

CSA Z662-19 Oil and gas pipeline systems standard

The CSA Z662 Oil and gas pipeline systems standard is the primary design and installation standard for gas utility and pipeline designers and operators, as it provides minimum criteria for the design, construction, operation, maintenance, deactivation, and abandonment of gas industry pipelines.

Pipelines that cross provincial boundaries fall under the jurisdiction of the Canadian Energy Regulator (CER), while pipelines that operate within the borders of the province of BC fall under the jurisdiction of the BC Oil and Gas Commission. Both regulators adopt the most recent version of the CSA Z662 Oil and gas pipeline systems standard into regulation upon publication. The portion of the utility gas delivery system, known as distribution and service piping, operating under 700 kPa (100 PSI) up to the outlet of the consumer's gas meter, falls under the scope of the Gas Safety Regulation.

Technical Safety BC plans to recommend adopting the 2019 edition of the CSA Z662, with no variations.

Section or clause	Revision	Impact
All sections	Terminology alignment between this standard and CSA Z245 standards.	All standard users: Alignment between nationally adopted codes and product standards, in terminology and technical requirements, increases user understanding and simplifies use and implementation of the associated documents.
Clause 3, Annexes A and N	Realignment and removal of duplications with clause 3 and annexes A and N.	All standard users: Revisions to clause 3 and associated annexes A and N clarify the prescribed requirements with explanatory information contained within the annexes. Results will lead to better understanding of the interaction between safety and loss management systems, risk assessment and mitigation requirements, and process safety in application by operators of pipeline systems.
Clause 4	Consolidation of transition piece requirements from other clauses for consistency and application in non-sour service.	All standard users: Consolidation of requirements for transition pieces into a single section of the standard provides for better understanding and application of the associated requirements.

Section or clause	Revision	Impact
Clause 4, Annex 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. Clause 4 includes updates to design criteria for onshore non-sour gas, natural gas transmission, and liquid petroleum products pipelines as well as updates to population density assessment areas surrounding onshore pipelines.	Designers and operators: Integrating new population density calculations for pipelines built after 2019, with existing methodology and technology for calculations for pipelines built prior to 2019, will have a significant economic impact.
Clause 4, Annex O	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. These changes further support the revisions in clause 4 and annex C by providing explanatory information and application guidance.	Designers and operators: Integrating new population density calculations for pipelines built after 2019, with existing methodology and technology for calculations for pipelines built prior to 2019, will have a significant economic impact. Impacts from changes to annex O are similar to annex C.
Clause 5	Revised requirements for threaded auxiliary connections on flanges.	Designers and installers: Allowance for auxiliary connections on flanges with specific reference to applicable construction code allows for greater flexibility in the design and construction of pipelines.
Clause 5	Revised requirements for reuse of materials.	Designers and installers: These revisions allow for greater flexibility on design and construction of pipelines. Added reference to engineering assessment of the reused materials maintains safety and reliability of the pipeline. Impacts of these changes are minimal as engineering and testing requirements for reuse of materials becomes cost prohibitive.

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Clause 7	Requirement to have a CGSB Level III qualified person review and approve non-destructive inspection procedures. This change clarifies the original intent of the standard clause.	Companies performing non-destructive testing: Personnel will need to demonstrate competency. Provides consistency and minimum criteria for testing procedures. The impact is relatively low as many operators performing non-destructive testing already implement this requirement to demonstrate competency in accordance with safety and loss management system requirements.
Clause 7	Rewording of clause 7 to clarify welding procedure specification qualification tests and weld procedure specifications.	Designers, manufacturers, and welders: Revisions to clause 7 clarify weld specifications which align with nationally recognized codes such as ASME construction codes.
Clause 6	Updated requirements for trenchless installations, including greater engineering assessment and planning requirements as well as installation and inspection criteria based on experience. Aligns with the expansion of use of trenchless pipe installation technologies.	Owners and operators using trenchless pipe technologies: May impose additional requirements in design, and installation of pipelines using trenchless technologies.
Clause 10	Revisions made to class location assessment areas, class location designations, class location factors, class location changes, and added requirements for designated geographical areas.	Designers and operators primarily under NER and OGC jurisdiction: Changes to the population density assessment area will have a significant impact on pipeline designers and operators primarily under the oversight of the National Energy Regulator (NER) and the Oil and Gas Commission (OGC), which have already adopted the 2019 edition of the CSA Z662. Inconsistency in code and standard adoption has the potential to create conflicts when pipelines cross jurisdiction, but the impact would be low as pipelines requiring class location calculations are primarily under NER or OGC jurisdiction.
Clause 10.10.2.1	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.	Operators: This revision was made to align with and add reference to recognized industry standards for corrosion evaluations.

Section or clause	Revision	Impact
Clause 13	Addition of cross-linked polyethylene (PEX) as an acceptable plastic pipe material and PE 80 as an approved material for gas applications.	Designers and manufacturers: The addition of emerging pipe technologies such as cross-linked polyethylene (PEX) allows for greater flexibility in design and construction of pipelines and aligns with nationally recognized standards for those technologies.
Annex E	Rewriting of annex E to improve general flow and terminology and to remove overlap with other clauses of this standard.	All standard users: Revisions to both annexes E and N are intended to increase usability and understanding of the standard. Increased awareness of the intent and application of the specific standard requirements increases consistency and overall safety in industry.
Annex N	Restructuring of annex N to include facilities and improve integration with clause 3 and annex A.	