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CSA Z662:19
National Standard of Canada

Oil and gas pipeline systems

Standards Council of Canada
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Revision History

CSA Z662-19, Oil and gas pipeline systems

Errata — April 2020	Revision symbol (in margin)
Standard: Subcommittee on Materials Clauses 2.1, 4.1.10, A.7.1, H.1, H.2.8.2.2, and N.1.8.3 Tables 8.1 and 10.2 Figure 10.2	Δ

Errata — April 2020	Revision symbol (in margin)
Commentary: Clauses 3.1.2, 3.3, and 4.1.10	Δ

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Oil and gas pipeline systems

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Contents

Preface

This is the eighth edition of CSA Z662, *Oil and gas pipeline systems*. It supersedes the previous editions published in 2015, 2011, 2007, 2003, 1999, 1996, and 1994.

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

a) realignment and removal of duplications with Clause 3 and Annexes A and N;
b) consolidation of transition piece requirements from other clauses for consistency and application in non-sour service;
c) full rewrite of Annex C on limit states design, to improve safety factors for key limit states including revised segmentation and population density assessment area details;
d) segmentation criteria made mandatory in Annex O, revised population density assessment area and a scope extension to include environmental effects of all LVP liquid pipelines;
e) revised requirements for threaded auxiliary connections on flanges;
f) revised requirements for reuse of materials;
g) requirement to have a CGSB Level III review and approve nondestructive inspection procedures;
h) rewording of Clause 7 to clarify welding procedure specification qualification tests and weld procedure specifications;
i) updated requirements for trenchless installations;
j) revisions made to class location assessment areas, class location designations, class location factors, class location changes, and added requirements for designated geographical area;
k) terminology alignment between this Standard and CSA Z245 standards;
l) changes to the interaction rules in Clause 10.10.2.1 to more accurately reflect industry practices for when corrosion features are considered to be interacting;
m) addition of cross-linked polyethylene (PEX) as an acceptable plastic pipe material and PE 80 as an approved material for gas applications;
n) increase in temperature limits of certain types of HDPE to 82 °C;
o) revision to specify Category 1 mechanical fittings only for PE gas distribution applications;
p) rewriting of Annex E to improve general flow and terminology and to remove overlap with other clauses of this Standard;
q) restructuring of Annex N to include facilities and improve integration with Clause 3 and Annex A; and
r) effective pressure cycle management added to the list of considerations to reduce imperfection failures.

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 Group 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.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

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:*
   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 available on the* Current Standards Activities *page at* ***standardsactivities.csa.ca****.*
5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to* ***inquiries@csagroup.org*** *and include "Proposal for change" in the subject line:*
   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

CSA Z662:19
Oil and gas pipeline systems

1 Scope

1.1

C There is a commentary available for this Clause.

This Standard covers the design, construction, operation, maintenance, deactivation, and abandonment 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) liquid or dense phase carbon dioxide; or
e) gas.

Notes:

1) *Vapour phase carbon dioxide pipeline systems fall under Item e).*
2) *Designers are cautioned that the requirements in this Standard might not be appropriate for gases other than natural gas, manufactured gas, vapour phase carbon dioxide, and synthetic natural gas.*

1.2

C There is a commentary available for this Clause.

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) carbon dioxide pipelines;
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.

1.3

C There is a commentary available for this Clause.

This Standard does not apply to

a) piping with metal temperatures below –70 °C;
b) gas piping beyond the outlet of the customer's meter set assembly (covered by CSA B149.1);
c) 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;
d) oil refineries, terminals other than pipeline terminals, and marketing bulk plants;
e) abandoned piping;

f) in-plant piping for drinking, make-up, or boiler feed water;
g) casing, tubing, or pipe in oil or gas wells, wellheads, separators, production tanks, and other production facilities;
h) vent piping for waste gases of any kind operating at or near atmospheric pressure;
i) heat exchangers;
j) liquefied natural gas systems (covered by CSA Z276);
k) liquid fuel distribution systems;
l) loading/unloading facilities for tankers or barges;
m) refuelling facilities; and
n) hydrocarbon storage in underground formations and associated equipment (covered by CSA Z341 Series).

1.4

C There is a commentary available for this Clause.

This Standard is intended to establish essential requirements and minimum standards for the design, construction, operation, pipeline system management, and abandonment of oil and gas industry pipeline systems. This Standard is not an application manual for these activities. It is intended to be used by persons competent to make technical judgments in the areas to which this Standard is being applied including engineering, safety, and environmental protection.

Note: *Where newly developed materials or processes are used, or unusual conditions are encountered, requirements in addition to those specified in this Standard might be needed.*

1.5

C There is a commentary available for this Clause.

The requirements of this Standard are applicable to the operation, maintenance, and upgrading of existing installations. It is not intended that such requirements be applied retroactively to existing installations insofar as design, materials, construction, and established operating pressures are concerned, except as required by Clause 10.7.1 for changes in class location and Clause 10.8.1 for crossings of existing pipelines.

1.6

C There is a commentary available for this Clause.

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.

1.7

C There is a commentary available for this Clause.

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.

1.8

C There is a commentary available for this Clause.

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

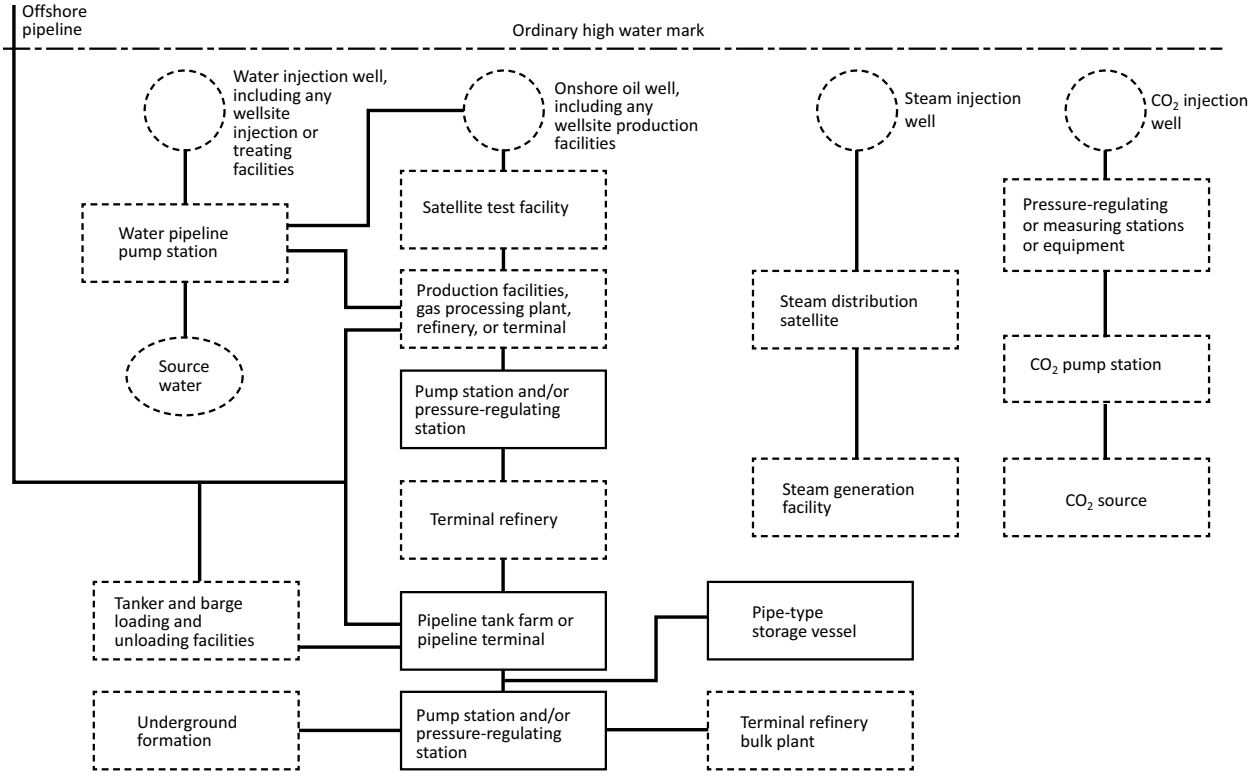
In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the Standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible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

Figure 1.1
Scope diagram — Oil industry pipeline systems
(See Clauses 1.2, 2.2, 10.3.5, 14.1.1, and E.1.1.)



Note: *Facilities, including associated pumps and compressors, indicated by dashed lines are not within the scope of this Standard.*