Latest Perfluoroelastomer Sealing Developed in Rapid Gas Decompression

Reduce potential for costly seal failure with Kalrez® O-rings that have the best rating under the NORSOK M-710 Rev 2 standard for rapid gas decompression (RGD) and sour gas resistance.

Standing up to harsher conditions

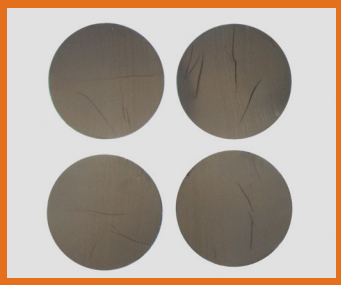
Building on more than 30 years of experience in serving the oil and gas industry, DuPont delivers durable, reliable sealing solutions for downhole and surface-level equipment such as packers, pumps, and valves.

DuPont scientists recently developed Kalrez® 0090 parts which provide outstanding repeated rapid gas decompression (RGD). Stringent NORSOK M-710 tests conducted by the independent Materials Engineering Research Laboratory Ltd. (MERL) in the UK confirm the outstanding RGD resistance of Kalrez® 0090 parts. Some seals can pass NORSOK M-710 with multiple internal cracks developed during test cycling, but Kalrez® 0090 O-rings do much better than that. They obtain the test's *best possible* rating. Ratings and test conditions are summarized in the table below.

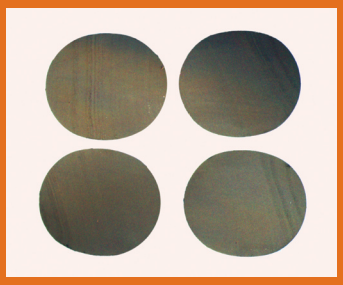
Why 0000 rating matters

The best rating a seal can receive in the NORSOK test is "0000." This demonstrates compliance according to the NORSOK M710 requirements, with no cracks or blisters visible on the O-ring cross section after the test. This demonstrates the capability of Kalrez® 0090 perfluoroelastomer parts to provide performance that meets the needs of this important industry standard.

Comparison of Kalrez® 0090 performance rating versus competitive FFKM according to NORSOK rating



FFKM: NORSOK M-710 rating of 3332



Kalrez® 0090: NORSOK M-710 rating of 0000

Test conditions: 100% CO_2 gas composition, 100 °C temperature, Pressure of 15 MPa, Decompression rate of 12 MPa/min

NORSOK M-710 Tests Prove Outstanding RGD Resistance of Kalrez® 0090 (certified by MERL)

Rating results	
Kalrez® 0090	0000 — No internal cracks, holes, or blisters
Test conditions	
Gas	90/10 mol% CH_4/CO_2
Temperature	100 °C (212 °F)
Pressure gradient	150 bar (~2200 psi)* to ambient
Decompression rate	20 bar/min
Cycling	10 cycles, one every 24 h
Sample details	
Size	BS 1806 size 312
Section diameter	5.33 mm, nominal
Groove fill	67%, nominal

*Initial pressure maintained for at least 72 h prior to testing.

DUPONT®

The miracles of science™

DuPont™ Kalrez® 0090 O-rings
for oil and gas applications

DuPont™ Vespel® back-up rings

Superior performance in harsh environments

In addition to providing outstanding RGD resistance, DuPont™ Kalrez® 0090 seals have other properties that ensure superior performance.

- Chemical resistance. Kalrez® parts withstand attack by more than 1800 chemicals and solvents. Kalrez® 0090 can be resistant to sour multi-phase fluids containing H_2S as shown by the external NORSOK M-710 Rev 2 Sour Fluid ageing resistance certification provided by MERL (UK).
- High-temperature resistance. Retains high levels of elasticity and recovery even after long-term exposure to temperatures up to 250 °C (482 °F).
- High modulus at low elongation provides excellent extrusion resistance.

DuPont™ Vespel® meets challenges in back-up rings

In addition to Kalrez® 0090 parts, DuPont™ Vespel® CR-6100 back-up rings and parts have shown their ability to perform in a range of high-pressure pumps and mechanical seals used in hydrocarbon processing and refining. Custom machined from a polymeric composite consisting of carbon fibers held within a matrix of DuPont™ Teflon® PFA fluoropolymer resin (PFA/CF reinforced composite, 20% mass fraction random X-Y oriented carbon-fiber), Vespel® CR-6100 parts deliver:

- Higher temperature resistance and more mechanical strength than alternative materials such as polyetheretherketone (PEEK).
- Nearly universal chemical resistance.

API 610 recognition for Vespel® CR-6100

Vespel® CR-6100 parts are recognized under the latest edition of the ISO 13709 International Standard and the American Petroleum Institute API 610 Standard for centrifugal pumps.

Let's talk

With DuPont™ Kalrez® and DuPont™ Vespel®, you'll get a winning combination of seal components, technical resources and experience in the oil and gas industry. Let us help you meet *your* engineering challenges. For information and assistance, please contact one of the offices below, or visit our website listed below.

For more information about DuPont™ Kalrez®:

Phone: 800-323-9806
Web: www.kalrez.com

For more information about DuPont™ Vespel®:

Phone: 800-222-VESP (8377)
Web: vespel.dupont.com

K-22021-1 (08/10) Printed in the U.S.A.

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