Place Gaskets

The best choice depends on your application

What Causes Gasket Failure?

It’s easy to point fingers when a joint won’t seal, or when a sealed joint begins to leak. Usually, the gasket gets the blame. In reality, while the gasket plays an important part in the seal, other factors more often actually cause the failure. The *Post Mortem Observations & Findings* research study, commissioned by the Pressure Vessel Research Council (PVRC), documents why seals fail, and the causes that occur most often: &#149Improper installation: 26% &#149Flange damaged: 25% &#149Gasket defective: 22% &#149Loose bolts: 15% &#149Flange misalignment: 12%

The world of fluid sealing is more complex than many plant operations managers may realize. Selecting a gasket for a common or routine application is one thing, but what about the oddball application? Or to fix &#151 once and for all &#151 that troublesome flange that has leaked for years?

Expanded PTFE (ePTFE) gaskets are often a good starting point. Compared to rubber gaskets, synthetic fiber gaskets, composite material gaskets, or PTFE gaskets that have fillers or other additives, ePTFE gaskets can greatly simplify the question of whether the gasket will withstand the media to be sealed. That’s because ePTFE material has all of the chemical resistance properties of standard PTFE (polytetrafluoroethylene), while its enhanced strength and creep resistance under high loads and temperature makes it an ideal material for industrial flanges. (The few areas of chemical protection weakness for ePTFE involve molten alkali metals or instances where a significant degree of elemental fluorine is present.) Once you’ve determined that ePTFE makes sense as the sealing material, your next question might be whether to use a pre-cut gasket versus a form&#151in&#151place gasket. Each gasketing option has its own particular advantages, and the key is to select the one that best fits your specific application.

An additional factor to be considered when choosing an expanded PTFE form&#151in&#151place gasketing product is the need for dimensional stability in the gasket. The gasket’s resistance to change in linear dimension will influence the gasket’s stress retention capability and thus improve the seal reliability. Expanded PTFE form&#151in&#151place gaskets are available in three different variations. The first and original form of ePTFE is the cord&#151type Joint Sealant, which is uniaxially expanded, or expanded only in the length direction. The expansion of the PTFE in the length direction enhances the tensile strength and creep resistance of

the material in that direction only. However, there is very little enhancement to the properties in the width (radial) direction of the cord material. With no expansion in that direction, the PTFE is prone to cold flow in the width direction, resulting in the spreading of the gasket when it is compressed between flanges. This spreading increases the surface area of the gasket and decreases the effective stress on the gasket. Spreading of the gasket can also result in the splitting of the gasket when high spots (areas of intense stress concentration) exist on a flange surface.

Uniaxially expanded PTFE is also available in a flat tape. This rectangular shaped form is commonly known as gasket tape. Depending on the manufacturing process, gasket tape can have some significant tensile strength in the width direction, even though the expansion occurs only in the length direction. In this case, these gasket tapes would have better dimensional stability than round cord joint sealants. In applications where dimensional stability and cut&#151through resistance of the gasket is a critical concern, such as in glass lined steel flanges, the best solution is a biaxially expanded PTFE gasketing product. Biaxially expanded PTFE tapes are the most dimensionally stable of the three forms of ePTFE form&#151in&#151place gaskets. They are available in flat tape form, and are expanded in both the length and width directions of the tape. The expansion in the width direction provides enhanced tensile strength in that direction, resulting in a gasket with very little cold flow. As such, these gaskets will stay tight longer, increasing the reliability of the seal. [Insert Photo C.]

Overlapping Material Does Not Cause Leaking