



an EnPro Industries company

Expansion Joint Department

Currently, there is no nationally recognized standard pertaining to these types of expansion joints. However, after researching ASME B31.3-2008, it can be contended that our expansion joints are suitable for ASME piping systems and can be classified using the guidelines for unlisted components and for metallic expansion joints.

Paragraph A304.7.2 provides criteria for unlisted nonmetallic components. Paragraph A304.7.2(a) allows an unlisted component to be used as long as there are calculations supporting the design along with an “extensive, successful service experience under comparable design conditions with similarly proportioned components made of the same or like material.” Garlock has produced non-metallic expansion joints for over 50 years with the components being used in many commercial and nuclear applications. The proof tests performed over the many year history which prove the 4:1 safety factor of the expansion joints also show the successful service requirement for these joints. Paragraph A304.7.2(b) continues to allow an unlisted component with a “performance test under design conditions.” The proof test also simulates this scenario and in fact surpasses the requirements for the design conditions. Also, the many expansion joints that are currently installed in power plants across the United States proves their robust design and ability to accommodate all design criteria.

In addition to meeting the requirements within A304.7.2, Garlock’s rubber expansion joints meet or exceed many of the considerations within paragraph F304.7.4 for pressure design of metallic expansion joints. Paragraph A304.7.2(a) refers to stress corrosion cracking of the expansion joints. This is not a factor in non-metallic expansion joints and can be omitted from its requirements. Section (b) considers the media and its compatibility with the material of construction. Due to Garlock’s ability to provide various rubber compounds, the compatibility is always taken into account when providing an expansion joint. Section (c) considers the minimum ply thickness of the expansion joint with a concern of fatigue life. Failure due to fatigue is not a factor in rubber expansion joints as they do not exhibit an endurance limit. Therefore, the thickness solely serves as a pressure retention characteristic, shown in the calculations within the original report. Section (d) concerns the accessibility of the joint for maintenance and installation. The need for accessibility of a non-metallic expansion joint is no different than that for a metallic expansion joint. Section (e) considers the need for leak tightness criteria for mechanical seals on slip-type joints. This does not apply to rubber expansion joints as they are flanged joints and are not typically intended for slip-type applications. Section (f) requires the specification of installation procedures and shipping information. Similar to section (d) this is no different than the necessary information for a metallic expansion joint. Section (g) lists ten (10) design criteria that can be requested from the manufacturer of the expansion joints. The ten items that are listed are all standard information pertaining to any type of expansion joint, whether metallic or non-metallic.

From this information, it can be concluded that non-metallic expansion joints are acceptable components for ASME B31.3 piping systems. They fit within the unlisted components requirements and are at least equal if not superior to the metallic expansion joints.