DuPont™ Kalrez® Perfluoroelastomer Parts

DuPont™ Kalrez® Spectrum™ 7375 perfluoroelastomer parts as an alternative to DuPont™ Kalrez® 1050LF perfluoroelastomer parts for the Chemical Processing and Oil & Gas Industries

Technical Information - September 2021

Product Description

Kalrez® 1050LF parts are black products used in applications involving aggressive chemicals such as amines, strong bases, and/or steam and have an upper service temperature of 288 °C. However, production of this legacy product is being discontinued.

Kalrez® 7375 parts are black products that offer excellent amine-resistance, the best performance of any Kalrez® product in steam services, and superior overall chemical resistance. It has an upper service temperature of 300 °C as well as excellent compression set resistance. Kalrez® 7375 parts may be a suitable replacement for Kalrez® 1050LF parts, and physical property comparisons between these products are shown in the table below.

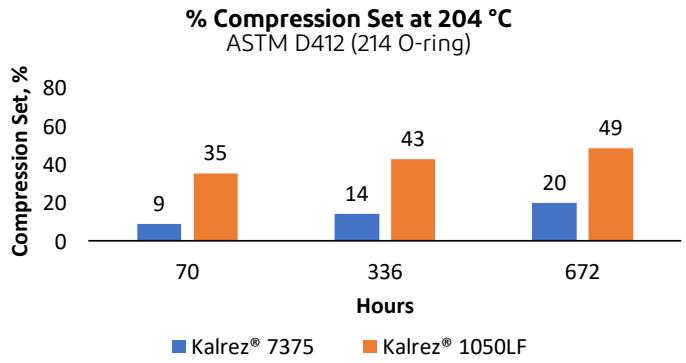
For additional information on Kalrez® 7375 parts performance in specific industrial environments, please contact a Kalrez® Technical Service & Development Engineer who can review and evaluate your specific application and needs in more detail.

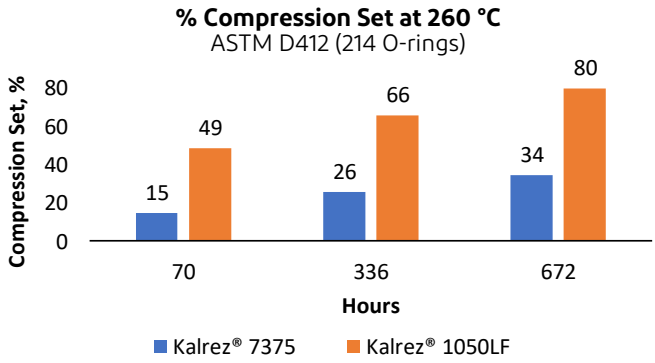
Typical Physical Properties[1]	Kalrez® 1050LF	Kalrez® Spectrum™ 7375
Color	Black	Black
Hardness, Durometer Shore A[2]	82	79
100% Modulus[3], MPa (psi)	12.4 (1800)	10.2 (1480)
Tensile Strength at Break[3], MPa (psi)	18.6 (2700)	16.9 (2450)
Elongation at Break[3], %	125	128
Compression Set[4], %70 hrs.at 204 °C (400 °F)	35	9
Maximum Service Temperature[5], °C (°F)	288 (550)	300 (572)
Lowest Service Temperature[5], °C (°F)	-21 (-6)	-20 (-4)
TR10[6], °C (°F)	-4 (25)	0 (31)

[1] Not to be used for specifications
[2] ASTM D2240 (Pellet test specimens)
[3] ASTM D412 (Dumbbell test specimens)
[4] ASTM D395B & D1414, (AS568 K214 O-ring test specimens)
[5] DuPont proprietary test method; performance will vary with seal design and application specifics
[6] Temperature retractation per ISO2921 or ASTM D1329

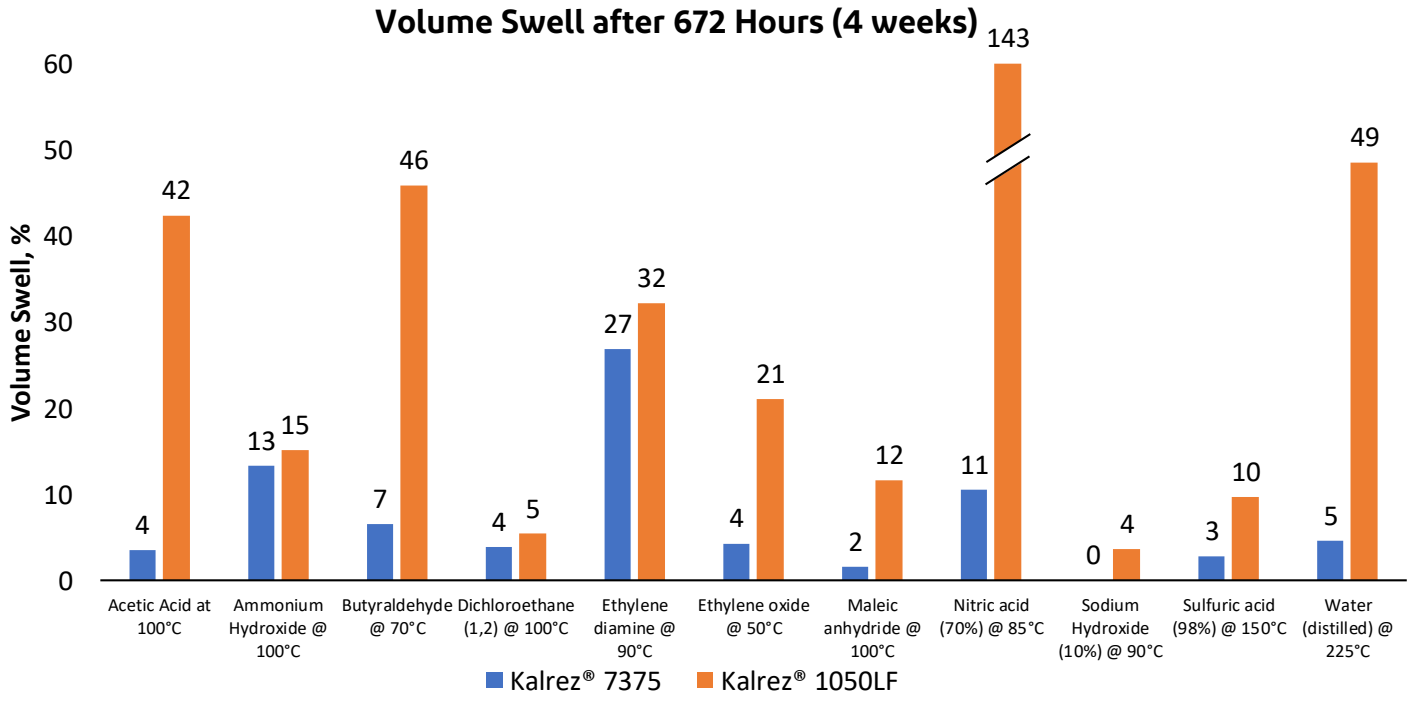
Compression Set

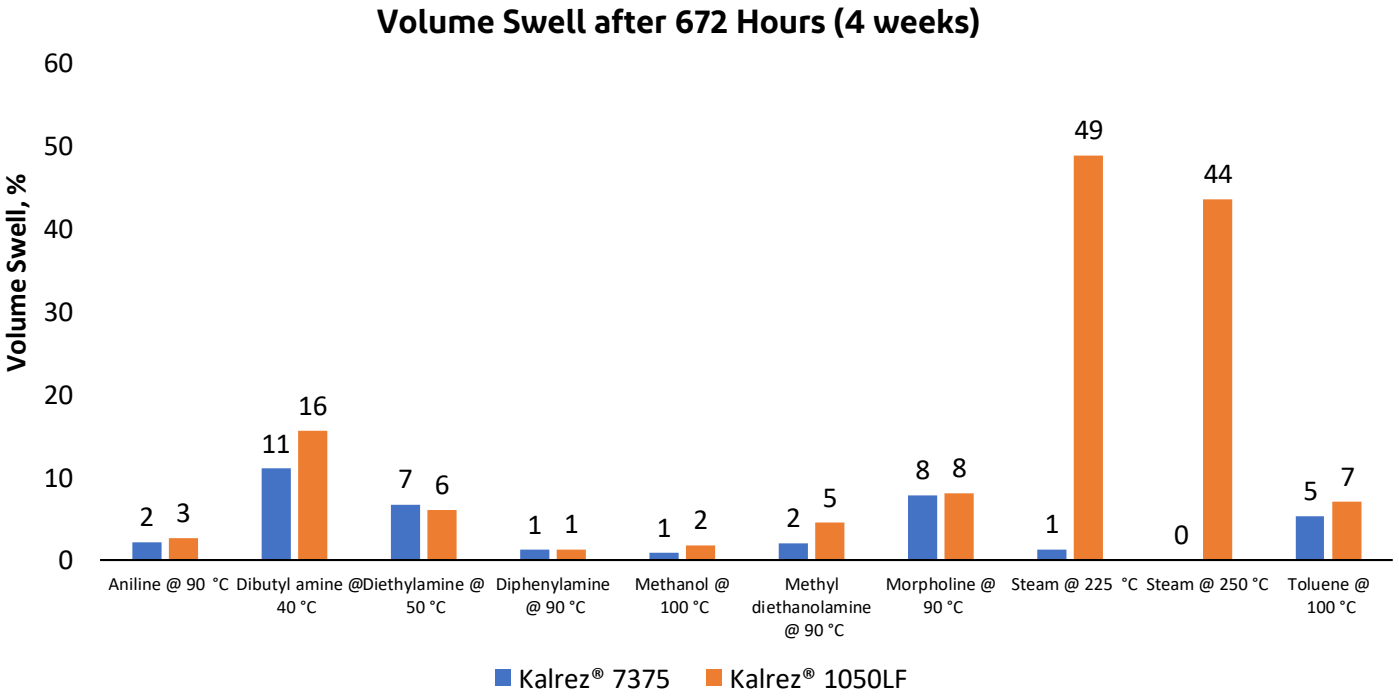
Compression set is a good indicator of long term performance with a lower compression set translating to better long term sealing. The charts below show compression set data for Kalrez® 7375 and Kalrez® 1050LF at 204 °C (left) and 260 °C (right).





Volume Swell:
Volume swell is an excellent indicator of product performance in various chemicals. Excessive volume swell can result in product softening and possible extrusion due to overfilling the groove, or from system pressure. The charts below show a comparison of o-ring volume swell data after fluid exposure in various chemical enviornments for 672 hours (4 weeks). Kalrez® 7375 parts perform as well as or better than Kalrez® 1050LF parts in these aggressive chemicals.





Sour Multi-Phase Fluid Aging:
Kalrez® 7375 parts pass the acceptance criteria for sour aging of elastomers in 10% H_2S and aromatic multi-phase fluids. Aging was conducted at three temperatures and completed in accordance with ISO 23936-2:2011 sour aging criteria. The fluid composition and test details are shown on the table below:

Sour Multi-Phase Fluid Aging		
Volume %	**Phase**	**Composition**
30	Gas	5% CO_2, 10% H_2S, 85% CH_4
	Liquid	Distilled Water
60	Liquid	70% Heptane, 20% Cyclohexane, 10% Toluene
Temperature		**Duration (Days)**
Low	200 °C	2, 7, 14, 28, 42
Medium	215 °C	2, 7, 14, 28, 42
High	225 °C	2, 7, 14, 28, 42
Pressure		60 ± 5 bar (872 psi) initial charge
Specimen Type		ISO 37-2 Tensile bars
Measurements		Tensile, Hardness, Volume, and Visual inspection

Extrusion Resistance:
Extrusion is a common failure mode for sealing applications in high temperature and pressure environments. Under certain conditions, a seal can deform and begin to flow out of the gap between the two metallic surfaces. An internal test procedure was developed by DuPont to further evaluate in the extrusion resistance of various sealing materials under high temperature and pressure conditions. The data in the table below was collected using the DuPont proprietary test method[7] and highlights the increased extrusion resistance for Kalrez® 7375 parts vs. Kalrez® 1050LF parts.

Extrusion Resistance (Pressure in MPa)				
Product/Temp.	**100 °C**	**150 °C**	**200 °C**	**250 °C**
Kalrez® 7375	72.4	50.3	33.6	21.0
Kalrez® 1050LF	36.9	24.3	18.5	15.7

[7]DuPont proprietary test method where the diametrical clearance gap Is 0.2mm (extrusion gap is 0.1 mm)

(08/21) Reference No. KZE-A40105-00-A1021