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Popis in kvalifikacija varilnih postopkov za kovinske materiale – Specifikacija varilnega postopka – 5. del: (Elektro)uporovno varjenje (ISO 15609-5:2004)

Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 5: Resistance welding (ISO 15609-5:2004)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißanweisung - Teil 5: Widerstandsschweißen (ISO 15609-5:2004)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Descriptif d'un mode opératoire de soudage - Partie 5: Soudage par résistance (ISO 15609-5:2004)

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Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 5: Resistance welding (ISO 15609-5:2004)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Descriptif d'un mode opératoire de soudage - Partie 5: Soudage par résistance (ISO 15609-5:2004)

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This European Standard was approved by CEN on 16 January 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies 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.



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Foreword

This document (EN ISO 15609-5:2004) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

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 February 2005, and conflicting national standards shall be withdrawn at the latest by February 2005.

Annexes A, B and C are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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.

NOTE Normative references to International Standards are listed in annex ZA (normative).

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EN ISO 15609-5:2004 (E)**Introduction**

All new welding procedures issued and the procedure for their creation and qualification are to be in accordance with this standard for the date of its issue.

This standard does not, however, invalidate welding procedures and their qualification complying with then existing national or international standards or regulations, provided the intent of the technical requirement is satisfied and the specified application remains unchanged.

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1 Scope

This standard specifies requirements for the content of welding procedure specifications for resistance spot, seam, butt and projection welding processes. The acceptability of applying the principles of the standard to other resistance and related welding processes should be established before any qualification is undertaken.

This standard is part of a series of standards. Details of this series are given in EN ISO 15607:2003, annex A.

Variables listed in this standard are those influencing either weld dimensions (quality), weld nugget dimension, weld pattern positioning, mechanical properties or geometry of the welded joint.

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.

EN ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers* (ISO 4063: 1998).

EN ISO 5183-1, *Resistance welding equipment - Electrode adaptors, male taper 1:10 - Part 1: Conical fixing, taper 1:10* (ISO 5183-1:1998)

EN ISO 5183-2, *Resistance spot welding — Electrode adaptors, male taper 1:10 — Part 2: Parallel shank fixing for end-thrust electrodes* (ISO 5183-2: 2000).

EN ISO 8205-1, *Water-cooled secondary connection cables for resistance welding — Part 1: Dimensions and requirements for double-conductor connection cables* (ISO 8205-1: 2002).

EN ISO 8205-2, *Water-cooled secondary connection cables for resistance welding — Part 2: Dimensions and requirements for single-conductor connection cables* (ISO 8205-2: 2002).

EN ISO 15607:2003, *Specification and qualification of welding procedures for metallic materials — General rules* (ISO 15607: 2003).

EN 25184, *Straight resistance spot welding electrodes* (ISO 5184: 1979).

EN 25821, *Resistance spot welding electrode caps* (ISO 5821: 1979).

EN 25827, *Spot welding — Electrode back-ups and clamps* (ISO 5827: 1983).

EN 28430-1, *Resistance spot welding — Electrode holders — Part 1: Taper fixing 1:10* (ISO 8430-1: 1988).

EN 28430-2, *Resistance spot welding — Electrode holders — Part 2: Morse taper fixing* (ISO 8430-2: 1988).

EN 28430-3, *Resistance spot welding — Electrode holders — Part 3: Parallel shank fixing for end thrust* (ISO 8430-3: 1988).

ISO 669:2000, *Resistance welding — Resistance welding equipment — Mechanical and electrical requirements*.

EN ISO 15609-5:2004 (E)**3 Terms and definitions**

For the purposes of this European Standard, the terms and definitions given in EN ISO 15607:2003 and ISO 669:2000 apply.

4 Technical contents of welding procedure specification (WPS)**4.1 General**

The welding procedure specification (WPS) shall provide all the necessary information required to make a weld. The minimum information required in a WPS for resistance welding processes is listed in clause 4.2 to 4.4.

Welding procedure specifications shall apply to one specific application only, and the acceptability of expansion to cover similar applications shall be established before any qualification is undertaken.

For some applications it may be necessary to supplement the list. All relevant information shall be specified in the WPS.

Tolerance ranges shall be specified.

Examples of the WPS format are shown in annexes A, B and C; these forms should be modified according to actual practice.

4.2 Related to manufacturer

- Identification of manufacturer;
- Identification of WPS;
- Reference to the Welding Procedure Qualification Record (WPQR).

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4.3 Related to parent material**4.3.1 Composition of parent material**

- Designation of the material(s) and referenced standard(s);
- In case of anticorrosion coating (type, thickness, number of faces).

4.3.2 Dimension of parent material

- Thickness of material at the joint;
- Dimensions of cross-section of pipe or section (butt welding).

4.4 Common to all welding procedures**4.4.1 Welding process**

- Welding process(es) specified shall be designated as listed in EN ISO 4063:
 - a) Spot welding (21):

- manual:
 - machine;
 - gun.
 - multi:
 - direct;
 - indirect;
 - push-pull;
 - series.
 - mechanized:
 - single stage;
 - transfer line;
 - automatic feed;
 - robotic.
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- b) Seam welding (22) (Roller spot welding):
- manual/guided/automatic/robotic.
- c) Projection welding (23):
- single/multiple;
 - embossed/solid.
- d) Resistance butt welding (25):
- resistance/flash/capacitor discharge.
- e) Weldbonding:
- manual/mechanized/robotic.

NOTE Numbers in accordance with EN ISO 4063.

4.4.2 Machine specification

Type of machine used and identification (serial number, plant number or nameplate in accordance with ISO 669).

4.4.3 Joint design

The overlap, edge conditions, spot weld pitch, sequence and pattern, spot or projection dimensions, which depend on the sheet thickness, shall be specified and shall comply with the appropriate standards, where applicable.