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**oSIST prEN 13480-5:2011**  
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**Kovinski industrijski cevovodi - 5. del: Kontrola 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 European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 267.

If this draft becomes a European Standard, 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.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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## iTeh STANDARD PREVIEW (standards.iteh.ai)

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## Foreword

This document (prEN 13480-5:2011) 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 will supersede EN 13480-5:2002.

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, see informative Annex ZA, which is an integral part of this document.

This document will supersede EN 13480-5:2011.

This European Standard EN 13480 for metallic industrial piping consists of eight interdependent and not dissociable parts which are:

— *Part 1: General;*

— *Part 2: Materials;*

— *Part 3: Design;*

— *Part 4: Fabrication and installation;* [SIST EN 13480-5:2012/A1:2013](#)

— *Part 5: Inspection and testing;* <https://standards.iteh.ai/catalog/standards/sist/66a8b672-1bd5-46a2-baa7-a61c881d1321/sist-en-13480-5-2012-a1-2013>

— *Part 6: Additional requirements for buried piping;*

— CEN/TR 13480-7, *Guidance on the use of conformity assessment procedures;*

— *Part 8: Additional requirements for aluminium and aluminium alloy piping.*

Although these Parts may be obtained separately, it should be recognised that the Parts are interdependent. As such the manufacture of metallic industrial piping requires the application of all the relevant Parts in order for the requirements of the Standard to be satisfactorily fulfilled.

## 1 Scope

This Part of this European Standard specifies the requirements for inspection and testing of industrial piping as defined in EN 13480-1 to be performed on individual spools or piping systems, including supports, designed in accordance with EN 13480-3 and EN 13480-6 (if applicable), and fabricated and installed in accordance with EN 13480-4.

## 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 473:2008, *Non destructive testing — Qualification and certification of NDT personnel — General principles*

EN 10217 (all parts) — *Welded steel tubes for pressure purposes — Technical delivery conditions*

EN 13480-1:2002+A2:2008, *Metallic industrial piping — Part 1: General*

EN 13480-2:2002+A2:2010, *Metallic industrial piping — Part 2: Materials*

EN 13480-3:2002+A4:2010, *Metallic industrial piping — Part 3: Design and calculation*

EN 13480-4:2002, *Metallic industrial piping — Part 4: Fabrication and installation*

EN 13480-6, *Metallic industrial piping — Part 6: Additional requirements for buried piping*

CEN/TR 13480-7:2002, *Metallic industrial piping — Part 7: Guidance on the use of conformity assessment procedures*

EN 14917:2009, *Metal bellows expansion joints for pressure applications*

EN ISO 5817:2007, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections (ISO 5817:2003 + Cor. 1:2006)*

EN ISO 17635:2010, *Non-destructive testing of welds — General rules for metallic materials (ISO 17635:2010)*

EN ISO 17640:2010, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment (ISO 17640:2010)*

## 3 Terms and definitions

For the purposes of this Part of this European Standard, the terms and definitions given in EN 13480-1 shall apply.

## 4 Symbols and abbreviations

For the purposes of this Part of this European Standard, the symbols given in EN 13480-1 apply together with the following abbreviations:

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- NDT Non-destructive testing;
- MT Magnetic particle testing;
- PT Penetrant testing;
- RT Radiographic testing;
- UT Ultrasonic testing;
- VT Visual testing;
- PWHT Post-weld heat treatment.

**5 Determination of inspection and testing requirements****5.1 General**

The manufacturer shall be responsible for the fabrication and the installation, even if this work will be sub-contracted to other fabricators and/or installers.

The fabricator and/or installer shall be responsible for carrying out the inspection and testing including subcontracted NDT (if any) specified in this European Standard, for all piping.

These requirements are specified in clauses 6 to 10. Where required in the technical specification, additional examination and testing shall be performed.

NOTE For guidance on the use of conformity assessment procedures see CEN/TR 13480-7:2002.

**5.2 Classification of piping**

Industrial piping shall be classified in accordance with EN 13480-1:2002+A2:2008, Table 4.1-1.

NOTE 1 Categories I to III are identical to categories I to III of the Pressure Equipment Directive.

NOTE 2 The requirements for classification of industrial piping that is to be installed in a Member State of the EU and which is covered by the scope of the Pressure Equipment Directive and the appropriate conformity assessment are given in the Pressure Equipment Directive.

**5.3 Testing and inspection procedures and reports**

Testing and inspection shall be carried out by personnel trained for the method used. European Standards or written procedures (if necessary) detailing the method and acceptance criteria shall be available to all testing personnel and inspectors.

Reports shall be kept to demonstrate that all required testing and inspection have been carried out and that the results are acceptable.

**6 Design validation**

Before fabrication/installation commences, a validation of the piping design and its supports shall be performed.



Where design and fabrication are carried out by separate organisations, the piping designer shall prepare a declaration for the manufacturer that the design is in compliance with the requirements of this European Standard.

A list of the relevant drawings shall be attached to the declaration.

Where the design of parts has already been validated in accordance with this European Standard, and where an appropriate certificate or assessment report is available, a further design validation shall not be required.

NOTE For guidance on the use of conformity assessment procedures see CEN/TR 13480-7:2002.

## 7 In-process inspection and testing

### 7.1 General

Examinations and tests specified in this standard shall be carried out by personnel trained for the method used. European Standards or written procedures (where necessary) detailing the method and acceptance criteria shall be available.

### 7.2 Materials and formed pressure retaining parts

#### 7.2.1 General

The testing and inspection specified below shall be restricted to parts formed during the fabrication process, especially induction bending. Formed bought out standardized parts and components shall not be a part of this requirement.

#### 7.2.2 Verification of material

A verification shall be performed that materials are in accordance with the specified material standard or purchase order.

#### 7.2.3 Verification of formed pressure retaining parts

It shall be verified that all formed pressure retaining parts comply with the specified shape and dimensional requirements, and have received the specified finish or heat treatment.

#### 7.2.4 Non-destructive testing of formed parts

Formed parts shall be subject to appropriate non-destructive testing in accordance with the manufacturers test programme

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

- visual testing;
- wall thickness measurements;
- dimensional checks (ovality, angle of bend etc.);
- hardness tests;
- ultrasonic testing for volumetric (internal) imperfections in longitudinal and transversal direction;
- testing for surface imperfections (magnetic particle or penetrant testing);

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- 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.

**7.2.5 Destructive testing of formed parts**

Testing performed to verify the heat treatment of the formed parts shall include:

- tensile test;
- hot tensile test (where items are being used in the creep range);
- notch impact test;
- micrographs (e.g. 9 % or 12 % Cr steels);
- other tests specified in EN 13480-2:2002+A2:2010 or in a European Standard for base material.

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.

**7.3 Welding****7.3.1 Review of welding documents** [SIST EN 13480-5:2012/A1:2013](https://standards.iteh.ai/catalog/standards/sist/66a8b672-1bd5-46a2-baa7-)

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

### 7.3.2 Inspection of welding set-up

Prior to carrying out any welding, each weld preparation shall be visually inspected. The inspection shall verify compliance with the drawing and WPS, by ensuring the following:

- the correct materials are used;
- dimensions are within tolerance, including position, alignment, and orientation of branches, nozzles, attachments and anchors, etc.;
- cleanliness and freedom from imperfections which may give rise to defects in the completed joint;
- nozzles, branches etc., properly fit the curvature of the pipe;
- tack welds that are to be incorporated into the final weld are free from cracks or other defects.

### 7.3.3 Testing and inspection during welding

The following testing and inspection shall be carried out, where appropriate, at suitable stages during the welding operation to verify that the specified WPS is being followed for:

- a) correct preheat;
- b) correct welding process;
- c) correct welding consumables;
- d) correct electrical characteristics;
- e) correct interpass temperature and cleaning;
- f) other requirements of the WPS;
- g) all tack welds and temporary attachments are welded in accordance with an approved WPS.

### 7.3.4 Inspection after welding

The following inspection shall be carried out on completion of welding:

- a) examination for compliance with drawings;
- b) verification that welds are correctly identified and traceable to the welder/operator;
- c) verification that temporary attachments have been properly removed.

## 7.4 Heat treatment

For post-forming and post-weld heat treatment (PWHT), where applicable, it shall be verified by a review of the heat treatment reports, that the heat treatment carried out complies to the heat treatment procedure.

If additional examinations (e.g. replica, hardness) after post-forming and post-weld heat treatment are required, this testing shall be reported and the reports shall be reviewed.