SLOVENSKI STANDARD

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Elektromagnetna združljivost (EMC) – Produktni standard za opremo za uporovno varjenje

Electromagnetic compatibility (EMC) – Product standard for resistance welding equipment

ICS 25.160.30; 33.100.01

Referenčna številka
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EUROPEAN STANDARD **EN 50240**

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English version

Electromagnetic compatibility (EMC) - Product standard for resistance welding equipment

Compatibilité électromagnétique (CEM) - Norme de produit pour le matériel de soudage par résistance

Elektromagnetische Verträglichkeit (EMV) - Produktnorm für Widerstands-Schweißeinrichtungen

This European Standard was approved by CENELEC on 2004-04-01. 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.

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

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 26B, Electric resistance welding.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50240 on 2004-04-01.

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) 2005-04-01

- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-04-01

Contents

1 Scope

This standard is applicable to equipment for resistance welding and allied processes intended for use in industrial and light industrial environments which are connected to mains supplies with rated voltages up to 1 000 V a.c. rms. This standard does not define safety requirements.

Resistance welding equipment type tested in accordance with, and which has met the requirements of this standard, shall be deemed to be in compliance for all applications.

The frequency range covered is from 0 Hz to 400 GHz.

This product EMC standard for resistance welding equipment takes precedence over all aspects of the generic standards and no additional EMC tests are required or necessary.

NOTE 1 Typical allied processes are resistance hard and soft soldering or resistance heating achieved by means comparable to resistance welding equipment.

NOTE 2 Limit values are specified for only part of the frequency range.

Resistance welding equipment are classified as class A and class B equipment.

1.1 Emission

The objective of this standard is to specify:

a) test methods to be used in conjunction with EN 55011:1998 and its amendments A1:1999 and A2:2002 to determine electromagnetic emission;

b) relevant standards for harmonic current emission, voltage fluctuations and flicker.

NOTE 1 The limits in this standard may not, however, provide full protection against interference to radio and television reception when the resistance welding equipment is used closer than 30 m to the receiving antenna(e).

NOTE 2 In special cases, when highly susceptible apparatus is being used in close proximity, additional mitigation measures may have to be employed to further reduce the electromagnetic emissions.

1.2 Immunity

The objective of this standard is to define immunity requirements and test methods for continuous and transient, conducted and radiated disturbances including electrostatic discharges.

NOTE These levels do not, however, cover extreme cases which are extremely rare.

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. (New PNE text)

EN	*Title*	IEC/ISO
-	*International Electrotechnical Vocabulary - Chapter 161: Electromagnetic compatibility*	IEC 60050-161
-	*International Electrotechnical Vocabulary - Chapter 851: Electric welding*	IEC 60050-851
-	*Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus*	CISPR 16-1

EN	*Title*	IEC/ISO
EN 50063	*Safety requirements for the construction and the installation of equipment for resistance welding and allied processes*	-
EN 55011:1998 A1:1999 A2:2002	*Industrial, scientific and medical (ISM) radio-frequency equipment – Radio disturbance characteristics – Limits and methods of measurement*	CISPR 11:1997 (mod) A1:1999 A2:2002
EN 55014-1	*Electromagnetic compatiblility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*	CISPR 14-1
EN 61000-2-4	*Electromagnetic Compatibility (EMC) – Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances*	IEC 61000-2-4
EN 61000-3-2	*Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*	IEC 61000-3-2
EN 61000-3-3	*Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*	IEC 61000-3-3
-	*Electromagnetic compatibility (EMC) – Part 3-4: Limits – Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A*	IEC/TS 61000-3-4
-	*Electromagnetic compatibility (EMC) – Part 3: Limits – Section 6: Assessment of emission limits for distorting loads in MV and HV power systems - Basic EMC publication*	IEC/TR 61000-3-6
-	*Electromagnetic compatibility (EMC) – Part 3: Limits – Section 7: Assessment of emission limits for fluctuating loads in MV and HV power systems - Basic EMC publication*	IEC/TR 61000-3-7
EN 61000-3-11	*Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection*	IEC 61000-3-11
EN 61000-4-2	*Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*	IEC 61000-4-2
EN 61000-4-3	*Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*	IEC 61000-4-3
EN 61000-4-4	*Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*	IEC 61000-4-4

EN	*Title*	IEC/ISO
EN 61000-4-5	*Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*	IEC 61000-4-5
EN 61000-4-6	*Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques Immunity to conducted disturbances, induced by radio-frequency fields*	IEC 61000-4-6
EN 61000-4-7	*Electromagnetic compatibility (EMC) – Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*	IEC 61000-4-7
EN 61000-4-11	*Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*	IEC 61000-4-11
EN 61000-4-15	*Electromagnetic compatibility (EMC) – Part 4-15: Testing and measurement techniques – Flickermeter - Functional and design specifications*	IEC 61000-4-15
-	*Resistance welding – Resistance welding equipment – Mechanical and electrical requirements*	ISO 669:2000

3 Definitions

Definitions relating to EMC may be found in IEC 60050-161, and in CISPR publications.

The definitions relating to resistance welding equipment may be found in IEC 60050-851, EN 50063 and ISO 669.

3.1
conventional value
a standardised value that is used as a measure of a parameter for the purposes of comparison, calibration, testing etc

NOTE Conventional values do not necessarily apply during the actual welding process.

3.2
conventional load
the load condition with the electrodes short-circuiting as defined in ISO 669:2000

3.3
duty factor (symbol X)
the ratio for a given interval of the on-load duration to the total time

3.4
port
particular interface of the specified apparatus with the external electro-magnetic environment

3.5
enclosure port
the physical boundary of the apparatus through which electro-magnetic fields may radiate or impinge

3.6
cable port
a point at which a conductor or a cable is connected to the apparatus. Examples are signal, control and power ports

NOTE The secondary circuit of resistance welding equipment is not a cable port but is part of the enclosure port.

3.7
class A resistance welding equipment
resistance welding equipment suitable for use in all establishments other than domestic and those directly connected to a public low voltage supply network which supplies buildings used for domestic purposes

3.8
class B resistance welding equipment
resistance welding equipment suitable for use in all establishments including domestic and those directly connected to a public low voltage supply network which supplies buildings used for domestic purposes

4 Test set-up for emission and immunity

Emission and immunity testing shall be carried out on a representative resistance welding installation as described below. Resistance welding equipment tested in such an installation shall be considered to have met the necessary requirements of this standard.

Tests shall be carried out within the specified operating range of the resistance welding equipment.

Tests shall be carried out at the rated supply voltage and frequency. Results obtained at 50 Hz are valid for the same model operating at 60 Hz and vice versa.

If the resistance welding equipment is part of an installation, or can be connected to auxiliary equipment, then the resistance welding equipment shall be tested whilst connected to the minimum configuration of auxiliary equipment necessary to exercise the ports. If the resistance welding equipment has a large number of similar ports or ports with many similar connections, then a sufficient number shall be selected to simulate actual operating conditions and to ensure that all the different types of termination are covered.

Measurements to determine compliance with the high frequency emission limits shall be made in accordance with the test procedures in EN 55011.

Measurements to determine compliance with the low frequency emission limits shall be made in accordance with the test procedures of relevant basic and referenced standards.

Specific test set-up geometry's for immunity tests are found in the basic standards referred to in Tables 3, 4 and 5.

The configuration of the resistance welding equipment under test shall be precisely noted in the test report.

4.1 General requirements

The resistance welding equipment shall be tested. Type tests shall be made whenever possible for compliance. If the primary current exceeds 25 A the mains terminal disturbance measurement can be carried out using a voltage probe according to CISPR 16-1.