

Keeping It Clean: New Seal Eliminates Risk of Bacteria and Contamination

Maintaining an ultra clean environment is a priority in many processing industries including the food and pharmaceutical arenas. A new spring-energized PTFE-based seal promises the ultimate in cleanliness. Here's an inside look at its new design...

Manufacturers in the food/beverage and pharmaceutical industries must avoid contamination at all costs. As a result, it's important that the seals used in their processes are protected from bacteria. If the seals have no dead space in their design, then bacteria cannot accumulate and contamination is avoided. The seals also must be compatible with the process media and be able to withstand the aggressive chemicals of rigorous CIP and SIP cleaning regimes.

Trelleborg Sealing Solutions has developed a new seal called the Turcon Variseal Ultra-Clean to answer these needs. The standard Turcon Variseal is commonly used in processing systems. One of the main reasons for this is that Turcon, a proprietary PTFE-based material, offers compatibility with virtually all chemical media. It also boasts superior wear resistance and friction characteristics and can withstand extreme operating temperatures.

PTFE, though, has no elasticity, which means that the Turcon Variseal is energized with a spring that is fitted into the seal profile. In most applications, the open spring of the standard Turcon Variseal is acceptable. However, in some industries, where cleanliness is paramount, the area of dead space around the spring, where bacteria can potentially be caught, can pose a risk of contamination.



Newly engineered seal boasts a unique profile.

The need for an enclosed Turcon Variseal design led to the Turcon Variseal Ultra-Clean. In this new design, the spring required to activate the seal is fully enclosed within a Turcon case. Thus, for manufacturers of food, beverage, and pharmaceutical products, there is no dead space within the seal, guaranteeing that bacteria cannot accumulate, avoiding the risk of contamination.

Numerous tests were undertaken to establish the best material for the Turcon

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Variseal Ultra-Clean. Selected was Turcon MF, a material that has been specially engineered for super clean environments. Turcon MF compounds are produced from high-purity PTFE grades and additives. Their smooth finish, with high gloss and low porosity, avoids the risk of contamination buildup and reduces particle shedding. It also withstands high pressures and has a vacuum capability of 10⁻⁹ mbar x l/s in air.

Tests also show that Turcon MF compounds have extremely low ion extractables. Test samples of Turcon MF1 were immersed in ultra-pure de-ionized (UPDI) water at a temperature of 85°C (185°F) for a duration of one week. According to SEMI standard F57-0301, the leach-out of 20 of the most hostile cations was measured. In terms of parts per billion (ppb), Turcon MF1 demonstrated a leach-out of 80 percent less than that of a standard perfluoroelastomer (FFKM) material.

"Turcon Variseal Ultra-Clean is a revolutionary seal," says Colin Macqueen, director of technology for Trelleborg Sealing Solutions Americas. "We know that it will provide real benefits to processing companies globally. It offers the ultimate in cleanability and cleanliness for a spring-energized PTFE-based seal and solves the problem of ion extractables from seals contaminating wafer processes."

He says some of its other benefits are as follows:

- It operates in extreme temperatures from -253°C (-423°F) to +260°C (+500°F).

- It withstands high pressures in excess of 100 bar (1,450 psi).

- It has excellent wear and friction characteristics.

- It's compatible with virtually all chemicals such as aggressive CIP fluids and super heated steam up to 260°C (500°F).

- The materials available are compliant to FDA 21 CFR 177.1550, 3-A, USP Class VI, Cytotoxicity, NSF, and the EU Machinery Directive.

- It's suitable for piston, rod, face, rotary, reciprocating, and static situations.

- It fits into standard O-Ring and Variseal grooves for easy retro fitment.

- It can be cleaned and packed to class 100 standards.

Trelleborg Sealing Solutions, formerly known as Busak+Shamban, is a leading developer, manufacturer, and supplier of precision seals. Based in Fort Wayne, IN, it has some of the longest established sealing brands in its portfolio including Chase Walton, Dowty, Forsheda, Palmer Chenard, Shamban, Skeg, and Stefa along with a large number of proprietary products and materials such as Turcon, Zurcon, Orkot, Isolast, Stepseal, and Wills Rings. More information is available at www.tss.trelleborg.com/us or 260-749-9631.

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