



SLOVENSKI STANDARD
SIST EN 13480-8:2012/A1:2014
01-julij-2014

Kovinski industrijski cevovodi - 8. del: Dodatne zahteve za cevovode iz aluminija in aluminijevih zlitin - Dopolnilo A1

Metallic industrial piping - Part 8: Additionnal requirements for aluminium and aluminium alloy piping

Metallische industrielle Rohrleitungen - Teil 8: Zusatzanforderungen an Rohrleitungen aus Aluminium und Aluminiumlegierungen

Tuyauteries industrielles métalliques - Partie 8: Exigences complémentaires relatives aux tuyauteries en aluminium et alliages d'aluminium

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Ta slovenski standard je istoveten z: EN 13480-8:2012/A1:2014

ICS:

77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use
77.150.10	Aluminijski izdelki	Aluminium products

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Metallic industrial piping - Part 8: Additional requirements for aluminium and aluminium alloy piping

Tuyauteries industrielles métalliques - Partie 8: Exigences complémentaires relatives aux tuyauteries en aluminium et alliages d'aluminium

Metallische industrielle Rohrleitungen - Teil 8: Zusatzanforderungen an Rohrleitungen aus Aluminium und Aluminiumlegierungen

This amendment A1 modifies the European Standard EN 13480-8:2012; it was approved by CEN on 11 January 2014.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant 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 amendment 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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EN 13480-8:2012/A1:2014 (E)**Foreword**

This document (EN 13480-8:2012/A1:2014) 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 13480-8:2012 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2014, and conflicting national standards shall be withdrawn at the latest by November 2014.

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 document includes the text of the amendment itself. The amended/corrected pages of EN 13480-8:2012 will be published in July 2014 as Issue 3 of the European Standard.

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.

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1 Modification to Foreword

The first sentence of the 9th paragraph of the Foreword shall read as follows:

The contact to submit queries can be found at <http://www.unm.fr> (en13480@unm.fr)

2 Modification to Clause 1

Replace the existing Clause 1 with the following:

This Part of EN 13480 specifies requirements for industrial piping systems made of aluminium and aluminium alloys in addition to the general requirements for industrial piping according to the series of standards EN 13480 and CEN/TR 13480-7.

3 Modification to Clause 2

Replace the existing Clause 2 with the following:

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 485-2:2013, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 2: Mechanical properties*

EN 485-3, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 3: Tolerances on dimensions and form for hot-rolled products*

EN 485-4, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 4: Tolerances on shape and dimensions for cold-rolled products*

EN 571-1:1997, *Non-destructive testing — Penetrant testing — Part 1: General principles*

EN 573-3:2009, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition and form of products*

EN 583-1:1998, *Non-destructive testing — Ultrasonic examination — Part 1: General principles*

EN 583-2:2001, *Non-destructive testing — Ultrasonic examination — Part 2: Sensitivity and range setting*

EN 583-3:1997, *Non-destructive testing — Ultrasonic examination — Part 3: Transmission technique*

EN 583-4:2002, *Non-destructive testing — Ultrasonic examination — Part 4: Examination for discontinuities perpendicular to the surface*

EN 583-5:2000, *Non-destructive testing — Ultrasonic examination — Part 5: Characterization and sizing of discontinuities*

EN 583-6:2008, *Non-destructive testing — Ultrasonic examination — Part 6: Time-of-flight diffraction technique as a method for detection and sizing of discontinuities*

EN 586-2:1994, *Aluminium and aluminium alloys — Forgings — Part 2: Mechanical properties and additional property requirements*

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EN 754 (all parts), *Aluminium and aluminium alloys — Cold drawn rod/bar and tube*

EN 755 (all parts), *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles*

EN 764-3, *Pressure equipment — Part 3: Definition of parties involved*

EN 1321:1996, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds*

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

EN 1779:1999, *Non-destructive testing — Leak testing — Criteria for method and technique selection*

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

EN 10246-9:2000, *Non-destructive testing of steel tubes — Part 9: Automatic ultrasonic testing of the weld seam of submerged arc-welded steel tubes for the detection of longitudinal and/or transverse imperfections*

EN 10246-16:2000, *Non-destructive testing of steel tubes — Part 16: Automatic ultrasonic testing of the area adjacent to the weld seam of welded steel tubes for the detection of laminar imperfections*

EN 12392:2000, *Aluminium and aluminium alloys — Wrought products — Special requirements for products intended for the production of pressure equipment*

EN 13445-4:2009, *Unfired pressure vessels — Part 4: Fabrication*

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 13480-4:2012, *Metallic industrial piping — Part 4: Fabrication and installation*

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

EN ISO 148-1:2010, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2009)*

EN ISO 3834-2:2005, *Quality requirements for fusion welding of metallic materials — Part 2: Comprehensive quality requirements (ISO 3834-2:2005)*

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 4136:2011, *Destructive tests on welds in metallic materials — Transverse tensile test (ISO 4136:2001)*

EN ISO 5173:2010, *Destructive tests on welds in metallic materials — Bend tests (ISO 5173:2009)*

EN ISO 6892-1:2009, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2009)*

EN ISO 6892-2:2011, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature* (ISO 6892-2:2011)

EN ISO 7438:2005, *Metallic materials — Bend test* (ISO 7438:2005)

EN ISO 9606-2:2004, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys* (ISO 9606-2:2004)

EN ISO 10042:2005, *Welding — Arc-welded joints in aluminium and its alloys — Quality levels for imperfections* (ISO 10042:2005)

EN ISO 11666:2010, *Non-destructive testing of welds — Ultrasonic testing — Acceptance levels* (ISO 11666:2010)

EN ISO 15614-2:2005, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys* (ISO 15614-2:2005)

EN ISO 17637:2011, *Non-destructive testing of welds — Visual testing of fusion-welded joints* (ISO 17637:2003)

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

EN ISO 23277:2009, *Non-destructive testing of welds — Penetrant testing of welds — Acceptance levels* (ISO 23277:2006)

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

ISO 857-1:1998, *Welding and allied processes — Vocabulary — Part 1: Metal welding processes*

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4 Modification to Clause 3

Replace the existing Clause 3 with the following:

For the purposes of this document, the terms, definitions, symbols and units of EN 13480-1:2012, EN 13480-2:2012, EN 13480-3:2012, EN 13480-4:2012 and EN 13480-5:2012 apply.

5 Modification to Clause 4

Replace the existing Clause 4 with the following:

The general requirements of EN 13480-1 shall apply.

6 Modification to 5.1 and 5.2

Add the following to the beginning of 5.1:

Materials for pressure-bearing parts compliant with the requirements of this European Standard shall be accompanied by inspection documents in accordance with EN 10204:2004.

The type of inspection document should be in accordance with EN 764-5:2002 and include a declaration of compliance to the material specification.

The revised sub-clause 5.2 shall read as follows:

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Annex A of EN 13480-2:2012 is not applicable for aluminium and aluminium alloys. The allowable materials for industrial piping of aluminium and aluminium alloys shall be according to Table 5.2-1.

Any product form available in the EN standards referenced in Annex C for a material and temper listed in Table 5.2-1 is acceptable for construction to this European Standard. Other materials not defined here may be used by agreement (see EN 13480-2:2012, 4.3) if they meet the requirements of 5.2 and 5.3 of this standard and a Particular Material Appraisal is produced (see EN 764-4:2002).

The revised heading of Table 5.2-1 shall read as follows:

Table 5.2-1 — Grouping system based on CEN ISO/TR 15608:2005 and EN AW numbers according to EN 573-3:2009

7 Modification to 5.3

Both equations $L_o = 5,65\sqrt{S_o}$ in sub-clause 5.3 shall be referenced respectively (5.3-1) and (5.3-2).

8 Modification to 5.4

The revised sub-clause 5.4 shall read as follows:

The chemical composition shall be in accordance with the material specification.

NOTE EN 12392:2000, 5.1.3 recommends a maximum hydrogen level of 0,2 ml per 100 g aluminium, measured in the liquid metal during casting for parts to be welded. EN 12392:2000, 4.1, recommends a maximum lead content not exceeding 150 µg/g.

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9 Modification to 5.6

The revised sub-clause 5.6 shall read as follows:

NOTE 1 See also EN 13480-2:2012, 4.2.2.

EN 13480-2:2012, 4.2.2.1, 2nd paragraph is not applicable for aluminium and aluminium alloys.

Nominal design stress values are given in Table C.1, Table C.2, Table C.3 and Table C.4. Design temperatures that exceed the respective temperature limit in Annex C are not permitted.

For materials of group 22.4 temperatures above 80 °C may result in grain boundary precipitation of Al₃-Mg₂. These materials may be used at temperatures above 80 °C up to 200 °C only for non-corrosive service.

NOTE 2 For further material properties see EN 12392:2000.

For welded parts and heat treated parts after forming only the values equivalent to the O temper shall be used for design when 6 000 series flanges, etc. are welded. Nominal design stresses are given in C.6. The weld area shall be based on the O temper but the flange strength away from the weld (2t) may be based on the actual temper (T4 or T6).

For aluminium and aluminium alloys values of 0,2 % proof strength (or 1 % proof strength for material group 21-1 000 series aluminium) for temperatures above 20 °C shall be established by linear interpolation between two adjacent values in the tables in Annex C.

For material of group 22.4: For short periods, higher temperatures are permitted (e.g. when defrosting refrigerating plant) up to 150 °C are permissible provided that the pressure is reduced to half the working pressure for a period up to 8 h and to atmospheric pressure for a period up to 24 h.

10 Modification to 5.7

The revised sub-clause 5.7 shall read as follows:

EN 13480-2:2012, Annex B is not applicable. All materials of Table 5.2-1 are suitable for any minimum metal temperature without impact testing.

NOTE See also EN 1252-1 and EN 12392:2000, 8.4.

11 Modification to 5.8

The first paragraph in sub-clause 5.8 shall read as follows:

Threads of bolts and studs shall be rolled. Regarding prevention of brittle fracture for materials of fasteners 5.7 applies.

12 Modification to 5.11

The revised sub-clause 5.11 shall read as follows:

The requirements of EN 13480-2:2012, 4.3.5 shall apply.

13 Modification to 6.2

The revised Table 6.2-2 shall read as follows:

Table 6.2-2 — Allowable design strength values for 6 000 series aluminium alloys in the welded condition (see 5.6)

Material designation	Value of f for design temperature (°C) not exceeding					
	50	75	100	125 ^a	150	175 ^a
EN AW 6060	40	40	40	38	-	-
EN AW 6061	55	55	55	54	51	43
NOTE Data are derived from EN 13445-8:2009.						
^a For maximum design temperature see 5.6. Values for 125 °C (EN AW 6060) and 175 °C (EN AW 6061) shall be used for interpolation only.						

14 Modification to 6.3

The revised sub-clause 6.3 shall read as follows:

In general, straight pipes shall be designed in accordance with EN 13480-3:2012, 6.1.

For $D_o/D_i > 1,2$, Formula (6.3-1) may be used. In this case pipes shall be seamless or tested in accordance with 8.4.3 and 8.6 for $z = 1,0$ and the maximum allowable pressure p_a shall be determined as follows:

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$$p_a = \left[\frac{2}{\sqrt{3}} \times R_{p0,2,t} \times \ln \left(\frac{D_0}{D_i} \right) \right] \times \frac{1}{1,5} \quad (6.3-1)$$

For material group 21 $R_{p1,0,t}$ shall be used instead of $R_{p0,2,t}$.

15 Modification to 6.4

The revised sub-clause 6.4 shall read as follows:

The standard method for calculation of bends and elbows for aluminium and aluminium alloys shall be the method described in EN 13480-3:2012, B.4.1.3.

NOTE 1 This clause should not be understood as to prohibit the other methods given in EN 13480-3, but to reflect the actual situation at the bend manufacturers.

NOTE 2 Also see 6.2.3 and EN 13480-3:2012, Formula B.4.1-11.

16 Modification to 6.5

The first paragraph in sub-clause 6.5 shall read as follows:

EN 13480-3:2012, 6.3 may be used for the design of mitre bends for aluminium and aluminium alloys.

The second paragraph in sub-clause 6.5 shall read as follows:

Alternatively the method described in Formulae (6.5-1) to (6.5-4) may also be used for multiple mitre bends for aluminium and aluminium alloys according to Figure 6.5-1 with a maximum angle Θ of 22,5°. The pressure limit given in EN 13480-3:2012, 6.3.1 is not applicable for this method.

The NOTE 1 in sub-clause 6.5 shall read as follows:

NOTE 1 Current experiences are available up to pressures of 63 bar for time independent design stresses, however this does not prohibit the calculation of mitre bends to the given formula for use of higher pressures, but shows the reference pressure for which mitre bends made of aluminium and aluminium alloys and designed to the rules are in safe operation.

The revised Table 6.5-1 shall read as follows:

Table 6.5-1 — Special symbols for subclause 6.5

Symbol	Description	Unit
σ_v	Equivalent stress intensity	MPa (N/mm ²)
pa^a	Maximum allowable pressure	MPa (N/mm ²)
d_{iv}	Design inside diameter	mm

^a See footnote ^a in EN 13480-3:2012, Table 3.2-1.

Formulae (6.5-1) to (6.5-4) and Figure 6.5-1 shall read as follows:

$$\sigma_v = pa \cdot \left(\frac{B_i \cdot d_{iv}}{2 \cdot e \cdot z} + 0,5 \right) \leq f \quad (6.5-1)$$

shall be met with regard to internal pressure loading, where with the smaller value of