

Overview of CSA Group and the CSA Z662-15 Standard

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- Overview of CSA Z662
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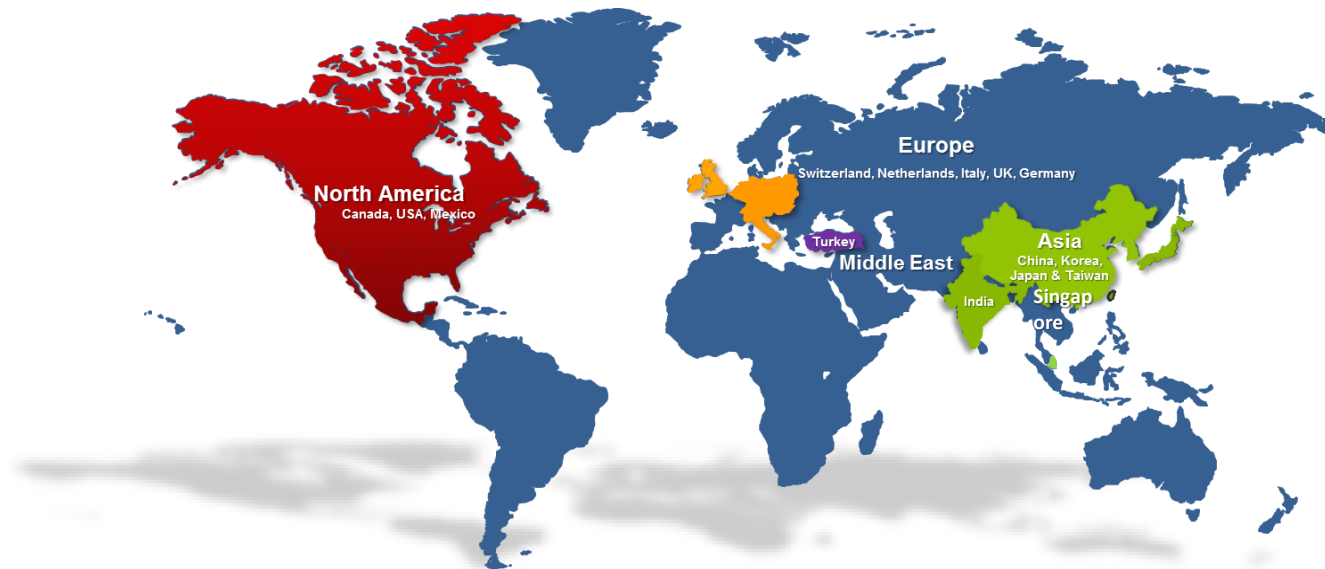
Introduction of CSA Group and the Standards Development Process



**CSA
Group**

Key Facts

- Established in 1919
- Global leader in **standards development, product testing and certification, and product evaluation**
 - 38 offices in 15 countries



CSA Standards

- Independent, not-for-profit membership association
- Serves business, industry, government, and consumers
- Accredited by Standards Council of Canada
- Develops standards designed to:
 - enhance public safety and health
 - advance the quality of life
 - help to protect the environment
 - facilitate trade



Breadth of CSA Standards

Management Systems

- Quality Management and Auditing, Risk Management

Construction and Infrastructure

- Building Products and Systems, Components & Structures, Masonry & Steel, Plumbing

Electrical

- Installation and Safety Codes, Products and Components, Distribution and Generation , Engineering , Electro-Magnetic Compatibility

Energy

- Petroleum & Natural Gas Industry Systems, Gas & Fuel Burning Equipment
- Alternative Energy Vehicles, Energy Efficiency, Renewable Energy
- Nuclear

Environment

- Environmental Performance and Management,
- Life Cycle Analysis and Product Labelling

Health Care and Medical Devices

- Facilities Engineering, Patient Care and Safety, Infection Control, Sterilization and Device Reprocessing, Blood and Tissue, Medical Labs, Nanotechnologies

Worker and Workplace Safety

- Ergonomics, Electrical Safety, Management Systems, Equipment & Machine Safety, Fall Protection, Personal Protective Equipment

Technical Safety

- Pressure Vessels, Elevators and Lifting Devices, Transportation

Public and Community Safety

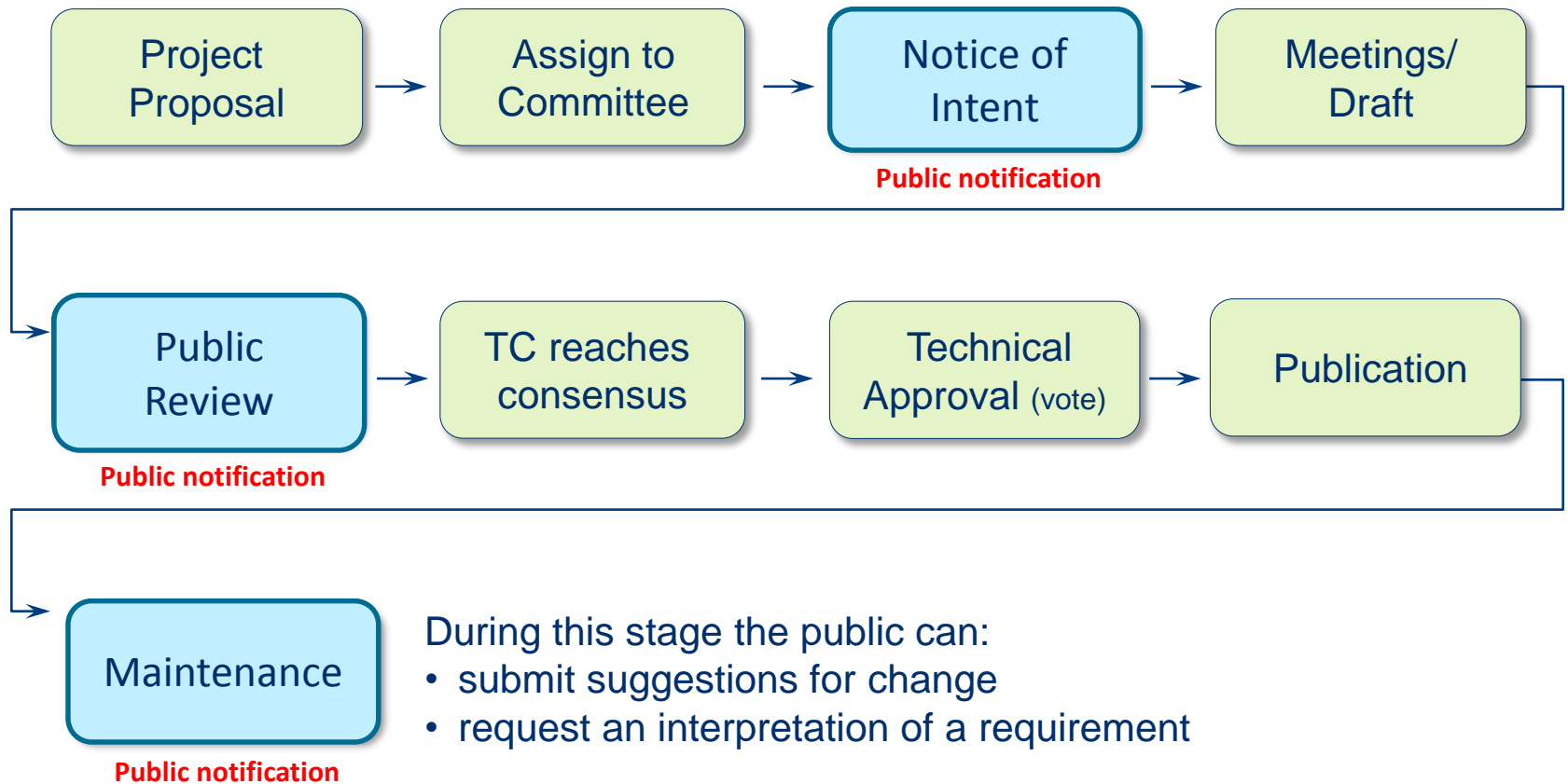
- Injury Protection, Accessibility, Emergency Preparedness

Standards Development Methodology

- CSA members develop standards content; staff facilitates the accredited development process
- Once published, standards are continually reviewed, revised and refreshed
- CSA standards are **voluntary documents**
 - Only when referenced by government or a regulatory authority is their compliance mandatory



Standards Development Process



Overview of CSA Z662



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CSA Z662 – Oil and gas pipeline systems

- Z662 contains 500+ pages of prescriptive and performance-based technical requirements
- Z662 takes a lifecycle approach; it covers the design, construction, operation and maintenance of pipelines, along with requirements for safety management systems
- CSA standards are continually reviewed and updated to incorporate lessons learned, technological advancements and best practices



CSA Z662 Technical Committee

- Over 250 expert volunteer committee members
- The Technical Committee (TC) operates under consensus with a balanced committee matrix
- The TC is supported by 10 Technical Subcommittees (TSCs) with various working groups under each of these TSCs
- TC and TSC representatives participate internationally at ISO TC67/SC2



CSA Z662 Scope

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.



Standard Content - 17 Clauses and 14 Annexes:

- Clause 1: Scope
- Clause 2: References and Definitions
- Clause 3: Safety and Loss Management Systems
- Clause 4: Design
- Clause 5: Materials
- Clause 6: Installation
- Clause 7: Joining
- Clause 8: Pressure Testing
- Clause 9: Corrosion Control
- Clause 10: Operating, maintenance, and upgrading
- Clause 11: Offshore steel pipelines
- Clause 12: Gas Distribution Systems
- Clause 13: Reinforced composite, thermoplastic-lined, and polyethylene pipelines
- Clause 14: Oilfield steam distribution pipelines

Standard Content - 17 Clauses and 14 Annexes:

- Clause 15: Aluminum piping
- Clause 16: Sour service pipelines
- Clause 17: Composite-reinforced steel pipelines

- Annex A: Safety and Loss Management System
- Annex B: Guidelines for risk assessment of pipelines
- Annex C: Limit states design
- Annex D: Guidelines for in-line inspection of piping for corrosion imperfections
- Annex E: Recommended practice for liquid hydrocarbon pipeline system leak detection
- Annex F: Slurry pipeline systems (*deleted in 2015 edition*)
- Annex G: Precautions to avoid explosions of gas-air mixtures (*deleted in 2015 edition*)
- Annex H: Pipeline failure records

Standard Content - 17 Clauses and 14 Annexes:

- Annex I: Oilfield steam distribution pipelines — Alternate provisions
- Annex J: Recommended practice for determining the acceptability of imperfections in fusion welds using engineering critical assessment
- Annex K: Standards of acceptability for circumferential pipe butt welds based upon fracture mechanics principles
- Annex L: Alternative or supplementary test methods for coating property and characteristics evaluation
- Annex M: Guidance for system control, monitoring, and protection of liquid pipelines
- Annex N: Guidelines for pipeline system integrity management programs
- Annex O: Reliability-based design and assessment (RBDA) of onshore non-sour service natural gas transmission pipelines
- Annex P: (New) Development and qualification and welding procedure specifications

Standard Application

- Z662 is referenced by oil and gas pipeline and facility regulators, including:
 - National Energy Board (for pipelines crossing provincial or international borders), and
 - Ontario, British Columbia, Alberta, Saskatchewan, Manitoba, Quebec, New Brunswick and Nova Scotia
- The timing of regulatory adoption following publication varies between regulators
- Regulators may choose to reference Z662 as published or with modifications through regulations

Highlight of key changes in the 2015 Edition of CSA Z662



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Updated requirements for safety and loss management systems, integrity management programs, and engineering assessments process. (Clause 3 and Annex A)

Description:

The update clarify the requirements for safety and loss management system by expanding the use of integrity management programs and engineering assessments for oil and gas industry pipeline systems. These requirements, combined with the recommended practices in Annex A, are intended to enhance the protection of people, the environment, and property.

Clarification of requirements for mitigation programs for internal corrosion and monitoring of the effectiveness of the programs when pipelines are susceptible to internal corrosion (Clause 9)

Description:

The revised requirement highlights the proactive approach for considering the risk of corrosion unless there is proof that corrosion would not occur. These requirements are applicable to the operation, maintenance, and upgrading of existing installations. This revision is intended to reduce risk and improve reliability.

New requirements for training and certification of field applied coating applicators through a reference to CSA Z245.30 (Clause 9)

Description:

The application company shall ensure that all personnel involved in assisting the applicators are trained in the specific tasks that have been assigned to them (e.g., surface preparation, preheat, and mixing) prior to the start of work.

Expanded scope to further recognize CO2 pipeline systems

Description:

The revised scope was expanded to include deactivation and abandonment of oil and gas industry pipeline systems that convey liquid or dense phase carbon dioxide, and vapour phase carbon dioxide.

The broadened scope to include carbon dioxide pipeline systems addresses the use of pipelines to transport carbon dioxide for many purposes, not only for enhanced recovery schemes, but also for transportation over long distances of captured carbon dioxide for storage or sequestration.

- Further requirements for abandonment of pipelines (Clause 10)
- New requirements for addressing ripples and wrinkles, buckles, and out of roundness on pipe (Clause 10)
- Clarification of the requirements for reinforced composite, thermoplastic-lined, and polyethylene pipelines
- Clarification of the sour service requirements for gas-free pipeline systems for crude oil, crude oil blends, and low vapour pressure condensate (Clause 16)
- Updating of the requirements for leak detection on liquid hydrocarbon pipelines previously published in Update 3 (August 2013) to CSA Z662-11. The recommended practice considers computational methods and direct leak detection methods (Annex E)
- Expansion of Annex M to address system control, monitoring, and protection for all hydrocarbon pipelines
- New Annex P to provide guidance on the development and qualification of welding procedure specifications

Security Management (CSA Z246.1)

- Specifies criteria for establishing a security management program to ensure security threats and associated risks are identified and managed through mitigation and response processes and procedures

Emergency Preparedness and Response (CSA Z246.2)

- Provides requirements for developing an emergency preparedness and response program to provide greater safety for workers, establish best practices that are consistent across Canada, and help protect people, property and the environment

Damage Prevention (CSA Z247)

- Aims to address the challenges facing damage prevention in Canada; identifying the damage prevention process and outlining its key elements that when consistently applied, can reduce damage to underground infrastructure and enhance public safety