

# DuPont™ Kalrez® 0090 perfluoroelastomer parts

## Maximum Resistance to Rapid Gas Decompression

Reduce potential for costly seal failure with Kalrez® O-rings which have been certified by two independent labs to meet rigorous requirements for resistance to rapid gas decompression.



### 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-mounted equipment such as ball valves, other kinds of valves, packers and pumps.

DuPont scientists developed Kalrez® 0090 perfluoroelastomer parts providing outstanding resistance to repeated rapid gas decompression. In third-party testing to stringent globally recognized standards, O-rings obtained the *best possible* rating (0000) with no internal cracks, holes or blisters (see Table 1 for test conditions). Materials Engineering Research Laboratory Ltd. (MERL) in the U.K. conducted tests according to the Norsok M-710 (Rev. 2) standard. Centre Technique des Industries Mécaniques (CETIM) of France conducted tests according to international oil and gas company, TOTAL's specification GS EP PVV 142 (Rev. 05).

### Why the 0000 rating matters

The best rating a seal can receive in the Norsok and TOTAL tests, 0000, demonstrates compliance with the specifications listed above with no cracks or blisters visible on the O-rings' cross-section after the test. The results of these tests demonstrate the capability of Kalrez® 0090 perfluoroelastomer parts to provide performance meeting both important industry standards.

### Superior all-around performance in harsh environments

In addition to providing outstanding RGD resistance, Kalrez® 0090 seals have other properties that ensure superior performance in harsh oil and gas environments.

- Chemical resistance. Critical seal parts withstand attack by more than 1800 chemical substances.
- Broad temperature capability: Kalrez® 0090 retains high levels of resilience up to temperatures as high as 250 °C (482 °F). It can seal down to -21 °C (-5.8 °F) based on the DuPont static low temperature test. Under pressurized sealing conditions, Kalrez® 0090 has demonstrated low temperature performance down to -40 °C (-40 °F) in customer laboratory tests<sup>1</sup>.
- High modulus at low elongation provides excellent extrusion resistance.



**Highest rating of "0000" in severe test conditions demonstrates outstanding RGD resistance of DuPont™ Kalrez® 0090.**

Test Conditions (internal DuPont):

Gas composition: 100% CO<sub>2</sub>

Pressure: 15 MPa

Temperature: 100 °C

Soak Time: 24 hours

Decompression rate: 12 MPa/min

Sample compressed 20%

Samples are cut to ensure that gas is on both sides

1 decompression cycle

<sup>1</sup>MERL presentation—Matoux 24 Oct 2012



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**Table 1. Recognized Industry Tests Demonstrate Outstanding RGD Resistance of DuPont™ Kalrez® 0090**

	<b>NORSOK M-710 (Rev. 2) Certified</b>	<b>TOTAL GS EP PVV 142 (Rev. 5) Qualified</b>
Rating	0000 — No internal cracks, holes, or blisters	0000 — No internal cracks, holes, or blisters
<b>Test conditions:</b>		
Gas	90/10 mol% CH <sub>4</sub> /CO <sub>2</sub>	80/20 mol% CH <sub>4</sub> /CO <sub>2</sub>
Temperature	100 °C (212 °F)	75 °C ±2 °C (167°F ± 3.6° F)
Pressure gradient	15 MPa (~2200 psi)* to ambient	19 MPa (~2800 psi)* to ambient
Decompression rate	2 MPa/min	12.67 MPa/min
Cycling	10 cycles, one every 24 h	5 cycles
<b>Sample details:</b>		
Size	BS 1806 size 312	BS 1806 size 349
Section diameter	5.33 mm, nominal	5.33 mm, nominal
Groove fill	67%, nominal	73%, nominal

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



DuPont™ Kalrez® 0090 O-rings meet demanding requirements for RGD resistance in oil and gas equipment.

### Let's talk

With DuPont™ Kalrez® 0900, 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 listed below, or visit our website at [kalrez.com](http://kalrez.com).

Visit us at: [kalrez.dupont.com](http://kalrez.dupont.com)

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*Kalrez® perfluoroelastomer parts are not routinely tested using the USP testing protocol. Cured samples made only from compounds 6221 and 6230 have been tested in accordance with USP protocols and meet the requirements of a USP Class VI polymer. USP testing was done to support use of Kalrez® parts in pharmaceutical processing and food processing applications. While USP Class VI compliance materials are not required for pharmaceutical and food processing applications, many pharmaceutical and food processing customers including customers seeking ISO 9000 certification, have requested compliance. Testing of any finished article that incorporates Kalrez® perfluoroelastomer parts is the responsibility of the manufacturer or seller of the finished article if certification that meets USP standards is required.*

*Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer service representative and read Medical Caution Statement H-50103-3.*

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