SLOVENSKI STANDARD
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Valoviti kovinski cevni sestavi za uporabo v tlačnih cevovodih

Corrugated metal hose assemblies for pressure applications

Gewellte Metallschlauchleitungen für Druckanwendungen

Tuyauteries métalliques flexibles onduleuses pour applications sous pression

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Corrugated metal hose assemblies for pressure applications

Tuyauteries métalliques flexibles onduleuses pour applications sous pression

Gewellte Metallschlauchleitungen für Druckanwendungen

This European Standard was approved by CEN on 26 August 2024.

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

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European foreword

This document (FprEN 14585:2024) has been prepared by Technical Committee CEN/TC 342 “Metal hose, hose assemblies, bellows and expansion joints”, the secretariat of which is held by SNV.

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of an identical text or by endorsement, at the latest by April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.

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 supersedes EN 14585-1:2006, CEN/TR 14585-2:2006, CEN/TR 14585-3:2017.

Annex E provides details of significant technical changes between this document and the previous edition.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

This document has been produced to address the specific needs of corrugated metal hose assemblies for pressure applications. For applications outside the scope of EU Directive 2014/68/EU, refer to EN ISO 10380:2012.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Corrugated metal hose assemblies are used as components in piping.

The requirements of this document impact designers, manufacturers, suppliers and importers of corrugated metal hose assemblies for pressure applications.

The unique nature of a corrugated metal hose assembly is characterized by:

— the opposing requirements of pressure resistance and flexibility;

— the interactive role of its pressure bearing parts: corrugated metal hose, braid, end fittings and its permanent joints.

As a general rule PED [1] Annex I, Clause 2.2.2 limits the experimental design method for piping to PS · DN less than 3000. Validation tests are, however, intended to support design of corrugated metal hose assemblies for all practically achievable values of PS · DN.

Regarding sound engineering practice (SEP), the manufacturer is responsible for its application based on relevant standards or other professional codes. Corrugated metal hose assemblies according to SEP are expected to be designed, manufactured, verified and delivered with instructions for use in order to ensure their safety during their intended life, when used in foreseeable or reasonably foreseeable conditions.

NOTE 1 EN ISO 10380:2012 or relevant professional codes answer sound engineering practice requirements.

NOTE 2 See also PED Guidelines I-01 [5] and I-09 [6].

1 Scope

This document specifies the requirements for design, manufacture and installation of corrugated metal hose assemblies for pressure applications, i.e. maximum allowable pressure PS greater than 0,5 bar.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 764-4:2014, *Pressure equipment - Part 4: Establishment of technical delivery conditions for metallic materials*

EN 764-5:2014, *Pressure equipment - Part 5: Inspection documentation of metallic materials and compliance with the material specification*

EN 1092-1:2018, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges*

EN 1562:2019, *Founding - Malleable cast irons*

EN 1591-1:2013, *Flanges and their joints - Design rules for gasketed circular flange connections - Part 1: Calculation*

EN 1593:1999,[1] *Non destructive testing — Leak testing — Bubble emission techniques*

EN 1652:1997, *Copper and copper alloys - Plate, sheet, strip and circles for general purposes*

EN 1653:1997,[2] *Copper and copper alloys — Plate, sheet and circles for boilers, pressure vessels and hot water storage units*

EN 1779:1999,[3] *Non destructive testing — Leak testing – Criteria for method and technique selection*

EN 1982:2017, *Copper and copper alloys - Ingots and castings*

EN ISO 6892-1:2019, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 7369:2020, *Pipework - Metal hoses and hose assemblies - Vocabulary (ISO 7369:2020)*

EN ISO 9445-1:2010, *Continuously cold-rolled stainless steel - Tolerances on dimensions and form - Part 1: Narrow strip and cut lengths (ISO 9445-1:2009)*

EN ISO 9445-2:2010, *Continuously cold-rolled stainless steel - Tolerances on dimensions and form - Part 2: Wide strip and plate/sheet (ISO 9445-2:2009)*

[1] As impacted by EN 1593:1999/A1:2003.

[2] As impacted by EN 1653:1997/A1:2000.

[3] As impacted by EN 1779:1999/A1:2003.

EN ISO 9606-1:2017, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*

EN ISO 9606-4:1999, *Approval testing of welders - Fusion welding - Part 4: Nickel and nickel alloys (ISO 9606-4:1999)*

EN ISO 9712:2022, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2021)*

EN 10028-2:2017, *Flat products made of steels for pressure purposes - Part 2: Non-alloy and alloy steels with specified elevated temperature properties*

EN 10028-4:2017, *Flat products made of steels for pressure purposes - Part 4: Nickel alloy steels with specified low temperature properties*

EN 10028-7:2016, *Flat products made of steels for pressure purposes - Part 7: Stainless steels*

EN 10088-3:2014, *Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes*

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

EN 10216-1:2013, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10216-2:2013+A1:2019, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10216-3:2013, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes*

EN 10216-4:2013, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 4: Non-alloy and alloy steel tubes with specified low temperature properties*

EN 10216-5:2021, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 5: Stainless steel tubes*

EN 10217-3:2019, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low temperature properties*

EN 10217-4:2019, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 4: Electric welded non-alloy steel tubes with specified low temperature properties*

EN 10217-5:2019, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-7:2021, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 7: Stainless steel tubes*

EN 10222-2:2017+A1:2021, *Steel forgings for pressure purposes - Part 2: Ferritic and martensitic steels with specified elevated temperatures properties*

EN 10222-3:2017, *Steel forgings for pressure purposes - Part 3: Nickel steels with specified low temperature properties*

EN 10222-5:2017, *Steel forgings for pressure purposes - Part 5: Martensitic, austenitic and austenitic-ferritic stainless steels*

EN 10253-2:2021, *Butt-welding pipe fittings - Part 2: Non alloy and ferritic alloy steels with specific inspection requirements*

EN 10253-4:2008, *Butt-welding pipe fittings - Part 4: Wrought austenitic and austenitic-ferritic (duplex) stainless steels with specific inspection requirements*

EN ISO 10380:2012, *Pipework - Corrugated metal hoses and hose assemblies (ISO 10380:2012)*

EN 12164:2016, *Copper and copper alloys - Rod for free machining purposes*

EN 12165:2016, *Copper and copper alloys - Wrought and unwrought forging stock*

EN 12166:2016, *Copper and copper alloys - Wire for general purposes*

EN 12167:2016, *Copper and copper alloys - Profiles and bars for general purposes*

EN 12168:2016, *Copper and copper alloys - Hollow rod for free machining purposes*

EN 12449:2023, *Copper and copper alloys - Seamless, round tubes for general purposes*

EN 13134:2000, *Brazing - Procedure approval*

EN 13184:2001,[4] *Non-destructive testing — Leak testing — Pressure change method*

EN 13445-3:2021, *Unfired pressure vessels - Part 3: Design*

EN 13480-2:2017, *Metallic industrial piping - Part 2: Materials*

EN 13480-3:2017, *Metallic industrial piping - Part 3: Design and calculation*

EN ISO 148-1:2016, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1:2016)*

EN ISO 13585:2012, *Brazing - Qualification test of brazers and brazing operators (ISO 13585:2012)*

EN ISO 14732:2013, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

EN ISO 15610:2023, *Specification and qualification of welding procedures for metallic materials — Qualification based on tested welding consumables (ISO 15610:2023)*

EN ISO 15613:2004, *Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613:2004)*

[4] As impacted by EN 13184:2001/A1:2003.

EN ISO 15614-1:2017, *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 15614-1:2017, Corrected version 2017-10-01)*

EN ISO 17637:2016, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637:2016)*

EN ISO 20485:2018, *Non-destructive testing - Leak testing - Tracer gas method (ISO 20485:2017)*

3 Terms and definitions

For the purposes of this document, the terms and definitions in EN ISO 7369:2020 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
metal hose assembly
assembly of a corrugated metal hose with its end fittings

3.2
maximum allowable pressure
PS
maximum pressure at the operating temperature for which the metal hose assembly is designed

Note 1 to entry: See also 6.2.1.

3.3
maximum allowable pressure at 20°C
***PS*$_{20}$**
equivalent maximum pressure at ambient temperature for which the metal hose assembly is designed

3.4
minimum allowable temperature
minimum allowable temperature *TS*
minimum temperature for which the metal hose assembly is designed

Note 1 to entry: See also 6.2.1.

3.5
maximum allowable temperature
maximum allowable temperature *TS*
maximum temperature for which the metal hose assembly is designed

Note 1 to entry: See also 6.2.1.

3.6
nominal pressure
PN
dimensionless alphanumerical designation which is a convenient rounded number commonly used for reference purposes of piping components and stock parts

Note 1 to entry: For this document PN represents the maximum allowable pressure at 20°C as specified by the metal hose assembly manufacturer.

3.7
test pressure
PT
pressure at which the metal hose assembly is proof tested (normally at ambient temperature)

3.8
main pressure bearing parts
parts, such as corrugated metal hose, braid, pipe ends, the failure of which can result in a sudden discharge of pressure energy

3.9
pressure bearing parts
parts, such as swivel nuts, flanges, threaded end fittings, that are not main pressure bearing parts defined in 3.8 and the failure of which can not lead to a sudden discharge of pressure energy

3.10
attachments to pressure parts
parts, such as ferrules, that are directly welded to parts defined in 3.8 or 3.9

3.11
other parts
parts, such as external protection, anti-kink device, braid protecting spiral, which are not parts according to 3.8 to 3.9

3.12
experimental tests
type testing
tests made to develop an experimental design method

3.13
category
classification of pressure equipment according to ascending level of hazard

Note 1 to entry: See Annex A.

3.14
equipment manufacturer
natural or legal person responsible for the values of the parameters *PS* and *TS*

Note 1 to entry: This can be the manufacturer or planner of the piping for which the metal hose assembly is designed.

3.15
hose manufacturer
natural or legal person responsible for the design and the manufacture of the corrugated metal hose and/or the metal hose assembly

3.16
purchaser
person or organization that orders products in accordance with this document

Note 1 to entry: The purchaser is not necessarily, but can be, a manufacturer of pressure equipment in accordance with the EU Directive listed in Annex ZA. Where a purchaser has responsibilities under this EU Directive, this document will provide a presumption of conformity with the essential requirements of the Directive identified as such in Annex ZA once the reference of the Standard is published in the Official Journal of the European Commission

3.17
hydraulic forming
longitudinal welded
corrugating a tube by pressurizing the inside against external tooling which allows this corrugated tube to be axially shortened during the process

3.18
roll forming
longitudinal welded
corrugating a tube by rolling from the outside to the inside and allowing or forcing this corrugated tube to be axially shortened during the process

3.19
helical crest welded
resistance welded
profiling a strip, rolling it over helically and finally welding the overlaps

3.20
strand
group of parallel wires used for plain braid or wires woven together to form a braided strand

3.21
braided braid
braid that is manufactured from previously braided strands

3.22
operating instructions
written procedure provided by the manufacturer which include all information regarding installation, operation, safety and maintenance of the equipment within the manufacturer's scope of supply

4 Classification

For the application of this document, hose assemblies are divided into groups according to ascending level of hazard: SEP, Category I, and Categories II and III.

The grouping is, according to the requirements of PED [1], depending on their nominal diameter DN, their maximum allowable pressure PS, and on the type of fluid they convey.

According to the conformity assessment tables of the PED (see also Annex A) the different levels of hazard lead to:

— SEP, covering the field of sound engineering practice according to Article 4, Clause 3 of PED; i.e. smallest level of hazard with no CE marking;

— Category I, covering metal hose assemblies designed for a mean level of hazard and being CE marked;

— Categories II and III, covering metal hose assemblies designed for higher levels of hazard and being CE marked.