DuPont[™] Kalrez[®] 0090 perfluoroelastomer parts

Provides Outstanding Resistance to Rapid Gas Decompression

Technical Information — Rev. 3, September 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 H₂S as shown by the external NORSOK 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 ¹	
Color	Black
Hardness ² , Durometer Shore A	95
50% Modulus ³ , MPa (psi)	14.18 (2057)
Tensile Strength at Break ³ , %	19.49 (2827)
Elongation at Break ³ , %	80
Compression Set—O-rings ⁴ , 70 hr at 200 °C (392 °F), %	33
Compression Set—Pellets ⁴ , 70 hr at 200 °C (392 °F), %	19
Compression Set in Nitrogen ⁴ —O-ring, 336 hr at 250 °C, %	35
Upper Service Temperature ⁵ , °C (°F)	250 (482)
Lower Service Temperature ⁶ , °C (°F)	-21 (-5.8)
Tg ⁶ , °C (°F)	-1 (30.2)
Tr10 ⁷ , °C (°F)	-7.4 (18.68)
Volume Swell ⁸ , % change	
Steam, 225 °C (437 °F), 672 hr	<5
Ethylenediamine, 90 °C (194 °F), 672 hr	<5
H ₂ S/CO ₂ (65%/35%), 220 °C (428 °F), 672 hr	<5

¹ Not to be used for specification purposes

² ASTM D2240 (pellet test specimens)

³ ASTM D412, (AS568 K214 O-ring test specimens)

⁴ ASTM D395B

⁵ DuPont proprietary test method (anaerobic conditions)

⁶ DuPont proprietary test method

⁷ ASTM D1329 (slab test specimens)

⁸ ASTM D471 (AS568 K214 O-ring test specimens)



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

	NORSOK 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		
Test conditions				
Gas	90/10 mol% CH ₄ /CO ₂	80/20 mol% CH ₄ /CO ₂		
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	, one every 24 h 5 cycles		
Sample details				
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

TEST CERTIFICATE This document certifies that Kalrez(r) 0090 - K312 "A" O-rings from **DuPont Performance Polymers** meet the requirements of NORSOK M710 [Rev. 2. October 2001] in respect of rapid gas decompression resistance in 10% carbon dioxide at 150 bar and 100°C 90/10 mol% CH₄/ CO₂ gas rature Test pressure 150 bar ression rate: 20 bar/minute Dr Sabine Munch 15/10/2009 16/08/2012 Passed by : Date of first issue Date of last revision MATERIALS ENGINEERING RESEARCH LABORATORY LTD Harthoninum, SGA 0TW, Unlied Kingdom, T: +44 (0) 1462 427850 F: +44 (0) 1462 42785

NORSOK M-710 (Rev. 2) Certificate

TOTAL GS EP PVV 142 (Rev. 5) Qualification

dea Autochten märanäpsen www.jettes.it	
	TEST REPORT*
Rapid Gas	Decompression Test According to
Total G	S EP PVV 142 rev. 5 Procedure
N : CET0973497/6JL/b	Date : 11 January 2012
Attention to r	BUPONT DE NEMOURS INTERNATIONAL SARL 2 CHEMIN DU PAVILLON PO BOX 50 1218 LE GRAND SACONNEX SUISSE
Reference of request : Or	
Specimen supplied by cus 6 O-rings Da	tomer : Pont ^{ru} Kalrez® 0090: 113,67 x 5,33mm
I. Alm and definition of test :	
resistance to rapid gas decompression	4 of Nantes in November 2011, nim at testing the elastorser seal n or explosion decompression. The procedure is TOTAL General 5 concerning O-rings used in industrial valve industry.
2. Component tested :	
Elsnoomer Material : • Manufacturer : DuPost de Ni • Becference : (81349 / compo • Batch number : 1011450707 • Production period : (0106/20 Kaler@B in a registered tradema	und: Kalrez® 0090 Production unit Location : • Town : Newsk
Oving nominal dimension • Cross- section : 113,67 mm	Internal diameter : 5,33 mm
3.Test conditions 1	
 Fluid: 80 % CH₆, 20 % CO₂ Temperature: 75°C ± 2 °C 	 Number of decompression : 5
 Decompression rate : 190 to Soaking times : 72 h and 4 ti 	0 bar in 90 s (linear decompression) mes 48 h
 Nomisal grove fill : 73 % 	 Nominal axial compression 13.7%
Actual grove fill : 72.6 % Actual grove fill : 72.6 %	 Actual axial compression : 13.9 %
 No visible crack on the exter 	nal surface of three O-rings tested simultaneously. The observed cross sections (MT10 rev. 02/10/01) is 0000.
	e criterion of the GS EP PVV 142 Rev. 5. All the results an tailed test report number CET0073407/6J1/am.
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lis obarge of test Steven PASQUEREAU	U Toldental Contact Enemand SAUGER

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