



SLOVENSKI STANDARD

SIST EN ISO 5826:2003

01-december-2003

Oprema za elektroporovno varjenje - Transformatorji - Splošne specifikacije, veljavne za vse transformatorje (ISO 5826:1999)

Resistance welding equipment - Transformers - General specifications applicable to all transformers (ISO 5826:1999)

Widerstandsschweißeinrichtungen - Transformatoren - Allgemeine Anforderungen (ISO 5826:1999)

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Matériel de soudage par résistance - Transformateurs - Spécifications générales applicables a tous les transformateurs (ISO 5826:1999)

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ICS:

25.160.30	Varilna oprema	Welding equipment
29.180	Transformatorji. Dušilke	Transformers. Reactors

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 5826

May 2003

ICS 25.160.30; 29.180

English version

**Resistance welding equipment - Transformers - General
specifications applicable to all transformers (ISO 5826:1999)**

Matériel de soudage par résistance - Transformateurs -
Spécifications générales applicables à tous les
transformateurs (ISO 5826:1999)

Widerstandsschweißeinrichtungen - Transformatoren -
Allgemeine Anforderungen (ISO 5826:1999)

This European Standard was approved by CEN on 3 April 2003.

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 Management Centre or to any CEN 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 CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN ISO 5826:2003 (E)**Foreword**

The text of ISO 5826:1999 has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 5826:2003 by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

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 November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 5826:1999 has been approved by CEN as EN ISO 5826:2003 without any modifications.

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INTERNATIONAL STANDARD

ISO
5826

Second edition
1999-11-15

Resistance welding equipment — Transformers — General specifications applicable to all transformers

*Matériel de soudage par résistance — Transformateurs — Spécifications
générales applicables à tous les transformateurs*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 5826 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding*.

This second edition cancels and replaces the first edition (ISO 5826:1983), which has been technically revised.

Annexes B, C and D form a normative part of this International Standard. Annex A is for information only.

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Resistance welding equipment — Transformers — General specifications applicable to all transformers

1 Scope

This International Standard give specifications applicable to transformers for resistance welding equipment without connected rectifier.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 669, *Resistance welding equipment — Mechanical and electrical requirements.*

IEC 60051-2, *Direct acting indicating analogue electrical measuring instruments and their accessories — Part 2: Special requirements for ammeters and voltmeters.*

IEC 60085, *Thermal evaluation and classification of electrical insulation.*

IEC 60204-1, *Electrical equipment of industrial machines — Part 1: General requirements.*

IEC 60529, *Degrees of protection provided by enclosures (IP code).*

IEC 60536-2, *Classification of electrical and electronic equipment with regard to protection against electric shock — Part 2: Guidelines to requirements for protection against electric shock.*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests.*

IEC 60905, *Loading guide for dry-type power transformers.*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 669 apply.

4 Symbols

The symbols used in this International Standard are listed in Table 1.

Table 1 — List of symbols

Symbol	Description	Reference
I_{1p}	rated permanent input current	10, 12
I_{1X}	input current at a given duty factor	annex C
I_2	output current	annex C
I_{2p}	permanent output current at 100 % duty factor	13.2, annex C
I_{2X}	output current at a given duty factor	annex C
$I_{2/50}$	output current at 50 % duty factor	13.2
m	mass	13.2
P	power	annex C
P_p	permanent input power (at 100 % duty factor)	10, 11, 13.2, annex C
P_X	input power at a given duty factor	annex C
P_{50}	input power at 50 % duty factor	13.2
Q	required total rate of cooling liquid flow	11, 13.2
R_1	initial resistance of a winding	8.2.1, 8.3.2
R_2	resistance of a winding at the end of the heating test	8.3.2
t	time	annex C
t_1	on-load time	annex C
T	cycle time	annex C
U_{cc}	rated short-circuit voltage	10
U_{1cc}	input short-circuit voltage	10
U_{1N}	rated supply voltage	9, 10, 13.2
U_{20}	rated output no-load voltage	9, 13.2
X	duty factor	annex C
X_m	duty factor of the magnetic circuit	annex C
Z_2	total impedance referred to the output	10
Δp	pressure drop of the cooling liquid circuit	11, 13.2
$\Delta\theta_{1,2}$	temperature differences	annex C
θ	temperature	annex C
θ_a	cooling medium temperature	annex C
θ_m	equilibrium temperature	annex C
θ_n	temperature when the transformer starts to cool	annex C
$\theta_{0,1,2}$	temperatures for calculation of the thermal time constant or the winding temperatures during the heating test	8.2.1, 8.3.2, annex C
τ	thermal time constant	annex C
τ_2	thermal time constant at given on-load time	annex C
τ_{2p}	thermal time constant at permanent output current	annex C

5 Physical environment and operating conditions

5.1 General

Transformers shall be suitable for use in the physical environment and operating conditions as specified below.

When the physical environment and/or operating conditions are outside those specified below, an agreement may be needed between the supplier and the user, (see e.g. annex B of IEC 60204-1:1997).

5.2 Ambient air temperature

Transformers shall be capable of operating correctly in an ambient air temperature between + 5 °C and + 40 °C.

In case of other maximum temperatures of the cooling medium, see annex B.

5.3 Humidity

Transformers shall be capable of operating correctly within a relative humidity range of 30 % to 95 %.

Harmful effects of occasional condensation shall be avoided by proper design of the equipment or, where necessary, by proper additional measures (e.g. air conditioners, drain holes).

5.4 Altitude

Transformers shall be capable of operating correctly at altitudes up to 1 000 m above mean sea level.

In case of other altitudes, see annex B.

5.5 Transportation and storage

Transformers shall be designed to withstand, or suitable precautions shall be taken to protect against, transportation and storage temperatures between – 25 °C and + 55 °C and for short periods not exceeding 24 h up to + 70 °C. Suitable means shall be provided to prevent damage from humidity, vibration and shock.

5.6 Provisions for handling

Transformers shall be provided with suitable means for handling by cranes or similar equipment.

5.7 Temperature of the cooling liquid

The temperature of the cooling liquid may be up to + 30 °C at the inlet of the transformer.

NOTE Condensation caused by high cooling liquid flow or low cooling liquid temperature in relation to the relative humidity should be prevented.

6 Test conditions

6.1 General

The tests shall be carried out on new, dry and completely assembled transformers at an ambient air temperature between + 10 °C and + 40 °C. The ventilation shall be identical with that prevailing under normal service conditions. When placing the measuring devices, the only access permitted shall be through openings with cover plates, inspection doors or easily removable panels provided by the manufacturer. The measuring devices used shall not interfere with the normal ventilation of the transformer or cause transfer of heat to or from it.

Liquid cooled transformers shall be tested with liquid conditions as specified by the manufacturer.

The accuracy of measuring instruments shall be:

- a) electrical measuring instruments: Class 0,5 (0,5 % full scale, see IEC 60051-2);
- b) thermometer: ± 2 K.

Unless otherwise specified, the tests required in this International Standard are type tests.

The sequence for some of the type tests is specified in 6.2.

The routine tests are specified in 6.3.

Compliance with other standards referred to shall be checked according to these standards.

6.2 Type tests

All type tests shall be carried out on the same transformer except otherwise specified.

Those type tests given below shall be carried out in the following sequence without delay between f), g), h) and i).

- a) General visual inspection;
- b) Insulation resistance (see 7.1) preliminary check;
- c) Thermal rating (see clause 8);
- d) Rated short-circuit voltage (see clause 10);
- e) Protection provided by the enclosure (see 7.3.1);
- f) Insulation resistance (see 7.1);
- g) Dielectric strength (see 7.2);
- h) Dynamic characteristic (see clause 12);
- i) General visual inspection.

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The other tests of this International Standard not mentioned above may be carried out in any convenient sequence.

NOTE The preliminary check on insulation resistance is required to determine whether the transformer is safe to connect to the supply.

6.3 Routine tests

Each transformer shall be submitted successively to the following routine tests.

- a) General visual inspection;
- b) Dielectric strength (see 7.2);
- c) Rated no-load output voltage (see clause 9);
- d) Cooling liquid circuit (see clause 11);
- e) General visual inspection.