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## EXPANDED PTFE GASKET MATERIAL PERFORMANCE VARIATION COMPARING SOLID TO JOINTED CONSTRUCTIONS

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### ABSTRACT

Polytetrafluoroethylene (PTFE) is an excellent gasket material. Expanded PTFE (ePTFE) achieves better mechanical performance compared to plain PTFE by a highly fibrillated microstructure. However, between the fibers of the ePTFE, there are air voids. To achieve superior sealing, the microstructure must be adequately compressed to close these voids and reduce permeation leakage through the gasket material itself. During this compression, the ePTFE dimensions shrink in contrast to most PTFE sheet materials that radially expand when compressed. This ePTFE behavior is problematic where a gasket with a joint is needed, for example on industrial column body flanges larger than available ePTFE sheets. Care must be taken to make a leakfree ePTFE joint on such gaskets.

Industry experience with the common dovetail joint has been poor using ePTFE materials. However, joints are sometimes needed. The authors investigated the leakage and mechanical performance of ePTFEs as solid rings without joints, industry-standard dovetail jointed rings, and Engineered Interference Tortuous Path (EITP) jointed rings. Data was collected according to the EN13555 leakage test at room temperature [1]. A preliminary investigation of pressure performance at temperature was made using the first step of the Hot Blowout Thermal Cycling (HOBTC, ASTM WK61856 Rev 10-9-2020) test (no thermal cycles this test round) [2]. Lab tests were performed on an amtec TEMES fl.ai1 test fixture at the authors' company.

Keywords: Gaskets, Mechanical Properties, PTFE, expanded PTFE, ePTFE, jointed rings

