SLOVENSKI STANDARD
SIST EN ISO 15641:2002

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Milling cutters for high speed machining - Safety requirements (ISO 15641:2001)

Milling cutters for high speed machining - Safety requirements (ISO 15641:2001)

Fräswerkzeuge für die Hochgeschwindigkeitsbearbeitung - Sicherheitstechnische Anforderungen (ISO 15641:2001)

Fraises pour usinage à grande vitesse - Prescriptions de sécurité (ISO 15641:2001)

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ICS:

25.100.20 Orodja za frezanje Milling tools

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EUROPEAN STANDARD

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English version

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Fraises pour usinage à grande vitesse - Prescriptions de sécurité (ISO 15641:2001)

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This European Standard was approved by CEN on 7 March 2001.

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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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

The text of EN ISO 15641:2001 has been prepared by Technical Committee CEN/TC 143 "Machine tools – Safety", the secretariat of which is held by SNV, in collaboration with Technical Committee ISO/TC 29 "Small tools".

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of an identical text or by endorsement, at the latest by March 2002, and conflicting national standards shall be withdrawn at the latest by March 2002.

The annexes A and B are informative.

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.

Introduction

This standard is intended to assist designers, manufacturers and suppliers of milling cutters to satisfy their obligations in respect of high speed machining applications. It defines requirements for design, confirmation testing and information for use that manufacturers and suppliers are to provide.

The prime objective is to ensure that milling cutters, employed for high speed machining, will be able to safely withstand the quadratic increase in centrifugal force resulting from their application at increased rotational speed.

It is based upon a collaborative German research project established to investigate the suitability of milling cutters for use in high speed machining operations.

This standard deals only with the tool and is not sufficient alone to ensure the safety. The safety of machinery is dealt with by other specific safety standards.

This standard takes account of cutting conditions only by requiring the manufacturer to provide application information.

Informative annex A provides guidance for reduction of hazards by design and informative annex B explains the scope limits.

1 Scope

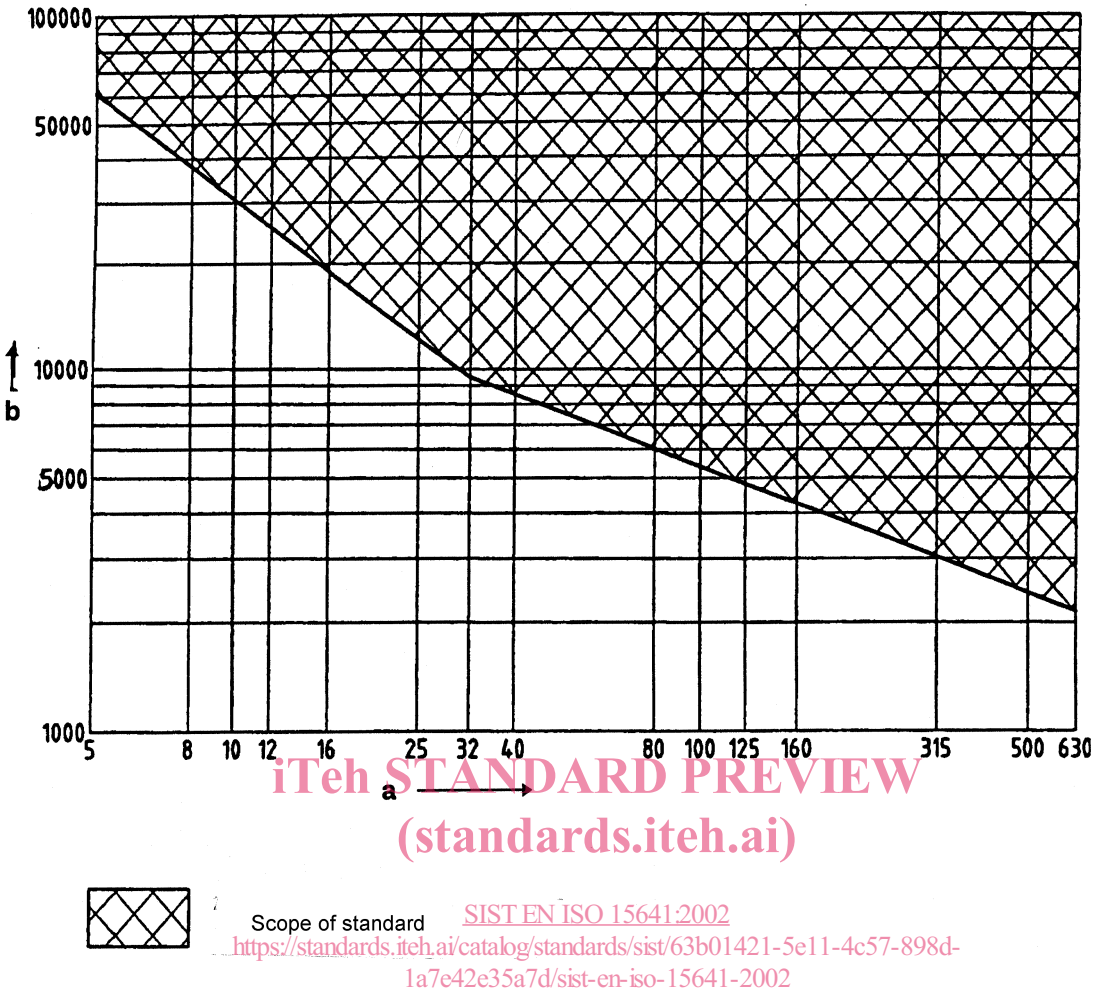
This standard deals with the principle hazards arising from use of milling cutters, e.g. milling cutters according to ISO 3855, used for high speed machining (chip removal machining at increased peripheral speeds) on metal working machine tools and prescribes safety requirements.

It specifies design methods, centrifugal force test procedures, operational limits and the provision of information that will lead to minimisation or elimination of these hazards.

The standard is applicable to milling cutters which are intended for operation at speeds in accordance with figures 1 and 2.

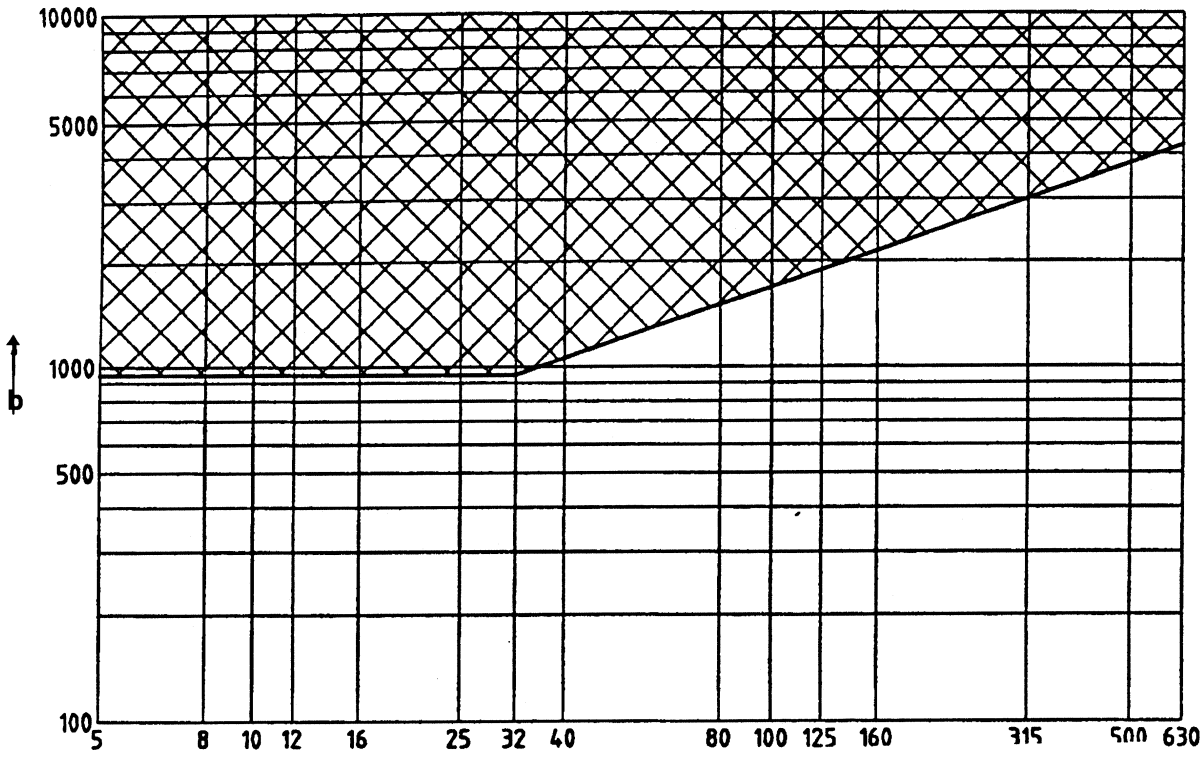
These figures respectively define the rotational speed limits and peripheral speed limits for specific cutter diameters.

NOTE A detailed explanation is provided in annex B.



a Maximum diameter of tool *D* in mm
b Rotational speed *n* in min^{-1}

Figure 1 - Rotational speed *n* vs maximum diameter of tool *D*



a Maximum diameter of tool *D* in mm

b Velocity at *D* (speed v_D at maximum diameter of tool D) in $\frac{m}{min}$

Figure 2 - Velocity at *D* (speed v_D) vs maximum diameter of tool *D*

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 1070
Safety of machinery – Terminology

ISO 1940-1:1986
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

ISO 3855
Milling cutters – Nomenclature

3 Terms and definitions

For the purposes of this standard the terms and definitions given in EN 1070, ISO 3002-1 and the following apply:

3.1 Tool classification terms

3.1.1
solid or one-piece cutter
milling cutter which has no detachable parts. Its body and cutting part or parts are one piece.

3.1.2
composite cutter
milling cutter in which the cutting part or parts (e.g. tips) are attached to the body by material bonding (e.g. by brazing).

3.1.3
complex cutter
milling cutter in which one or more parts (e.g. indexable inserts, cartridges, clamping elements) are attached to the body by mechanical fastening (e.g. key bolt, screw bolt or clamp bolt fixing which operate by friction lock or form lock principles).

3.2 Types of fixing

3.2.1
bonding
securing of cutter parts with material bonding such as brazing, welding or gluing.

3.2.2
separable
securing of cutter parts by detachable fastening(s). Examples are friction lock and form lock fixings, or a combination of these, which can be mounted and detached repeatedly.

3.2.3
friction lock
means of securing cutter parts where friction force prevents the movement of parts in use.

3.2.4
form lock
means of securing cutter parts where the shape and arrangement of parts prevents their movement in use.

3.3 Terms for the designation of geometric parameters

3.3.1
maximum diameter of tool *D*
maximum diameter of the circle created by cutter rotation. See *D* in figures 3, 4 and 5.

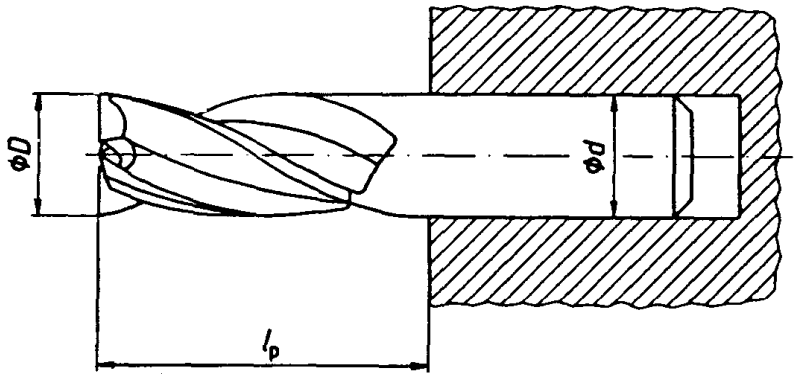


Figure 3 - Example for solid, one-piece or composite cutter

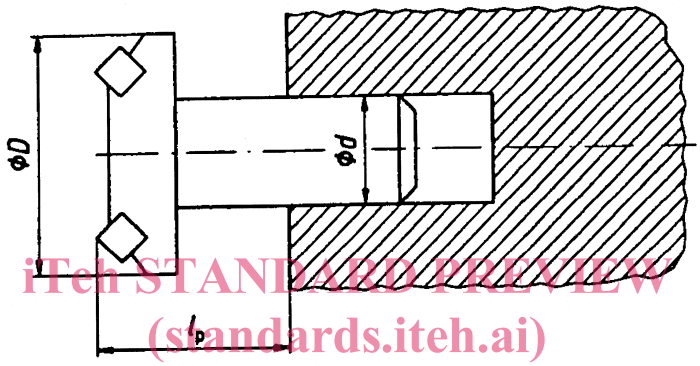


Figure 4 - Example for complex cutter

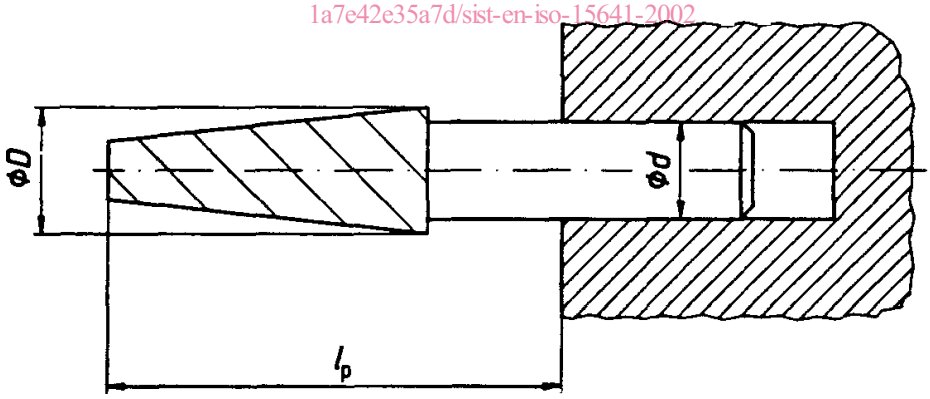


Figure 5 - Example for tapered solid, one-piece or composite cutter