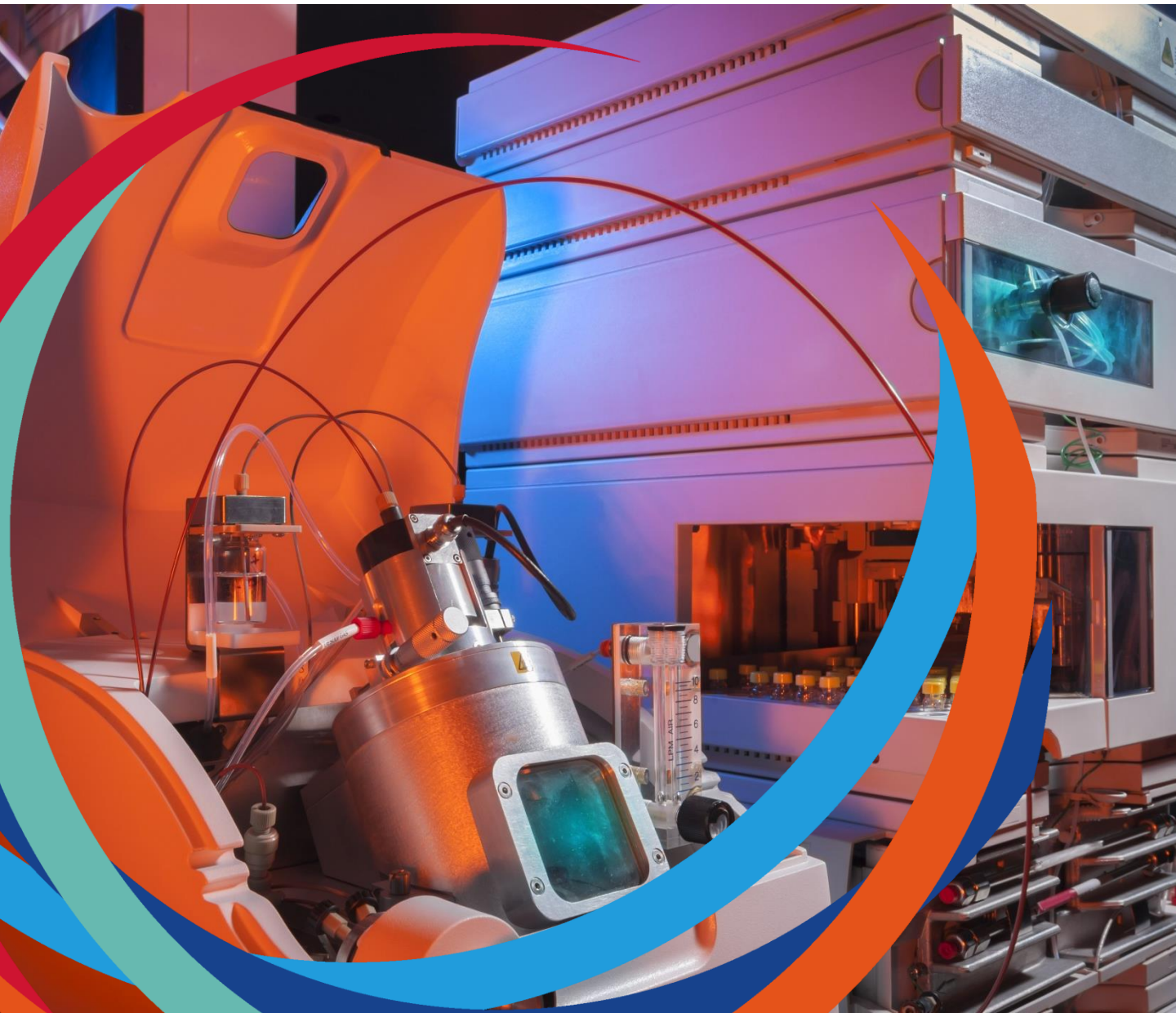




LIFE SCIENCE CASE STUDY

LIQUID CHROMATOGRAPHY RECIPROCATING PISTON PUMP





OMNISEAL® SPRING-ENERGIZED SEALS

PFAS-Free* Seal For Liquid Chromatography Reciprocating Piston Pump

David Sima January 2024

LIFE SCIENCE WEAR & FRICTION HIGH PRESSURE

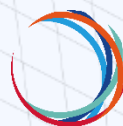
Environment

Liquid chromatography equipment is a widely spread analytical tool used to separate, identify and quantify components in a liquid mixture for purity and content. The equipment utilizes reciprocating pumps to pass pressurized liquid solvents with sample mixtures through a column filled with a solid material. Positive displacement pumps use Omniseal® spring-energized seals to optimize performance and equipment longevity.

Challenge

Since each customer's reciprocating pumps are unique, they need seals that are custom designed to accommodate specific pressure ranges and dimensional specifications. Seals must also be able to handle various liquid solvents and environments. Customers want improved cycle times up to two million cycles to improve the time between maintenances or the overall lifetime of their machines.. They are looking for higher pressures and smaller seals with improved performance.

Ultra High Performance Liquid Chromatography (UHPLC) equipment utilize high operational pressure up to 1400 bar or 20,000 psi and above. Due to the high pressures utilized, critical sealing is necessary in the plunger pumps to ensure analysis accuracy. Seals are important for challenges such as chemical resistance, friction and wear control. With growing regulation on the use of PFAS material like fluoropolymers, OEMs are requiring parts deprived of PFAS, making the application even more challenging, in particular on the friction management.



Omniseal Solutions
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Solution

Omniseal Solutions provides custom seals for precision fit and has compounded and designed several specialized PFAS-Free* materials to withstand harsh solvents and improve wear.

The right combination of material and design for the equipment application and pressure range are the key to the wear and overall equipment performance. Physical models of our materials allow predictive simulation, enabling the selection of the right design.

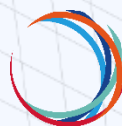
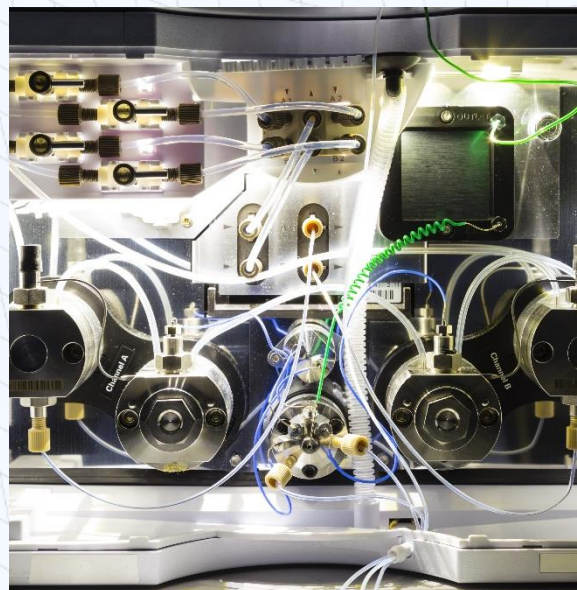
Addressing material challenges!

At the Kontich, Belgium, research and development center, critical life and wear testing studies are performed in customers' reciprocating pumps, which ensure equipment performance for longevity and quality. Maintenance cycles can be reduced with the right alternative material and shape that is formulated based on our design and development experience in high pressure and solvent testing.

Benefits

- PFAS-Free* solution, removing concern on potential subsequent supply chain modifications
- Chemical resistance and compatibility with saline solutions and a wide range of media and solvents
- Low friction and wear for long life
- Continuous performance under high pressures
- Smaller seal designs withstand higher pressure

**PFAS-Free here means we do not intentionally add PFAS material in the product, but does not exclude the possibility of traces, as these materials are common in the environment.*



Omniseal Solutions
SAINT-GOBAIN

Design Expertise & Customized Solutions for Your Extreme Applications

Omniseal Solutions is a global engineering leader with over 65 years of historical legacy, relentlessly dedicated to the design and manufacture of precision sealing and wear control solutions that protect critical applications in the most demanding environments and passionately driven to push "*Beyond the Boundaries of Possible.*"



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