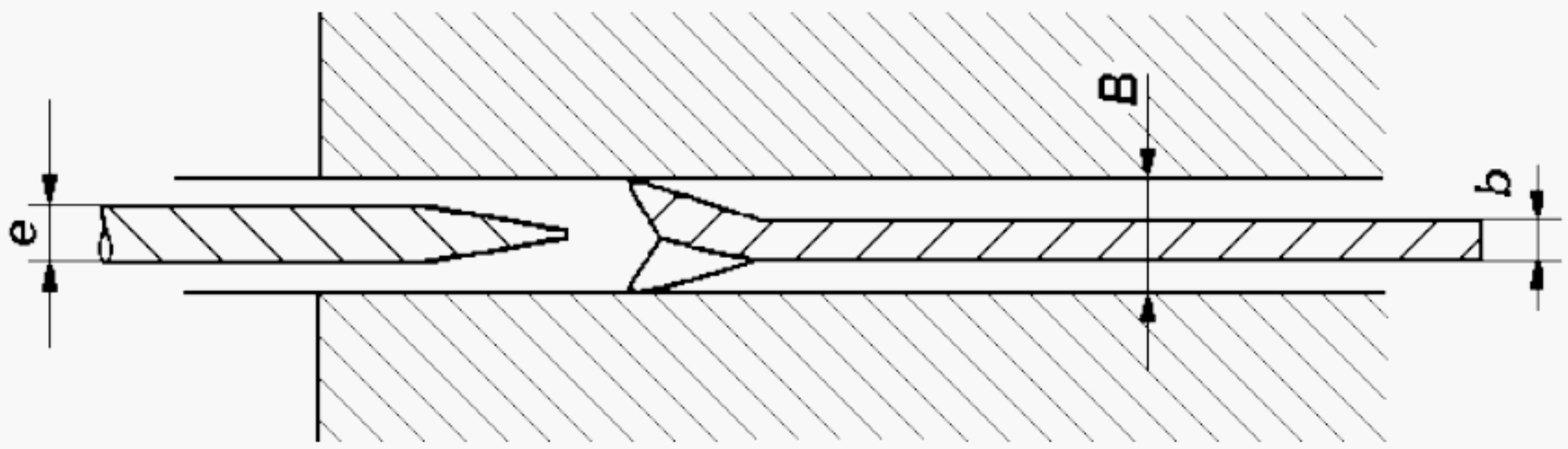
For use in the sawbench mode the machine shall be supplied with a riving knife/riving knives to accommodate the range of sawblades which are intended for use with it, as indicated in the instruction handbook.

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

The riving knife and its mounting 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 sawblade plate and the kerf (width of saw teeth) (see Figure 9).

Verification : By checking the relevant drawings, measurement and steel manufacturers confirmation of the ultimate tensile strength ;



Key
e Riving knife thickness
B Width of cut
b Width of sawblade

Figure 9 — Thickness of riving knife in relation to sawblade 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 sawblade when set in accordance with the requirements of this European Standard (see Figure 11).

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

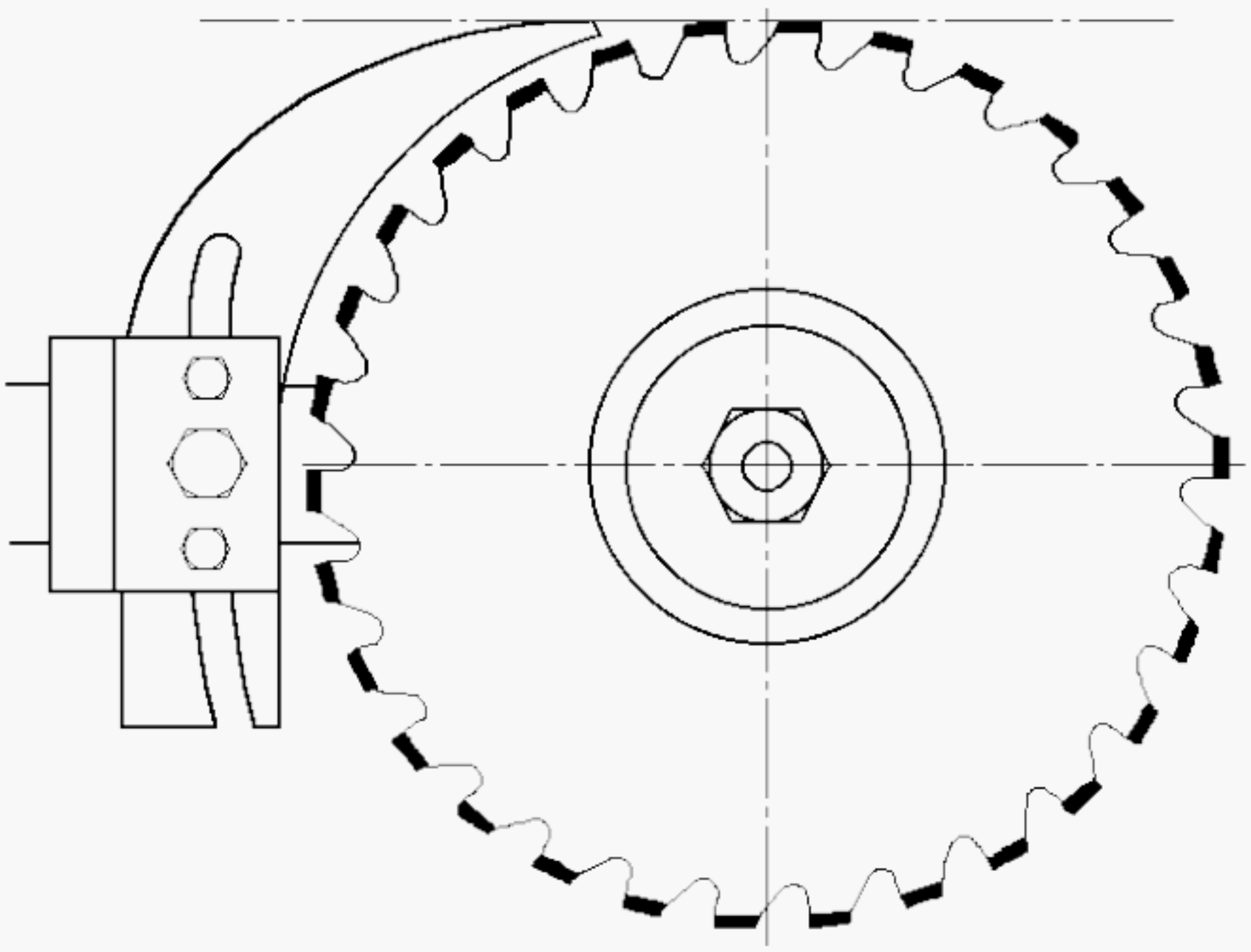


Figure 11 — Riving knife height adjustment

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

Verification : By checking the relevant drawings, inspection and measurement

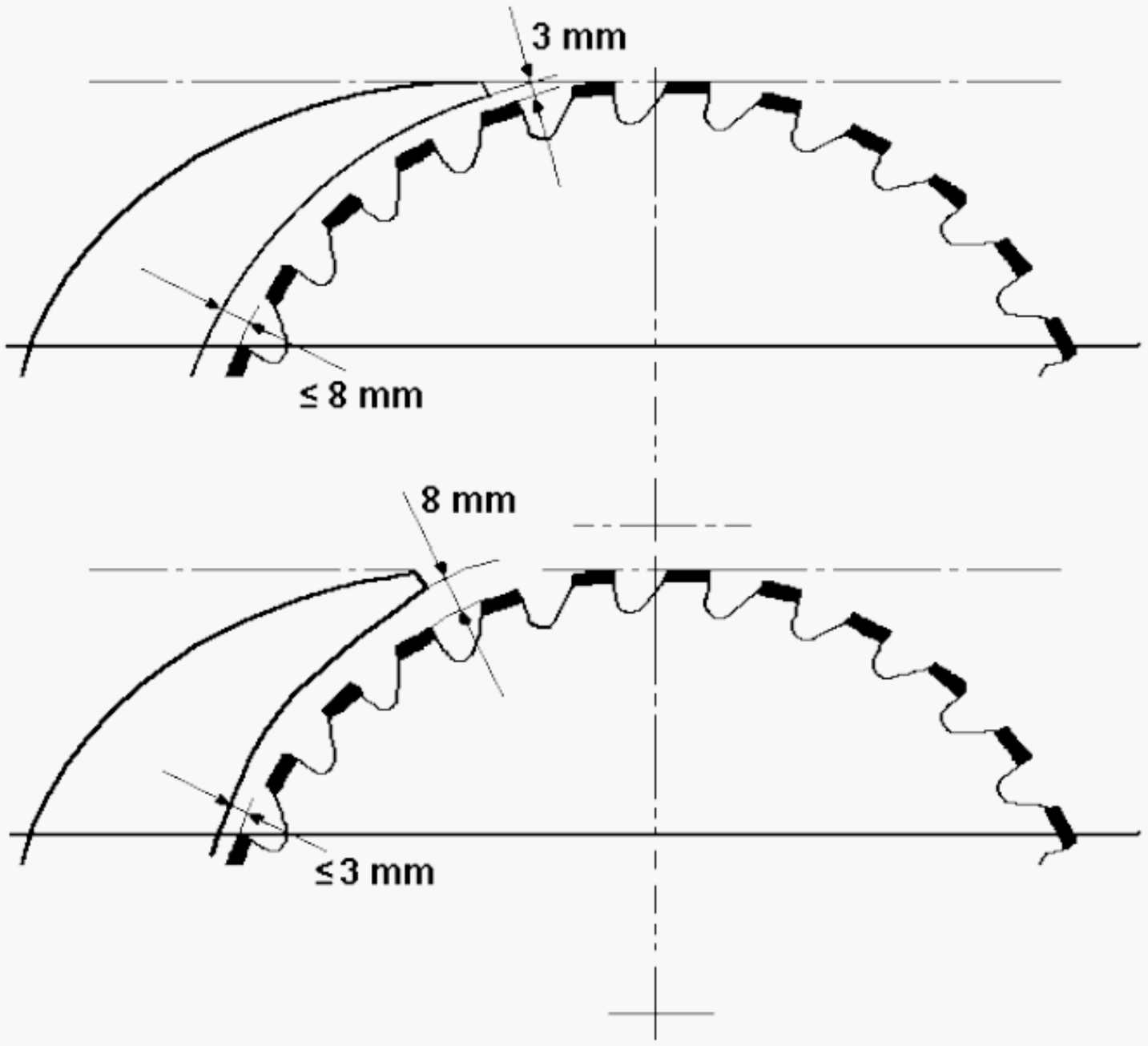
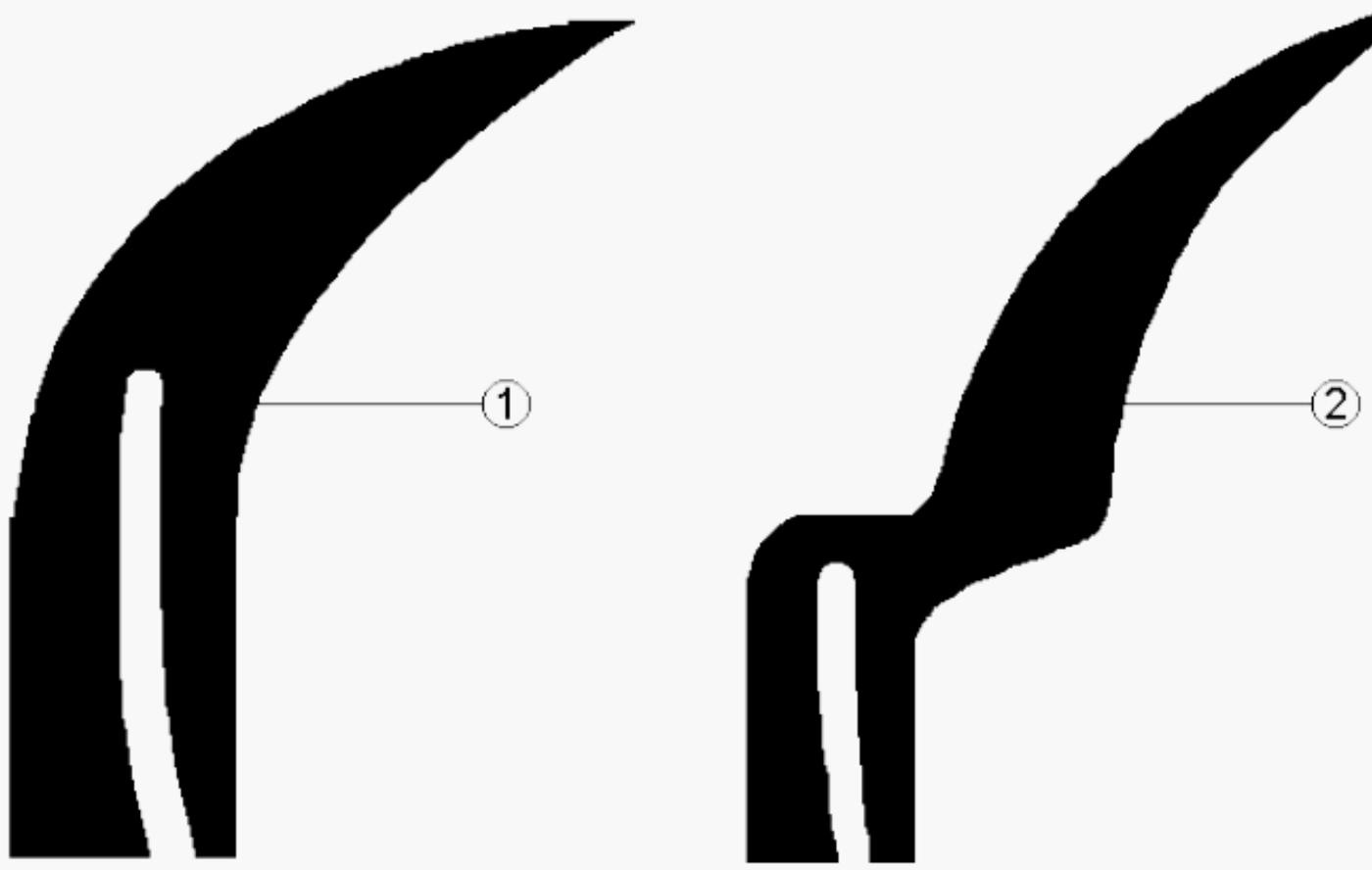


Figure 12 — Positioning limits for riving knife design

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 ;

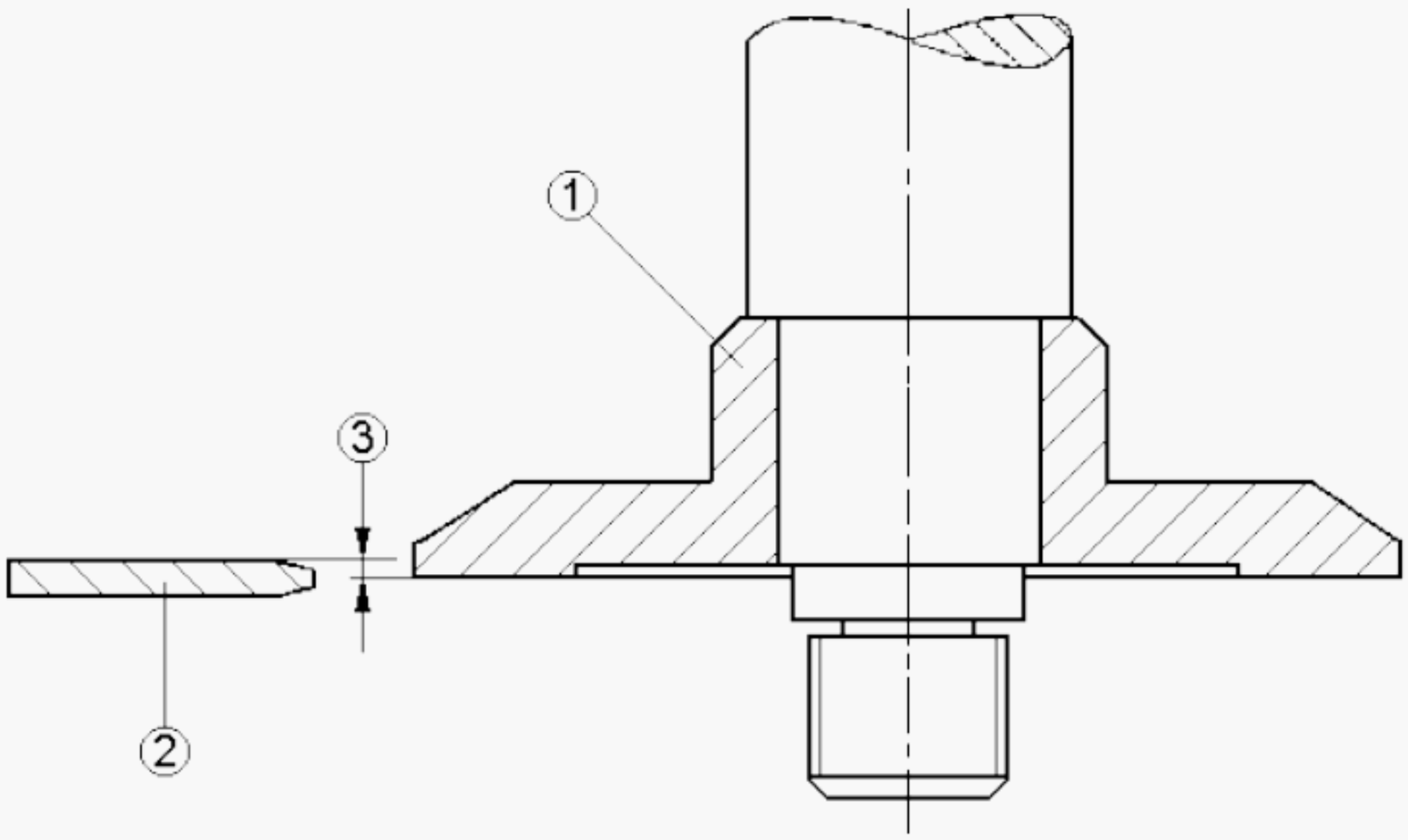


Key 1 Example of acceptable riving knife shape
2 Example of unacceptable riving knife shape

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 sawblade flange shall be maintained with the rise and fall and tilt of the sawblade.

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;

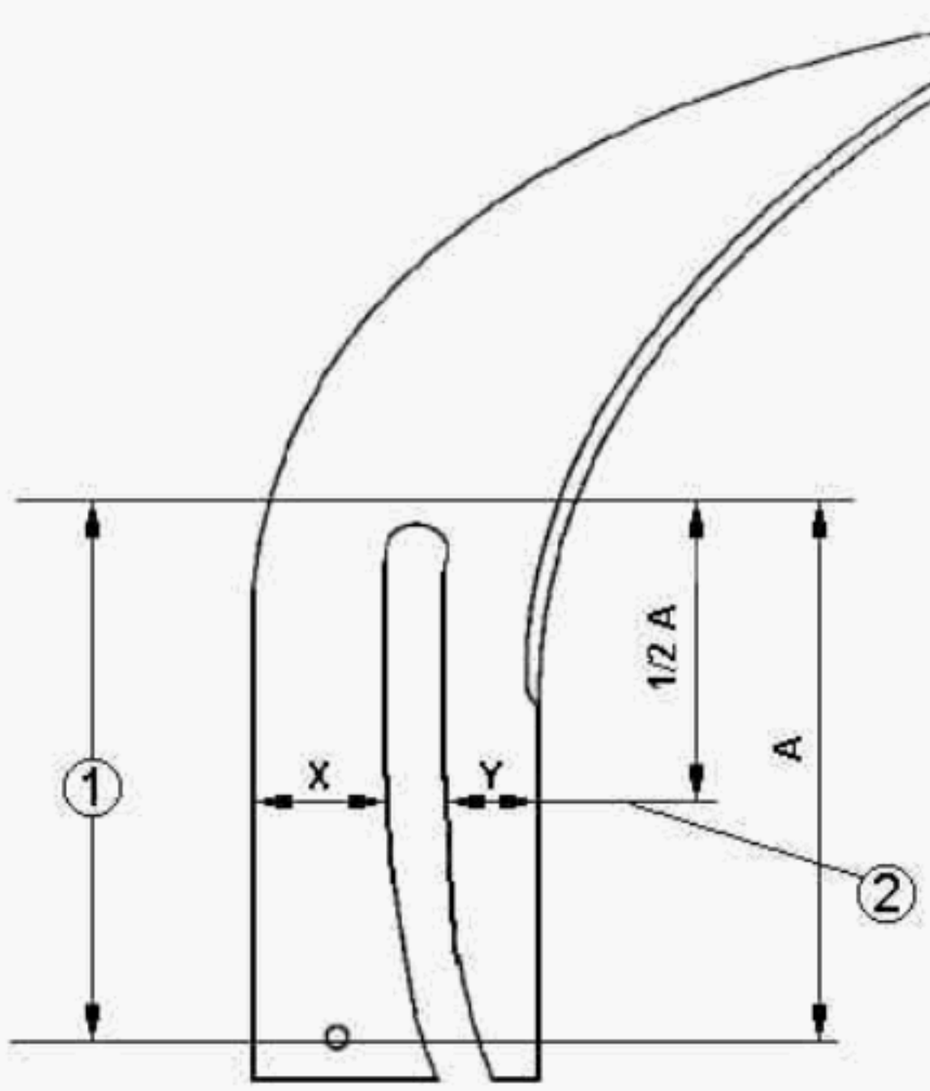
h) the riving knife shall either conform with the lateral stability test laid down in Annex D ,or the width of the riving knife on each side of the riving knife slot within the fixing area shall be designed in accordance with the requirements of the following equation :

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

where D_{max} is the sawblade 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;

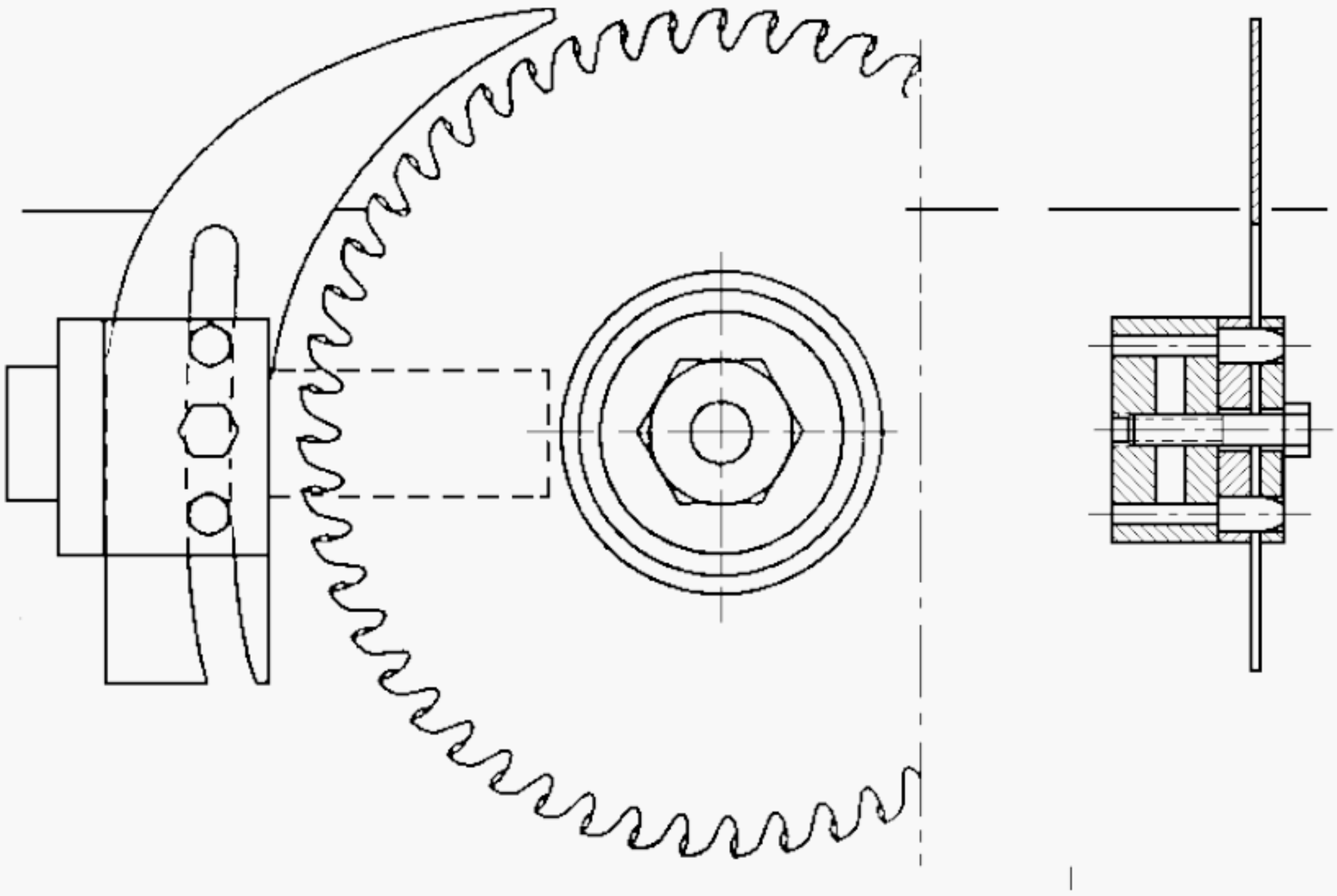


Figure 16 — Example of riving knife fixing arrangement

j) where it is necessary to change the riving knife to accommodate different widths of sawblade, 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 Fence

The machine shall be fitted with a fence which meets the following requirements :

a) for ripping :

The workpiece guiding part of the fence shall :

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

ii) be adjustable parallel with the sawblade so that its out-feed end can be adjusted forward to a point in line with 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 sawblade for which the machine is designed and adjusted to the maximum cutting height;

iii) be either :

— manufactured from a single component, having two guiding surfaces one with a high position for deep cutting (see Figure 17a)) and the other with a low position for shallow or angled cutting (see Figure 17b)); or

— consist of two components, one, with a high guiding surface for deep cutting and the other with a low guiding surface for shallow or angled cutting. These components shall not be capable of being fitted to the support at the same time, except in the case of machines with a maximum sawblade diameter of 200 mm, where they may consist of two parts which can be fitted together but shall be removable without the aid of a tool;

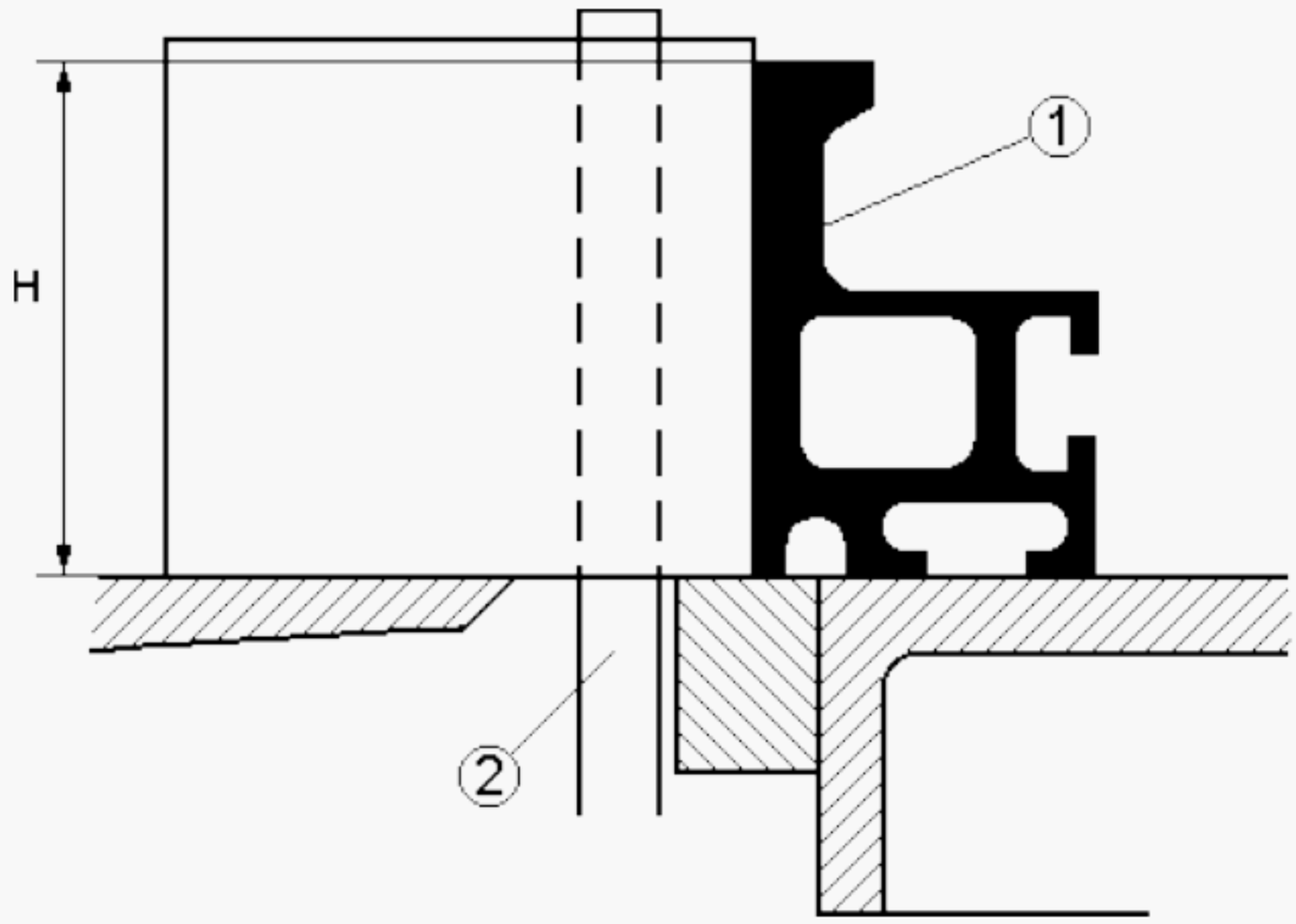


Figure 17a) - Fence in high position for deep cutting

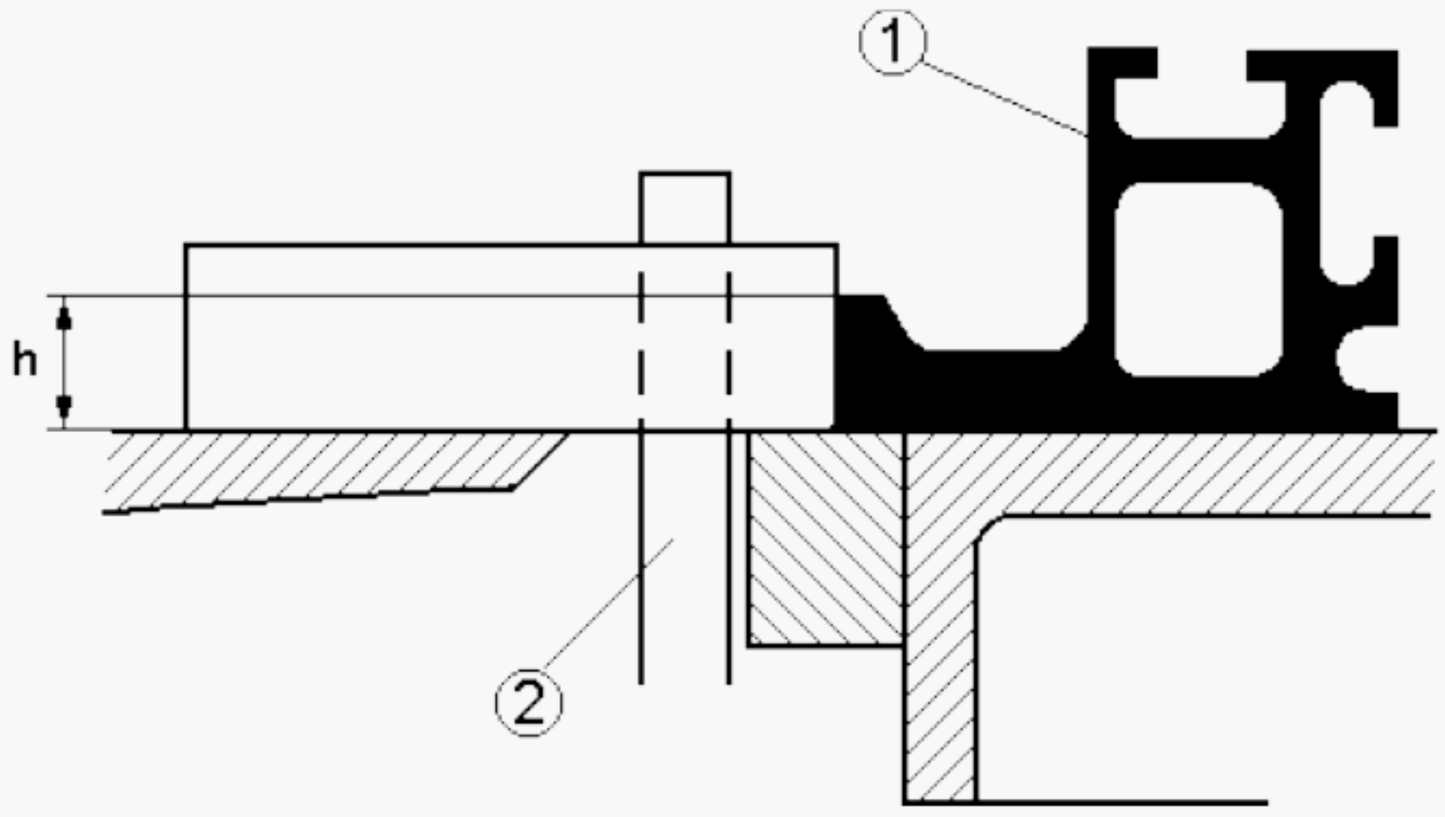


Figure 17b) - Fence in high position for shallow or angled cutting

Key		
	1	Fence
	2	Sawblade

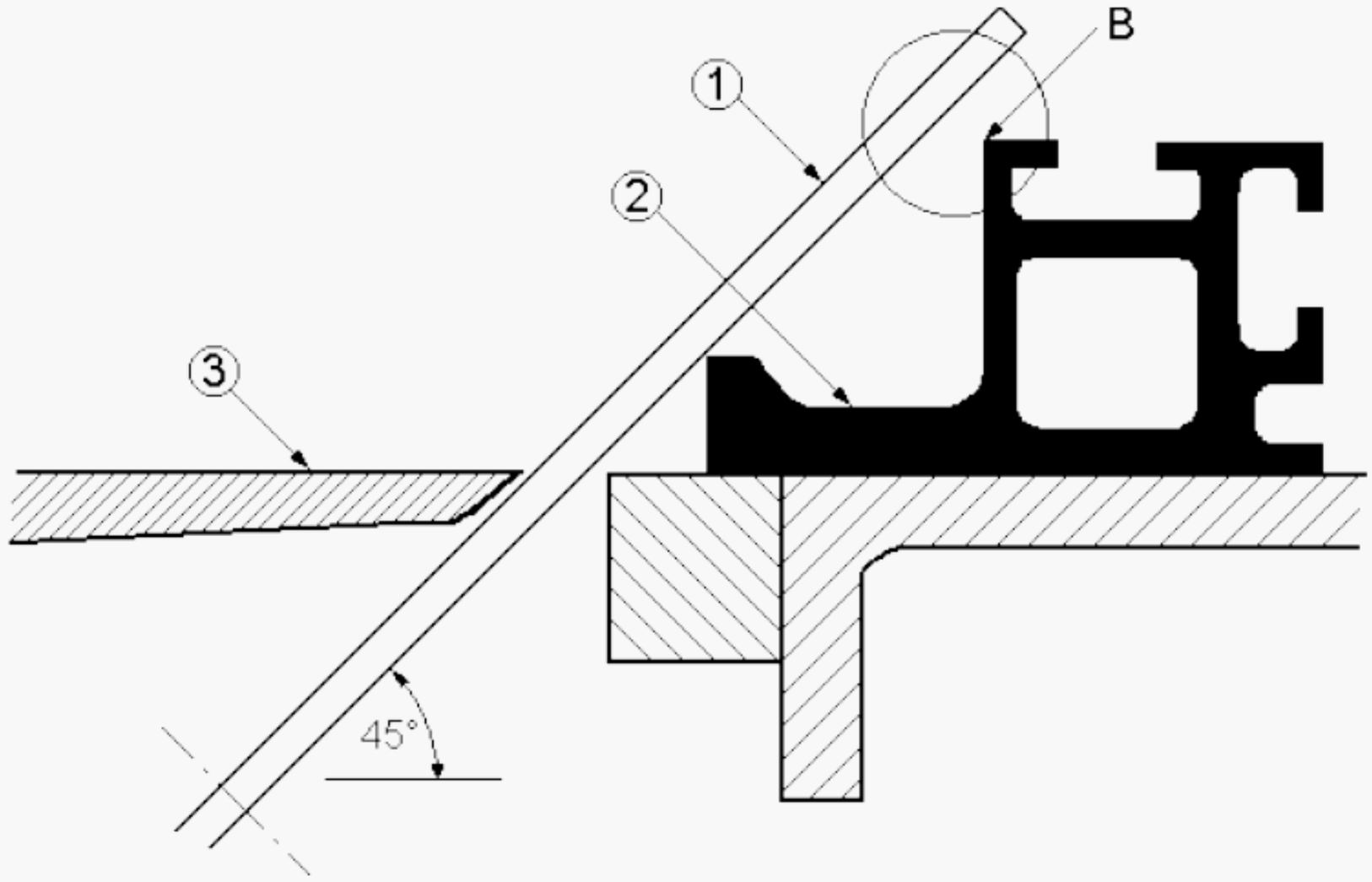
Figure 17 — Two position fence

iv) have a height *H* in the high position and a height *h* in the low position in accordance with the dimensions in Table 3;

Table 3 — Dimensions *H* and *h* of the guiding surface of the fence

Height mm	Sawblade diameter *D* (mm)		
	$D \leq 200$	$200 < D \leq 315$	$D > 315$
H	≥ 30	≥ 50	≥ 90
h	$6 \leq h \leq 15$		

v) be so designed that when it is in the low position, the sawblade shall not be capable of touching the rip fence at point B as shown in Figure 18 when the sawblade is fully tilted.



Key

1 Sawblade
2 Rip fence in low position
3 Table

Figure 18 — Design of rip fence in low position

b) <u>for cross-cutting</u> :

The fence shall meet the following requirements :

i) it shall be adjustable at right angles to the direction of rip feed;

ii) that part nearest to the sawblade shall for a minimum length of *D* (where *D* is the maximum diameter of the sawblade for which the machine is designed) be manufactured from wood, light alloy or plastic;

iii) where it extends beneath the sawblade guard (in the cross-cutting position) the height of that section of the fence shall be a maximum of 15 mm.

For both ripping and cross-cutting, all adjustments of the fence shall be possible without the aid of a tool.

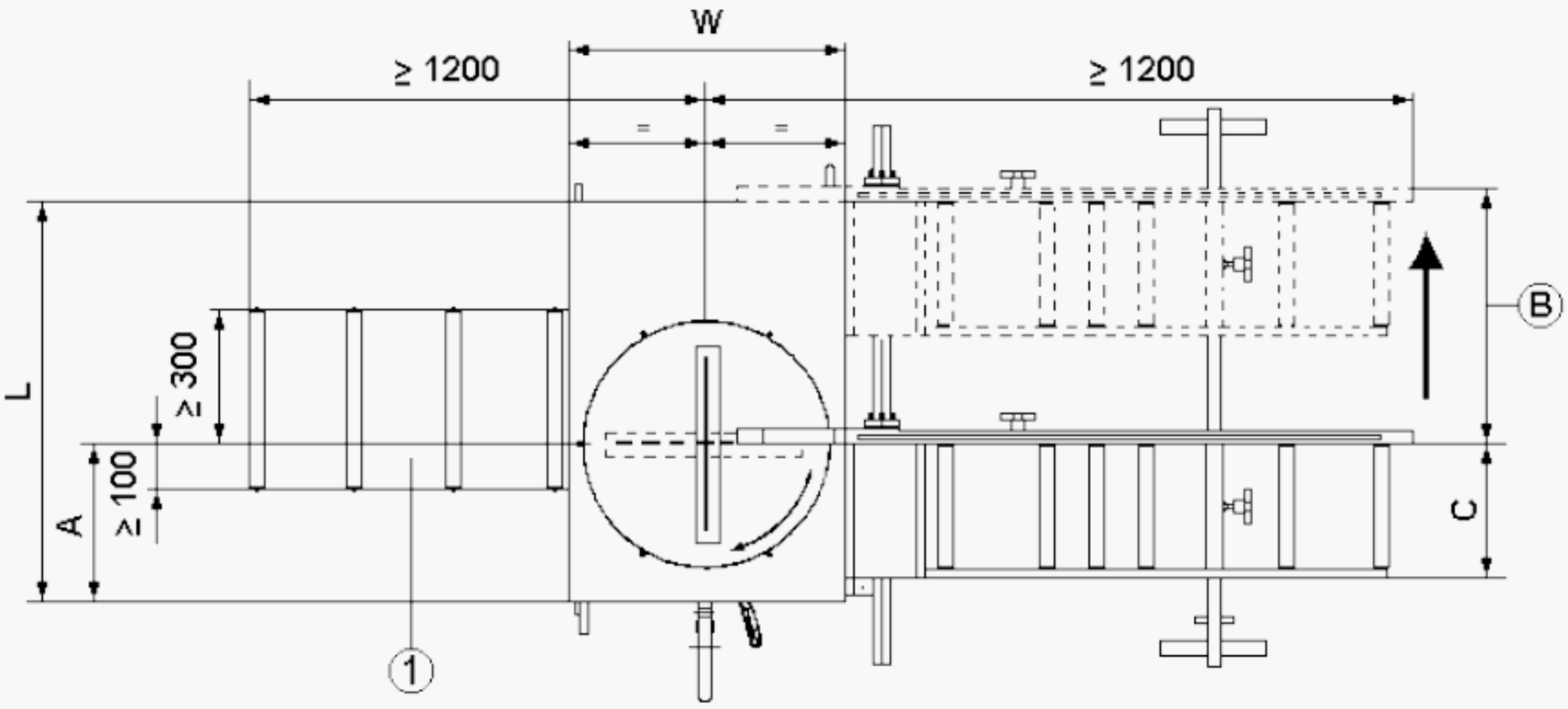
<u>*Verification*</u> : By checking the relevant drawings, inspection, measurement and relevant functional testing of the machine.

5.2.6.2 Machine table size

The dimensions of the sawbench table (see Figure 19) shall be in accordance with the requirements of Table 4.

<u>*Verification*</u> : By checking relevant drawings, inspection and measurement.

Dimensions in millimetres



Key

	1	Outfeed table
	B	Travelling distance

Figure 19 — Minimum dimensions of the machine table

Table 4 — Table dimensions

Table dimensions	Sawblade diameter *D* mm						
	$D \leq 200$	$200 < D \leq 250$	$250 < D \leq 350$	$350 < D \leq 400$	$400 < D \leq 450$	$450 < D \leq 500$	$D > 500$
L	500	530	750	900	1000	1150	1300
W	335	400	500	600	700	800	900
A	250	270	320	350	380	420	480
Minimum width of the roller table = $C_{min} = ½ (B - ½ D)$							

5.2.6.3 Sawbench moveable roller table

The machine shall be fitted with a moveable roller table on the infeed side which meets the following requirements :

a) its minimum length shall be 1 200 mm and the minimum width (C_{min}) shall be in accordance with the equation shown in Table 4;

b) it shall be connected to the sawbench table and be moveable at least over the whole width (*L*) of the table (see Figure 19);

c) it shall be lockable in any position;

d) it shall be supported at the end furthest from the sawblade and the support shall be adjustable in height for levelling;

e) t the end nearest to the sawblade the first 150 mm of the roller table shall be continuous i.e. without rollers (see Figure 19).

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

5.2.6.4 Outfeed table

A separate extension table (or part of the machine table) shall be provided such that the total length and the width are in accordance with the requirements of Figure 19.

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

5.2.7 Prevention of access to moving parts

5.2.7.1 Guarding of the sawblade above the table

Access to that portion of the blade above the table shall be prevented by a manually adjustable sawblade guard. This sawblade guard shall meet the following requirements :

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

b) it shall be mounted separately from the riving knife;

c) it shall cover both the top and sides of the sawblade above the table and shall be capable of being lowered so that the bottom edge of the guard is at table level, and raised so that the maximum height of the bottom edge of the guard above the table level shall permit the passage of the maximum workpiece height for which the machine is designed. The sawblade guard shall be fitted with a device for easy height adjustment e.g. a handle. This device may be also be the push stick if it is placed in a holder fixed on the adjustable sawblade guard;

d) the bottom edge of the sawblade guard shall remain parallel to the table when adjusted for height;

e) the support carrying the sawblade guard shall rotate with the saw unit when the rotating part of the table is rotated;

f) on machines which do not have the facility to tilt the sawblade, the maximum width of the sawblade guard at its base shall be 50 mm. The maximum distance of the outermost face of the sawblade guard on the fence side shall be 15 mm from the sawblade flange (see Figure 20);

g) on machines which have the facility to tilt the sawblade, either an auxiliary guard shall be provided, or the sawblade guard shall be provided with an extension for use when the sawblade is tilted;

h) the infeed end and outfeed end of the base of the sawblade guard shall be designed to allow upward vertical movement in order to avoid mis-feeding should the guard be incorrectly set or the workpiece be uneven. This may be achieved either by e.g. :

i) designing the sawblade guard in accordance with the minimum dimensions given in Figure 21; or

ii) equipping the sawblade guard with rollers of at least 60 mm diameter at the infeed end (see Figure 22);

i) the lower inner edges of the sides of the adjustable sawblade 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 sawblade teeth from cutting into the adjustable sawblade guard should it be displaced from the line of cut (see Figure 23). If the rib is replaceable, the fixing arrangement shall be such that it does not damage the sawblade e.g. by using brass screws;

j) the rigidity of the sawblade guard shall meet the requirements of Annex E.

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

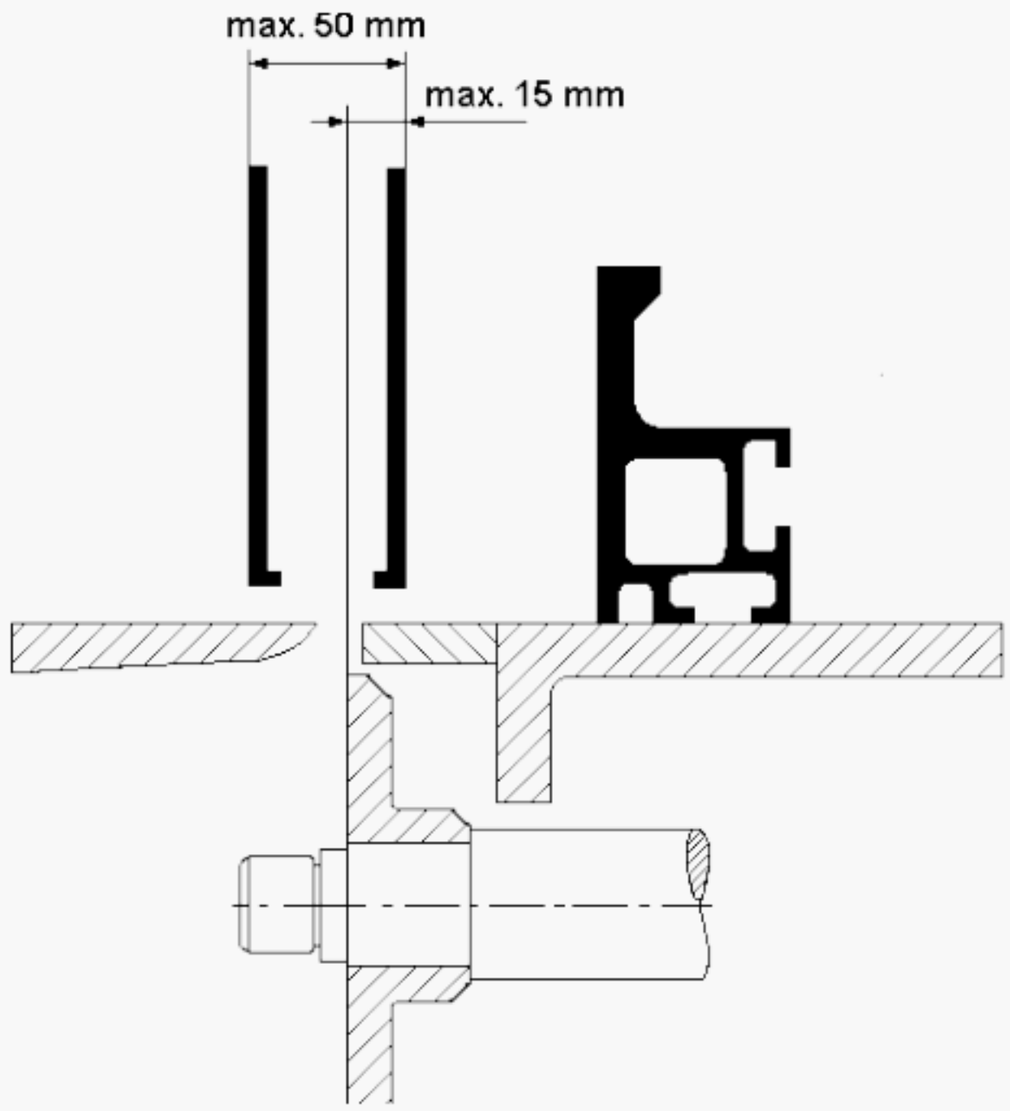


Figure 20 — Maximum width of sawblade guard

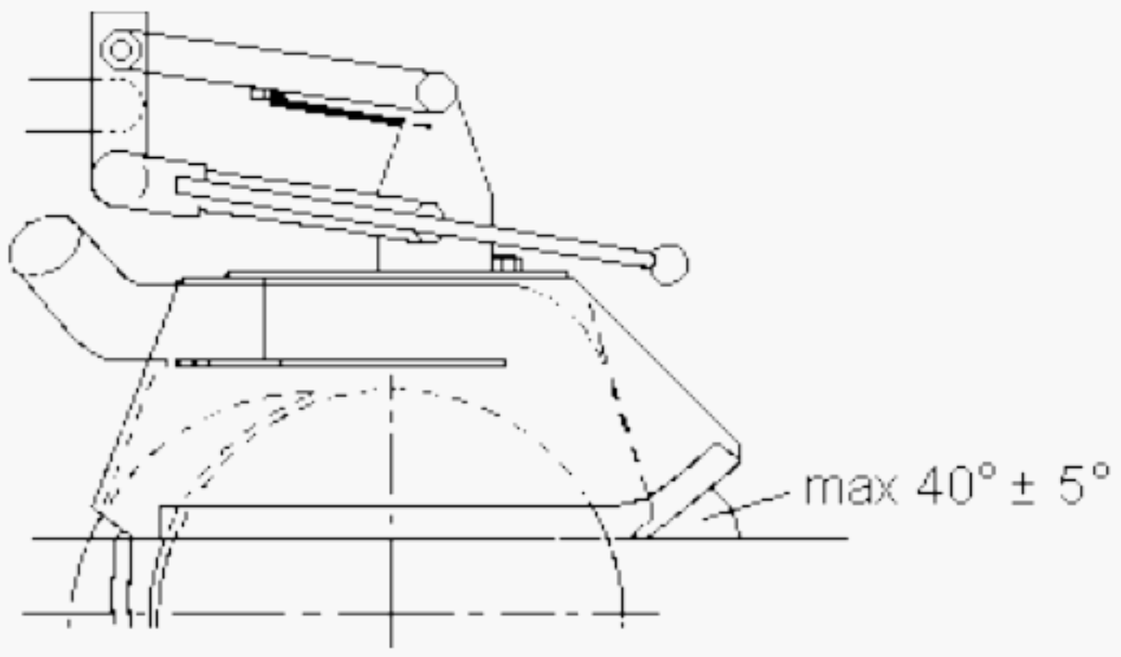


Figure 21 — Lead-in to sawblade guard

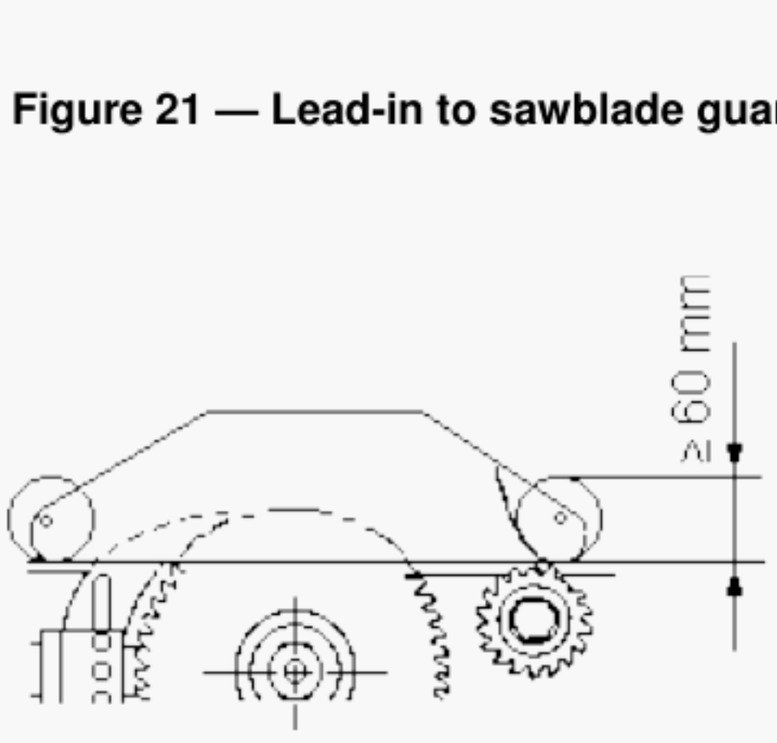
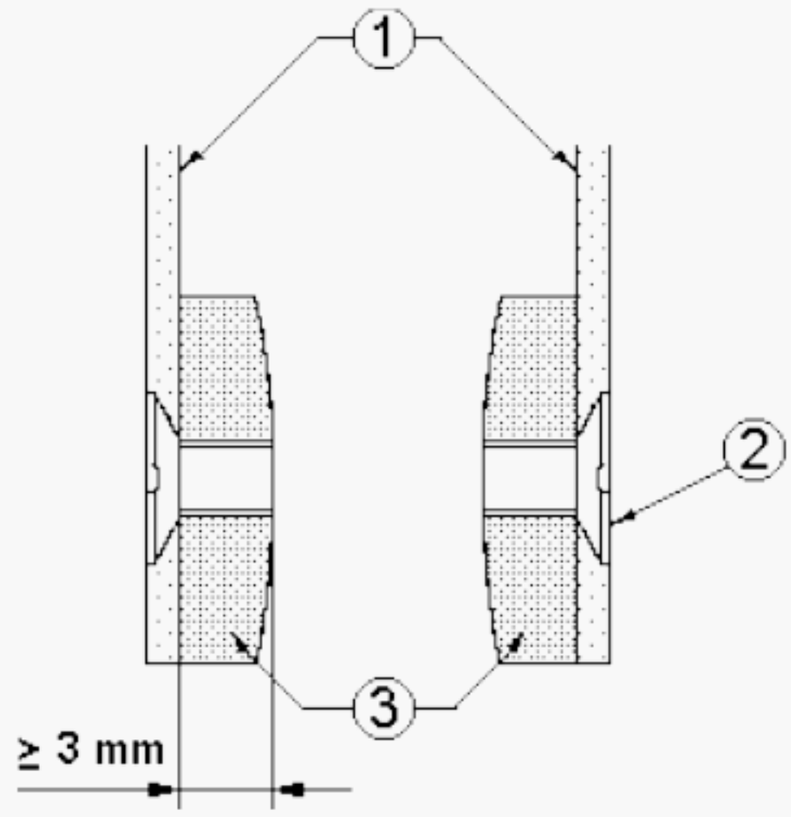


Figure 22 — Lead-in rollers to sawblade guard



Key

1 Side walls
2 Fixing screw
3 Ribbings

Figure 23 — Reinforcement of the underside of the sawblade guard

5.2.7.2 Slot for the sawblade in the table or in the table slot lining

The total width *L* of the sawblade slot shall not exceed l2 mm for sawblade diameters ≤ 500 mm and shall not exceed l6 mm for sawblade diameters > 500 mm. On the fixed saw flange side of the table, the distance *D* between the fixed saw flange and the edge of the table slot shall not exceed 3 mm for sawblade diameters ≤ 500 mm and 5 mm for sawblades with a diameter > 500 mm (see Figure 24).

The table slot shall extend not more than 20 mm in front of the sawblade at table level when fitted with the maximum diameter sawblade for which the machine is designed, when raised to its maximum height.

The table slot shall be lined with light alloy, plastic, wood or wood based material.

Machines designed for use with a sawblade diameter > 315 mm shall have a replaceable table slot lining which is held in position such that it will not be dislodged in the event of contact with the rotating sawblade.

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

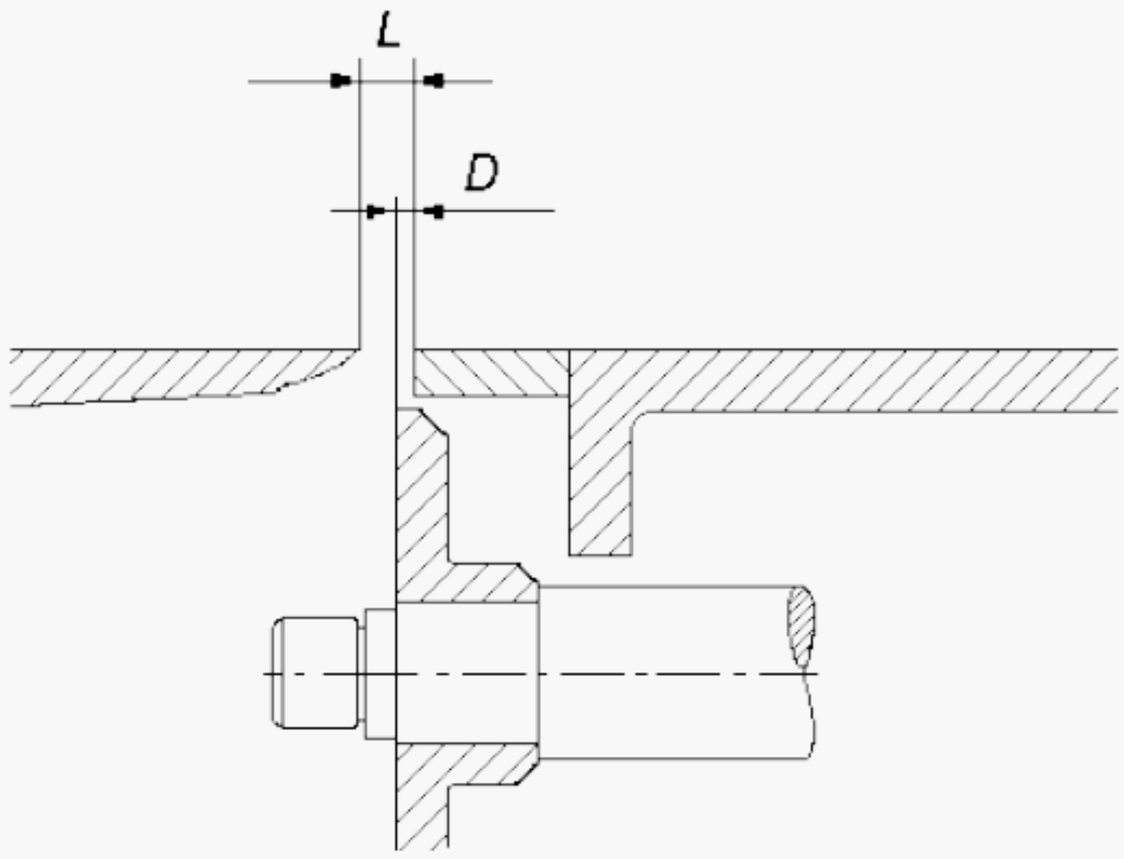


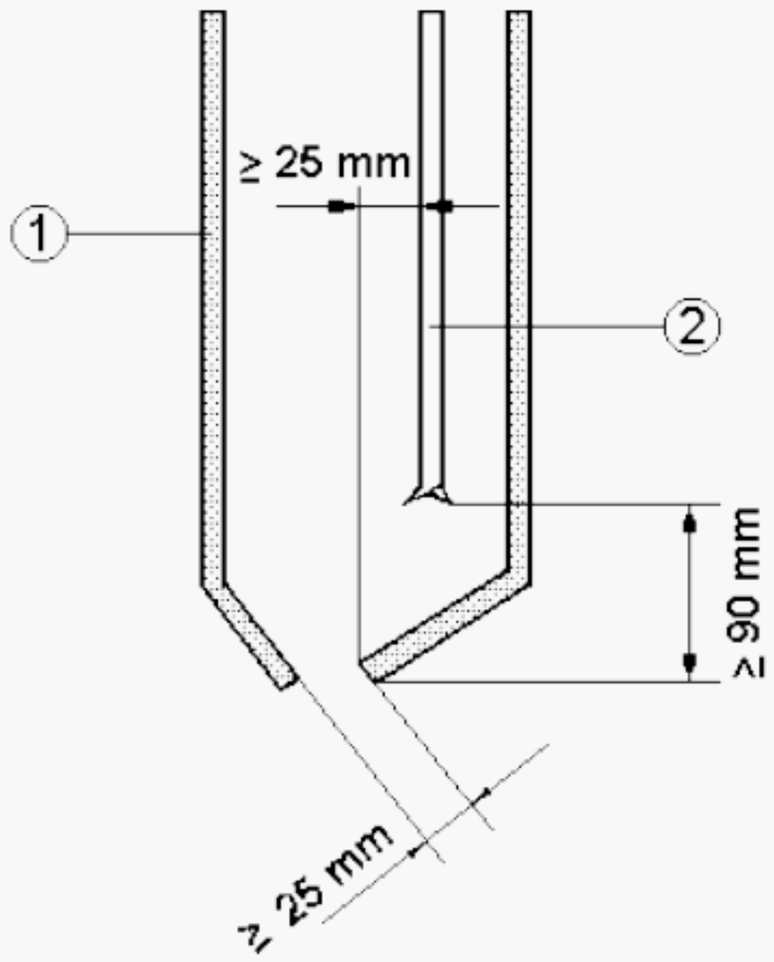
Figure 24 — Distance between fixed saw flange and edge of table slot

5.2.7.3 Access to the sawblade below the table

Access to the sawblade below the table shall be prevented by a fixed guard. Any access which may be required for maintenance purposes or for changing the sawblade shall be via a moveable guard interlocked with the spindle drive motor.

Any opening for chip removal shall either fulfil the safety distance requirements shown in Table 4 of EN 294:1992 or meet the requirements shown in Figure 25.

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



Key

1 Sawblade guard
2 Sawblade

Figure 25 — Dimensions for chip removal opening below the table

5.2.7.4 Guarding of drives

Access to the drive mechanisms shall be prevented either by a fixed guard or a moveable guard interlocked with the spindle drive motor.

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

5.2.8 Safety appliances

A push stick and push block handle shall be provided for use with all machines. Provision shall be made for storing the push stick and push block handle/push block on the machine. Push stick 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 6a).

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

5.3 Protection against non-mechanical hazards

5.3.1 Fire and explosion

To avoid or minimise fire hazards, the requirements in 5.3.3 and 5.3.4 shall be met (see also Annex F).

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 sawblade.

5.3.2.2 Noise emission measurement

Operating conditions for noise measurement shall comply with Annex A and Annex N of ISO 7960:1995.

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

For machines where neither Annex A or Annex N of ISO 7960:1995 is not applicable, e.g. for different spindle speeds and sawblade diameters, the detailed operating conditions used shall be given in the test report.

Emission sound power levels shall be measured in accordance with the enveloping surface measuring method shown in 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 equation 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.

On large machines the reference box shall be as close to the noise source as possible but shall not exclude any part of the structure which radiates noise.

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 ISO 3745 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:

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

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

j) 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 ISO 3745 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

That part of the sawblade which is situated below the table shall be enclosed by an exhaust hood, which shall have an extraction outlet (see 5.2.7.3).

On machines with a maximum cutting capacity > 50 mm, an extraction outlet shall be provided on the sawblade guard (see Figure 1).

Machines designed solely for use outside do not need provision for extraction.

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 should be based on a conveying velocity of extracted air in the duct of 20 m s^{-1} for dry chips and 28 m s^{-1} for wet chips (moisture content 18 % or above).

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

5.3.4 Electricity

EN 60204-1:1992 applies unless otherwise stated in this European Standard.

In particular see clause 6 of EN 60204-1:1992 for the requirements regarding prevention of electric shock and clause 7 of EN 60204-1:1992 for the requirements regarding protection against short circuits and overloading.

Single phase motors with a rated input ≤ 1 kW, manufactured in accordance with EN 61029-1:1995 can be used.

The degree of protection for electrical components shall be in accordance with 13.3 of EN 60204-1:1992, with the following exceptions :

a) for three phase motors the degree of protection shall be at least IP 5X in accordance with EN 60529;

b) the last sentence of 13.3 of EN 60204-1:1992 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 S3 .

Verification : By checking the relevant drawings and/or circuit diagrams, inspection, manufacturers confirmation and relevant tests (specified in EN 60204-1:1992).

5.3.5 Ergonomics and handling

See 5.2.1.

NOTE On transportable machines the designer should consider weight and ease of moving.

5.3.6 Lighting

See Annex F.

5.3.7 Pneumatic

In accordance with EN 983:1996.

5.3.8 Hydraulic

In accordance with EN 982:1996.

5.3.9 Heat

Not relevant.

5.3.10 Substances

See 5.3.3.

5.3.11 Vibration

Not relevant.

5.3.12 Radiation

Machines which incorporate CE-marked electrical equipment and where the cabling is completed in accordance with the electrical equipment manufacturers instructions, are generally considered to be protected against external electromagnetic influence.

For CNC machines see clause 1.

Other radiation : Not relevant.

Verification : By checking the circuit diagrams and by requiring confirmation from the manufacturer of the equipment which declares conformity with the relevant standards.

5.3.13 Laser

If the machine is fitted with a laser to indicate the cutting line, the laser shall be of category IIIA or a lower category according to EN 60825-1.

Direct eye contact with the nominal ocular hazard area shall be prevented e.g. by the use of an extension piece to maintain a safe distance.

Verification : By checking the relevant drawings, inspection and confirmation from the manufacturer of the laser.

5.3.14 Static electricity

Not relevant.

5.3.15 Errors of fitting

See 5.3.16, 5.3.17, 6.3 and Annex F.

5.3.16 Isolation

See 3.8 and 6.2.2 of EN292-2:1991 and in addition :

The electrical isolator of stationary machines shall be in accordance with 5.3 of EN 60204-1:1992, except that the isolator shall not be of type d) in 5.3.2 of EN 60204-1:1992.

For the electrical isolation of transportable machines with a rated current not exceeding 16 A and a total power rating not exceeding 3 kW see 5.3.2 d) of EN 60204-1:1992.

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 (e.g. a padlock). Where the pneumatic supply is used only for clamping, a quick action coupling (see EN 983:1996) without the means for locking shall be acceptable.

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

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.

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

5.3.17 Maintenance

See 3.12 and A.1.6.1 of EN 292-2:1991/A1:1995.

Verification : By checking the instruction handbook.

6 Information for use

See clause 5 and A.1.7 of EN 292-2:1991/A1:1995.

6.1 Warning devices

Not relevant.

6.2 Marking

6.2.1 Marking of the machine

The following shall be permanently marked on the machine or on a plate which is permanently fixed to the machine :

a) direction of sawblade rotation;

b) maximum and minimum diameter and bore diameter of the sawblade for which the machine is designed;

c) width of riving knife guiding elements.

Permanently marked means for example engraving or etching.

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

6.2.2 Marking of riving knives

The following shall be permanently marked on the riving knife :

a) width of its mounting slot;

b) the thickness and range of sawblade 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

See 5.5 of EN 292-2:1991/A1:1995 and in addition the instruction handbook shall include at least :

a) a warning regarding residual risk;

b) recommendations for safe working practice (see Annex F);

c) 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;

d) information concerning the correct method of lifting the machine;

e) the range of sawblade diameters and thicknesses for which the machine is designed, and guidance to the user on the selection of the correct riving knife for particular sawblade dimensions;

f) a statement that only sawblades made in conformity to EN 847-1:1997 shall be used on the machine;

g) information concerning maintenance and repair of push block handles and push sticks;

h) information regarding the dust extraction equipment fitted to the machine 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;

i) 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 prEN 12779.

j) if fitted with a laser, a statement that no exchange with a different type of laser is permitted, that no additional optical equipment shall be used and that repair shall only be carried out by the laser manufacturer or authorised persons;

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

l) a declaration of airborne noise emission as required by A.1.7.4 f) of EN 292-2:1991/A1:1995 determined in accordance with the methods given in 5.3.2.2. 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 (see EN ISO 4871:1996) as follows :

4 dB when using EN ISO 3746:1995 and EN ISO 11202:1995
2 dB when using EN ISO 3743-1, EN ISO 3743-2 or EN ISO 3744
1 dB when using ISO 3745

For example, for a sound power level : L_{WA} = 93 dB (measured value)
accompanied 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 :

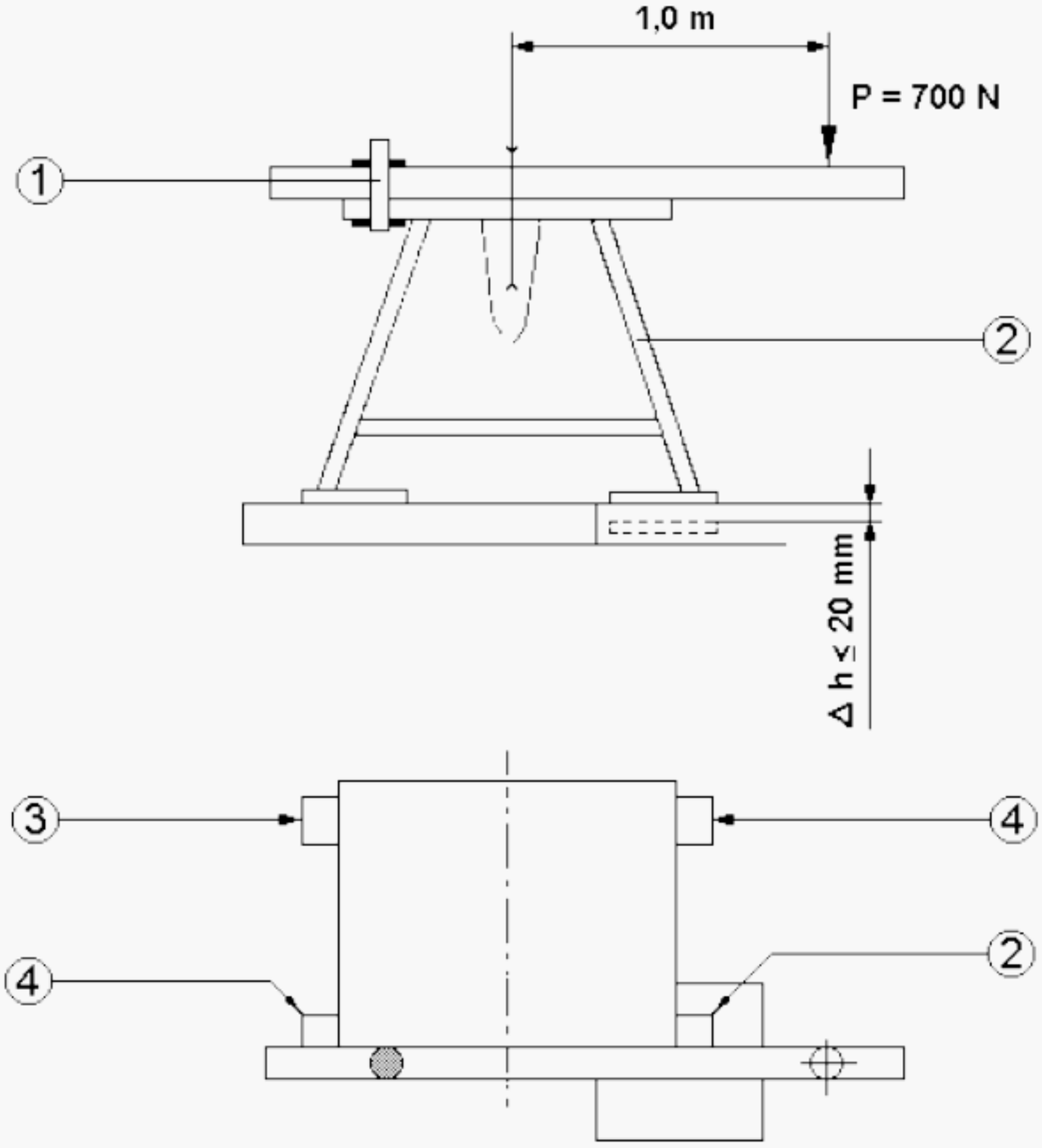
"The figures quoted are emission levels and are not necessarily safe working levels. Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required. Factors that influence the actual level of exposure of 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."

Verification : By checking the instruction handbook and relevant drawings.

Annex A
(normative)

Open frame machines stability test

Under a load of 700 N applied as shown in Figure A.1, the deflection of the free table leg shall be ≤ 20 mm.



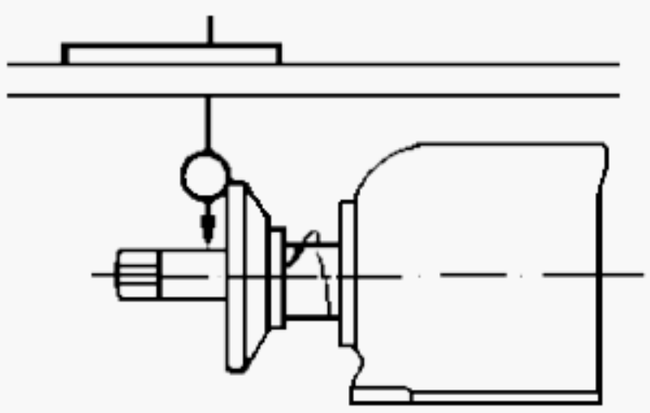
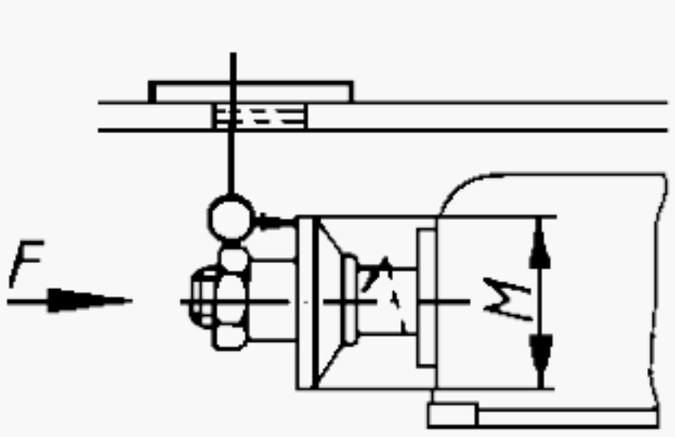
Key

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

Figure A.1 — Stability test for open frame machines

Annex B
(normative)

Dimensional tolerances of saw spindles

Diagram	Object	Limit deviation mm	Measuring instruments
 Measurement as close as possible to the saw flange	Measuring run-out of saw spindle	0,03	Dial gauge
 Apply axial pressure *F* as recommended by manufacturer	Measuring camming of the 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 sawblade 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 sawblade 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

Sawblade diameter for which riving knife is designed	≤ 315 mm	> 315 mm
Maximum deflection "*A*"	1.5 mm	2.0 mm

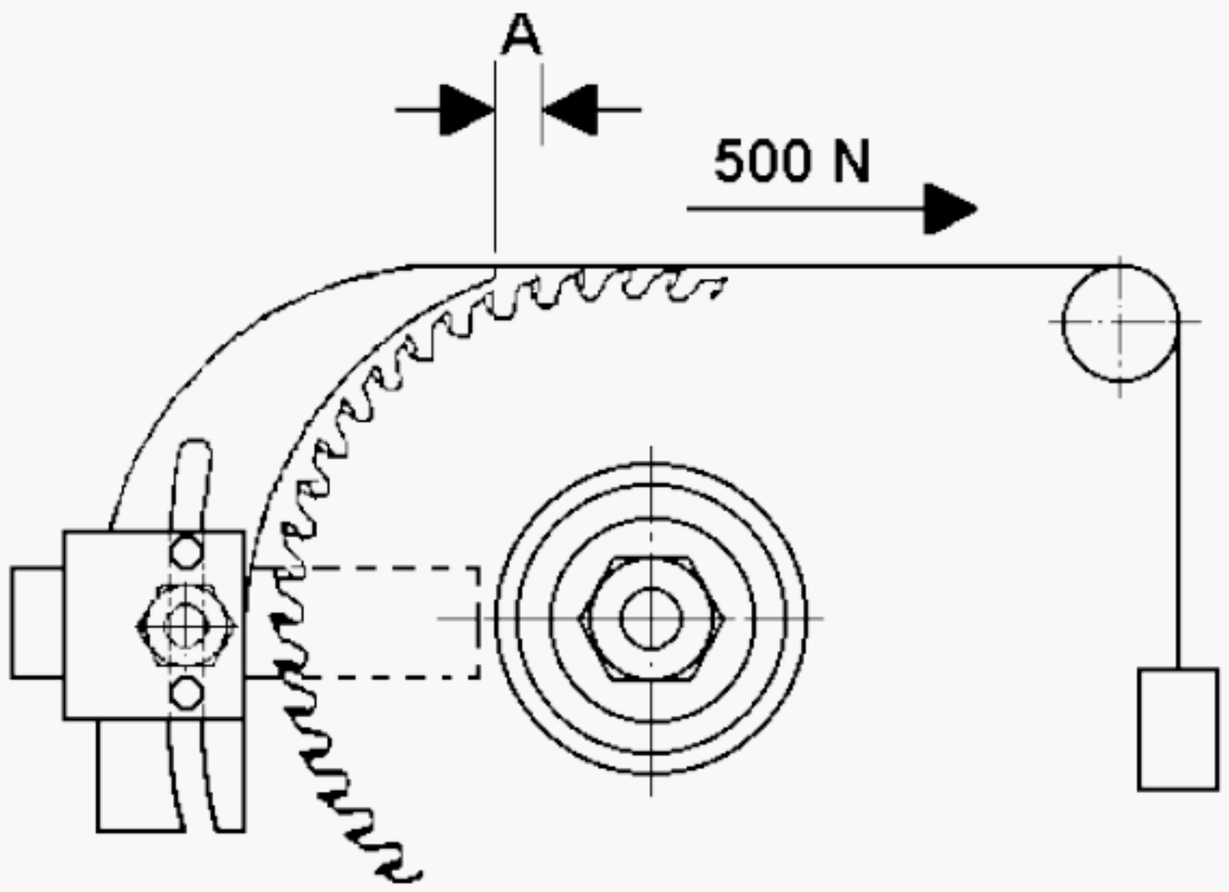


Figure C.1 — Riving knife mounting strength test

Annex D
(normative)

Riving knife lateral stability test

With the riving knife securely tightened in position to suit the maximum diameter sawblade 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.

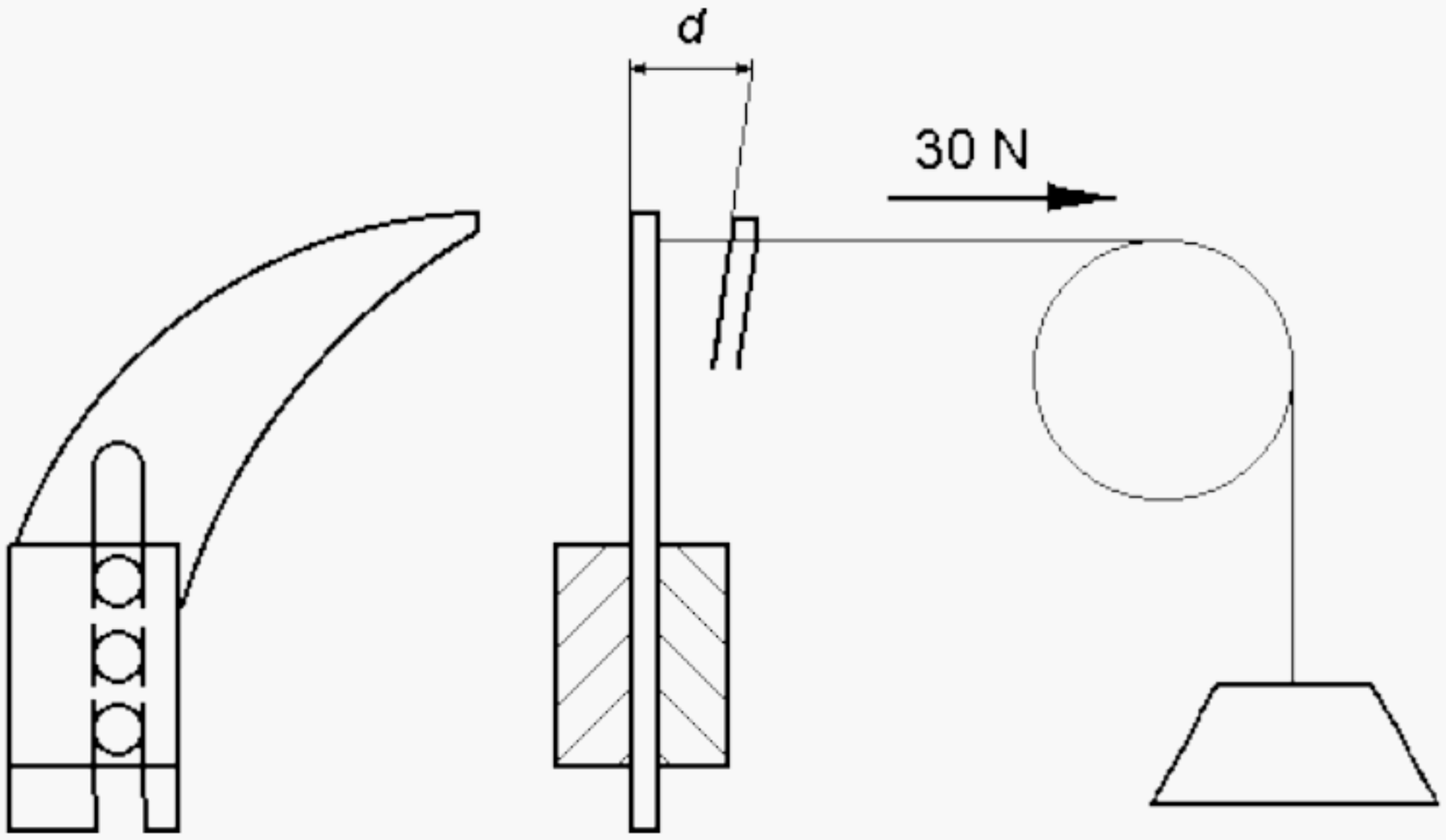


Figure D.1 — Riving knife lateral stability test

Annex E
(normative)

Sawblade guard stability test

E.1 General

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

E.2 Machines with sawblade guards with lead-in

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

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

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

The deflections of the sawblade guard shall be as follows :

a) ≤ 8 mm at measuring point *A*;

b) ≤ 3 mm at measuring point *B*.

E.3 Machines with sawblade guards with in-feed rollers

The test loads shall be applied to the sawblade 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 E.2).

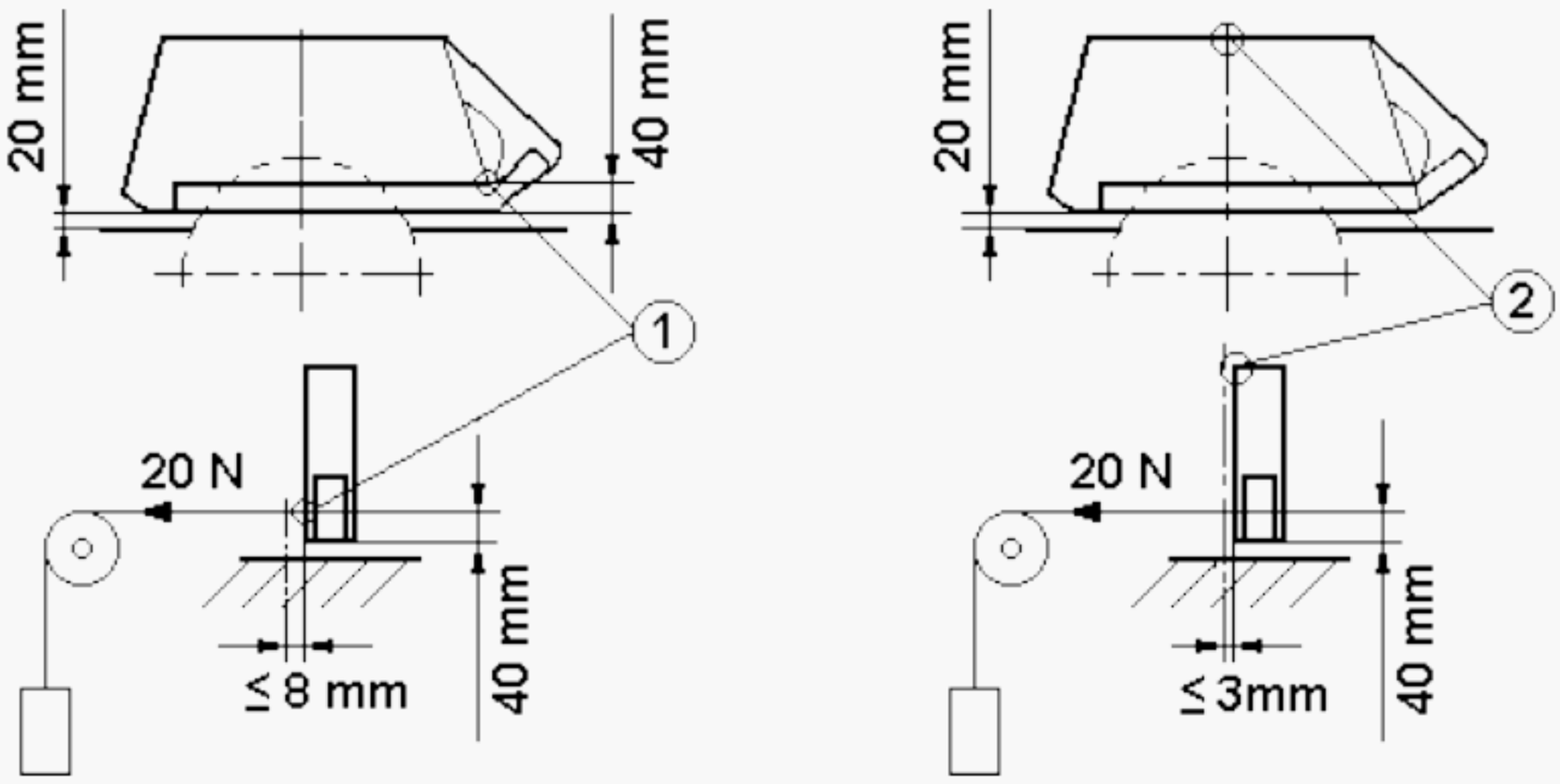
The measuring point *A* shall be located at the same point where the test load is applied (see Figure E.2).

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

The deflections of the sawblade guard shall be as follows :

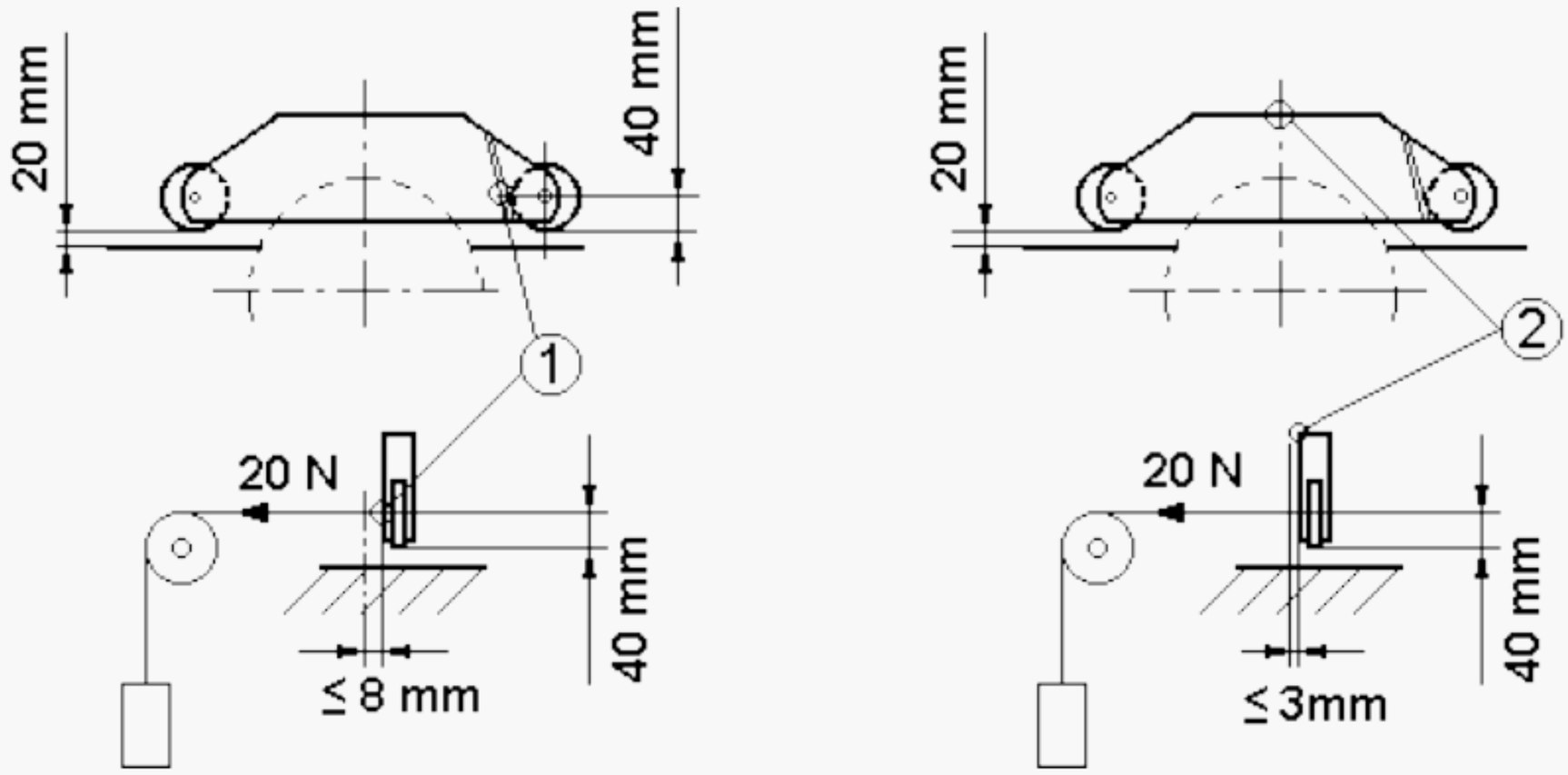
a) ≤ 8 mm at measuring point *A*;

b) ≤ 3 mm at measuring point *B*.



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

Figure E.1 — Stability test for sawblade guards with lead-in



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

Figure E.2 — Stability test for sawblade guards with in-feed rollers

Annex F
(informative)

Safe working practice

It is essential that all operators are :

a) adequately trained in the use, adjustment and operation of the machine;

b) instructed in factors that influence exposure to noise e.g. :

i) sawblades designed to reduce the emitted noise;

ii) sawblade and machine maintenance;

c) informed of factors that influence exposure to dust e.g. :

i) type of material being machined;

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

iii) proper adjustment of hoods/baffles/chutes;

iv) where provided, dust extraction equipment to be switched on before commencing machining.

It is important that :

d) the floor area around the machine is level, well maintained and free from loose material e.g. chips and off-cuts;

e) adequate general or localised lighting is provided;

f) stock and finished workpieces are located close to the operators normal working position.

It is essential for the operator to

g) use a push block or push stick to avoid working with the hands close to the sawblade when using the machine in the saw bench mode;

h) wear suitable personal protective equipment when necessary; this could include :

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

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

iii) gloves for handling sawblades (sawblades should be carried in a holder wherever practicable);

i) stop the machine running whilst unattended;

j) observe the manufacturers instructions when moving the machine;

k) report faults in the machine, including guards or sawblades, as soon as they are discovered;

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

m) follow manufacturers instructions for use, adjustment and repair of sawblades;

n) select the correct riving knife, depending on the sawblade thickness, when using the machine in the saw bench mode;

o) observe the maximum speed marked on the sawblades;

p) use correctly sharpened sawblades;

q) ensure that any spacers and spindle rings used are suitable for the purpose as stated by the manufacturer;

r) 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;

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

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

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 EU Directive "Machinery" 98/37/EC as amended by Directive 98/79/EC.

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

The clauses of this standard are likely to support requirements of Directive Machinery.

Compliance with the clauses of this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

Bibliography

EN 953:1997	*Safety of machinery - Guards - General requirements for the design and construction of fixed and moveable guards*
EN 1870-1:1999	*Safety of woodworking machines – Circular sawing machines – Part 1: Circular saw benches (with and without sliding table) and dimension saws*
prEN 12779	*Chip and dust extraction equipment - Safety related performance and safety requirements - Part 1: Chip and dust extraction equipment with fixed installation*

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