SLOVENSKI STANDARD

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Popis in kvalifikacija varilnih postopkov za kovinske materiale - Razvrġļanje na podlagi predproizvodnega preskusa varjenja (ISO 15613:2004)

Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613:2004)

Anforderung und Anerkennung von Schweißverfahren für metaltallische Werkstoffe - Qualifizierung aufgrund einer vorgezogenen Arbeitsprüfung (ISO 15613:2004)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Qualification sur la base d'un assemblage soudé de préproduction (ISO 15613:2004)

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Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613:2004)

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This European Standard was approved by CEN on 7 May 2003.

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Contents

Foreword

This document (EN ISO 15613:2004) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

This European Standard EN ISO 15613:2003 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This document supersedes EN 288-8:1995.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

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Introduction

In EN ISO 15607, one of the methods of welding procedure qualification is based on pre-production welding test.

Qualification based on a pre-production welding test can be used where the shape and dimensions of the standard test pieces (e.g. those of prEN ISO 15614) do not adequately represent the joint to be welded.

In such cases, one or more special test pieces can be made to simulate the production joint in all essential features, e.g. dimensions, restraint, heat sink effects, limited access. In the case of resistance welding, actual components have to be used for the pre-production test.

1 Scope

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

This standard specifies how a preliminary welding procedure specification is qualified based on pre-production welding tests.

The principles of this standard may be applied to other welding processes.

This standard is applicable to arc welding, gas welding, beam welding, resistance welding, stud welding and friction welding of metallic materials.

The use of this standard can be restricted by an application standard or specification.

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

CR ISO 15608:2000, *Welding - Guidelines for a metallic material grouping system (ISO/TR 15608:2000).*

prEN ISO 15609-1, *Specification and approval of welding procedures for metallic materials - Welding procedure specification - Part 1: Arc welding (ISO/DIS 15609-1:2000).*

EN ISO 15609-2, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 2: Gas welding (ISO 15609-2:2001).*

prEN ISO 15609-3, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 3: Electron beam welding (ISO/DIS 15609-3:2000).*

prEN ISO 15609-4, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 4: Laser beam welding (ISO/DIS 15609-4:2000).*

prEN ISO 15609-5, *Specification and approval of welding procedures for metallic materials - Welding procedure specification - Part 5: Resistance welding (ISO/DIS 15609-5:2000).*

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2003).*

prEN ISO 15614-2, *Specification and approval of welding procedures for metallic materials - Welding procedure tests - Part 2: Arc welding of aluminium and its alloys (ISO/DIS 15614-2:2000).*

prEN ISO 15614-3, *Specification and qualification of welding procedures for metallic materials - Welding procedure tests - Part 3: Welding procedure tests for the arc welding of casts iron (was submitted to CEN Enquiry as prEN 288-12).*

prEN ISO 15614-4, *Specification and qualification of welding procedures for metallic materials - Welding procedure tests - Part 4: Finishing welding of aluminium castings (was submitted to CEN Enquiry as prEN 288-13).*

prEN ISO 15614-5, *Specification and approval of welding procedures for metallic materials - Welding procedure tests - Part 5: Arc welding of titanium, zirconium and their alloys (ISO/DIS 15614-5:2000).*

prEN ISO 15614-6, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 6: Copper and copper alloys.*

EN ISO 15614-8, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 8: Welding of tubes to tube-plate joints (ISO 15614-8:2002).*

prEN ISO 15614-9, *Specification and qualification of welding procedures for metallic materials - Welding procedure tests - Part 9: Underwater hyperbaric wet welding (ISO/DIS 15614-9:2000).*

prEN ISO 15614-10, *Specification and approval of welding procedures for metallic materials - Welding procedure test - Part 10: Hyperbaric dry welding (ISO/DIS 15614-10:2000).*

EN ISO 15614-11, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 11: Electron and laser beam welding (ISO 15614-11:2002).*

prEN ISO 15614-12:2002, *Specification and approval of welding procedures for metallic materials - Welding procedure tests - Part 12: Spot, seam and projection welding (ISO/DIS 15614-12:2000).*

prEN ISO 15614-13:2002, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 13: Resistance butt and flash welding (ISO/DIS 15614-13:2002).*

ISO 10447*, Welding - Peel and chisel testing of resistance spot, projection and seam welds.*

3 Terms and definitions

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

4 Preliminary welding procedure specifications (pWPS)

The preliminary welding procedure specification shall be prepared in accordance with prEN ISO 15609-1 or EN ISO 15609-2.

5 Qualification of the welding procedure

The qualification of the welding procedure shall be carried out by an examiner or examining body in accordance with the relevant part of prEN ISO 15614 as modified by this standard.

6 Welding of test pieces

Preparation and welding of the test pieces shall be carried out under the general conditions of production welding which they shall represent with shapes and dimensions of the test piece simulating the actual welding conditions of the structure. This includes welding positions and other essential items, e.g. stress conditions, heating effects, limited access, edge condition.

When actual components are used, jigs and fixtures shall be those which will be used in production.

If tack welds are to be fused into the final joint they shall be included in the test piece.

7 Testing

7.1 Fusion welding

The testing of the test pieces shall as far as possible be carried out in accordance with the relevant part of prEN ISO 15614.

In general, the following tests are to be performed at least:

a) visual inspection (100 %);

b) surface crack detection (for non-magnetic materials, penetrant testing only);

c) hardness tests (not required for parent metals of ferritic steels with R_m < 420 N/mm^2 or R_e < 275 N/mm^2 or for steels according to group 8 or aluminium alloys in accordance with groups 21 and 22 of CR ISO 15608:2000);

d) macroscopic examination (number depends on the geometry of the structure).

7.2 Resistance welding

7.2.1 General

If available, the results of other WPS could be taken into consideration if all conditions are sufficiently comparable, e.g. equipment, electrodes, material (type, surface, thickness) and weld data.

7.2.2 Overlap welding

If a pre-production weld test of overlap welds relates to prEN ISO 15614-12:2002, all types of tests according to Table 1 of that standard shall be carried out as far as necessary. In general, the following tests shall be performed at least:

a) visual inspection;

b) work shop test to determine weld size and fracture type;

c) macroscopic examination to determine at least nugget diameter and indentation respectively minimum width of a resistance seam weld (number depends on the geometry of the structure);

d) chisel tests according to ISO 10447 of pre-production test piece.

7.2.3 Butt welding

If a pre-production weld test of butt welds relates to prEN ISO 15614-13:2002, all types of test related to Table 1 of that standard shall be carried out as far as possible. In general, the following tests shall be performed at least:

a) visual inspection (penetrant testing);

b) destructive tests, especially bend tests or tests by deformation of the whole pre-production test piece.

8 Range of qualification

Any qualification issued under this standard is limited to the type of joint used in the pre-production test.

The range of qualification is generally in accordance with the relevant parts of prEN ISO 15614 for welding procedure tests. However the range of qualification for thickness can be applied to each component in the joint, as well as weld thickness.

In the case of resistance welding, the qualification range is limited to the pre-production test piece which was tested.

9 Validity

The qualified welding procedure based on pre-production welding test is valid as far as the welding production is carried out in the specified range, see clause 8.