SLOVENSKI STANDARD
SIST EN 13480-5:2012/A2:2017

01-maj-2017

Kovinski industrijski cevovodi - 5. del: Pregled in preskušanje - Dopolnilo A2

Metallic industrial piping - Part 5: Inspection and testing

Metallische industrielle Rohrleitungen - Teil 5: Prüfung

Tuyauteries industrielles métalliques - Partie 5: Inspection et contrôle

Ta slovenski standard je istoveten z: **EN 13480-5:2012/A2:2017**

ICS:

77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use

SIST EN 13480-5:2012/A2:2017 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13480-5:2012/A2

March 2017

ICS 23.040.01

English Version

Metallic industrial piping - Part 5: Inspection and testing

Tuyauteries industrielles métalliques - Partie 5: Inspection et contrôle

Metallische industrielle Rohrleitungen - Teil 5: Prüfung

This amendment A2 modifies the European Standard EN 13480-5:2012; it was approved by CEN on 16 January 2017.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This amendment 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 13480-5:2012/A2:2017) has been prepared by Technical Committee CEN/TC 267 “Industrial piping and pipelines”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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 EN 13480-5:2012.

This document includes the text of the amendment itself. The amended/corrected pages of EN 13480-5:2012 will be published in the new Edition 2017 of the European Standard.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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 with the following: "

7.2.4 Non-destructive testing of formed parts

7.2.4.1 General

All formed parts shall be subject to non-destructive testing. 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) testing for surface imperfections (magnetic particle or penetrant testing);

on formed parts of 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.

Replicas of the surface structure in the tension zone may be required in case of lifetime monitoring for creep range application.

Ultrasonic testing may be performed if specified. Specification shall include area, extent, method and acceptance criteria.

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 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.

Heat treatment shall be done if required by EN 13480-4. Subsequent hardness testing shall be performed on the straight length and within bending zone to verify the homogeneity of annealing.

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).

MT/PT testing shall be performed to verify 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 (see EN 13480–2)	VT	Dimensional check	Hardness testing	MT/PT	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	b5e	—
4	c	c	c	ce	—
5.1, 5.2	c	c	b10e	b10e	—
10	c	c	—	cf	yes

NOTE
b5e – 5 % of batch on extrados
b10e – 10 % of batch on extrados
c – testing per component
ce – testing per component extrados
cf – component forming area

7.2.4.3 Cold formed pipes

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

Heat treatment shall be done if required by EN 13480-4. Subsequent hardness testing shall be performed on the straight length and within bending zone to verify the homogeneity of annealing.

If no heat treatment is required after forming, hardness testing is required in the bending zone only if specified by the purchaser 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 MT/PT (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 $r_m \leq 1{,}3\ d_o$.

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

Table 7.2.4.3—1 — NDT after cold forming of pipes

<table>
<tr><th rowspan="2">Material group (see EN 13480–2)</th><th rowspan="2">Category</th><th rowspan="2">VT
%</th><th colspan="3">Surface testing (MT/PT)
%</th><th rowspan="2">Hardness testing
$r_m \leq 1{,}3\ d_o$</th></tr>
<tr><th>$r_m \leq 1{,}3\ d_o$</th><th>$1{,}3\ d_o < r_m < 2{,}5\ d_o$</th><th>$2{,}5\ d_o \leq r_m$</th></tr>
<tr><td rowspan="3">1.1, 1.2, 1.3, 8.1, 8.2, 9.1</td><td>I</td><td rowspan="3">100</td><td rowspan="2">0</td><td rowspan="3">0</td><td rowspan="3">0</td><td rowspan="3">0</td></tr>
<tr><td>II</td></tr>
<tr><td>III</td><td>b5e</td></tr>
<tr><td rowspan="3">2.1, 2.2, 4.1, 4.2, 5.1, 5.2, 7.1, 8.3, 9.2, 9.3</td><td>I</td><td rowspan="3">100</td><td>0</td><td>0</td><td>0</td><td rowspan="3">c
(only for material groups 2.1, 2.2, 4.1, 4,2)</td></tr>
<tr><td>II</td><td rowspan="2">b5e</td><td>0</td><td>0</td></tr>
<tr><td>III</td><td>b5e</td><td>0</td></tr>
<tr><td rowspan="3">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</td><td>I</td><td rowspan="3">100</td><td>b5f</td><td rowspan="2">b5f</td><td rowspan="2">b5f</td><td rowspan="3">c
(only for material groups 3.1, 3.2, 3.3, 5.3, 5,4, 6.1, 6.2, 6.3, 6.4)</td></tr>
<tr><td>II</td><td rowspan="2">b25f</td></tr>
<tr><td>III</td><td colspan="2">b10f</td></tr>
</table>

NOTE
b5e – 5 % of batch on extrados
b5f – 5 % of batch on forming area
b10f – 10 % of batch on forming area
b25f – 25 % of batch on forming area
c - testing per component

3 Modification to 7.2.5

Replace sub-lause 7.2.5 with 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:

a) tensile test at room temperature;

b) impact test;

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

Testing shall be performed as specified in the European Standards for the 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 thermocouple attached to the component."

4 Modification to 8.4.3

Replace sub-clause 8.4.3 with 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.".