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**Elektromagnetna združljivost (EMC) - Družina standardov za strojna orodja -  
1. del: Oddajanje**

**(istoveten EN 50370-1:2005)**

Electromagnetic compatibility (EMC) - Product family standard for machine tools -  
Part 1: Emission

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EUROPEAN STANDARD

**EN 50370-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2005

ICS 25.080.01; 33.100.10

English version

**Electromagnetic compatibility (EMC) –  
Product family standard for machine tools  
Part 1: Emission**

Compatibilité électromagnétique (CEM) –  
Norme de famille de produits pour les  
machines-outils  
Partie 1: Emission

Elektromagnetische Verträglichkeit (EMV) –  
Produktfamilienorm für  
Werkzeugmaschinen  
Teil 1: Störaussendung

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This European Standard was approved by CENELEC on 2005-02-01. CENELEC 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 Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

**CENELEC**

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 210, Electromagnetic compatibility (EMC).

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50370-1 on 2005-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2006-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-02-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 89/336/EEC. See Annex ZZ.

The purpose of this product family standard is

- to establish uniform requirements for the electromagnetic emission of the machine tools contained in the scope,
- to fix test specifications of emission,
- to refer to Basic Standards for methods of testing, <https://standards.iteh.ai/catalog/standards/sist/4afe0ab0-330c-45bf-ac64-5e5aacc25d8c7/sist-en-50370-1-2007>
- to standardise conditions during the tests and test report format for the assessment of conformity.

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## 1 Scope

This standard deals with the electromagnetic emission (radio frequency protection) of machine tools, excluding electro discharge machines (EDM), designed exclusively for industrial and similar purposes that use electricity, the rated voltage of the machine tool not exceeding 1 000 V AC or 1 500 V DC between lines.

Machine tools may incorporate motors, heating elements or their combination, may contain electric or electronic circuitry, and may be powered by the mains, or any other electrical power source.

This standard does not cover fixed installations as defined in the Guide to the Application of Directive 89/336/EEC, published by the European Commission.

Emission requirements in the frequency range 9 kHz to 400 GHz are covered. No measurements need to be performed at frequencies where no requirements are specified.

## 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 55011	Industrial, scientific and medical (ISM) radio-frequency equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 11, mod.)
EN 55022	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22, mod.)
EN 61800-3	Adjustable speed electrical power drive systems — Part 3: EMC product standard including specific test methods (IEC 61800-3)
CISPR 16-1	Specification for radio disturbance and immunity measuring apparatus and methods — Part 1: Radio disturbance and immunity measuring apparatus

## 3 Definitions

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

### 3.1

#### **machine tool (MT)**

machine, not portable as a whole during its operation, driven by an external electrical energy source and intended to work typically metal products in the solid state, with material removal (cutting processes as turning, milling, grinding, drilling, machining...) or without material removal (forming processes as bending, forging, etc.)

The machine tool is normally equipped with a power supply, an electrical and electronic assembly for power and control and one or more power drive systems for the movement of mobile elements or parts

**3.2****module**

unit consisting of mechanical, pneumatic, hydraulic, electrical and/or electronic parts (examples: machine bed, tool holder, sensor, spindle unit, cabinet including NC-controller and human-machine-interface, programmable logic controller - PLC, power drive...), intended exclusively for an industrial assembly operation for incorporation in an apparatus or system. A component can be considered as a module

**3.3****electromagnetically relevant component/module**

An electromagnetically relevant component or module for emission aspects is defined as one that, due to its electromagnetic characteristics, is liable to cause electromagnetic disturbances such that it will influence the emission characteristics of typical assemblies into which it may be incorporated

**3.4****port**

particular boundary of the specified machine tool or module with the electromagnetic environment of the process

(IEV 131-02-21 modified)

NOTE By boundary is meant the physical limits of the complete machine tool or module.

**3.5****power interface**

connections needed for the distribution of electrical power within the machine tool

**3.6****entire electrical set**

assembly of all electro-magnetic relevant modules separated from the mechanical structure of the machine tool allowing the assembly to be tested in a reference test site

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**3.7****type test**

test of one or more devices made to a certain design to show that the design meets certain specifications (IEV 151-04-15)

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**3.8****equipment**

generic term, referring to the entire machine tool, the entire electrical set or an electrical/electromechanical module

**4 System configuration**

A basic configuration may consist of (see Figure 1)

- an electrical feeding section,
- control and protection circuits and equipment,
- one or more basic power conditioning units (example: drive modules) performing control and/or conversion of electrical energy,
- one or more actuators and their associated transducers,
- control and sequencing systems such as NC-controllers, programmable controllers and their associated peripherals, programming and debugging tools, test equipment and human-machine interfaces,
- peripherals (transducer(s), operator station, emergency stop devices, etc.),
- the structure and the moving parts driven by the actuator(s).

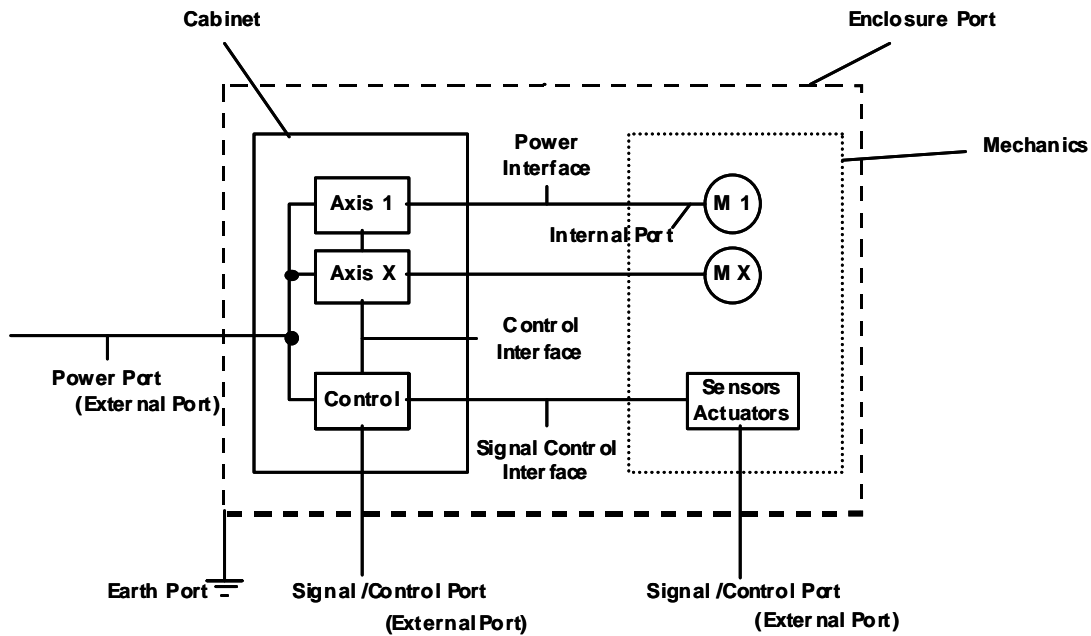


Figure 1 – System configuration and example of ports

#### 4.1 Test approach

Type testing of a finished product is the normal method for conformity assessment against the requirements of a standard, but complete testing of an entire machine tool at a conventional EMC test site is only technically possible and economically feasible for a limited number of machines. A distinction shall be drawn between type-testable machines and machines which, because of the weight, dimensions, operation or unreasonable testing costs and testing delay, cannot be type-tested as a whole at a conventional EMC test site.

Furthermore, it is necessary to take into account single-piece production and the multitude of types as well as expansions and modifications.

Distinctions shall be drawn between the following cases and shall be taken into account:

- type-testable machines;
- machines which are not type-testable;
- multitude of types;
- modifications, additions and expansions.

Each testing procedure for conformity assessment is based on one or a combination of various tests:

- type test at the EMC test site;
- visual inspection of entire machine tool;
- additional tests on entire machine tool <sup>1)</sup>.

<sup>1)</sup> Such tests are usually performed in the manufacturers premises.



## 5 Emission measurements

Emission measurements shall be performed in accordance with EN 55011 and CISPR 16.

The content of these standards are not repeated here however modifications or additional information needed for the practical application of the testing procedures are given in the present product standard. (These conditions may include in situ measurements as long as they are in accordance with the test methods specified in EN 55011 and CISPR 16).

### 5.1 Classification and testing procedures

The emission testing procedures are described in the following paragraphs. A flow chart providing an overview of the test procedures is included in the informative Annex E.

#### 5.1.1 Machine tool containing no electromagnetically relevant components

If the machine tool contains no electromagnetically relevant components, no tests have to be carried out.

EXAMPLES Machine tools containing only components such as squirrel cage motors and electromechanical switches.

#### 5.1.2 Machine tool containing electromagnetically relevant components

If the machine tool contains electromagnetically relevant components such as electronic control and power parts (sub-assemblies, sub-systems, etc.), one of the procedures laid down in Table 1 shall be carried out. The test procedure is chosen by the manufacturer based on the characteristics of the machine tool.

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**Table 1 – Testing procedures**

Test procedure	Procedure A (Applicable for the entire MT)	Procedure B (Applicable for the entire electrical set)	Procedure C (Applicable for electrical or electromechanical modules)
Type test	Required	Required	Required
Visual inspection of entire MT	Not required	Required	Required
Additional tests on entire MT <sup>a</sup>	Not required	Not required	Required
<sup>a</sup> Such tests are usually performed in the manufacturers premises.			

##### 5.1.2.1 Test procedure A

The machine tool shall be tested according to the emission requirements laid down in this standard (see 5.2 to 5.4 and Annex A).

During measurement, the machine tool shall operate as specified by the manufacturer.

##### 5.1.2.2 Test procedure B

The entire electrical set of the machine tool shall be tested according to the specific emission requirements laid down in this standard (see 5.2 to 5.4 and Annexes A and B) while simulating specific functions to be specified by the manufacturer.