Z245.11-17

Steel fittings

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In addition to the members of the Subcommittee on Materials, **Jan Andersson** made a valuable contribution to the development of this Standard.

Preface

This is the eighth edition of CSA Z245.11, *Steel fittings*. It supersedes the previous editions published in 2013, 2009, 2005, 2001, 1996, 1991, and 1985.

This Standard covers the requirements for steel fittings intended to be used for transporting fluids as specified in CSA Z662.

Changes to this edition include the following:

a) addition of requirements for induction bends;
b) revised requirements for all bends;
c) revised pressure rating requirements (Clause 4.3);
d) revised design proof test requirements (Clause 5);
e) revised requirements for fittings containing welds (Clause 6.3);
f) revised requirements for fittings other than bends (Clauses 6.4.1 and 9.1.3);
g) addition of manufacturing procedure specification requirements for cold and induction bends, and fittings (Clauses 6.4 and 6.6);
h) addition of inspection and test plan requirements (Clause 6.7);
i) revised heat-treatment procedures and records (Clause 8);
j) revised tension tests requirements (Clause 9.2);
k) addition of retesting requirements (Clause 9.6);
l) addition of requirements for cold and induction qualification bend testing, and essential variables (Clause 9 and Table 15);
m) addition of requirements for wall thickness tolerances for bends (Clause 10.3);
n) addition of segmentable elbows (Clause 10.8), their marking requirements (Clause 14.2.1) and recommendations for segmenting (new Annex C);
o) revised certification requirements (Clause 15);
p) addition of new minimum through passage diameters (Table 4); and
q) revised Annex B (now a mandatory Annex).

In this 2017 edition, where a major change or addition to the previous edition of this Standard has been made, the clause, table, or figure affected is identified by the symbol delta (Ⓟ) in the margin. Users of this Standard are advised that the change markers in the text are not intended to be all-inclusive and are provided as a convenience only; such markers cannot constitute a comprehensive guide to the revisions made to this Standard. Care must therefore be taken not to rely on the change markers to determine the current requirements of this Standard. As always, users of this Standard must consider the entire Standard.

This Standard was prepared by the Subcommittee on Materials, under the jurisdiction of the Technical Committee on Petroleum and Natural Gas Industry Pipeline Systems and Materials and the Strategic Steering Committee on Petroleum and Natural Gas Industry Systems, and has been formally approved by the Technical Committee.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include "Request for interpretation" in the subject line:*
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   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

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   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

   Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are published in CSA's periodical Info Update, which is available on the CSA Web site at www.csa.ca.

Z245.11-17
Steel fittings

1 Scope

Ⓟ 1.1 General

This Standard covers wrought steel buttwelding fittings, including extruded headers and factory-made induction or cold bends, primarily intended for use in oil or gas pipeline systems.

1.2 Size, grade, and category

1.2.1 Size

This Standard covers fittings in sizes from NPS 1/2 to NPS 60. (See Table A.1.)

Ⓟ 1.2.2 Grade

For other than sour service, this Standard covers fittings from Grade 207 to Grade 690. For sour service, this Standard covers fittings from Grade 207 to Grade 483.

Note: *The standard grades are Grades 207, 241, 290, 317, 359, 386, 414, 448, 483, 550, 620, and 690 (see Table 1); however, intermediate grades may also be used.*

1.2.3 Category

This Standard covers fittings in the following categories:

a) Category I: fittings without requirements for proven notch-toughness properties; and
b) Category II: fittings with requirements for proven notch-toughness properties.

1.3 Assemblies

This Standard does not cover assemblies.

Note: *An assembly means a grouping of fittings or flanges, or both, joined by one or more circumferential welds.*

1.4 Terminology

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

Ⓟ 2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, unless the user finds it more appropriate to use newer or amended editions of such publications.

CSA Group

Z245.1-14
Steel pipe

Z662-15
Oil and gas pipeline systems

API (American Petroleum Institute)

5L-2012 (SPEC)
Specification for Line Pipe

ASME (The American Society of Mechanical Engineers)

Boiler and Pressure Vessel Code
Section VIII — Pressure Vessels, Division 1, 2015
Section IX — Welding and Brazing Qualifications, 2015

B16.49-2012
Factory-Made, Wrought Steel, Buttwelding Induction Bends for Transportation and Distribution Systems

B31.1-2016
Power Piping

B31.3-2014
Process Piping

B31.4-2016
Pipeline Transportation Systems for Liquid and Slurries

B31.5-2016
Refrigeration Piping and Heat Transfer Components

B31.8-2016
Gas Transmission and Distribution Piping Systems

B31.9-2014
Building Services Piping

ASTM International (American Society for Testing and Materials)

A370-16
Standard Test Methods and Definitions for Mechanical Testing of Steel Products

A751-14a
Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

E18-16
Standard Test Methods for Rockwell Hardness of Metallic Materials

E29-13
Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E140-12be1
Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness

E165/E165M-12
Standard Test Method for Liquid Penetrant Examination for General Industry

E709-15
Standard Guide for Magnetic Particle Testing

EN (European Standard)
10204:2004
Metallic products — Types of inspection documents

ISO (International Organization for Standardization)
15156-2:2015
Petroleum and natural gas industries — Materials for use in H_2S-containing environments in oil and gas production — Part 2: Cracking-resistant carbon and low alloy steels, and the use of cast irons

NACE International/ISO (International Organization for Standardization)
NACE MR0175/ISO 15156-2:2015
Petroleum and natural gas industries — Materials for use in H_2S-containing environments in oil and gas production — Part 2: Cracking-resistant carbon and low alloy steels, and the use of cast irons

NACE International/SSPC (Steel Structures Painting Council)
NACE No. 3/SSPC-SP 6-2006
Joint Surface Preparation Standard: Commercial Blast Cleaning

Ⓟ 3 Definitions

The following definitions shall apply in this Standard:

Bend angle — amount of directional change through the bend.

Bend radius — distance from the centre of curvature to the centreline axis of the bent pipe.

Cold bending — continuous bending process which applies a controlled mechanical force on the pipe being bent at ambient temperature.

Defect — an imperfection of sufficient magnitude to warrant rejection based on the requirements of this Standard.

Demonstrate — verify, or describe and explain, by the use of records, measurements, tests, comparison of specimens, experiments, or analysis by a competent person, supported by documentation.

