



SLOVENSKI STANDARD
SIST EN 50199:1998
01-september-1998

Electromagnetic compatilby (EMC) - Product standard for arc welding equipment

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

Elektromagnetische Verträglichkeit (EMV) - Produktnorm für Lichtbogenschweißeinrichtungen

Compatibilité électromagnétique (CEM) - Norme de produit pour le matériel de soudage à l'arc

STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: ^{SIST EN 50199:1998} **EN 50199:1995**
<https://standards.iteh.ai/catalog/standards/sist/0268d546-a19c-41d8-877f-9521439f41f2/sist-en-50199-1998>

ICS:

25.160.30	Varilna oprema	Welding equipment
29.020	Elektrotehnika na splošno	Electrical engineering in general
33.100.99	Drugi vidiki v zvezi z EMC	Other aspects related to EMC

SIST EN 50199:1998

sl,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50199:1998

<https://standards.iteh.ai/catalog/standards/sist/0268d54b-a19c-41d8-877f-9521439f41f2/sist-en-50199-1998>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 50199

December 1995

ICS 29.020

Descriptors: Welding equipment, arc welding, electromagnetic compatibility, EMC

English version

**Electromagnetic compatibility (EMC)
Product standard for arc welding equipment**

Compatibilité électromagnétique (CEM)
Norme de produit pour le matériel de
soudage à l'arc

Elektromagnetische
Verträglichkeit (EMV)
Produktnorm für
Lichtbogenschweißeinrichtungen

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50199:1998

[https://standards.iteh.ai/catalog/standards/sist/0268d54b-a19c-41d8-877f-](https://standards.iteh.ai/catalog/standards/sist/0268d54b-a19c-41d8-877f-9521439811f2/sist-en-50199-1998)

This European Standard was approved by CENELEC on 1995-07-04. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 26A, Electric arc welding.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50199 on 1995-07-04.

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) 1996-07-01
- latest date by which national standards conflicting with the EN have to be withdrawn (dow) 1996-07-01

For products which have complied with the relevant national standard before 1996-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-07-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex A is informative.

<https://standards.iteh.ai/catalog/standards/sist/0268d54b-a19c-41d8-877f-952143n-50199-1998>
952143 Contents n-50199-1998

1	Scope	4
2	Normative references	4
3	Objectives	5
3.1	Emission	5
3.2	Immunity	5
4	Definitions	6
4.1	conventional value	6
4.2	conventional load	6
4.3	duty cycle; duty factor (X)	6
4.4	conventional welding current (I_2)	6
4.5	conventional load voltage (U_2)	6
4.6	rated supply current (I_1)	6
5	Conditions during testing	6
6	Test set-up for emission and immunity	7
6.1	General Requirements	7
6.2	Wire feeders	8
6.3	Remote controls	9
6.4	Ancillary Equipment	9
6.5	Arc striking and stabilizing devices	9
6.6	Measuring equipment	9

7	Emission tests	10
7.1	Test Conditions	10
7.1.1	Welding power source	10
7.1.2	Conventional load	10
7.1.2.1	Manual metal arc welding with covered electrodes	10
7.1.2.2	Tungsten inert gas welding	10
7.1.2.3	Metal inert/active gas and selfshielded flux cored welding	10
7.1.2.4	Submerged arc welding	10
7.1.2.5	Plasma cutting	10
7.1.3	Wire feeders	10
7.1.4	Arc striking and stabilizing devices	11
7.2	Emission limits	11
7.2.1	Background	11
7.2.2	Conducted emission limits	11
7.2.3	Radiated emission limits	12
8	Immunity tests	12
8.1	Classification and applicability of tests	12
8.1.1	Category 1	12
8.1.2	Category 2	12
8.2	Test conditions	12
8.3	Immunity performance criteria	13
8.3.1	Performance criteria A	13
8.3.2	Performance criteria B	13
8.3.3	Performance criteria C	13
8.4	Immunity levels	13
9	Documentation for the purchaser/user	14
<p style="text-align: center;">SIST EN 50199:1998 https://standards.iteh.ai/standards/sist/0268d54b-a19e-41d8-877f-9521439f41f2/sist-en-50199-1998</p>		
Figures		
1	Typical arc welding installation with a conventional load	7
2	Position of welding equipment and conventional load with respect to the antenna	8
3	Test set-up for arc striking and stabilizing devices	9
Tables		
1	Mains terminal disturbance voltage limits for arc welding installation	11
2	Electromagnetic radiation disturbance limits for arc welding installation	12
3	Immunity levels - Enclosure	15
4	Immunity levels - AC input power port	15
5	Immunity levels - Ports for process measurement and control lines	16
6	Immunity levels - AC input power port (informative)	16
Annex		
A	Installation and use	17

1 Scope

This standard is applicable to equipment for arc welding and allied processes designed for use in industrial and domestic establishments. Included are welding power sources, wire feeders and ancillary equipment, e.g. water coolers and arc striking and stabilizing devices

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

This standard is not applicable to: arc welding torches, guns, electrode holders, cables and coupling devices.

NOTES

- 1 Allied processes are for example plasma cutting and arc stud welding.
- 2 Limits are not specified over the whole frequency range.

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.

ENV 50140:1993	Electromagnetic compatibility: Basic immunity standard; Radiated, radio-frequency electromagnetic field; Immunity test
EN 50192	Arc welding equipment Plasma cutting systems
EN 55011:1991	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio frequency equipment (CISPR 11:1990, modified)
EN 55014:1993	Limits and methods of measurement of radio disturbance characteristics of electrical motor-operated and thermal appliances for household and similar purposes, electric tools and similar electrical apparatus. (CISPR 14:1993)
EN 60974-1	Arc welding equipment - Part 1: Welding power sources (IEC 974-1)
EN 61000-3-2:1995	Electromagnetic compatibility (EMC); Part 3: Limits; Section 2: Limits for harmonic current emissions (equipment input current up to 16 A per phase) (IEC 1000-3-2:1995)
EN 61000-3-3:1995	Electromagnetic compatibility (EMC); Part 3: Limits; Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to 16 A (IEC 1000-3-3:1994)
EN 61000-4-2:1995	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test - Basic EMC publication (IEC 1000-4-2:1995)

- EN 61000-4-4:1995 Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test - Basic EMV publication
(IEC 1000-4-4:1995)
- EN 61000-4-5:1995 Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test
(IEC 1000-4-5:1995)
- EN 61000-4-11:1994 Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 11: Voltage dips, short interruptions and voltage variations immunity tests
(IEC 1000-4-11:1994)
- CISPR 16-1:1993 Specification for radio disturbance and immunity measuring apparatus and methods; Part 1: radio disturbance and immunity measuring apparatus
- IEC 50-161 International Electrotechnical Vocabulary - Chapter 161: Electromagnetic compatibility.
- IEC 50-851 International Electrotechnical Vocabulary - Chapter 851 : Electric welding.

INTERNATIONAL STANDARD PREVIEW
(standards.iteh.ai)

3 Objectives

3.1 Emission

The objective of this standard is to define limits and test methods for electromagnetic emissions which may cause interference in other apparatus.

These emission limits represent essential electromagnetic compatibility requirements. They have been selected to minimise the disturbances generated by the welding equipment when operated normally.

NOTES

- 1 The limits in this standard may not, however, provide full protection against interference to radio and television reception when the welding equipment is used closer than 30 m to the receiving antenna(e).
- 2 In special cases, when highly susceptible apparatus is being used in close proximity, additional mitigation measures may have to be employed further to reduce the electromagnetic emissions.

3.2 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.

These test requirements represent essential electromagnetic compatibility immunity requirements. They have been selected to ensure a level of immunity for apparatus at industrial establishments. These levels do not, however, cover extreme cases which may occur with an extremely low probability of occurrence in any location.

NOTE - This standard does not specify basic safety requirements for welding equipment such as protection against electric shock, unsafe operation, insulation coordination and related dielectric tests.

4 Definitions

Definitions related to EMC and to the relevant phenomena may be found in IEC 50 chapter 161 and in CISPR publications.

Definitions related to arc welding equipment may be found in IEC 50 chapter 851 and in EN 60974-1.

4.1 conventional value [EN 60974-1]

A standardized 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.

4.2 conventional load

A practically non-inductive constant resistive load as defined in IEC 974-1.

4.3 duty cycle; duty factor (X) [EN 60974-1]

The ratio for a given time interval of the on-load duration to the total time.

NOTES

- 1 This ratio, lying between 0 and 1 may be expressed as a percentage.
- 2 For the purpose of this standard, the time period of one complete cycle is 10 min. E.g., in the case of a 60 % duty cycle (duty factor), load is applied continuously for 6 min, followed by a no-load period of 4 min.

4.4 conventional welding current (I_2) [EN 60974-1]

The current delivered by a welding power source to a conventional load at the corresponding conventional load voltage. [SIST EN 50199:1998](https://standards.iteh.ai/catalog/standards/sist/0268d54b-a19c-41d8-877f-95214594112/sist-en-50199-1998)

NOTE - The values of I_2 are given as rms values for ac and arithmetic mean values for dc.

4.5 conventional load voltage (U_2) [EN 60974-1]

The load voltage of a welding power source having a specified linear relationship to the conventional welding current.

NOTES

- 1 The values of U_2 are given as rms values for ac and arithmetic mean values for dc.
- 2 The specified linear relationship varies in accordance with the process (see 7.1.2).

4.6 rated supply current (I_1) [EN 60974-1]

The rms value of a supply current to the welding power source at a rated conventional welding condition.

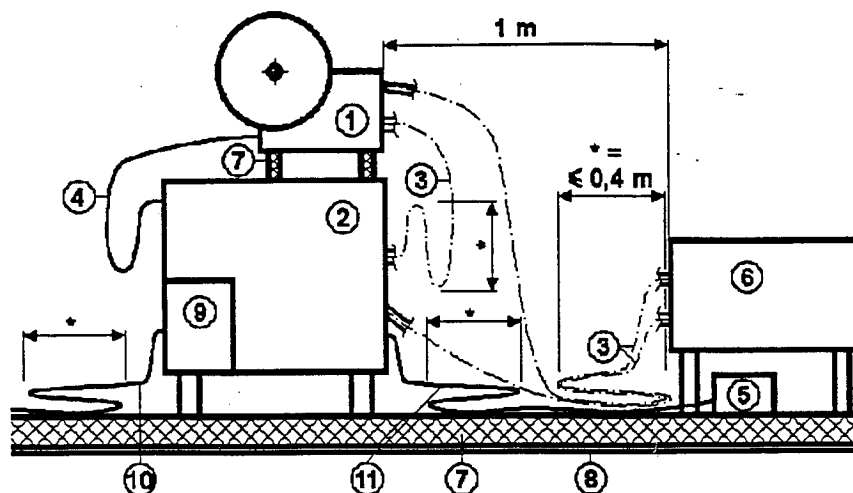
5 Conditions during testing

Tests shall be carried out within the operating range of the 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.

6 Test set-up for emission and immunity

Emission and immunity testing shall be carried out on a typical arc welding installation according to figure 1. Welding equipment tested in such an installation shall be considered to have met the necessary requirements of this standard.



- | | |
|-------------------------------------|-------------------------------------|
| 1 - Wire feeder | 7 - Insulation |
| 2 - Welding power source | 8 - Earthed ground plane |
| 3 - Welding cable (bundled) | 9 - Water cooler |
| 4 - Interconnection cable (bundled) | 10 - Main supply |
| 5 - Remote control | 11 - Remote control cable (bundled) |
| 6 - Conventional load | |

SIST EN 50199:1998

<https://standards.iteh.ai/catalog/standards/sist/0268d54b-a19c-41d8-877f-05132024032a/sist-en-50199-1995>

Figure 1 - Typical arc welding installation with a conventional load

If the welding equipment is part of an installation, or can be connected to auxiliary equipment, then the welding equipment shall be tested whilst connected to the minimum configuration of auxiliary equipment necessary to exercise the ports. If the 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 emission limits shall be made in accordance with the test procedures in EN 55011:1991.

Specific test set-up geometries for immunity tests shall be according to tables 3, 4 and 5.

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

6.1 General Requirements

The welding equipment shall be placed on the ground plane, but electrically insulated from it, see figure 1. The insulation may be provided by an insulating mat (or blocks) not greater than 12 mm thick, or by the welding equipment's own undergear if appropriate.

The welding equipment shall be connected to the electricity supply in accordance with EN 55011:1991. Where a flexible supply cable is provided by the manufacturer this shall

be 1 m long or, if in excess of 1 m, the excess shall be folded to and forth, as far as practicable to form a bundle not exceeding 0,4 m in length. If a supply cable is specified in the manufacturer's installation instructions a 1 m length of the type specified shall be connected between the welding equipment under test and the artificial mains network.

A conventional load as defined in EN 60974-1, shall be placed 1 m from the welding equipment and equidistant from the test antenna, see figure 2.

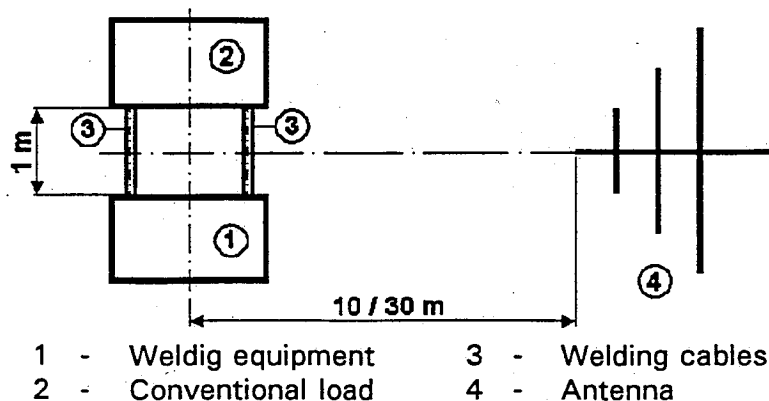


Figure 2 - Position of welding equipment and conventional load with respect to the antenna

The load shall be electrically insulated from the ground plane, as above. The welding equipment shall be connected to the conventional load by welding cables of suitable cross section for the welding current, or the appropriate cable hose assembly with adapter, of not less than 3 m in length. The cable shall be allowed to fall naturally to the ground plane and be electrically insulated from it, by insulation not greater than 12 mm thick. Where welding cables or cable hose assemblies which are greater than 3 m long are provided by the manufacturer, the excess shall be folded to and forth, as far as practicable, to form a bundle not exceeding 0,4 m in length.

An earthed ground plane shall extend under the welding equipment and the conventional load (or insulated table as required, see 6.5).

6.2 Wire feeders

Wire feeders shall be positioned on/by a welding power source as designed. Wire feeders which can be located inside or outside the welding power source enclosure shall be placed outside. Wire feeders designed to be placed on the floor shall be electrically insulated from it, by insulation not greater than 12 mm thick, or by insulated feet or equivalent, as normally supplied with the wire feeder.

The welding cable connecting the wire feeder to the welding power source shall be 2 m in length, or longer if required to make the connection and be of a suitable current rating. If a welding cable in excess of 2 m is provided by the manufacturer, the excess shall be folded to and forth, as far as practicable, to form a bundle not exceeding 0,4 m in length. A welding cable connection less than 2 m long shall be permitted if this is normally supplied with the welding equipment.

The interconnection cable(s) between the wire feeder and the welding power source shall be supplied by the manufacturer and shall be of the type and length as normally supplied with the welding equipment.

A welding torch as recommended by the manufacturer shall be connected to the wire feeder.

6.3 Remote controls

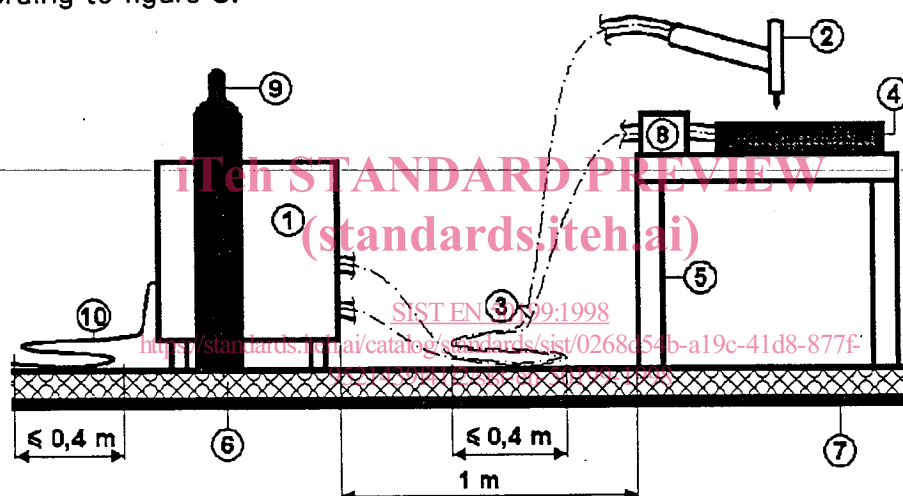
If a welding power source is capable of operating with a remote control, it shall be tested with the remote control connected which is expected to give the highest emissions and/or lowest immunity. The remote control shall be placed on, and electrically insulated from, the ground plane beside the load, where possible. The insulation shall not be greater than 12 mm thick. Remote controls designed to be attached to the welding equipment during use shall be placed as intended. Excess cable shall be folded to and forth to form a bundle not exceeding 0,4 m in length.

6.4 Ancillary Equipment

Ancillary equipment shall be tested in conjunction with a welding power source. It shall be connected and installed as recommended by the manufacturer.

6.5 Arc striking and stabilizing devices

Arc striking and stabilizing devices for tungsten inert gas welding shall additionally be tested according to figure 3.



- | | | | | | |
|---|---|----------------------------------|----|---|----------------|
| 1 | - | Welding power source | 6 | - | Insulation |
| 2 | - | Tungsten inert gas welding torch | 7 | - | Earthed ground |
| 3 | - | Welding cable (bundled) | 8 | - | Capacitor |
| 4 | - | Metallic plate | 9 | - | Gas cylinder |
| 5 | - | Insulated table | 10 | - | Main supply |

Figure 3 - Test set-up for arc striking and stabilizing devices

A welding or cutting torch, designed for use with the welding equipment, shall be connected and clamped above a metallic plate (30 x 30) cm, placed on a non-metallic table, 80 cm above the ground plane. The distance between the electrode tip and the metallic plate shall be adjusted according to 7.1.4. A 0,1 μ F capacitor shall be placed in series with the current return cable to prevent the establishment of an arc and hence the flow of welding current.

Additional test set ups for other processes are under consideration.

6.6 Measuring equipment

The measuring equipment shall comply with the requirements of CISPR 16-1:1993.