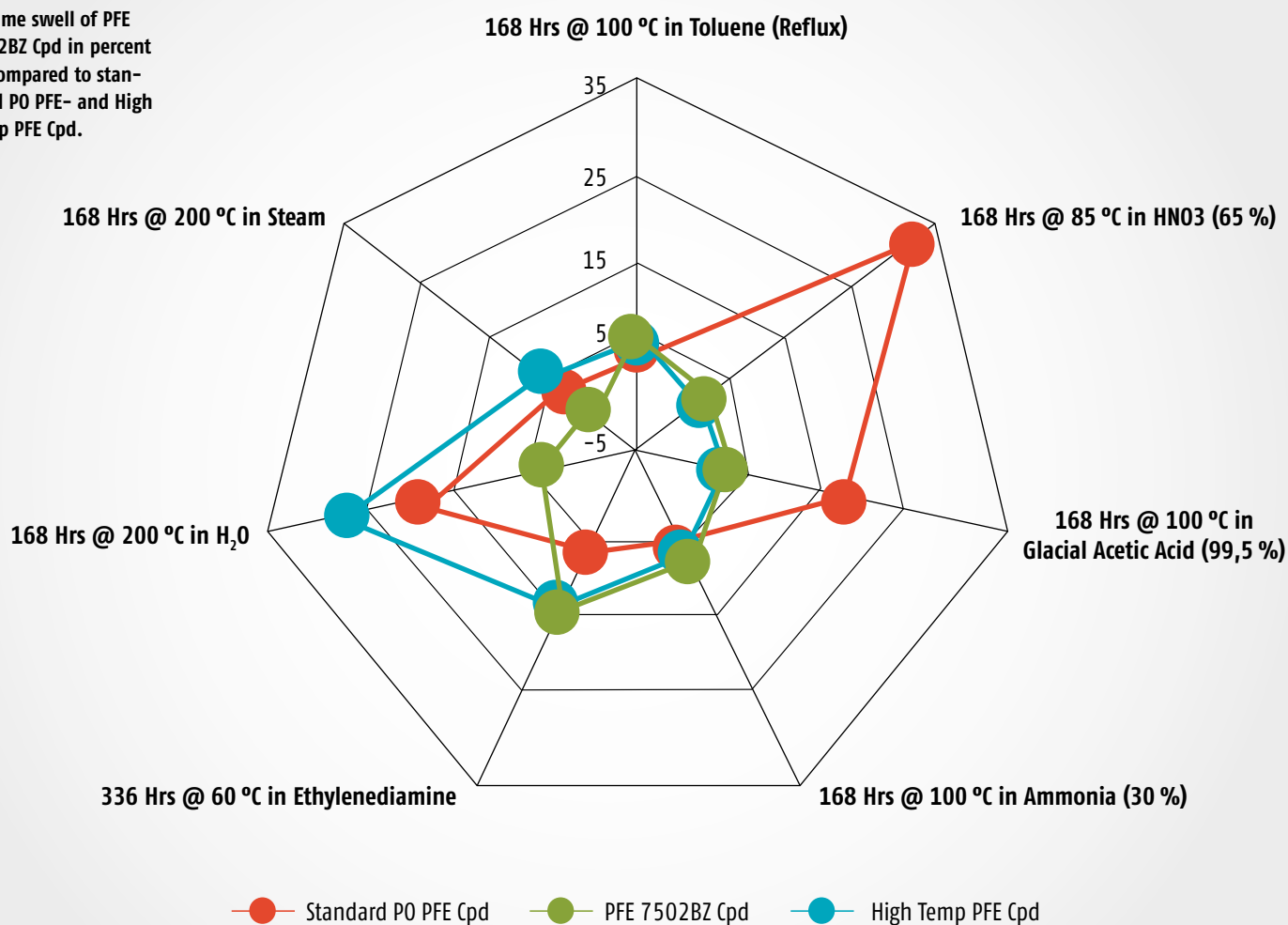


# IT DEPENDS ON THE COMPOUND

## High-Performance FFKM Sealing Technology for Pharmaceutical, Food and Beverage Industries

Chemical, Pharmaceutical, Food and Beverage industry processes can be mighty tough on seals. Their rough conditions and exacting regulations keep scientists on their toes looking for solutions to meet even more difficult demands. Perfluoroelastomers, also known as FFKMs, are establishing themselves as very useful materials in these fields.

Volume swell of PFE 7502BZ Cpd in percent as compared to standard PO PFE- and High Temp PFE Cpd.



The Pharmaceutical, Food and Beverage industries frequently use clean in place (CIP) and sterilize in place (SIP) processes today due to their resource-saving benefits, such as faster changeovers, increased output and uptime, as well as lower usage of chemicals and the prevention of toxic contamination and the minimisation of recontamination, the latter two which are necessary to ensuring safe and compliant processing. FFKMs have the ideal skill set to satisfy these sealing needs.

CIP and SIP processes may employ a number of techniques to clean and sterilise residues of bioreactors, fermenters, mix vessels and other equipment or systems, and to control bioburden and reduce endotoxin components. The processes use different combinations of heat, chemical action and turbulent flows, all of which can severely affect the longevity and performance of seals over time. Their media are often injected water, caustic solutions, acid solutions and forced air. SIP processes frequently employ pressurized 140 °C steams or ethylene oxide. In addition, they often use high energy impinging spray for highly soiled or large diameter vessels for which a dynamic spray device may be used.

For these processes, seals must be resistant to abrasion or deterioration and their components must have a limited inclination to migrate, in order to avoid contaminating the processed medium. In addition, seal surfaces must be smooth to facilitate cleaning and sterilising.

### When the Going Gets Tough, the Tough Get Going

Many seal materials, such as peroxide-cured EPDM, bisphenol-cured FKM or peroxide-cured HNBR, to name a few, just don't have the ability to stand up to the aggressive environments and agents common to the Pharmaceutical, Food and Beverage industry processes. Dyneons PFE 7502BZ Chemshield, a proprietary, black, 75 Shore A compound, does, featuring the superb chemical resistance of peroxide-cured FFKM type



Picture: Dyneon/Delicious-photography.de

**O-Rings from material PFE 7502BZ for pharmaceutical, food and beverage applications are especially heat resistant.**

materials and the ability to withstand high continuous operating temperatures, even those of 275 °C.

Being that it is a FFKM, PFE 7502BZ Chemshield possesses both the exceptional chemical resistance properties of PTFE and the elastic properties of FKM rubber. Unlike FKM types, however, perfluoroelastomers, which have fully fluorinated backbones, have only C-F bonds that are the strongest in organic chemistry, making them highly resistant to aggressive environments. In addition, FFKMs maintain their elastic properties, such as compression set resistance low volume swell longer than conventional elastomeric types. Temperature plays a decisive role in diminishing compression set performance, speeding up the aging process and eventually leading to the breakdown of polymer backbones and cross links and subsequent leakage and a host of other ills. The high heat resistance of this sealing technology is very welcome here.

Comparing the chemical resistances of FKM and PFE 7502BZ Chemshield to hot fluid media, including acids, i.e. hydrochloric, nitric, sulfuric, acetic (glacial), solvents, bases, such as ammonia and sodium hydroxide, as well as ethylene diamine, water and steam, PFE 7502BZ Chemshield performs

significantly better than FKM. Moreover it's continuous temperature of 275 °C is about 50 degrees higher than that of FKM. While both have the same compression set of 15 for 70 hours at 200 °C.

### Verified and Certified for Hygienic Use

The compound complies with their extremely high standards of key international food and drug supervision agencies, including the FDA, USP Class VI, and EU No. 10/2011 with all its amendments. It is safe for use as sealing material in Pharmaceutical, Food and Beverage applications. It complies with the FDA standard for the use in food processing, pharmaceutical products, cosmetics, biotech products, medical devices and radioactive drugs for oncology.

Besides PFE 7502BZ Chemshield, 3M's range of FFKM products for sealing applications include Perfluoroelastomer PFE 90Z, a peroxide curable FFKM gum, Perfluoroelastomer PFE 7301BZ Heatshield, a high-temperature, triazine cure compound with superior temperature resistance (316 °C continuous) and the new Perfluoroelastomer E-21464 Heatshield compound (316 °C continuous with improved long term compression set) to name a few.

WER

### PROCESS-Tip

• Visit the experts from 3M/Dyneon at this year's **Composites Europe** trade show in Stuttgart (September 22–24): Hall 3, Stand B01.