

Conformance of IPS Grooved Couplings and Fittings to ASME B31.1 Power Piping Code (2014) Requirements

The American Society of Mechanical Engineers (ASME) established the B31 Pressure Piping Code Committees to promote safety in pressure piping design and construction through published engineering criteria. The basic consideration of the Codes is safety, however, the Codes are not designed to replace competent engineering design or judgement. Most importantly, the Codes do not “approve”, “rate”, or “endorse” any items of construction; proprietary devices, or activity. The Codes do not put a limit on conservatism and, conversely, the Codes also allow for designs that are capable of more rigorous engineering analysis which justifies less conservative designs. A final point of importance is that the Codes strive to keep abreast of all current technologies regarding improvements to materials, fabrication, and any other new developments in the piping industry. They are not intended to limit the introduction of new products. Numerous sections of the B31 Codes provide the necessary guidelines to analyze new or nontraditional products so that sound engineering judgments can be made regarding Code conformance.

Victaulic Standard IPS couplings and grooved end fittings may be utilized on ASME B31.1 Power Piping Code applications within their published temperature and pressure parameters. ASME B31.1 designates the use of mechanical joints, specifically grooved joints that use gaskets as method of leak resistance under Paragraph 100.2, Definitions, which defines a Mechanical Joint as:

“A joint for the purpose of mechanical strength or leak resistance, or both, where the mechanical strength is developed by threaded, grooved, rolled, flared, or flanged pipe ends, or by bolts, pins, and compounds, gaskets, rolled ends, caulking or machined and mated surfaces. These joints have particular application where ease of disassembly is desired.”

Grooving is acknowledged as an acceptable pipe end preparation under Paragraph 102.4.2 Threading and Grooving. Grooving is further addressed under Paragraph 104.7.1 which permits the use of materials “manufactured in accordance with the standards listed in Table 126.1”. Table 126.1 includes both ASTM A536 and ASTM A-395 ductile irons. Victaulic couplings and fittings are manufactured from ductile iron that conforms to these two specifications. Table 126.1 also includes American National Standard/American Water Works Association, ANSI/AWWA C-606 - Standard for Grooved and Shouldered End Joints. ANSI/AWWA C-606 was proposed in 1971 and initially published in 1978 as the first national standard for grooved and shouldered end pipe joints. C-606 covers materials of construction, general design, grooving specifications and testing procedures for the grooved pipe joining method. Victaulic standard grooved couplings meet the requirements of ANSI/AWWA C-606 for use on grooved end fittings and pipe grooved in accordance with this standard.

Paragraph 106 - Fittings, Bends, and Intersections permits grooved end fittings under Paragraphs 106.1 (A) and 106.1 (B).

Paragraph 106.1 (A) states:

“Threaded, flanged, grooved and shouldered, socket-welding, butt-welding, compression, push-on, mechanical gland, and solder-joint fittings made in accordance with the applicable standards in Table 126.1 may be used in power piping systems within the material, size, pressure, and temperature limitations of those standards, and within any further limitations specified in this Code.”

Couplings, while specifically qualified by the inclusion of ANSI/AWWA C-606, are similarly permitted under Paragraph 118 - Sleeve Coupled and Other Proprietary Joints which states:

“Coupling type, mechanical gland type, and other proprietary joints may be used where experience or tests have demonstrated that the joint is safe for the operating conditions, and where adequate provision is made to prevent separation of the joint.”

If one were to consider Victaulic products under paragraph 104.7.2, Specially Designed Components, they may be qualified under subparagraphs (A) and (C):

104.7.2(A) Extensive, successful service experience under comparable conditions with similarly proportioned components of the same or similar material.

104.7.2(C) Proof test in accordance with either ASME B 16.9; MSS SP-97; or the ASME Boiler and Pressure Vessel Code, Section I, A-22.

Victaulic grooved products have over 85 years of proven successful installation performance under a large variety of service conditions. In addition, Victaulic grooved joints will provide excellent qualifying working pressures based on temperatures and pressures within their published parameters in accordance with the test methods mentioned in 104.7.2(C). Extensive testing is performed on all Victaulic products before and after they are made available to the piping industry. Victaulic is an ISO 9001 certified company, which has stringent requirements for quality systems, design control, process control, traceability, inspection, measurement, and testing of our products.

A piping system properly designed and installed utilizing Victaulic flexible and rigid couplings is ideal for accommodating both primary and secondary stresses. Flexible couplings provide for both deflection and axial movement at each coupling joint. The available deflection and axial movement can then be used to virtually eliminate any secondary thermal piping stresses. Both flexible and rigid couplings have proven performance benefits in reducing primary stresses such as seismic and induced system vibration. The rigid coupling also provides sufficient joint rigidity to allow hanger spacing to ASME B31.1 hanger spacing requirements. To assist design engineers, Victaulic provides published engineering design data and suggested methods for accommodating thermal movement and vibration attenuation in a piping system. Request 26.01, 26.02 and 26.03. Both flexible and rigid coupling hanger spacing requirements can be found on page 5 of Section 26.01. The use of Victaulic couplings and fittings for B31.1 applications should also be reviewed by the piping system designer for the specific application. Victaulic grooved end products will be acceptable on applications within the scope of the published limitations. Services such as hot and cold fluids, compressed air, and non-combustible gases are permitted provided the system temperature is within our published temperature range for the gasket utilized, and the system pressure is at or less than the published working pressure.