SEALING SOLUTIONS

Fusion® 938 NFS

for Hydrogen & CCUS Applications

Solution of choice for high pressure, high temperature CO_2 & H_2 applications

Fusion® 938 FKM is a high-performance elastomer originally engineered to withstand Rapid Gas Decompression (RGD) in high-pressure, high-temperature Oil & Gas environments. Its exceptional RGD resistance makes it the ideal choice for demanding hydrogen (H_2) and carbon dioxide (CO_2) applications.

Proven in high-pressure hydrogen cycling tests by two US laboratories

In high-pressure hydrogen cycling tests conducted by two U.S. National Laboratories, Fusion® 938 delivered outstanding results. It exhibited one of the lowest hydrogen diffusion coefficients among all tested materials, with minimal changes to physical properties and dimensions even after exposure to H_2 at 870 bar (12,500 psi).

New NFS alternative

We recently developed an NFS (non-fluorosurfactant) formulation of this compound to remove the use of any fluorinated surfactants during the manufacturing process and enable better compliance with environmental regulations.

Features and Benefits

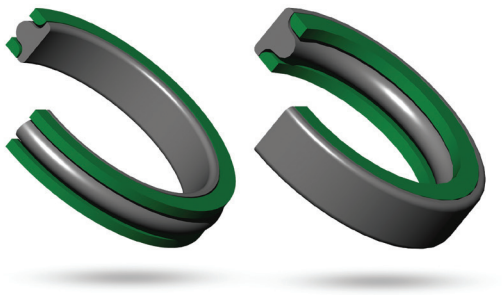
- Exceptional RGD and chemical resistance to H_2 & CO_2 at high temperature & high pressure
- High temperature capability up to 232°C (450°F)
- Extends the life of hydrogen and CCUS equipment exposed to unanticipated process upsets, resulting in pressure drops
- Superior RGD resistance reduces maintenance and increases MTBF (mean time between failures)

Applications

- H_2 & CO_2 compressors
- H_2 & CO_2 mechanical seals
- H_2 & CO_2 valves
- H_2 & CO_2 completion equipment
- H_2 & CO_2 instrumentation
- CO_2 pumps

Availability

- O-rings
- G-T® rings
- Custom-molded shapes



Typical Properties	
Original Properties (ASTM Standard)	Typical
Color	Black
Hardness, Shore A, Points (D2240)	90
O-ring Properties (ASTM Standard)	
Elongation @ Break, % (D1414)	94
Tensile Strength, psi [MPa] (D1414)	3454 [23.8]
Modulus @ 50% Elongation, psi [MPa] (D1414)	960 [6.6]
Compression Set @ 25% Deflection, 22 Hours @ 392°F (200°C) in Air, % of Original Deflection (D1414)	22
Compression Set @ 25% Deflection, 70 Hours @ 392°F (200°C) in Air, % of Original Deflection (D1414)	37
Thermal	
Service Temperature Range, °F (°C)	-35°F to 450°F (-37°C to 232°C)

Hydrogen exposure test results

Fusion® 938 size 312 O-rings underwent a rigorous custom pressure cycling test developed by leading US national labs.

Test Conditions

- Test standard: custom pressure cycling test developed by two US national labs as part of their research program
- Media: 100% H_2
- Temperature: Ambient
- Pressure: 170 bar (2,500 psi) to 870 bar (12,500 psi) to 17 MPa (2,500 psi)
- 100 cycles per test (100 decompression steps)
- Total exposure: 175 hours
- Test specimen: size 312 O-ring

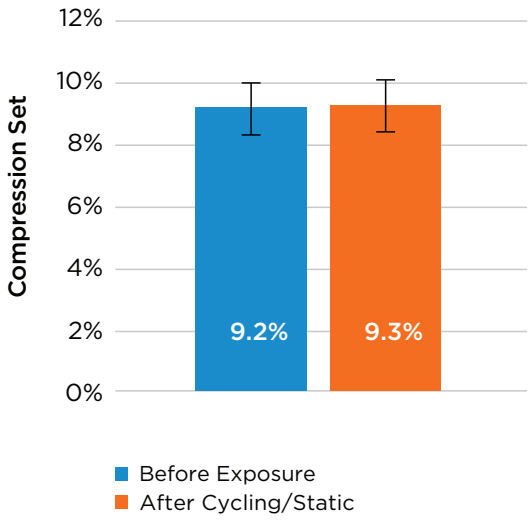
Test Results

When exposed to hydrogen pressure cycling and static exposure tests, Fusion 938 exhibited no change in density, viscoelasticity properties and compression set, negligible changes in dimensions, no chemical changes on the surface of the material, very high recovery ratio and low diffusion coefficient.

Fusion® 938 FKM, change in compression set before and after cycling/static

Average of 2 specimens,
3 measurements per specimen

Compressed to 75% for 22 hours at 110°C, recovered 30 minutes



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