

English version

Metallic industrial piping - Part 1: General
(includes amendment A1:2005)

Tuyauteries industrielles métalliques - Partie 1: Généralités
(inclut l'amendement A1:2005)

Metallische industrielle Rohrleitungen - Teil 1: Allgemeines
(enthält Änderung A1:2005)

This European Standard was approved by CEN on 23 May 2002. Amendment A1 was approved by CEN on 12 May 2005.

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Foreword

This document (EN 13480-1:2002) 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of an identical text or by endorsement, at the latest by November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.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.

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

- *Part 1: General;*
- *Part 2: Materials;*
- *Part 3: Design and calculation;*
- *Part 4: Fabrication and installation;*
- *Part 5: Inspection and testing;*
- *Part 6: Additional requirements for buried piping;*

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

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A1 This European Standard will be maintained by a Maintenance working group whose scope of working is limited to corrections and interpretations related to EN 13480. The contact to submit queries can be found at <http://comelec.afnor.fr/cen/en13480>. Detailed scope of working for this Maintenance working group is given in informative Annex A. **A1**

Foreword to amendment A1

This document (EN 13480-1:2002/A1:2005) has been prepared by Technical Committee CEN/TC 267 "Industrial piping and pipelines", the secretariat of which is held by AFNOR.

This Amendment to the European Standard EN 13480-1:2002 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

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1 Scope

This European Standard specifies the requirements for industrial piping systems and supports, including safety systems, made of metallic materials (but initially restricted to steel) with a view to ensure safe operation.

This European Standard is applicable to metallic piping above ground, ducted or buried, irrespective of pressure.

This European Standard is not applicable to:

- Pipelines and their accessories;
- Stream waterways such as penstocks, pressure tunnels, pressure shaft for hydro-electric-installations and their related specific accessories;
- Piping for vehicles covered by the EEC type approval procedures as laid down in Directives 70/156/EEC [1], 74/150/EEC [2] and 92/61/EEC [3];
- Items specifically designed for nuclear use, failure of which may cause an emission of radioactivity;
- Well-control equipment used in the petroleum, gas or geothermal exploration and extraction industry and in underground storage which is intended to contain and/or control well pressure, including the piping;
- Piping of blast furnaces including the furnace cooling, hot blast recuperators, dust extractors and blast furnace exhaust gas scrubbers and direct reducing cupolas including the furnace cooling, gas converters and vacuum furnaces and pans for melting, re-melting de-gassing and casting of steel and non ferrous metals;
- Enclosures for high voltage electrical equipment such as switchgear, control gear and transformers;
- Pressurized pipes for the containment of transmission systems such as for electrical power and telephone cables;
- Permanently fixed piping for ships, rockets, aircraft and mobile offshore units;
- Internal piping in medical devices as defined in the Directive 93/142/EEC [4] concerning medical devices;
- Internal piping of boilers and piping integral to pressure vessels.

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 764-2, *Pressure equipment - Part 2 : Quantities, symbols and units.*

EN 764-3, *Pressure equipment - Part 3 : Definitions and parties involved.*

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

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

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

EN 13480-5:2002, *Metallic industrial piping - Part 5: Inspection and testing.*

prEN 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*.

3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 764-3 and the following apply.

Specific definitions are given in the relevant Parts of this European Standard.

3.1.1

ambient temperature

temperature of the surrounding atmosphere in the immediate vicinity of the piping system

3.1.2

piping system

piping

pipe or system of pipes for the conveyance of fluids within an industrial site

NOTE 1 A piping system can be regarded as one single system provided it conveys substances having the same properties and it is as a whole designed for the same allowable pressure.

NOTE 2 Interruption by different components such as pumps, machines, vessels etc. does not preclude the integration to one single piping.

3.1.3

fluid

gases, liquids and vapours in pure phase as well as mixtures thereof

NOTE: A fluid may contain a suspension of solids.

3.1.4

manufacturer

person or organization that takes full responsibility for the design and manufacture of the piping system and its conformity to EN 13480

NOTE 1 The manufacturer is responsible for carrying out all relevant production processes and testing as specified in the applicable standards.

NOTE 2 If a manufacturer employs subcontractors or fabricators/installers for certain items he is responsible for their work.

NOTE 3 In the EC Member States a manufacturer or his representative is responsible for the conformance of a piping system he puts on the market, with the essential safety requirements of the PED.

3.1.5

piping fabricator and/or installer

individual or organization that takes responsibility for the fabrication and/or installation of industrial piping complying with the requirements of EN 13480.

NOTE The piping fabricator or the installer may be the manufacturer

3.1.6

designer

individual or organization that takes responsibility for the design of industrial piping complying with the requirements of EN 13480.

NOTE The designer can also be the manufacturer.

3.1.7

piping class

category in which industrial piping is classified

NOTE The category depends on the fluid contained, the maximum allowable pressure *PS* and nominal size *DN* and the physical condition of the fluid.

3.1.8

test

physical activity (destructive or non-destructive) carried out in accordance with a defined procedure which provides an objective assessment of a characteristic of a component or system

NOTE See Figure 3.1-1.

3.1.9

testing

performance of a test or examination and production of a record of results and evaluation of the results compared to the requirements

NOTE See Figure 3.1-1.

3.1.10

examination

assessment carried out to determine or verify the acceptability of a component, system or document

NOTE See Figure 3.1-1.

3.1.11

inspection

activity carried out by persons independent of production to verify that the results of the testing and examinations conform to specific requirements

NOTE See Figure 3.1-1.

3.1.12

design validation

Examination of the design documents to verify that the design conforms to EN 13480

3.1.13

imperfection

discontinuity noted during testing and inspection which needs to be evaluated with respect to the acceptance criteria

3.1.14

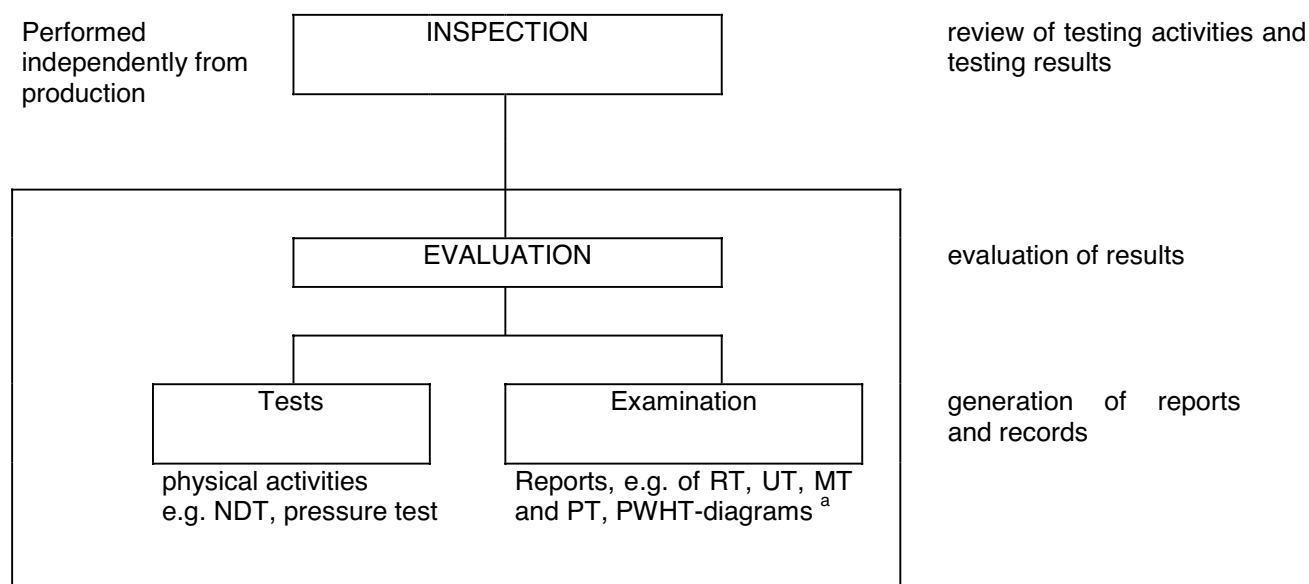
defect

discontinuity that renders the material integrity unacceptable with respect to the acceptance level

3.1.15

repair

process of rectifying a defect in either base material or weld



^a See EN 13480-5:2002, clause 4

Figure 3.1-1 — Scheme of inspection and testing activities

3.2 Symbols and units

For the purposes of this European Standard, the symbols and units given Table 3.2.1 and further symbols of EN 764-2 apply.

Additional symbols are given in some of the relevant Parts of this European Standard.

Table 3.2-1 — General symbols and units

| Symbol | Description | Unit |
|--|--|-------------------------|
| A | elongation at rupture | % |
| D, d^a | diameters | mm |
| E | Modulus of elasticity | N/mm ² (MPa) |
| e | minimum required thickness without allowances and tolerances, to withstand pressure, calculated by the appropriate equations given in this standard (see figure 4.3-1) | mm |
| R_{eH} | minimum specified value of upper yield strength at room temperature | N/mm ² (MPa) |
| R_m | minimum specified value of tensile strength at room temperature | N/mm ² (MPa) |
| $R_{m t}$ | minimum specified value of tensile strength at calculation temperature when this temperature is greater than the room temperature | N/mm ² (MPa) |
| $R_{p0,2}$ | minimum specified value of 0,2 % proof strength at room temperature | N/mm ² (MPa) |
| $R_{p0,2 t}$ | minimum specified value of 0,2 % proof strength at calculation temperature t when this temperature is greater than the room temperature | N/mm ² (MPa) |
| $R_{p1,0}$ | minimum specified value of 1,0 % proof strength at room temperature | N/mm ² (MPa) |
| $R_{p1,0 t}$ | minimum specified value of 1,0 % proof strength at calculation temperature t when this temperature is greater than the room temperature | N/mm ² (MPa) |
| T | time | h |
| t | temperature | °C |
| ν | Poisson's ratio | - |
| NOTE All pressures for calculation purposes are in N/mm ² (MPa) and PS is in bar. | | |
| ^a The following subscripts apply: o outside i inside m mean | | |

4 Classification of piping

4.1 General

The design, manufacture type, extent and sequence of testing and inspection of piping shall be based on the fluid contained in the system and the operating conditions in accordance with Table 4.1-1.

The manufacturer shall be responsible for the identification of the piping class of the piping system.

If it is necessary or expedient, e.g. for construction or maintenance reasons, a piping system can be divided into several sections.

Table 4.1-1 — Classification of piping systems by piping categories

| Fluid | Fluid group (see CEN/TR 13480-7:2002, 4.2) | Criteria | Piping class | Reference to CEN/TR 13480-7 |
|--------------------|---|--|-----------------|-----------------------------|
| Gases ^a | 1 | $PS > 0,5$ bar and $DN > 350$ or $PS > 0,5$ bar and $DN > 100$ and $PS \cdot DN > 3\,500$ | III | See Figure A.1 |
| | | $PS > 0,5$ bar and $100 < DN \leq 350$ and $PS \cdot DN \leq 3\,500$ or $25 < DN \leq 100$ and $PS \cdot DN > 1\,000$ or $25 < DN \leq 350$ and $1\,000 < PS \cdot DN < 3\,500$ | II ^b | |
| | | $PS > 0,5$ bar and $25 < DN \leq 100$ and $PS \cdot DN \leq 1\,000$ | I ^b | |
| | | $PS > 0,5$ bar and $DN \leq 25$ | 0 (see 4.2) | |
| | 2 | $PS > 0,5$ bar and $DN > 250$ and $PS \cdot DN > 5\,000$ | III | See Figure A.2 |
| | | $PS > 0,5$ bar and $DN > 250$ and $3\,500 < PS \cdot DN \leq 5\,000$ or $100 < DN \leq 250$ and $PS \cdot DN > 3\,500$ | II ^c | |
| | | $PS > 0,5$ bar and $DN > 32$ and $1\,000 < PS \cdot DN \leq 3\,500$ or $32 < DN \leq 100$ and $PS \cdot DN > 1\,000$ | I | |
| | | $PS > 0,5$ bar and $DN \leq 32$ or $PS > 0,5$ bar and $PS \cdot DN \leq 1\,000$ | 0 (see 4.2) | |
| | All | $PS \leq 0,5$ bar | (see 4.3) | — |
| | Liquids ^d | $PS > 500$ bar and $DN > 25$ | III | see Figure A.3 |
| | | $10 \text{ bar} < PS \leq 500$ bar and $DN > 25$ and $PS \cdot DN > 2\,000$ | II | |
| | | $0,5 \text{ bar} < PS \leq 10$ bar and $PS \cdot DN > 2\,000$ | I | |
| | | $PS > 0,5$ bar and $DN \leq 25$ or $PS > 0,5$ bar and $PS \cdot DN \leq 2\,000$ | 0 (see 4.2) | |
| | 2 | $PS > 500$ bar and $DN > 200$ | II | See Figure A.4 |
| | | $10 < PS \leq 500$ bar and $DN > 200$ and $PS \cdot DN > 5\,000$ | I | |
| | | $0,5 \text{ bar} < PS \leq 10$ bar or $PS > 0,5$ bar and $DN \leq 200$ or $PS > 0,5$ bar and $PS \cdot DN \leq 5\,000$ | 0 (see 4.2) | |
| | All | $PS \leq 0,5$ bar | (see 4.3) | — |

^a Gases: gases, liquefied gases, gases dissolved under pressure, vapours and those liquids whose vapour pressure at the maximum allowable temperature is greater than 0,5 bar above normal atmospheric pressure of 1,013 bar (1 013 mbar).

^b Piping for unstable gases which fall within class I or II on the basis of the above table, shall be classified in class III. (An unstable gas is a gas or a vapour liable to be transformed spontaneously and suddenly, which produces a variation in pressure when this transformation takes place in a closed volume under the sole effect of a small variation in one of the operation parameters.)

^c All piping containing gases at a temperature greater than 350 °C which fall within class II on the basis of the above table shall be classified in class III.

^d Liquids: liquids having a vapour pressure at the maximum allowable temperature of not more than 0,5 bar above normal atmospheric pressure of 1,013 bar (1 013 mbar).

4.2 Piping of piping class 0

Piping of piping class 0 shall be designed, manufactured, examined and subjected to testing in accordance with technical rules applicable in one of the EU or EFTA Member States or in accordance with this standard.

4.3 Piping operating $\leq 0,5$ bar

Piping operating $\leq 0,5$ bar shall be designed, manufactured, examined and subjected to testing in accordance with sound engineering practice applicable in one of the EU or EFTA Member States or in accordance with this standard.

4.4 Special cases

In special cases, deviations from the specified requirements may be agreed, provided objective evidence is available to demonstrate that equivalent safety shall be attained.

5 Requirements for a Piping systems

The piping system shall be constructed of materials in accordance with EN 13480-2 and harmonized standards referenced therein.

The piping system shall be designed and calculations performed in accordance with EN 13480-3.

The fabrication and the installation of the piping system shall be in accordance with EN 13480-4.

The inspection and testing of the piping system shall be made in accordance with EN 13480-5.

The additional requirements for buried piping systems shall be in accordance with prEN 13480-6.

Annex A (informative)

Maintenance of EN 13480

A.1 Introduction

Because of the complexity of the series of European Standards EN 13480 (as illustrated by the number of figures, tables, and equations), CEN/TC 267 has established a working group in order to regularly update EN 13480 and to answer queries from users of the standard.

This Annex gives the scope of working for this Maintenance working group and gives indications to users of the standards on how to submit queries and the process for dealing with their queries.

This is separate from the normal CEN process for amending standards.

A.2 Scope and composition of the Working Group

The scope of this Maintenance working group is limited to corrections and interpretations related to EN 13480. In order to complete the maintenance of EN 13480, this group should :

- be a central point to collect any queries from users of the standard;
- be able to answer in a very short time the queries;
- be able to give authorised answers, accepted by the "authors" of the standard, within the remit of clarification and correction;
- have means and methods for ensuring that a query is properly dealt with.

In order to be able to ensure a reliable and efficient follow-up the evolutions and interpretations given on EN 13480, this working group is composed of European experts also involved in the preparation of this standard or in its revision.


A.3 Methods of Maintenance

A.3.1 Administration tools

In order to comply with the above, the working group "Maintenance" is provided with an efficient administrative secretariat and tools, intended to register, trace and issue the answer for every query as quickly as possible.

The website where to submit queries can be found at <http://comelec.afnor.fr/cen/en13480>.

It is intended to facilitate users of EN 13480 by providing in an accelerated fashion official answers to questions regarding the application of this European Pressure Equipment Standard as well as updated information about the evolution of the standard.

In order to facilitate the editing of the requests the website includes a downloadable form for questions and instructions on how to submit a question. 

A.3.2 Submission of queries and consultation of the experts

The electronic template available on the web site includes all the necessary indications in order to keep track of the request such as date, name and occupation of the enquirer, part of the standard concerned, etc.

The Administrative Secretariat of the Maintenance working group, when receiving the question, sends a confirmation of receipt of the question to the enquirer and registers the question in the data base with an identification number (which consists of the part number, a serial number followed by the full clause number) and then consults the working group experts.

After subject experts have agreed on an answer, the information on the results of the consultation will be communicated to the questioner.

A.4 Results of the consultation

In addition to the base standard, there are several types of documents in which the consultation can result :

- interpretation sheet which gives interpretation and clarification of the rules within the standard ;
- correction which corrects errors or ambiguities inadvertently introduced in either drafting or printing ;
- draft amendment for the updating and/or the altering of technical provisions, proposed to CEN/TC 267 for approval.

Each reply made to an enquirer will depend on the type of the result.

A.4.1 Practical provisions for interpretations

Every "simple" interpretation is put as question/answer on the Maintenance working group website with direct link from CEN website.

When approved by the Maintenance working group, "complex" interpretations can be transmitted to the Technical Committee CEN/TC 267 for publication as a CEN Technical Report.

These interpretations are periodically revised by the TC to decide whether to incorporate the interpretation sheet as an amendment to the main text, to keep the interpretation sheet, or to withdraw it.

A.4.2 Practical provisions for corrections

Corrections are issued as corrected pages of EN 13480 and are given specific issue number and issued by CEN according to CEN Rules. They are prepared in the form for the re-issue of the concerned page(s), with an adapted identification system (identification of the issue number, page and correction mark).

It may also happen that the corrections of a specific issue do not apply to all language versions.

A separate log of all pages for each language version is maintained by the Secretariat and made available on the website.

Important corrections, for which it is advisable to inform potential users without waiting for the availability of the next issue, are put on the website with information about the date of the issue of the corrected page. ^{A1}

Annex ZA (informative)

Clauses of this European Standard addressing essential safety requirements or other provisions of EU directives

This European standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential safety requirements of the Pressure Equipment Directive 97/23/EC with regard to general requirements for metallic industrial piping.

WARNING Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The following clauses of this standard given in Table ZA.1 are likely to support the essential safety requirements of the Pressure Equipment Directive 97/23/EC.

Table ZA.1 — Comparison between EN 13480-1 and the Pressure Equipment Directive 97/23/EC with respect to general requirements for metallic industrial piping

| EN 13480-1 harmonised clauses | Content | Pressure Equipment Directive 97/23/EC, Annex I |
|----------------------------------|---------|--|
| All | General | 1 |

Compliance with these clauses of this standard provides one means of conforming with the specific essential safety requirements of the Directive concerned and associated EFTA regulations.

Bibliography

- [1] Directive No 70/156/EEC of the European Parliament of the Council on the approximation of the laws of the member states relating to the type-approval of motor vehicles and their trailers, Official Journal EC, 1970.
- [2] Directive No 74/150/EEC of the European Parliament of the Council on the approximation of the laws of the member states relating to the type-approval of wheeled agricultural or forestry tractors, Official Journal EC, 1974.
- [3] Directive No 92/61/EEC of the European Parliament of the Council on the approximation of the laws of the member states relating to the type-approval of two or three-wheel motor vehicles, Official Journal EC, 1974
- [4] Directive No 93/42/EEC of the European Parliament of the Council on the approximation of the laws of the member states relating to medical devices, Official Journal EC, 1993
- [5] Directive No 67/548/EEC of the European Parliament of the Council on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, Official Journal EC, 1967
- [6] Directive No 97/23/EC of the European Parliament of the Council on the approximation of the Laws of the Member States concerning Pressure Equipment, Brussels, Official Journal EC, July 1997.

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