Sealant Technologies

CREEP AND CREEP RELAXATION
OF PTFE GASKETS

It is widely known that sealing performance is often compromised with full-density PTFE gaskets because of creep (continued flow of the gasket under load and temperature) and creep relaxation (diminishing gasket stress translating into torque loss) of the PTFE under compressive loads. As can be seen by the photomicrograph of full-density PTFE on the next page, there is no real defined internal structure to prevent this slippery material from flowing when subjected to compressive loads and high temperatures. Thus, it becomes apparent why the gasket flows under these conditions.

The unique process used to manufacture expanded PTFE GORE-TEX® joint sealant tremendously reduces these debilitating phenomena of creep and creep relaxation. This is accomplished by introducing an oriented, highly fibrillated structure to the PTFE essentially rendering it a fiber reinforced PTFE (see photograph on the next page). These, literally millions of fibrils in GORE-TEX® joint sealant, impart a very strong hoop strength to the compressed gasket that, in conjunction with its intricate mating with the microfinish of the flanged surfaces, prevents significant long-term "flow" or creep of the gasket.

With expanded PTFE gasket materials, the creep and creep relaxation properties are directly related to the degree of fibrillation. In short, the resistance to creep and creep relaxation increases with the number and length of fibrils present in the microstructure.

When selecting a PTFE gasket material for applications where creep and creep relaxation must be minimized, keep the following in mind:

1) Don't select full-density, unfilled PTFE.

2) Choose a material that has the greatest degree of internal fibrillation. This can be determined through examination of photomicrographs or by visually inspecting a torn section of the material.

3) Choose a size of material whose compressed thickness is as thin as your system can tolerate.