

# DuPont™ Kalrez® 0090 perfluoroelastomer parts

Provides Outstanding Resistance to  
Rapid Gas Decompression

Technical Information — Rev. 4, November 2012

## Product Description

DuPont™ Kalrez® 0090 perfluoroelastomer parts deliver durable, reliable sealing solutions for applications requiring excellent rapid gas decompression (RGD) properties as well as high hardness and high modulus properties. Some application areas include downhole equipment such as drilling and completion tools as well as industrial equipment including pumps and valves. Kalrez® 0090 has been certified by two independent labs (see Table 2) to meet rigorous requirements for resistance to RGD.

In addition to demonstrated RGD resistance, DuPont™ Kalrez® 0090 seals have other chemical and temperature properties that provide superior performance.

- Chemical resistance: Kalrez® parts withstand attack by more than 1800 chemical substances. Kalrez® 0090 can be resistant to sour multi-phase fluids containing H<sub>2</sub>S as shown by the external NORSO M-710 Rev 2 Sour Fluid ageing resistance certification provided by MERL (UK).
- Broad temperature capability: Kalrez® 0090 retains high levels of resilience up to temperatures as high as 250 °C (482 °F) and down to -21 °C (-5.8 °F). Under pressurized sealing conditions, Kalrez® 0900 has demonstrated low temperature performance down to -40 °C (-40 °F) in customer laboratory tests\*.

\* MERL presentation—Matoux 24 Oct 2012.

**Table 1. Typical Physical Properties<sup>1</sup>**

Color	Black
Hardness <sup>2</sup> , Durometer Shore A	95
50% Modulus <sup>3</sup> , MPa (psi)	14.18 (2057)
Tensile Strength at Break <sup>3</sup> , MPa (psi)	19.49 (2827)
Elongation at Break <sup>3</sup> , %	80
Compression Set—O-rings <sup>4</sup> , 70 hr at 200 °C (392 °F), %	33
Compression Set—Pellets <sup>4</sup> , 70 hr at 200 °C (392 °F), %	19
Compression Set—O-rings <sup>4</sup> , 336 hr in nitrogen at 250 °C (482 °F), %	35
Upper Service Temperature <sup>5</sup> , °C (°F)	250 (482)
Lower Service Temperature <sup>6</sup> , °C (°F)	-21 (-5.8)
Tg <sup>6</sup> , °C (°F)	-1 (30.2)
Tr10 <sup>7</sup> , °C (°F)	-7.4 (18.68)
Volume Swell <sup>8</sup> , % change	
Steam, 225 °C (437 °F), 672 hr	<5
Ethylenediamine, 90 °C (194 °F), 672 hr	<5
H <sub>2</sub> S/CO <sub>2</sub> (65%/35%), 220 °C (428 °F), 672 hr	<5

<sup>1</sup> Not to be used for specification purposes

<sup>2</sup> ASTM D2240 (pellet test specimens)

<sup>3</sup> ASTM D412, (AS568 K214 O-ring test specimens)

<sup>4</sup> ASTM D395B

<sup>5</sup> DuPont proprietary test method (anaerobic conditions)

<sup>6</sup> DuPont proprietary test method

<sup>7</sup> ASTM D1329 (slab test specimens)

<sup>8</sup> ASTM D471 (AS568 K214 O-ring test specimens)



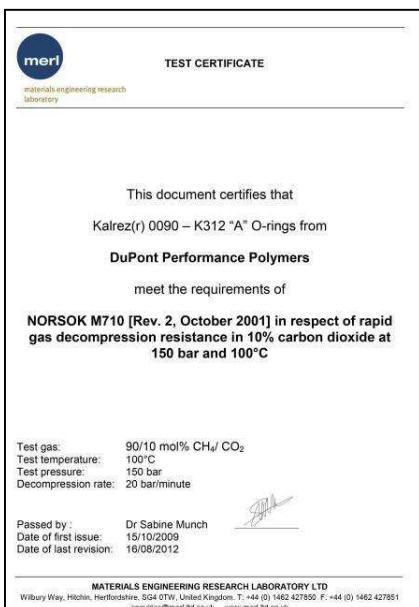
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Table 2. Highest NORSOOK and TOTAL Rating Demonstrates Outstanding RGD Resistance of DuPont™ Kalrez® 0090

	NORSOOK M-710 (Rev. 2) Certified	TOTAL GS EP PVV 142 (Rev. 5) Qualified
Rating	No internal cracks, holes, or blisters	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 (~2756 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

#### NORSOOK M-710 (Rev. 2) Certificate



#### TOTAL GS EP PVV 142 (Rev. 5) Qualification



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