

**METALLIST TÖÖSTUSTORUSTIK.
OSA 4: VALMISTAMINE JA PAIGALDAMINE**

**Metallic industrial piping -
Part 4: Fabrication and installation**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 13480-4:2016+A3:2016 sisaldab Euroopa standardi EN 13480-4:2012 ja selle muudatuse A3:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 13480-4:2016+A3:2016 consists of the English text of the European standard EN 13480-4:2012 and its amendment A3:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 27.06.2012 muudatuse A3:2016 02.11.2016.	Date of Availability of the European standard is 27.06.2012 for amendment A3 02.11.2016
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 23.040.01

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Metallic industrial piping - Part 4: Fabrication and installation

Tuyauteries industrielles métalliques - Partie 4: Fabrication
et installation

Metallische industrielle Rohrleitungen - Teil 4: Fertigung
und Verlegung

This European Standard was approved by CEN on 8 May 2012.

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

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	4
1 Scope	6
2 Normative references	6
3 Terms and definitions.....	7
4 Symbols	7
5 General.....	7
5.1 Requirements on the manufacturer	7
5.2 Requirements on fabricators and installers of piping and supports	8
5.3 Requirements for fabrication and installation	8
5.4 Classification of piping	8
5.5 Material grouping.....	9
5.6 Tolerances	9
6 Cutting and bevelling	9
6.1 General.....	9
6.2 Identification of pressure parts	9
7 Bending and other forming.....	9
7.1 General.....	9
7.2 Heat treatment after cold forming	12
7.2.1 Flat products	12
7.2.2 Pipes.....	12
7.3 Heat treatment after hot forming	14
7.3.1 Material groups 1, 3, 4, 5 and 6.....	14
7.3.2 Material groups 8.1 and 8.2.....	14
7.3.3 Heat treatment after hot forming for material group 10	16
7.3.4 Heat treatment after hot forming for clad materials	16
7.4 Tolerances	16
7.4.1 Out-of-roundness of bends under internal pressure equal to, or greater than, the external pressure	16
7.4.2 Out-of-roundness of bends under external pressure and vacuum	17
7.4.3 Waves at bends	17
7.4.4 Start-up bulge of induction bends	18
7.5 Surface finish	19
8 Installation of piping.....	19
8.1 Fixing and alignment	19
8.2 Field run piping	20
8.3 Flanged or similar mechanical connections	21
8.3.1 Flange connections	21
8.3.2 Threaded connections.....	22
8.3.3 Couplings and compression fittings.....	22
8.4 Protection of ends of piping components.....	22
9 Welding	22
9.1 Welding personnel	22
9.2 Welding procedure specifications	22
9.3 Welding procedures	23
9.3.1 Verification of suitability	23
9.3.2 Application.....	23

9.4	Filler metals and auxiliary materials.....	24
9.5	Climatic conditions.....	24
9.6	Cleaning before and after welding.....	24
9.7	Joint preparation	24
9.8	Edge protection	24
9.9	Assembly for welding.....	24
9.10	Earthing	25
9.11	Performance of welding	25
9.11.1	Preheating	25
9.11.2	Striking marks.....	25
9.11.3	External welds.....	25
9.11.4	Dissimilar joints	26
9.12	Backing rings	26
9.13	Attachments	26
9.13.1	General	26
9.13.2	Temporary attachments	26
9.13.3	Permanent attachments	26
9.14	Post-weld heat treatment.....	27
9.14.1	General	27
9.14.2	Equipment	30
9.14.3	Temperature measurements	30
9.14.4	Controlling thickness	30
9.14.5	Rate of heating	32
9.14.6	Local heat treatment.....	32
9.14.7	Insulation.....	33
9.15	Weld identification.....	33
10	Adjustment and repair.....	33
10.1	General	33
10.2	Adjustment.....	33
10.2.1	Cold hammering	33
10.2.2	Adjustments by means of heat	33
10.2.3	Adjustment by welding	34
10.2.4	Adjustment by local forging	34
10.3	Weld repair	34
11	Marking and documentation.....	34
11.1	Marking of spools and components for installation	34
11.2	Marking and identification of installed piping	34
11.2.1	General	34
11.2.2	CE Marking of installed piping	35
11.2.3	Technical identification of installed piping.....	35
12	Additional requirements	36
12.1	Cleaning.....	36
12.2	Temporary preservation.....	36
12.3	External corrosion protection	36
12.4	Thermal and acoustic insulation.....	36
12.5	Connections for static electricity.....	36
Annex A (informative)	Contamination and surface quality of stainless steel.....	38
Annex B (normative)	Dimensional tolerances for fabricated spools.....	41
Annex Y (informative)	History of EN 13480-4	43
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU aimed to be covered.....	44
Bibliography.....		45

Foreword

This document (EN 13480-4:2012) 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 December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] 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 this document.

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 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;*
- *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.

This European Standard will be maintained by a Maintenance MHD 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://www.unm.fr> (en13480@unm.fr). A form for submitting questions can be downloaded from the link to the MHD website. After subject experts have agreed an answer, the answer will be communicated to the questioner. Corrected pages will be given specific issue number and issued by CEN according to CEN Rules. Interpretation sheets will be posted on the website of the MHD.

This document supersedes EN 13480-4:2002. This new edition incorporates the Amendments/the corrigenda which have been approved previously by CEN members, and the corrected pages up to Issue 17 without any further technical change. Annex Y provides details of significant technical changes between this European Standard and the previous edition.

Amendments to this new edition may be issued from time to time and then used immediately as alternatives to rules contained herein. It is intended to deliver a new Issue of EN 13480:2012 each year, consolidating these Amendments and including other identified corrections. Issue 4 (2016-07) Amendment EN 13480-4:2012/A2:2015; it includes the corrected pages listed in Annex Y.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This Part of this European Standard specifies the requirements for fabrication and installation of piping systems, including supports, designed in accordance with EN 13480-3:2012.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 287-1:2011, *Qualification test of welders — Fusion welding — Part 1: Steels*

EN 1418:1997, *Welding personnel — Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 12952-5:2011, *Water-tube boilers and auxiliary installations — Part 5: Workmanship and construction of pressure parts of the boiler*

EN 13480-1:2012, *Metallic industrial piping — Part 1: General*

EN 13480-2:2012, *Metallic industrial piping — Part 2: Materials*

EN 13480-3:2012, *Metallic industrial piping — Part 3: Design and calculation*

EN 13480-5:2012, *Metallic industrial piping — Part 5: Inspection and testing*

EN ISO 3834-3:2005, *Quality requirements for fusion welding of metallic materials — Part 3: Standard quality requirements (ISO 3834-3:2005)*

EN ISO 4063:2010, *Welding and allied processes — Nomenclature of processes and reference numbers (ISO 4063:2009, Corrected version 2010-03-01)*

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, corrected version:2005, including Technical Corrigendum 1:2006)*

EN ISO 13920, *Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position (ISO 13920)*

EN ISO 15609 (all parts), *Specification and qualification of welding procedures for metallic materials — Welding procedure specification*

EN ISO 15610:2003, *Specification and qualification of welding procedures for metallic materials — Qualification based on tested welding consumables (ISO 15610:2003)*

EN ISO 15611:2003, *Specification and qualification of welding procedures for metallic materials — Qualification based on previous welding experience (ISO 15611:2003)*

EN ISO 15612:2004, *Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure (ISO 15612:2004)*

EN ISO 15614-1:2004, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004)*

EN ISO 17663:2009, *Welding — Quality requirements for heat treatment in connection with welding and allied processes (ISO 17663:2009)*

CEN ISO/TR 15608:2005, *Welding — Guidelines for a metallic materials grouping system (ISO/TR 15608:2005)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13480-1:2012 together with the following apply.

3.1

field run piping

piping installed without preplanning by drawings of the piping routing and the support points

Note 1 to entry: Typical dimensions are DN 50 or smaller.

3.2

spool (with or without overlength)

prefabricated assembly of components which forms part of a piping system

3.3

cold forming

forming at ambient temperature, but not below + 5 °C

3.4

hot forming

for ferritic steels, forming at temperatures at or above the maximum permissible temperature for post-weld heat treatment; for austenitic and austenitic-ferritic steels at temperatures above 300 °C

4 Symbols

For the purposes of this Part of this European Standard, the symbols given in EN 13480-1:2012 apply. Additional symbols are defined in appropriate clauses of this Part.

5 General

5.1 Requirements on the manufacturer

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.