



PS-68—2022

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POSITION STATEMENT

DESIGN REGISTRATION REQUIREMENTS FOR VACUUM-JACKETED PRESSURE VESSEL PIPING

Introduction

Design calculations, drawings, and specifications for specific piping on a vacuum-jacketed pressure vessel purchased before November 1, 2022, may not be currently included in the vessel design registration package that was submitted to the Provincial authorities. The requirements for piping design registration packages are found in CSA B51, *Boiler, pressure vessel, and piping code*. This piping is connected to the nozzles of the pressure vessel and runs inside and outside the annular space to a connection external to the outer vessel.

Question

Does this piping require submittal of a retroactive piping design registration package with the Provincial authorities?

Answer

The Compressed Gas Association (CGA) recommends that there is no need to retroactively update the design registration package for a pressure vessel registered before November 1, 2022. These vacuum-jacketed vessels have a proven exemplary safety performance in cryogenic and refrigerated liquid service in the industry for over 50 years.

CGA further recommends including the piping design registration package in the design registration package for pressure vessels registered on or after June 1, 2022.

Reasons

Noncorrosive cryogenic and refrigerated liquids are often stored in a vacuum-jacketed storage tank. For a vacuum-jacketed storage tank, the ASME coded pressure vessel is enclosed in a steel outer vessel, or vacuum-jacket. This design allows a vacuum to be applied to the space between the pressure vessel and the outer vessel as a method to insulate the product and maintain it in a liquid state. The space found between the pressure vessel and the outer vessel is referred to as the annular space.

Piping is installed by the vessel manufacturer, inside and outside the annular space, to connect the inner pressure vessel to the safety relief, process, and instrumentation connection points that are external to the outer jacket. No piping terminates in the annular space. In almost all cases, each pipe is 2 inch nominal pipe size (NPS) or less and the internal volume of each pipe does not exceed 1.5 ft³. The outer steel jacket on these tanks provides this piping with structural protection from physical damage. Telltale signs such as loss of vacuum in the annular space, decreased thermal performance, and/or frost spots on the outer jacket would be apparent during routine checks if leakage was to occur.

Additionally, the piping is designed, assembled, and installed by the vessel manufacturer (or its approved contractor) in accordance with ASME B31.3, *Process Piping* and under the manufacturer's quality control program. For vessels registered in Canada, the manufacturers follow their registered quality assurance program.

Collectively, the members of Compressed Gas Association (CGA) throughout Canada and the United States have significant historic positive experience with vacuum-jacketed pressure vessels in their fleet of installed tanks. Industry experience shows leakage or other failures in this piping rarely, if ever, occurs.

References

Unless otherwise specified, the latest edition shall apply.

[1] CSA B51, *Boiler, pressure vessel, and pressure piping code*, Canadian Standards Association. www.csa-group.org

[2] ASME B31.3, *Process Piping*, American Society of Mechanical Engineers. www.asme.org

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Work Item 17-128
Canadian Pressure Vessels and Piping Systems Committee

FIRST EDITION: 2022

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