SLOVENSKI STANDARD
SIST EN 847-1:2000

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Orodje za obdelavo lesa - Varnostne zahteve - 1. del: Frezalno orodje in listi krožnih žag

Tools for woodworking - Safety requirements - Part 1: Milling tools and circular saw blades

MaschinenWerkzeuge für Holzbearbeitung - Sicherheitstechnische Anforderungen - Teil 1: Fräs- und Hobelwerkzeuge, Kreissägeblätter

Outils pour le travail du bois - Prescriptions de sécurité - Partie 1: Outils de fraisage, lames de scies circulaires

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25.100.20	Orodja za frezanje	Milling tools
25.100.40	Žagni listi	Saws
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English version

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/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of an identical text or by endorsement, at the latest by November 1997, and conflicting national standards shall be withdrawn at the latest by November 1997.

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(s).

Organisations contributing to the preparation of this European standard include the Comité Européen de l'Outillage (CEO).

This European Standard also includes annex A describing the rig for the testing of kickback behaviour of milling tools for hand feed and annex B giving guidance to the manufacturer, on information which shall be supplied to the user, concerning safe working practices to be employed.

Detailed drawings for the test rig (see annex A.1) and the reference tool can be acquired from the CEN members (i. e. the National Standards Institutes).

All figures in this standard are examples or explanations.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 Introduction

The extent to which hazards are covered is indicated in the scope of this standard, in addition, machinery shall comply as appropriate with EN 292 for hazards which are not covered by this standard.

The requirements of this standard concern designers, manufacturers, suppliers and importers of tools for wood-working machines.

This standard also includes information which the manufacturer should provide to the user.

Besides hazards which may result from inhomogeneity of the material and differing cutting forces during processing, other hazards result from high cutting speeds and manual feeding of the workpieces.

1 Scope

This standard is applicable to all hazards arising from the design and use of tools for woodworking machines, and describes the methods for the elimination or reduction of these hazards by tool design and by the provision of information. Part 1 of the standard deals with milling tools (bore mounted, shank mounted, integrated spindle) and circular saw blades, but does not cover any hazard related to the strength of shank of shankmounted milling tools. The hazards are listed in clause 5. This standard does not apply to boring bits, eccentric single router cutters, cutters with cutting circle less than 16 mm and to tools used in rotary knife lathes and copying lathes where the hazard of ejection and contact with the tool is always prevented by a system of fixed guards and/or movable guards interlocked with guard-locking and/or self-closing guards.

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.

EN 292-1	Safety of machinery - basic concepts; general principles for design - Part 1: Basic terminology, methodology
EN 292-2:1991	Safety of machinery - Basic concepts - General priniciples for design - Part 2: Technical priniciples and specifications
EN 292-2/A1:1995	
ISO 286-2	ISO system of limits and fits - Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts
ISO 513	Application of hard cutting materials for machining by chip removal - Designation of the main groups of chip removal and groups of application
ISO 1940-1	Mechanical vibration; balance quality requirements of rigid rotors - Part 1: Determination of permissible residual unbalance
ISO 3002-1	Basic quantities in cutting and grinding - Part 1: Geometry of the active part of cutting tools - General terms, reference systems, tool and working angles, chip breakers

3 Definitions

For the purpose of this standard the following definitions apply.

3.1 Milling tool for woodworking

A rotating cutting tool, (e. g. milling cutter, planing cutter, thicknessing cutter) normally having its main feed direction perpendicular to its axis of rotation, for working various surfaces on wood and similar materials through chip removal.

The cutting edge of the cutting part may be:

- parallel to the axis of rotation,
- square to the axis of rotation or
- a profile which is a combination of the two.

The tool may be:

- a one piece tool,
- a composite tool,
- a complex tool or
- in the form of a tool set.

3.2 Circular saw blade (woodworking)

A rotating cutting tool for cross-cutting or ripping wood and similar materials through chip removal.

The tool cuts on its periphery and both flanks simultaneously, and may be:

- a one piece tool,
- a composite tool or
- a complex tool.

3.3 One piece tool

Tools without bonded or detachable parts; the body and the cutting parts are one piece.

3.4 Composite tool (tipped tool)

Tools where the cutting components (tips) are firmly connected to the body by bonding, e. g. welding, brazing, adhesive fixing, etc.

3.5 Complex tool

Tools where one or more of the cutting components (inserts, blades) are exchangeably mounted in a body through detachable fixing elements. The cutting components may be one piece or a composite.

3.6 Tool set

A unit consisting of a number of individual tools clamped together on a carrier.

3.7 Body

The part of the tool which holds the cutting blades or inserts, or on which the cutting parts are formed [ISO 3002/1].

3.8 Cutting part

The functional part or parts of the tool each comprised of chip producing elements. The cutting edges, face and flank are therefore elements of the cutting part. In the case of a multi-toothed cutter, each tooth has a cutting part [ISO 3002/1].

3.9 Cutting diameter d_1 (cutting radius r_1)

For tools on which various blades can be mounted, the cutting diameter d_1 (cutting radius r_1) is the maximum possible value (see Figure. 1).

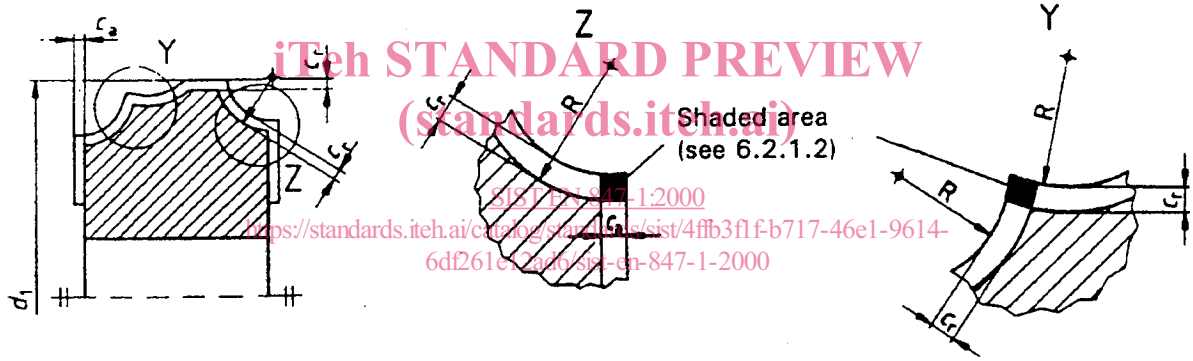

Figure 1: Cutting diameter

3.10 Deflector

A projecting part either exchangeably mounted or firmly connected by bonding to the body or part of the body which performs chip thickness limitation (see Figures 2b, c, d, e and g).

NOTE: The deflector can also be called a "counter-knife".

3.11 Cutting blade projection t

The difference between the radius r_1 of the cutting circle and the radius r_5 of the back supporting circle where $t = r_1 - r_5$ (see Figure. 2).

3.12 Clamping length L

That part of the cutting blade length h which is clamped to the body (see Figure. 3).

3.13 Radial cutting edge projection c_r

The difference between the deflector (not round form tools) or the body (round form tools) and the cutting edge measured in the direction of the normal to the profile (see Figures 1 and 2).

NOTE: The cutting edge projections defined in 3.13 and 3.14 are also called "chip thickness limitation".

3.14 Axial cutting edge projection c_a

The distance measured axially between the axial cutting edge and the body (see Figure. 2a) or the deflector (see Figure. 2d).

3.15 Round form tool

A tool where the body has a circular shape at any cross section perpendicular to the rotational axis of the tool and which performs chip thickness limitation (see Figures. 2a and 4).

3.16 Not round form tool

A tool where chip thickness limitation is performed by a deflector (see Figure. 2b, c, d, e and g) or where a cross section of the body is not circular (see Figure. 2f).

3.17 Adhesive fixing

The bonding of the tool components to the body which prevents their change of position relative to each other.

3.18 Separable fixing

3.18.1 Friction lock fixing (see Figure. 3)

A fixing where the relative change of position in a radial direction during rotation is prevented only by friction forces.

3.18.2 Form lock fixing (see Figure. 4)

A fixing where the relative change of position in the radial direction during rotation is prevented by the form and arrangement of the components.

3.19 Radial and axial approach flats (see Figure. 5)

A flat on the radial and/or axial surface of the deflector or of the body, in front of the deflector edge.

3.20 Radial approach angle τ_r (see Figure. 5)

The angle between the approach flat and the tangent to the deflector circle at the deflector edge or to the body circle at the point where the radial approach flat begins.

3.21 Axial approach angle τ_a (see Figure. 5)

The angle between a plane perpendicular to the axis of the tool and the axial approach flat.

3.22 Kickback velocity ratio V_R/V_c

The relation between the speed V_R of the ejected workpiece and the cutting speed V_c.

3.23 Woodworking machine

A machine or a combination of machines intended for cutting of wood and similar materials, by chip removal, chipless cutting, sanding, forming, laminating (including gluing and edging) or joining (see 3.24).

It includes equipment for noise and dust control which is integral with the machine.

A "machine" includes also associated auxiliary equipment, e. g. power feed units, reversing units, magazines and hoppers, clamping devices and conveying and lifting equipment.

3.24 Similar materials

Materials with physical and technological characteristics similar to those of wood, such as cork, bone, wood based materials such as chipboard, fibreboard, plywood etc. and for which the process of machining and chip or particle removal is similar e. g. rubber, plastic and other stiff material.

3.25 Tools

All individual tools and tool sets for the mechanical removal of chips e. g. circular saw blades, bandsaw blades, milling cutters, chain cutters. Tools also include devices for forming and shaping or chipless cutting.

3.26 Hand feed

The manual holding and/or 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 (see 3.30).

3.27 Integrated feed

A feed mechanism for the workpiece or tool which is integrated with the machine and where the workpiece or machine element with incorporated tool are held and controlled mechanically during the machining operation.

3.28 Speed range

The minimum and maximum speeds within which the tool spindle or tool is designed to operate.

3.29 Loading the machine

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

3.30 Demountable power feed unit

A feed mechanism which is mounted on the machine so that it can be moved from its working position without the use of a spanner or similar additional device.

3.31 Ejection

The unexpected movement of the workpiece, parts of it or parts of the machine during processing.

3.32 Kickback

A particular form of ejection (see 3.31) 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.

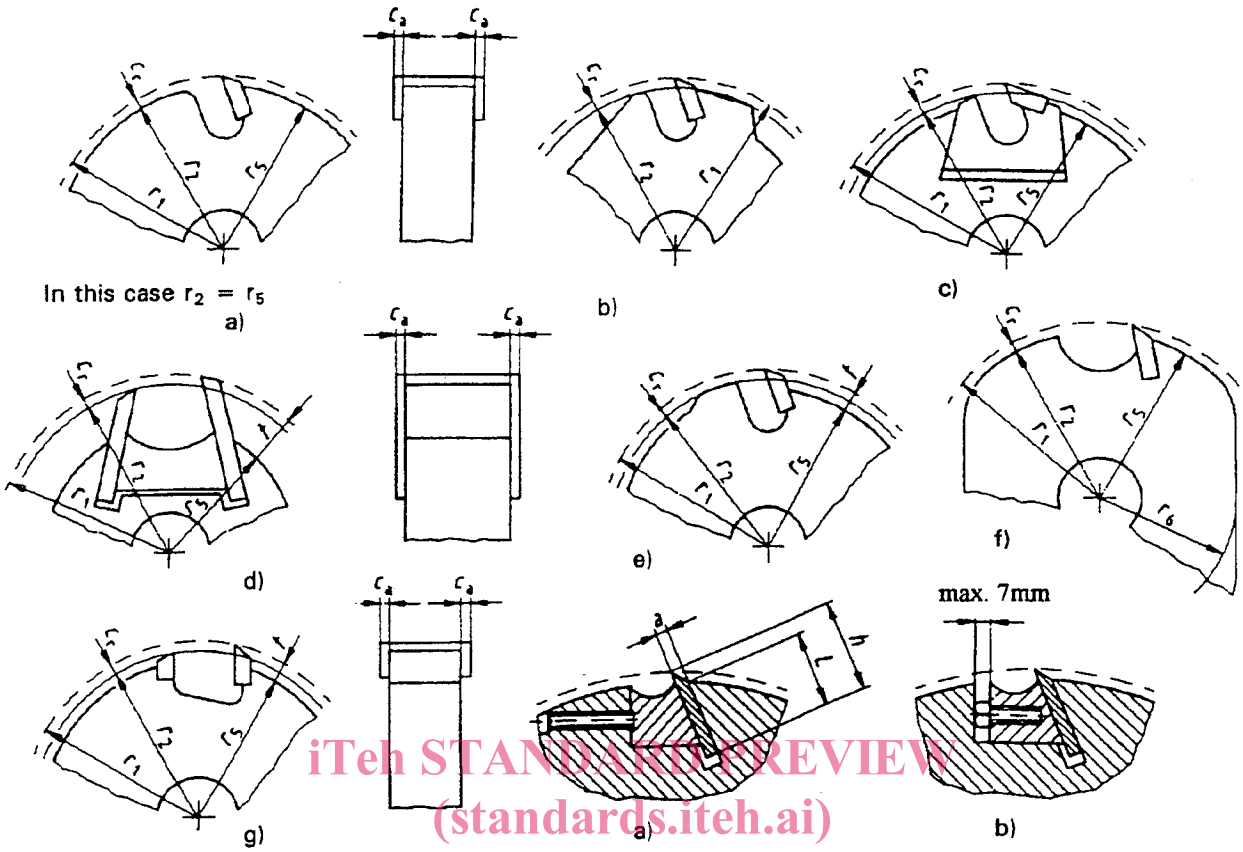

Figure 2: Deflector

Figure 3: Friction lock fixing

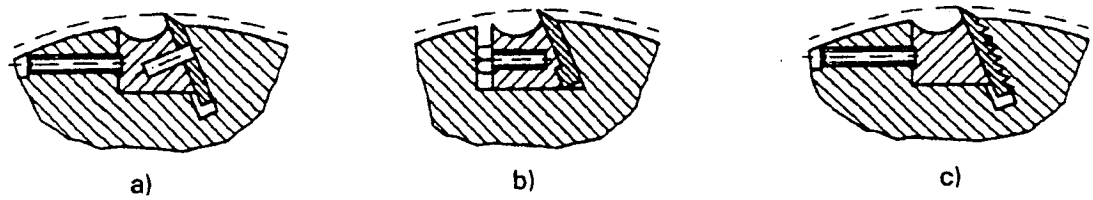

Figure 4: Form lock fixing