

TECHNICAL DEPARTMENT COMMUNICATION

Bulletin No.: CHEMCOM - 003 (Document Circulation: General; Distributor; Internal & confidential)

PRODUCT: All *INERTEX*® 100% Expanded PTFE Products

SUBJECT: Gaskets for Chlorine Industries

Strong chemicals such as hydrochloric acid (HCl), sodium hydroxide (NaOH), potassium hydroxide (KOH), sodium hypochlorite (NaOCl), and chlorine (Cl₂) are commonly produced and/or used in chlorine industries. Uncontrolled releases of these compounds to the environment are undesirable due to concerns of safety, interruption of plant operations, as well as non-compliance to regulations. Consequently, selection of appropriate materials of construction for chlorine services is of critical importance.

Bolted connections, such as piping flanges, heat exchanger covers, and storage vessel covers, are considered areas that are prone to leaks or fugitive emissions in chemical processing plants. Inappropriate gasketing materials are often the causes for such leaks or emissions. The failures of these gaskets are mainly result from their poor resistance to the strong chemicals, inept capability to provide a good seal, and presence of fillers or binders that are attacked by the strong chemicals.

The *INERTEX*® gasketing materials are 100% expanded virgin polytetrafluoroethylene (PTFE) which make them a perfect choice for chlorine industries for the following reasons:

Chemical Resistance

The *INERTEX*® gasketing materials are made of virgin PTFE materials that are well-known for their excellent chemical resistance. The table below shows the chemical resistance of PTFE to the common chemicals found in the chlorine industries:

Chemical Name	Chemical Resistance
Chlorine dry	Little or no chemical attack to 300° F
Chlorine wet	Little or no chemical attack to 500° F
Sodium Hypochlorite	Little or no chemical attack to 300° F
Hydrochloric acid (100%)	Little or no chemical attack to 260° F
Hydrochloric acid (20% and below)	Little or no chemical attack to 392° F
Sodium Hydroxide	Little or no chemical attack to 300° F
Potassium Hydroxide	Little or no chemical attack to 300° F

Table 1. Chemical Resistance of PTFE

As shown in the table, PTFE resins and the *INERTEX*® gasketing materials are resistant to these strong chemicals under service temperatures as high as 300° F (260° F for 100% hydrochloric acid). It should also be noted that these temperature values are limited to the maximum temperatures used in the reference research, the actual service temperature limit may be even higher.

innovative gasketing and sealing solutions.™

High Purity

The *INERTEX*[®] gasketing materials are made of 100% virgin PTFE with no binders, pigments, or fillers. Concerns about having binders, pigments, or fillers in the gaskets for chlorine services are twofold. The first concern is the capability of the binders, pigments, or fillers to resist the strong chemicals. If they yield to the chemical attack, the integrity or the sealing behavior of the gasket may be adversely affected. The other concern is the leachables in the binders, pigments, or fillers. These leachables may react with the strong chemicals and form unwanted products such as precipitates and trihalomethanes (THMs).

The *INERTEX*[®] gasketing materials have been tested for leachables by Balazs Analytical Laboratory (Sunnyvale, CA). Leachables of concern are total organic carbon (TOC), silica, metals, and anions. The test results show that the *INERTEX*[®] gasketing materials are essentially free of leachables and suitable for ultrapure water service (UPW) for the sophisticated semi-conductor industries.

Tightest Seal

The patented process for *INERTEX*[®] products improves upon existing PTFE products and provides all of the spectacular properties and benefits of PTFE. The highly fibrillated microstructure of *INERTEX*[®] maximizes performance predictability and stability while minimizing creep and cold flow. Consequently, the *INERTEX*[®] gaskets can provide a better seal than other PTFE gaskets. The great sealability of the *INERTEX*[®] gasketing materials is evidenced by test results of The PTFE Gasket Qualification Project, conducted by Ecole Polytechnique Tightness Testing and Research Laboratory (TTRL), University of Montreal. All testing results revealed that *INERTEX*[®] products provide the tightest seal. Not only did *INERTEX*[®] products beat the competitor's corresponding products in tightness, the *INERTEX*[®] products also were similar or better in all the other properties tested.

In summary, the *INERTEX*[®] gasketing materials are 100% virgin expanded PTFE with no fillers or binders. The excellent chemical resistance of the *INERTEX*[®] coupled with their other superior properties, such as superior sealability, high purity, low creep/relaxation, and low torque requirements, make them a perfect choice for chlorine industries.

All information and recommendations contained in this publication are, to our best knowledge, correct. Since conditions of use are beyond our control, users should base their decision upon information verified through their own field testing as to whether products are suitable for the intended processes and uses. No warranty is given or implied with respect to information or recommendations herein. In any event or occurrence our liability is limited to our invoice value of the goods delivered to you by Inertech. Inertech reserves the right to change product design and properties without notice.

Copyright 2019, INERTECH, All Rights Reserved.

PREPARED BY: Inertech, Inc.

DATE: May 14, 2019