



**SLOVENSKI STANDARD**  
**SIST EN 13480-5:2002**  
**01-november-2002**

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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

**Ta slovenski standard je istoveten z: EN 13480-5:2002**

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**ICS:**

77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 13480-5**

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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 European Standard was approved by CEN on 23 May 2002.

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 Management Centre 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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**Issue 1 (2002-05)**

## Foreword

This document (EN 13480-5:2002) 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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 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(s), see informative annex ZA, which is an integral part of this document.

In this standard the Annex A is informative

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

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— *Part 1: General.*

— *Part 2: Materials.*

— *Part 3: Design.*

— *Part 4: Fabrication and installation.*

— *Part 5: Inspection and testing.*

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

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This Part of this European Standard specifies the requirements for inspection and testing of industrial piping as defined in EN 13480-1:2002 to be performed on individual spools or piping systems, including supports, designed in accordance with EN 13480-3 and prEN 13480-6 (if applicable), and fabricated and installed in accordance with EN 13480-4.

## 2 Normative references

This Part of 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 Part of 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 287-1, *Approval testing of welders – Fusion welding – Part 1: Steels.*

EN 288-2, *Specification and approval of welding procedures for metallic materials – Part 2: Welding procedure specification for arc welding.*

EN 473:2000, *Non destructive testing - Qualification and certification of NDT personnel – General principles.*

EN 571-1, *Non destructive testing – Penetrant testing – Part 1: General principles.*

EN 970, *Non-destructive examination of fusion welds – Visual examination.*

EN 1289:1998, *Non-destructive examination of welds – Penetrant testing of welds – Acceptance levels.*

EN 1290, *Non-destructive examination of welds – Magnetic particle examination of welds*

EN 1291:1998, *Non-destructive examination of welds – Magnetic particle testing of welds – Acceptance levels.*

EN 1418, *Welding personnel – Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials.*

EN 1435:1997, *Non-destructive examination of welds – Radiographic examination of welded joints.*

EN 1712:1997, *Non-destructive examination of welds – Ultrasonic examination of welded joints – Acceptance levels.*

EN 1713, *Non-destructive examination of welds – Ultrasonic examination – Characterization of indications in welds.*

EN 1714:1998, *Non destructive examination of welds – Ultrasonic examination of welded joints.*

EN 12062:1997, *Non destructive examination of welds – General rules for metallic materials.*

EN 12517:1998, *Non-destructive examination of welds – Radiographic examination of welded joints – Acceptance levels.*

EN 13480-1:2002, *Metallic industrial piping – Part 1: General.*

EN 13480-2:2002, *Metallic industrial piping – Part 2: Materials.*

EN 13480-3, *Metallic industrial piping – Part 3: Design and calculation.*

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

prEN 13480-6, *Metallic industrial piping – Part 6: Additional requirements for buried piping.*

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

EN 25817:1992, *Arc welded joints in steel – Guidance on quality levels for imperfections (ISO 5817:1992).*

EN ISO 6520-1:1998, *Welding and allied processes – Classification of geometric imperfections in metallic materials – Part 1: Fusion welding (ISO 6520-1: 1998).*

### 3 Terms and definitions

For the purposes of this Part of this European Standard, the terms and definitions given in EN 13480-1:2002 shall apply.

### 4 Symbols and abbreviations

For the purposes of this Part of this European Standard, the symbols given in EN 13480-1:2002 apply together with the following abbreviations:

— LT	Leak test;	<b>iTeh STANDARD PREVIEW</b> <b>(standards.iteh.ai)</b>
— NDT	Non-destructive testing;	
— MT	Magnetic particle testing;	<a href="#">SIST EN 13480-5:2002</a>
— PT	Penetrant testing;	<a href="https://standards.iteh.ai/catalog/standards/sist/20d0276a-7e0e-4abb-8e2c-747e2f446a2f/sist-en-13480-5-2002">https://standards.iteh.ai/catalog/standards/sist/20d0276a-7e0e-4abb-8e2c-747e2f446a2f/sist-en-13480-5-2002</a>
— RT	Radiographic testing;	
— UT	Ultrasonic testing;	
— VT	Visual examination;	
— PWHT	Post-weld heat treatment.	

### 5 Determination of inspection and testing requirements

#### 5.1 General

The fabricator and/or installer shall be responsible for carrying out the testing, examinations and certification specified in this European Standard, for all piping fabricated to EN 13480-4. 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.

#### 5.2 Classification of piping

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



NOTE 1 Piping classes 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

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

## 6 Design validation

### 6.1 Objective and extent

Before fabrication/installation commences, a validation of the piping design and its supports shall be performed. The validation shall be carried out independently from the team that prepared the design, and independent from fabrication/installation.

The design validation includes the pressure walls to the first joint with other pressurised components. It also includes the interaction with components directly connected to the piping, but does not include validation of the components themselves.

The design validation shall be performed to verify that the piping meets the requirements of this European Standard with regard to materials, design details and dimensions, and that the requirements of procedures and personnel can be met during fabrication.

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.

### 6.2 Documentation

#### 6.2.1 General

Documentation shall be provided to demonstrate compliance with this European Standard and shall include construction drawings, parts lists, design calculations and the technical schedule for fabrication/installation.

#### 6.2.2 Design calculations

**6.2.2.1** Where calculations are performed by hand or with the aid of a computer, the following minimum data shall be provided:

- explanation of notations;
- calculation input data, including material details;
- reference number of the standard including the edition and reference number of the formula;
- full traceability of the calculations performed;

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- results of intermediate formulae;
- calculated minimum thickness or the calculated stress compared with the design stress;
- corrosion, wastage and other allowances where applicable;
- thickness tolerances;
- the selected thickness.

**6.2.2.2** Where stress analysis is carried out by numerical methods, e.g. finite element method, boundary element method or other design methods, it shall be documented.

Documentation shall include at least the following data:

- explanation of notations;
- details of the computer program;
- assumptions for calculation;
- calculation input data;
- graphs for the geometric model, including boundary and compatibility conditions;
- stresses, displacements and strains, where necessary;
- the stresses in the most critical areas;
- calculation of stress intensities compared with the design stress.

**6.2.3 Technical schedule**

The technical schedule shall consist of:

- a detailed description of the fabrication/installation plan;
- welding procedure specifications together with the welding procedure approval records;
- NDT procedures;
- heat treatment procedures, where applicable;
- leak testing procedures, where applicable;
- pressure test procedures where necessary;
- any additional procedures specifically requested.

## 6.3 Performance of design review

### 6.3.1 System design review

A review of isometrics and/or construction drawings, including parts lists and technical schedules, shall be performed with regard to operating conditions of the following items:

- the suitability of the material for the pressurised and un-pressurised parts including the required material inspection documents;
- the suitability of welding procedure specifications and approvals;
- suitability of weld joint design;
- provision for appropriate in-service testing and inspection ,where necessary;
- structural stability, including supports and fixed points;
- provision and adequacy of safety devices.

The system design review shall be performed against the requirements of this European Standard.

### 6.3.2 Review of design calculations

The review of design calculations shall be carried out to verify that the dimensions specified meet the requirements of EN 13480-3. The review shall also ensure that the stresses considered include pressure, temperature and that all loads that may be applied during operating and testing have been considered.

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### 6.3.3 Incomplete documentation

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When all required data is not available at the time of the design validation, fabrication/installation may proceed provided it shall not go beyond the applicable fabrication/installation stage, until approval is received.

### 6.3.4 Additional procedures/qualifications

Prior to the performance of the specific task involved, for piping class III the following shall be verified, preferably as part of the design examination:

- Approval of welders;
- Qualification and certification of NDT personnel;
- Procedures for finishing, e.g. cleaning, painting, insulation etc.

## 6.4 Alternative proof of safety

If the design proposed by the manufacturer has not been prepared by a method acceptable under the requirements of EN 13480-3, then the manufacturer shall supply all the necessary information in support of the alternative design approach. This may consist of mathematical analysis, proof test data, operating experience or any other data the manufacturer considers relevant to support this method of design. The documents submitted shall be reviewed to ensure that the design of the piping is as safe as that provided by this European Standard and include the principles given in 6.3.

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## 6.5 Manufacturer's declaration of design compliance

After validation of the design has shown that the design requirements of this European Standard have been fulfilled, the piping manufacturer shall prepare a declaration that the design is in compliance with the requirements of this European Standard.

NOTE A specimen of the manufacturer's declaration of design compliance is given in CEN/TR 13480-7.

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

## 7 In-process inspection and testing

### 7.1 General

Examinations and tests specified in EN 13480-5 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

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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

All formed parts shall be subject to non-destructive testing.

The examination shall include, if appropriate:

- wall thickness measurements;
- dimensional checks (ovality, angle of bend etc.);