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Z662-11

Oil and gas pipeline systems

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Preface

This is the sixth edition of CSA Z662, *Oil and gas pipeline systems*. It supersedes the previous editions published in 2007, 2003, 1999, 1996, and 1994.

The following are the most significant changes, relative to the previous edition:

(a) Clause 2 now contains reference publications and definitions.
(b) A new Clause 3 has been added to cover safety and loss management systems, integrity management programs, and engineering assessments.
(c) Clause 6.6 has been rewritten to focus on prevention and control measures to address the potential for uncontrolled fires, which are a risk during various phases of pipeline installation.
(d) Table 7.3 has been modified to separate welding procedure specifications for manual or semi-automatic welding for pipe not exceeding 323.9 mm OD and not exceeding Grade 386. Also, items have been added to the welding techniques section of this Table to address newer welding techniques that are being employed with mechanized or automatic welding. In-service welding Clauses have been moved from Clause 10 to Clause 7, and Table 7.10 was developed to address essential changes for qualification of welding procedure specifications intended for welding on in-service piping.
(e) Clauses 3, 8, and 10 have been significantly restructured.
(f) In Clause 9, internal corrosion control requirements have been revised to highlight that supporting documentation or tests are necessary to demonstrate that a substance is not corrosive.
(g) Clause 12 has been revised to incorporate higher performance thermoplastic and reinforced thermoplastic pipe and tubing.
(h) In Clause 13, numerous new clauses have been added to update the requirements for reinforced composite, thermoplastic-lined, and polyethylene pipelines including expanded requirements for joining personnel, joining inspections, and pressure testing for polyethylene pipelines.
(i) In Clause 16, changes have been made to clarify the service fluids/pipeline systems to which the sour service clause applies.
(j) Annex H has been substantially revised to restrict the scope to incident reporting. As a result, the Annex is now titled "Pipeline failure records" and is a normative part of the Standard.
(k) Annex M is a new, informative annex that provides guidance for system control, monitoring, and protection of liquid pipelines.
(l) The previous Annex M, "Gas distribution system integrity management guidelines", and the previous Annex N, "Guidelines for pipeline integrity management programs", have been combined into the current Annex N, which provides guidelines for pipeline system integrity management programs.

The requirements of this Standard are considered to be adequate under conditions normally encountered in the oil and natural gas industry. Specific requirements for abnormal or unusual conditions are not prescribed, nor are all details related to engineering and construction prescribed. It is intended that all work performed within the scope of this Standard meet the standards of safety and integrity expressed or implied herein, and that the requirements of this Standard be applied with due regard to the protection of the environment, which includes land, water, plant life, and animal life. Detailed requirements concerning the protection of the environment are not prescribed.

It is expected that changes will be made from time to time, based on new experience and technology. Where necessary, amendments and supplements will be prepared by the Technical Committee and published in accordance with CSA practices.

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

June 2011

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(b) relevant clause, table, and/or figure number;

(c) wording of the proposed change; and

(d) rationale for the change.

Z662-11
Oil and gas pipeline systems

1 Scope

C

1.1

This Standard covers the design, construction, operation, and maintenance of oil and gas industry pipeline systems that convey

(a) liquid hydrocarbons, including crude oil, multiphase fluids, condensate, liquid petroleum products, natural gas liquids, and liquefied petroleum gas;
(b) oilfield water;
(c) oilfield steam;
(d) carbon dioxide used in oilfield enhanced recovery schemes; or
(e) gas.

Note: *Designers are cautioned that the requirements in this Standard might not be appropriate for gases other than natural gas, manufactured gas, or synthetic natural gas.*

C

1.2

The scope of this Standard, as shown in Figures 1.1 and 1.2, includes

(a) for oil industry fluids, piping and equipment in offshore pipelines, onshore pipelines, tank farms, pump stations, pressure-regulating stations, and measuring stations;
(b) oil pump stations, pipeline tank farms, and pipeline terminals;
(c) pipe-type storage vessels;
(d) for carbon dioxide pipeline systems, piping and equipment in onshore pipelines, pressure-regulating stations, and measuring stations;
(e) for gas industry fluids, piping and equipment in offshore pipelines, onshore pipelines, compressor stations, measuring stations, and pressure-regulating stations;
(f) gas compressor stations; and
(g) gas storage lines and pipe-type and bottle-type gas storage vessels.

C

1.3

This Standard does not apply to

(a) piping with metal temperatures below –70 °C;
(b) piping (except oilfield steam distribution piping) with metal temperatures above 230 °C;
(c) gas piping beyond the outlet of the customer's meter set assembly (covered by CAN/CSA-B149.1);
(d) piping in natural gas liquids extraction plants, gas processing plants (except main gas stream piping in dehydration and all other processing plants installed as part of gas pipeline systems), gas manufacturing plants, industrial plants, and mines;
(e) oil refineries, terminals other than pipeline terminals, and marketing bulk plants;
(f) abandoned piping;
(g) in-plant piping for drinking, make-up, or boiler feed water;
(h) casing, tubing, or pipe in oil or gas wells, wellheads, separators, production tanks, and other production facilities;
(i) vent piping for waste gases of any kind operating at or near atmospheric pressure;
(j) heat exchangers;
(k) liquefied natural gas systems (covered by CSA Z276);
(l) liquid fuel distribution systems;
(m) loading/unloading facilities for tankers or barges;
(n) refuelling facilities; and

(o) hydrocarbon storage in underground formations and associated equipment (covered by CSA Z341 Series).

C

1.4

This Standard is intended to establish essential requirements and minimum standards for the design, construction, operation, and maintenance of oil and gas industry pipeline systems. This Standard is not a design handbook, and competent engineering judgment should be employed with its use.

Note: *For steel pipe of grade higher than Grade 555, requirements in addition to those specified in this Standard might be needed. Matters that should be considered include joining, thermal aging effects during coating application, strain capacity (including cold bending), pressure testing, assessment of imperfections, and repair.*

C

1.5

The requirements of this Standard are applicable to the operation, maintenance, and upgrading of existing installations; however, it is not intended that such requirements be applied retroactively to existing installations insofar as design, materials, construction, and established operating pressures are concerned.

C

1.6

Unless otherwise stated, to determine conformance with the specified requirements, it is intended that observed or calculated values be rounded to the nearest unit in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding method of ASTM E29.

C

1.7

Where any requirements of this Standard are at variance with the requirements of other publications referenced in this Standard, it is intended that the requirements of this Standard govern.

C

1.8

It is not the intent of this Standard to prevent the development of new equipment or practices, or to prescribe how such innovations are to be handled.

1.9

In CSA standards, "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 (nonmandatory) to define their application.

Z662.1-11

Commentary on CSA Z662-11, *Oil and gas pipeline systems*

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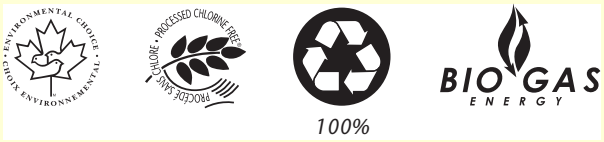

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Preface

This is the fourth edition of CSA Z662.1, *Commentary on CSA Z662-11*, Oil and gas pipeline systems. It supersedes the previous editions published in 2007, 2003, and 2001.

This Commentary is not part of the Standard and it has not been formally reviewed or approved by the Technical Committee responsible for CSA Z662. It does not provide formal interpretations of the Standard and should be viewed as an informal annotation of portions of the Standard, as compiled by those individuals involved in its development.

The purpose of the Commentary is to provide background information concerning certain clauses and requirements in the Standard, to provide information that can be of assistance to the reader in the understanding and implementation of such requirements, and to refer to research materials that were used during the formulation of some of the requirements in the Standard. The clause headings and numbers used in this Commentary correspond to those in the Standard; however, it should be noted that comments have not been provided for all the clauses of the Standard.

The Preface in the 2011 edition of the Standard highlights the most significant changes to the Standard, relative to the previous edition. All commentaries are the opinions of the respective authors and are not necessarily the opinions of CSA or its Technical Committee. The commentaries reflect the authors' selection of relevant material and do not include every change made throughout the history of the Standard.

It is expected that revisions to this Commentary will be made from time to time in order to incorporate information associated with new editions of the Standard.

June 2011

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 publication 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 publication.*

(4) *To submit a request for interpretation of CSA Standards, please send the following information to* ***inquiries@csa.ca*** *and include "Request for interpretation" in the subject line:*
(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;
(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.
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 website at* ***http://standardsactivities.csa.ca****.*

(5) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee. To submit a proposal for change to CSA Standards, please send the following information to* ***inquiries@csa.ca*** *and include "Proposal for change" in the subject line:*
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(c) wording of the proposed change; and
(d) rationale for the change.

Z662.1-11
Commentary on CSA Z662-11, Oil and gas pipeline systems

0 Introduction

0.1
CSA Z662 (hereafter in this Commentary also referred to as "the Standard" or "Z662") presents a collection of requirements for oil and gas pipeline systems to describe what has been accepted as good practice from the standpoint of safety. The requirements have been developed over time, based upon industry experience and knowledge of the scientific principles involved. The first edition of the Standard was published in 1994 and it was developed by the amalgamation of the requirements that were previously contained in three CSA Standards: CAN/CSA-Z183-M90, *Oil pipeline systems*; CAN/CSA-Z184-M92, *Gas pipeline systems*; and CAN/CSA-Z187-M87 (R1992), *Offshore pipeline systems*.

0.2
Prior to 1967 for oil pipeline systems and 1968 for gas pipeline systems, the standards used for such systems in Canada were codes that were developed in the U.S. and published by the American Society of Mechanical Engineers as part of the ASME B31 series (i.e., ASME B31.4 for liquid hydrocarbons and AME B31.8 for gas). The first editions of the CSA oil and gas pipeline standards were based extensively on the U.S. codes and, appropriately, many of their requirements were adopted by the Canadian publications without modification.

0.3
The requirements for aluminum pipe and aluminum piping systems were originally contained in CSA Z169-1964, *Code for Aluminum Pressure Piping*, which was later revised and published as CSA Z169-M1978, *Aluminum pipe and pressure piping systems*, with requirements more in harmony with the CSA Standards for oil and gas pipeline systems that were current at that time. The 1978 edition was reaffirmed in 1992 and again in 1998. CAN/CSA-Z245.6-M92, *Coiled aluminum line pipe and accessories*, was developed to incorporate and update the requirements for the manufacture of coiled aluminum line pipe that were contained in CSA Z169-M1978, and this coiled line pipe standard was later revised and published as CSA Z245.6-98, *Coiled aluminum line pipe and accessories*. Clause 15 of Z662 was developed to incorporate and update the requirements for the design, construction, operation, and maintenance of aluminum piping that were contained in CSA Z169-M1978 and to reference CSA Z245.6-98 for the material requirements for aluminum piping. Upon the completion of these two standardization activities, CSA Z169-M1978 (R1998) was withdrawn.

0.4
The clause headings and clause numbers used in this Commentary, except for those of this introductory clause, correspond to those used in the current Standard. Due to clause numbering changes in the current edition of CSA Z662, the referenced clause numbers in this Commentary do not necessarily correspond to the clause numbers in the previous editions of the Standard. Comments concerning specific clauses are sometimes presented under the heading of the broader clause number, rather than under the heading of the applicable subordinate clause number. Comments concerning figures and tables are sometimes presented under the heading of one of the clauses that refer to the figure or table, rather than under the heading of the applicable figure or table.

Notes:
(1) *In this Commentary, references to clauses, figures, tables, and annexes in the Standard will be in the format "Clause X.X, Figure X.X, Annex X, and Table X.X", generally without the phrase "of CSA Z662".*
(2) *Figures in this Commentary are identified in the format "Figure X" in order to distinguish them from figure numbers in the Standard.*

0.5
This Commentary is not part of the Standard and has not been formally reviewed or approved by the Technical Committee responsible for CSA Z662. Accordingly, this Commentary does not provide formal interpretations of the Standard. For formal interpretations of the Standard, see Note (5) in the Preface to the Standard.

1 Scope

S

1.1
- The scope statement indicates which aspects and parts of pipeline systems and which service fluids are covered by the Standard.
- Carbon dioxide was added as a new service fluid in 1996. The definition of "gas" was changed in 1983 to accommodate the coverage of gaseous service fluids other than fuel gas and sour gas; however, until 1996, none had been added.
- The carbon dioxide pipelines that are covered are those onshore pipelines that are for use in enhanced oil recovery operations, involving the transportation of high-purity carbon dioxide from a suitable source to the injection site at an oil well. These pipelines were added to the Standard because it was considered that there had been sufficient experience with such an application to warrant their inclusion. Pure carbon dioxide is non-toxic and non-flammable; however, it has some specific characteristics that necessitated the addition of requirements specific to carbon dioxide pipeline systems. It should be noted that the definition of a carbon dioxide pipeline system permits the service fluid in such a pipeline to be other than pure carbon dioxide, so additional special requirements are in some cases appropriate.
- It should be noted that carbon dioxide might additionally be present in conventional pipelines as a component of a multiphase fluid or as a component of a fluid in a gas pipeline system. For such fluids, the conventional requirements applicable to the multiphase liquid or gas pipeline system continue to be appropriate.

S

1.2
The parts of pipeline systems that are included in the scope are listed here, and the pictorial representations in Figures 1.1, 1.2, 11.1 to 11.5, and 12.1 are intended to augment the information provided in Clauses 1.2 and 1.3. The figures are schematic and are intended to convey broad functions rather than specific details.

S

1.3
The parts of pipeline systems that are not included in the scope are listed here, along with a list of some related items that are beyond the defined limits of pipeline systems. Items that are within the defined limits of pipeline systems but are currently outside the scope of the Standard could be included in the scope in some future edition of the Standard, should the CSA Technical Committee on Petroleum and Natural Gas Industry Pipeline Systems and Materials and the Strategic Steering Committee on Petroleum and Natural Gas Industry Systems deem that such additions to the scope are appropriate.

S

1.4
The requirements in the Standard are considered adequate under conditions normally encountered, and requirements for abnormal or unusual conditions are not necessarily specifically addressed. Although in some instances in the Standard the requirements are necessarily quite prescriptive, the Standard is not a

design handbook and the exercise of competent engineering judgment is necessary when using the Standard. The exercise of competent engineering judgment is intended to recognize circumstances in which the essential requirements and minimum standards contained in the Standard may be insufficient. The note provides a specific instance of such circumstances, pertaining to the use of high-strength materials.

S

1.5

The design and construction requirements have been primarily developed with new pipelines and facilities in mind. Some practices that are reasonable and practicable during design and construction are in some cases not practical for an existing pipeline (e.g., the requirement to use piping that has proven notch toughness properties). The requirements in the Standard have been modified and generally made more stringent through the years, primarily to provide improved safety, but also to reflect technological improvements that have been made in the manufacturing processes used for pipe and components. Design requirements can be readily changed; however, the mechanical properties of in-service piping cannot. Where upgrading involves the replacement of existing piping with new piping, what was not practical for the old piping is practicable for the new piping.

Note: *The terms "practicable", "practical", and "impractical" are not defined in the Standard because the ordinary dictionary meanings are intended, whereby "practicable" means capable of being effected or accomplished; "practical" means adapted to actual conditions; and "impractical" is the negative form of "practical". The term "not practicable" is used in the Standard rather than the dictionary term "impracticable" to indicate the negative form of "practicable". The similarity of the terms can lead to confusion for the reader unless the specific meanings are understood.*

S

1.6

Clause 1.6 defines the basis for the numerical rounding practices used throughout the Standard. It is important to understand its effect when applied in conjunction with the number of digits indicated in the specific requirements of the standard.

S

1.7

A requirement in the Standard cannot be superseded by a less restrictive requirement in a referenced publication.

S

1.8

Practices are not included in the Standard until sufficient experience has been accumulated for them to become generally accepted as being good practices. Even new practices that are superior to established practices are not included in the Standard until the Technical Committee deems such new practices to be acceptable. It is not the intent of the Standard to prevent the development of new practices, and generally such practices would need to be approved for use by the regulatory authority having jurisdiction.

2 Reference publications and definitions

S

2.1 Reference publications

- Various documents published by a variety of organizations are included by reference and the specific publication dates and titles for the referenced publications are listed. Normally, the editions listed are the editions that were current at the time that the Standard was being edited prior to publication.
- The context of the reference being made should be known because typically only limited parts of the referenced publications are intended to apply.
- The Commentary on the Standard refers to the publications listed below. The list includes a number of withdrawn standards and other published industry documents, as well as superseded editions that are cited in describing the development of requirements and standards. The list also reflects the editions available during the development and production of CSA Z662-11; more recent editions could have been published since its publication date.

CSA (Canadian Standards Association)
B51-09
Boiler, pressure vessel, and pressure piping code

B137 Series-09
Thermoplastic pressure piping compendium

B149.1-10
Natural gas and propane installation code

CAN/CSA-C22.3 No. 6-M91 (R2009)
Principles and practices of electrical coordination between pipelines and electric supply lines

CAN/CSA-C22.3 No. 7-10
Underground systems

CAN/CSA-S471-04 (R2008)
General requirements, design criteria, the environment, and loads

W48-06
Filler metals and allied materials for metal arc welding

W59-03 (R2008)
Welded steel construction (metal arc welding)

W178.2-08
Certification of welding inspectors

Z169-M1978 (withdrawn)
Aluminum pipe and pressure piping systems

CAN/CSA-Z183-M90 (withdrawn)
Oil pipeline systems

CAN/CSA-Z184-M92 (withdrawn)
Gas pipeline systems

CAN/CSA-Z187-M87 (withdrawn)
Offshore pipeline systems

Z245.1-07
Steel pipe

Z245.6-06 (R2011)
Coiled aluminum pipe and accessories

Z245.11-09
Steel fittings

Z245.12-09
Steel flanges

Z245.15-09
Steel valves

Z245.20 Series-10
Plant-applied external coatings for steel pipe

Z662-11
Oil and gas pipeline systems

API (American Petroleum Institute)
5L-2007 (SPEC)
Line Pipe

15LE-2008 (SPEC)
Polyethylene (PE) Line Pipe

15S-2006 (RP)
Qualification of Spoolable Reinforced Plastic Line Pipe

17J-2008 (SPEC)
Unbonded Flexible Pipe

576-2009 (RP)
Inspection of Pressure-relieving Devices

620-2009 (STD)
Design and Construction of Large, Welded, Low-Pressure Storage Tanks

650-2005 (STD)
Welded Steel Tanks for Oil Storage

653-2009 (STD)
Tank Inspection, Repair, Alteration, and Reconstruction

1104-2005
Welding of Pipelines and Related Facilities

1156-1999 (PUBL)
Effects of Smooth & Rock Dents on Liquid Petroleum Pipelines

2610-2005 (STD)
Design, Construction, Operation, Maintenance & Inspection of Terminal and Tank Facilities

ASME (The American Society of Mechanical Engineers)
B16.5-2009
Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard

B16.9-2007
Factory-Made Wrought Steel Buttwelding Fittings

B16.11-2009
Forged Fittings, Socket-Welding and Threaded

B16.20-2007
Metallic Gaskets for Pipe Flanges: Ring-Joint, Spiral-Wound, and Jacketed

B16.21-2005
Nonmetallic Flat Gaskets for Pipe Flanges

B16.34-2009
Valves Flanged Threaded and Welding End

B16.49-2007
Factory-Made, Wrought Steel, Buttwelding Induction Bends For Transportation and Distribution Systems

B31G-1991 (R2004)
Manual: Determining the Remaining Strength of Corroded Pipelines: Supplement to B31 — Pressure Piping

B31.1-2010
Power Piping

B31.3-2008
Process Piping

B31.4-2009
Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids

B31.8-2010
Gas Transmission and Distribution Piping Systems

ASME Boiler and Pressure Vessel Code, 2009

ASTM International (American Society for Testing and Materials)
A53/A53M-07
Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

A106-07
Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

A234/A234M-07
Standard Specification for Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

A268/A268M-05a
Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service

A269-08
Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

A312/A312M-09
Standard Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes

A333/A333M-05
Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service

A370-06
Standard Test Methods and Definitions for Mechanical Testing of Steel Products

D2290-04
Standard Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe by Split Disk Method

D2837-08
Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products

D2992-06
Standard Practice for Obtaining Hydrostatic or Design Basis for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fittings

D3350-10
Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

E21-09
Standard Test Methods for Elevated Temperature Tension Tests of Metallic Materials

E747-04
Standard Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology

E1025-05
Standard Practice for Design, Manufacture, and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology

E1290-08
Standard Test Method for Crack-Tip Opening Displacement (CTOD) Fracture Toughness Measurement

E1316-10c
Standard Terminology for Nondestructive Examinations

AWS (American Welding Society)
A5.1-2004
Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding

BSI (British Standards Institution)
BS 7448-1:1991
Fracture mechanics toughness tests. Method for determination of Klc, critical CTOD and critical J values of metallic materials

BS 7448-2:1997
Fracture mechanics toughness tests. Method for determination of Klc, critical CTOD and critical J values of welds in metallic materials

BS 7910:2005
Guide on methods for assessing the acceptability of flaws in metallic structures

PD 6493:1991
Guidance on methods for assessing the acceptability of flaws in fusion welded structures
(previous edition published in 1980 as *Guidance on Some Methods for the Derivation of Acceptance Levels for Defects in Fusion Welded Joints)*

CAPP (Canadian Association of Petroleum Producers)
2009-0014
Mitigation of Internal Corrosion in Sweet Gas Gathering Systems

CCME (Canadian Council of Ministers of the Environment)
CCME-EPC-LST-71E (1994)
Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products

CGA (Canadian Gas Association)
OCC-1-2005
Recommended Practice for the Control of External Corrosion on Buried or Submerged Metallic Piping Systems

DNV (Det Norske Veritas)
DNV-OS-F101-2010
Submarine Pipeline Systems

ESI (Electricity Supply Industry)
98-2-1979
Ultrasonic Probes: Medium Frequency, Miniature Shear Wave, Angle Probes

Government of USA
US Code of Federal Regulations, Title 49, Part 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards* (referenced as 49 CFR 192)

ISO (International Organization for Standardization)
5579:1998
Non-destructive testing — Radiographic examination of metallic materials by X- and gamma rays — Basic rules

MSS (Manufacturers Standardization Society)
SP-25-2008
Standard Marking System for Valves, Fittings, Flanges and Unions

NACE International (National Association of Corrosion Engineers)
ANSI/MR0175/ISO 15156-2009
Petroleum and natural gas industries — Materials for use in H_2S-containing environments in oil and gas production

RP0175-95
Control of Internal Corrosion in Steel Pipelines and Piping Systems

RP0675-88 (withdrawn)
Control of External Corrosion on Offshore Steel Pipelines

TM0177-2005
Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in the H_2S-Environments

NFPA (National Fire Protection Association)
30-2003
Flammable and Combustible Liquids Code

NRCC (National Research Council Canada)
National Fire Code of Canada, 2005

PPI (Plastic Pipe Institute)
TR-3/2010
Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Hydrostatic Design Stresses (HDS), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe