
**Machine-tools safety — Safety
requirements for the design and
construction of work holding chucks**

*Sécurité des machines-outils — Prescriptions de sécurité pour la
conception et la construction des mandrins porte-pièces*

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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

ISO 16156 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 8, *Work holding spindles and chucks*.

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Introduction

This International Standard was prepared to provide one means of conforming to the Essential Health and Safety Requirements of the Machinery Directive and associated EFTA Regulations.

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Machine-tools safety — Safety requirements for the design and construction of work holding chucks

1 Scope

This International Standard sets out the requirements and/or measures to remove the hazards and limit the risk on work holding chucks which are defined in 3.1.

It covers all the hazards relevant to this component, as listed in Clause 4.

The requirements concern designers, manufacturers, suppliers and importers of work holding chucks.

It also includes information which the manufacturer shall provide for the user.

It is primarily directed to components which are manufactured after its date of issue.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1940-1:2003, *Mechanical vibration — Balance quality requirements for rotors in a constant (rigid) state — Part 1: Specification and verification of balance tolerances*

ISO 3089:1991, *Self-centring manually-operated chucks for machine tools — Acceptance test specifications (geometrical tests)*

ISO 3442:1991, *Self-centring chucks for machine tools with tow-piece jaws (tongue and groove type) — Sizes for interchangeability and acceptance test specifications*

ISO 9401:1991, *Machine tools — Jaw mountings on power chucks*

EN 292-1:1991, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

EN 292-2:1991, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications + Amendment 1:1995*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

- 3.1 work holding chuck**
clamping device with movable jaws to hold a workpiece designated hereinafter by “chuck”
- NOTE Some chucks may be equipped with grooves or slots.
- 3.2 manually operated chuck**
chuck in which workpieces are clamped with the aid of manual energy (e.g. by means of a key)
- 3.3 power-operated chuck**
chuck in which workpieces are clamped with the aid of pneumatic, hydraulic or electric energy
- 3.4 centrifugally compensated chuck**
chuck in which there is a system which permits compensation of the loss of clamping force due to centrifugal force
- 3.5 base jaw**
radial moving part of the chuck which receives the top jaw
- 3.6 top jaw**
element mounted on a base jaw for the clamping of workpieces
- 3.7 clamping force**
algebraic sum of the individual radial forces applied by the chuck jaws on the workpiece
- 3.8 static clamping force**
clamping force of the chuck before the chuck has been rotated
- 3.9 maximum static clamping force**
maximum clamping force obtained when the maximum permissible input force (or input torque) is applied to a particular design
- 3.10 dynamic clamping force**
actual clamping force when the chuck is rotating
- 3.11 clamping cylinder**
cylinder which actuates the chuck with the aid of pneumatic or hydraulic energy
- 3.12 centrifugal force**
force generated by rotation that tends to move all parts away radially from the axis of rotation of the chuck