SLOVENSKI STANDARD
SIST EN 13480-5:2012/oprA2:2014

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Kovinski industrijski cevovodi - 5. del: Pregled in preskušanje

Metallic industrial piping - Part 5: Inspection and testing

Metallische industrielle Rohrleitungen - Teil 5: Prüfung

Tuyauteries industrielles métalliques - Partie 5: Inspection et contrôle

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Metallic industrial piping - Part 5: Inspection and testing

Tuyauteries industrielles métalliques - Partie 5: Inspection et contrôle

Metallische industrielle Rohrleitungen - Teil 5: Prüfung

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 267.

This draft amendment A2, if approved, will modify the European Standard EN 13480-5:2012. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Foreword

This document (EN 13480-5:2012/prA2:2014) has been prepared by Technical Committee CEN/TC 267 “Industrial piping and pipelines”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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.

This document includes the text of the amendment itself. The amended/corrected pages of EN 13480-5:2012 will be published as Issue 3 of the European Standard.

1 Modification to Clause 2

Add the following normative references:

EN ISO 10893-5:2011, *Non-destructive testing of steel tubes — Part 5: Magnetic particle inspection of seamless and welded ferromagnetic steel tubes for the detection of surface imperfections (ISO 10893-5:2011)*

ISO 3057:1998, *Non-destructive testing — Metallographic replica techniques of surface examination*

2 Modification to 7.2.4

Replace sub-clause 7.2.4 by the following:

7.2.4 Non-destructive testing of formed parts

7.2.4.1 General

Depending on material, dimensions and type of forming process testing may include:

a) visual testing;

b) wall thickness measurements;

c) dimensional checks (ovality, angle of bend etc.) and tolerances (see EN 13480-4);

d) hardness tests;

e) ultrasonic testing for volumetric (internal) imperfections in longitudinal and transversal direction;

f) testing for surface imperfections (magnetic particle or penetrant testing);

g) replicas of the surface structure in the tension zone (in case life monitoring is required for creep range applications)

on each component or batch of identical components.

Material, heat treatment conditions, heat treatment lot, degree of deformation shall be considered in the definition of the batch.

NOTE A customary interpretation of a heat treatment lot is the entire content of a furnace of a single heat treatment.

7.2.4.2 Induction bending

Material and material surfaces shall be suitable for induction bending. EN ISO 10893-5 specifies surface qualities and acceptance levels. The acceptance levels shall be agreed, considering material, dimensions and service (creep, fatigue).

Induction bends shall be tested according to Table 7.2.4.2-1.

Hardness testing shall be made to verify the heat treatment only, if heat treatment is required by EN 13480-4, to proof homogeneity of annealing results, hardness testing shall be performed on the straight length and within bending zone. If no heat treatment is required after forming, hardness testing is required in the bending zone only if specified for service reasons.

Dimensional checks shall include ovality, angle of bend, wall thickness and tolerances (see EN 13480-4).

PT/MT testing shall be performed to ensure that the outside surface in the bended zone is free of cracks.

If specified for the component or by Table 7.2.4.2-1, replicas of the surface structure in the tension zone shall be taken on each component or batch of identical components. Replicas shall be made in accordance with ISO 3057.

The material grade, the heat treatment conditions of the material, the heat treatment lot after bending and the forming conditions shall be considered in the definition of the batch.

Table 7.2.4.2-1 — NDT for induction bends

Material Group	VT	Dimensional check	Hardness testing	UT	PT/MT	replicas
1.1, 1.2, 1.3, 8, 9	c	c	—	—	b5e	—
1.4, 3, 5.3, 5.4, 6	c	c	c	—	cf	—
2	c	c	c	cw	b5e	—
4	c	c	c	—	ce	—
5.1, 5.2	c	c	b10e	—	b10e	—
10	c	c	—	—	cf	yes

NOTE

b5e – batch 5% extrados — b10e – batch 10% extrados

c – testing per component — ce – testing per component extrados

cf – component forming area — cw – testing per component weld

7.2.4.3 Cold formed pipes

Cold formed pipes shall be tested according to Table 7.2.4.3-1.

Hardness testing shall be made to verify the heat treatment, only if heat treatment is required according to EN 13480-4, to proof homogeneity of annealing results. Hardness testing shall be performed on the straight length and within bending zone. If no heat treatment is required after forming, hardness testing is required in the bending zone only if specified for service reasons.

Dimensional checks shall be performed after tooling of the bending machine and start of production to the same extent as specified for surface testing (see Table 7.2.4.2-1) and shall include ovality, angle of bend and tolerances (see EN 13480-4).

Wall thickness measurement at the extrados is required for all cold formed pipes with $r_m \leq 1{,}3\ d_o$.

PT/MT testing shall be performed to ensure that the outside surface in the bended zone is free of cracks.

Table 7.2.4.3-1 — NDT after cold forming of pipes

Material group	Category	VT	Cold forming					
			Surface testing (MT/PT %)			Volumetric testing (RT/UT)		
			$r_m \leq 1{,}3\ d_o$ [a]	$1{,}3\ d_o < r_m < 2{,}5\ d_o$	$2{,}5\ d_o \leq r_m$	$r_m \leq 1{,}3\ d_o$	$1{,}3\ d_o < r_m < 2{,}5\ d_o$	$2{,}5\ d_o \leq r_m$
1.1, 1.2, 1.3, 8.1, 8.2, 9.1	I	100%	n/a	n/a	n/a	n/a		
	II							
	III		b5e					
2.1, 2.2, 4.1, 4.2, 5.1, 5.2, 7.1, 8.3, 9.2, 9.3	I	100%	n/a	n/a	n/a	n/a		
	II		b5e	n/a	n/a	n/a		
	III			b5e	n/a	n/a		
1.4, 3.1, 3.2, 3.3, 5.3, 5.4, 6.1, 6.2, 6.3, 6.4, 7.2, 7.3, 10.1, 10.2	I	100%	b5f	b5f	b5f	n/a		
	II		b25f			n/a		
	III			b10f		10	5	n/a

NOTE

b5e – batch 5% extrados
b5f – batch 5% forming area
b10f – batch 10% forming area
b25f – batch 25% forming area
n/a – not applicable

[a] Hardness testing c (testing per component) for material group 2, 3, 4, 5.3, 5.4 and 6, hardness test b10e (batch 10% extrados) for material group 5.1 and 5.2.

3 Modification to 7.2.5

Replace sub-clause 7.2.5 by the following:

7.2.5 Destructive testing of formed parts

Testing shall be performed to verify the heat treatment of the formed parts (induction bends with or without subsequent heat treatment, cold formed parts with subsequent heat treatment, hot formed parts with or without subsequent heat treatment) and shall include as appropriate:

a) tensile test at room temperature;

b) impact test;

c) microscopic examinations (e.g. 9 % or 12 % Cr steels);

d) other tests specified in European Standards for base materials.

The tests shall be performed on test pieces from the end of the component itself, or from test pieces placed together with the components in the heat treatment furnaces.

Production test coupons for destructive testing shall be representative for one heat treatment lot defined by the same dimension, material heat and similar forming conditions.

Low alloyed steels (up to 5% total alloying content) may be representatively tested by a single production test coupon, representative for several furnace loads if:

1) comparable furnace parameters are applied and

2) the heat treatment parameters are recorded for each furnace load by a thermo couple attached to the component.

4 Modification to 8.4.3

Replace sub-clause 8.4.3 by the following:

8.4.3 Personnel qualification

Testing shall be carried out by an individual certified to at least EN ISO 9712:2012, level 1, under the supervision of personnel certified to level 2 or level 3 who shall also be responsible for the evaluation of the results.

Visual testing shall be performed and evaluated by an individual with sufficient knowledge and experience with the relevant standards and specifications. Certifications in accordance with EN ISO 9712 are not required.

Ultrasonic testing shall be performed and evaluated by an individual certified to at least EN ISO 9712:2012, level 2.

Prior to carrying out any testing activity, the fabricator shall verify that the personnel are qualified for the relevant work. This shall be reviewed by the manufacturer.

NOTE Qualifications and certifications according to EN 473 remain valid until their expiring date.