

# **SLOVENSKI STANDARD**

## **SIST EN 16564:2015**

**01-februar-2015**

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### **Stroji in obrati za pridobivanje in obdelavo naravnega kamna - Varnost - Zahteve za žage/frezalne stroje, ki vključujejo računalniško krmiljenje (NC/CNC)**

Machines and plants for mining and tooling of natural stone - Safety - Requirements for bridge type sawing/milling machines, included numerical control (NC/CNC) versions

Maschinen und Anlagen zur Gewinnung und Bearbeitung von Naturstein - Sicherheit - Anforderungen an Brücken-Säge/Fräsmaschinen einschließlich numerischer Steuerungsversionen (NC/CNC)

Machines et équipements pour l'exploitation et l'usinage de pierres naturelles - Sécurité - Prescriptions relatives aux machines à scier/fraiseuses de type pont, y compris les versions à commande numérique (NC/CNC)

**Ta slovenski standard je istoveten z: EN 16564:2014**

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#### **ICS:**

25.080.20	Frezalniki	Boring and milling machines
25.080.60	Strojne žage	Sawing machines
73.120	Oprema za predelavo rudnin	Equipment for processing of minerals

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**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 16564**

December 2014

ICS 25.080.20; 25.080.60; 73.120

English Version

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Safety - Requirements for bridge type sawing/milling machines,  
included numerical control (NC/CNC) versions**

Machines et équipements pour l'exploitation et l'usinage de  
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Maschinen und Anlagen zur Gewinnung und Bearbeitung  
von Naturstein - Sicherheit - Anforderungen an Brücken-  
Säge-/Fräsmaschinen einschließlich numerischer  
Steuerungsversionen (NC/CNC)

This European Standard was approved by CEN on 13 September 2014.

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 CEN-CENELEC Management Centre or to any CEN member.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**EN 16564:2014 (E)****Foreword**

This document (EN 16564:2014) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety”, the secretariat of which is held by DIN.

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 June 2015 and conflicting national standards shall be withdrawn at the latest by June 2015.

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

This document 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 2006/42/EC, see informative Annex ZA, which is an integral part of this document.

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

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## Introduction

This European Standard has been prepared to be a harmonized standard to provide one means of conforming to the essential health and safety requirements of the Machinery Directive and associated EFTA Regulations.

This European Standard is a type C standard as stated in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards for machines that have been designed and built according to the provisions of this type C standard.

The requirements of this document are directed to manufacturers and their authorized representatives of bridge type sawing/milling machines included numerical control (NC/CNC) versions. It is also useful for designers.

This also includes examples of information to be provided by the manufacturer to the user.

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## EN 16564:2014 (E)

## 1 Scope

This European Standard deals with all significant hazards, hazardous situations and events, as listed in Clause 4, which are relevant to bridge type machines: sawing, sawing and milling, milling, included numerical control (NC/CNC) versions, designed to saw and mill natural stone and engineered/agglomerated stone as defined by EN 14618:2009, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

This European Standard deals with the foreseeable lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.

This European Standard also applies to machines fitted with the following facilities/devices:

- mechanical, pneumatic, hydraulic or vacuum workpiece clamping;
- automatic tool change;
- loading and unloading conveyor system;
- tilting and/or rotating head axis;
- rotating workpiece support(s);
- tilting workpiece support(s) when loading;
- lathe unit;
- undercut grooving unit;
- axes operating in accordance with an NC work programme.

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This European Standard does not apply to:

- machines intended for operation in a potentially explosive atmosphere;
- machines operating in severe environmental conditions (e.g. extreme temperatures, corrosive environment);
- machines intended for outdoor operation;
- machines which are manufactured before the date of its publication as EN.

## 2 Normative references

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

EN 166:2001, *Personal eye-protection - Specifications*

EN 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*



- EN 953:1997+A1:2009, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards*
- EN 1005-2:2003+A1:2008, *Safety of machinery - Human physical performance - Part 2: Manual handling of machinery and component parts of machinery*
- EN 1005-4:2005+A1:2008, *Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery*
- EN 1037:1995+A1:2008, *Safety of machinery - Prevention of unexpected start-up*
- EN 1837:1999+A1:2009, *Safety of machinery - Integral lighting of machines*
- EN 14618:2009, *Agglomerated stone - Terminology and classification*
- EN 50370-1:2005, *Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 1: Emission*
- EN 50370-2:2003, *Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 2: Immunity*
- EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005, mod.)*
- EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*
- EN 60825-1:2007, *Safety of laser products - Part 1: Equipment classification and requirements (IEC 60825-1:2007)*
- EN 61439-1:2011, *Low-voltage switchgear and controlgear assemblies - Part 1: General rules*
- EN 61496-1:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1:2012)*
- EN 82079-1:2012, *Preparation of instructions for use — Structuring, content and presentation - Part 1: General principles and detailed requirements (IEC 82079-1:2012)*
- EN ISO 3743-1:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for small movable sources in reverberant fields - Part 1: Comparison method for a hard-walled test room (ISO 3743-1:2010)*
- EN ISO 3743-2:2009, *Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering methods for small, movable sources in reverberant fields - Part 2: Methods for special reverberation test rooms (ISO 3743-2:1994)*
- EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*
- EN ISO 3745:2012, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and hemi-anechoic rooms (ISO 3745:2012)*
- EN ISO 3746:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

**EN 16564:2014 (E)**

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power - General rules and safety requirements for systems and their components (ISO 4414:2010)*

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 11145:2008, *Optics and photonics - Lasers and laser-related equipment - Vocabulary and symbols (ISO 11145:2006)*

EN ISO 11200:2014, *Acoustics - Noise emitted by machinery and equipment - Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and at other specified positions (ISO 11200:2014)*

EN ISO 11201:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11202:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11204:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

EN ISO 11688-1:2009, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

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

EN ISO 13850:2008, *Safety of machinery - Emergency stop - Principles for design (ISO 13850:2006)*

EN ISO 13856-3:2013, *Safety of machinery - Pressure-sensitive protective devices - Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices (ISO 13856-3:2013)*

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

EN ISO 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

#### 3.1

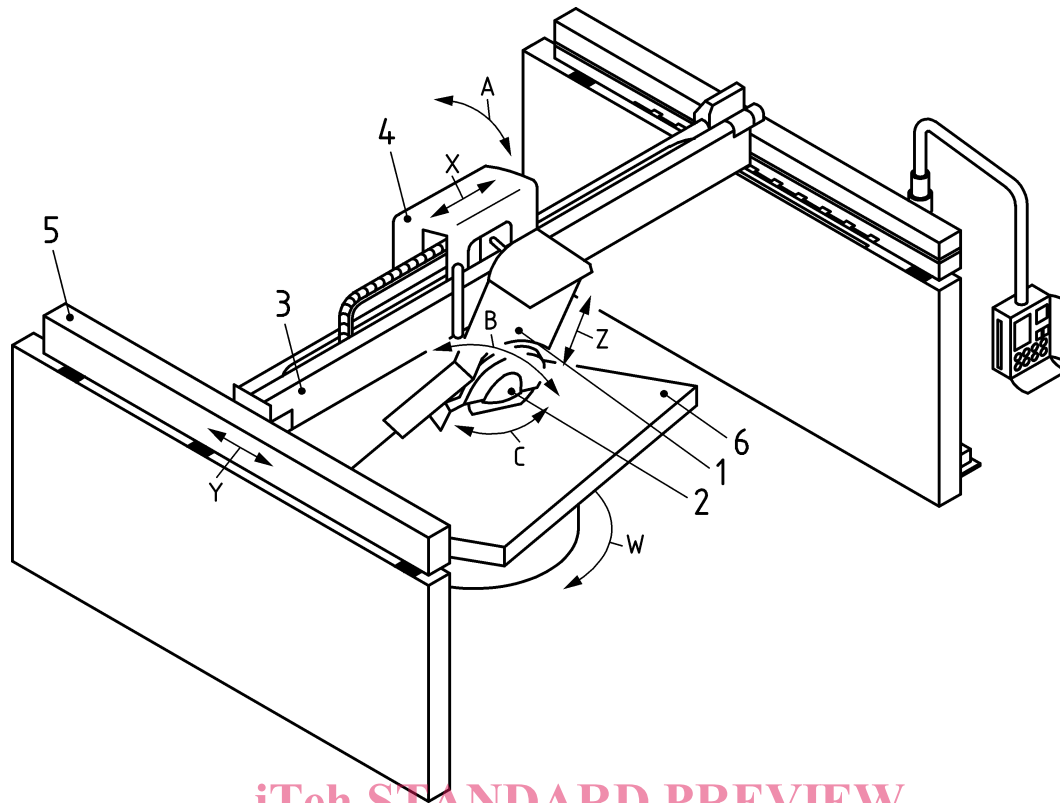
##### **bridge sawing machine**

integrated fed machine designed for sawing and/or shaping workpieces (see Figure 1) by the use of a diamond disk water cooled during the working process having at least two squared axes which the working head moves over

Note 1 to entry: This machine can be equipped with the following facilities:

- a) loading and unloading conveyor system;
- b) tilting (A/B) and/or rotating (C) head axis;
- c) rotating workpiece support (s);
- d) tilting workpiece support(s) when loading;
- e) lathe unit (see Figure 2);
- f) workpiece vacuum moving system;
- g) undercut grooving unit;
- h) axes operating in accordance with an NC work programme.

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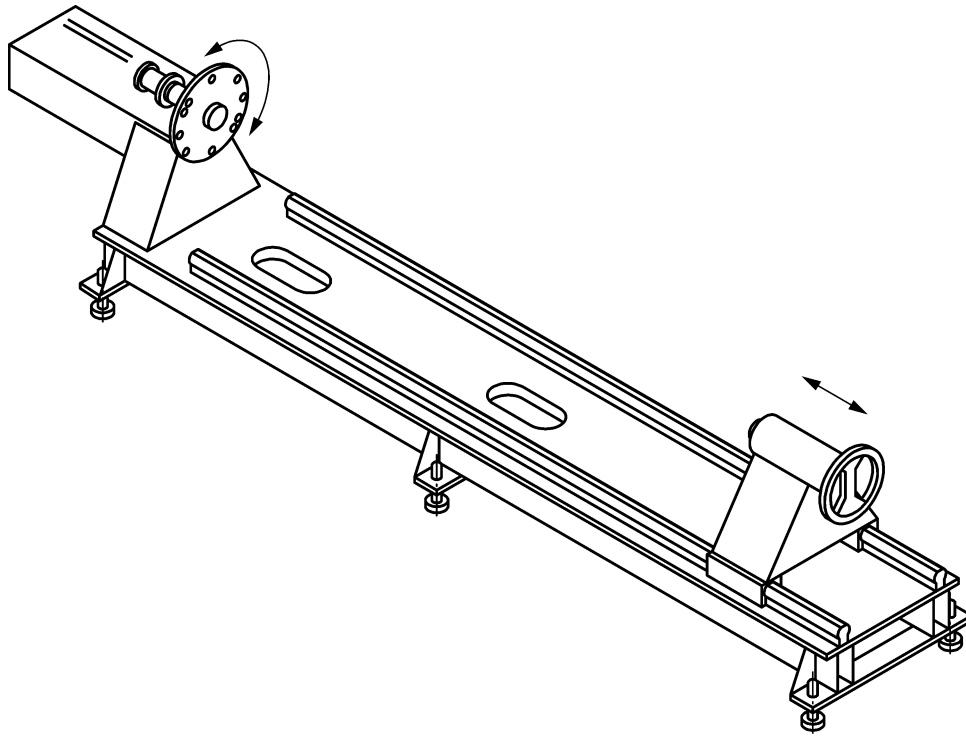
Safeguarding devices are not illustrated

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#### Key

1	tool holder head (tilting version)	A	direction of the tilting movement of the head
2	diamond disk	B	direction of the tilting movement of the head
3	bridge	C	direction of the rotating movement of the head
4	carriage	W	direction of the rotating movement of the workpiece support(s)
5	slide rail	X	longitudinal movement of the head along the carriage
6	tilting and rotating workpiece support(s)	Y	transverse movement of the bridge along the slide rail
		Z	vertical movement of the head

**Figure 1 — Example of a bridge sawing machine upper tilting head, rotating workpiece support**



Safeguarding devices are not illustrated

**Figure 2 — Example of a lathe unit**

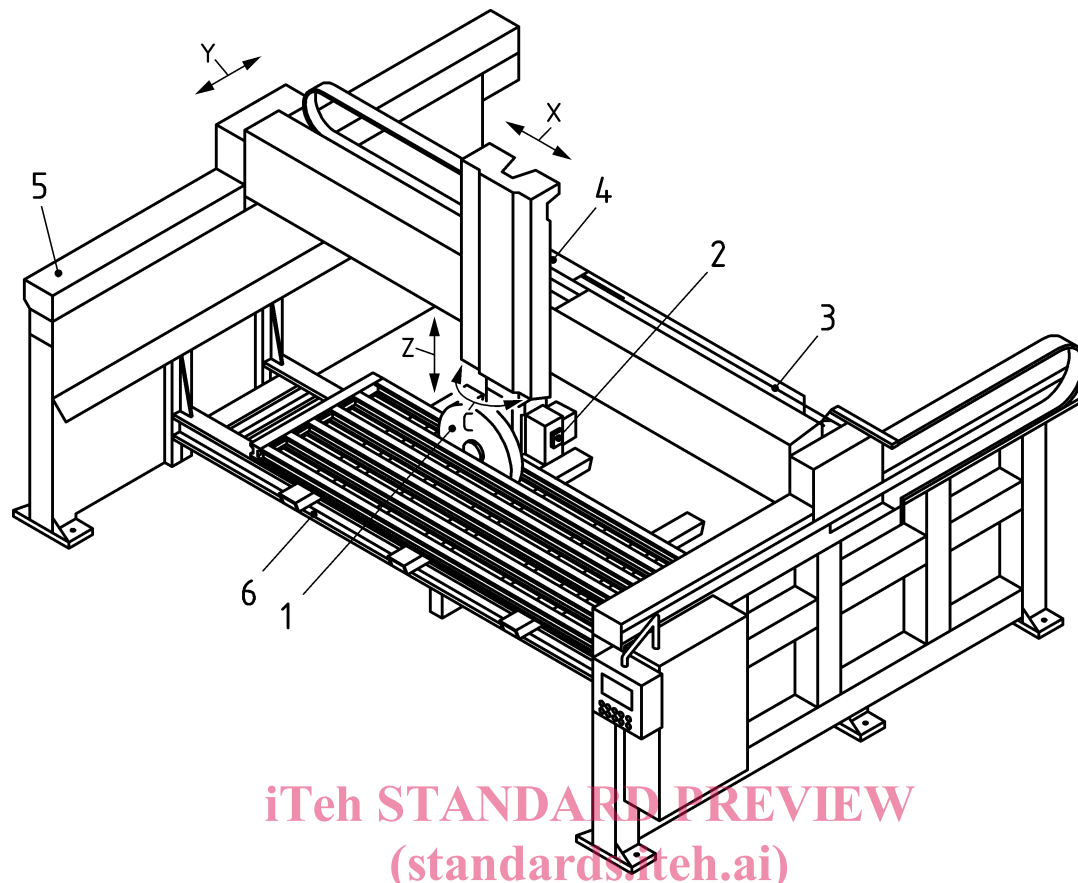
### 3.2

#### **bridge sawing and milling machine**

integrated fed machine designed for sawing, milling and boring workpieces (see Figure 3) by the use of a diamond disk and by a milling tool water cooled installed in the same head unit equipped with a single or double spindle having at least three squared axes (XYZ)

Note 1 to entry: This machine can be equipped with the following facilities:

- a) loading and unloading conveyor system;
- b) tilting (A/B) and/or rotating (C) head axis;
- c) rotating workpiece support (s);
- d) tilting workpiece support(s) when loading;
- e) lathe unit;
- f) workpiece vacuum moving system;
- g) undercut grooving unit;
- h) mechanical, pneumatic, hydraulic, or vacuum workpieces clamping;
- i) axes operating in accordance with an NC work programme.



Safeguarding devices are not illustrated

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#### Key

- |   |  |   |  |
|---|--|---|--|
| 1 | main drive – diamond disk                  | C | direction of the rotating movement of the head         |
| 2 | milling unit                               | X | longitudinal movement of the head along the carriage   |
| 3 | bridge                                     | Y | transverse movement of the bridge along the slide rail |
| 4 | carriage                                   | Z | vertical movement of the head                          |
| 5 | slide rail                                 |   |  |
| 6 | tilting and rotating workpiece support (s) |   |  |

**Figure 3 — Example of a bridge sawing and milling machine with double spindle**

### 3.3

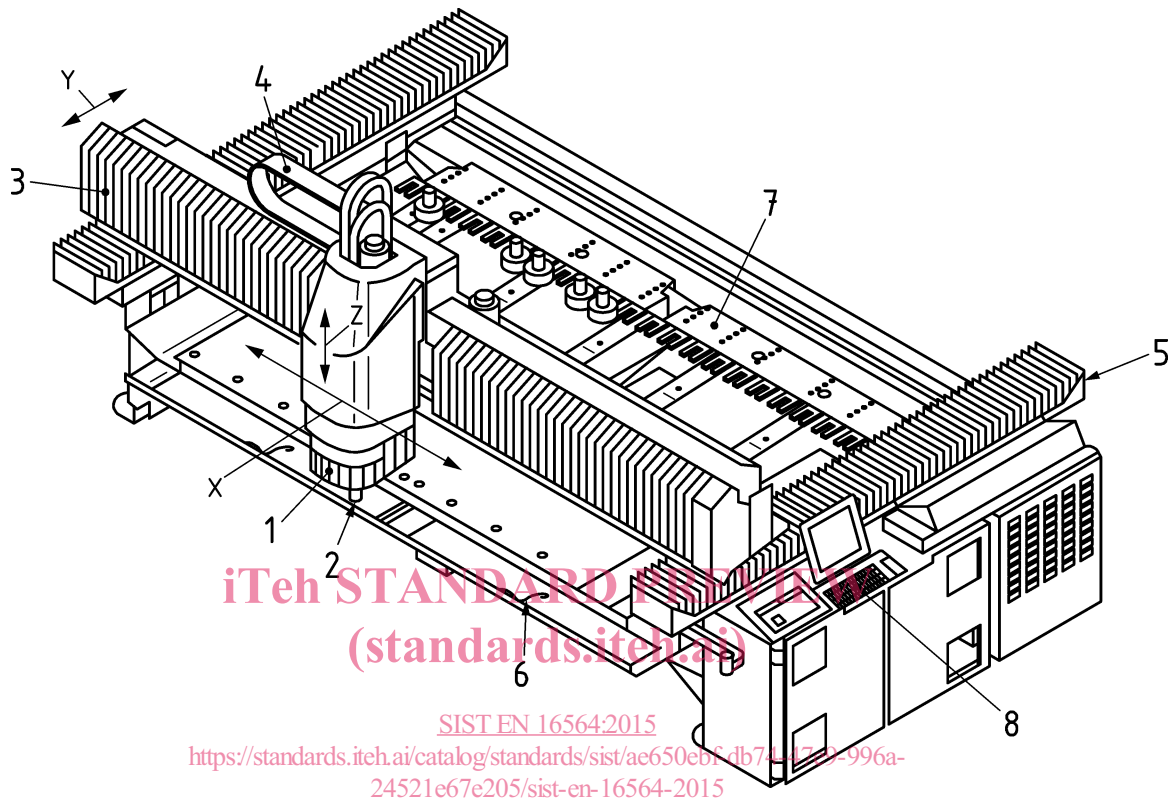
#### numerical control bridge sawing/milling machine

integrated fed machines provided with automatic tool change designed for machining of workpieces (see Figure 4) by the use of milling/boring tools and/or diamond disks water cooled with at least three square axes programmable by the user (X, Y, Z) for positioning and/or machining and axes operated in accordance with an NC work programme

Note 1 to entry: This machine can be equipped with the following facilities:

- loading and unloading conveyor system;
- tilting (A/B) and/or rotating (C) head axis;
- rotating workpiece support (s);
- tilting workpiece support(s) when loading;
- lathe unit;

- f) workpiece vacuum moving system;
- g) undercut grooving unit;
- h) mechanical, pneumatic, hydraulic, or vacuum workpieces clamping.



Safeguarding devices are not illustrated

#### Key

- |   |  |
|---|--|
| 1 tool holder head                          | 7 tool magazine  |
| 2 tool                                      | 8 PC for numerical control                               |
| 3 bridge                                    | X longitudinal movement of the head along the carriage   |
| 4 carriage                                  | Y transverse movement of the bridge along the slide rail |
| 5 slide rail                                | Z vertical movement of the head                          |
| 6 tilting and rotating workpiece support(s) |  |

**Figure 4 — Example of a numerical control bridge sawing and milling machine**

### 3.4

#### manual machining mode of operation

manual operation of the machine with the facility for manual or automatic loading/unloading of workpieces

### 3.5

#### bumper

pressure-sensitive protective device comprising:

- a) sensor(s) which generate(s) a signal when pressure is applied to part of its outer surface, where:
  - 1) the cross section throughout the pressure-sensitive area may be regular or irregular;
  - 2) the sensor is intended to detect a person or a part of his body (head, arm, leg, etc.) when entering the protected zone;