Kalrez® perfluoroelastomer parts

A Product of DuPont Dow Elastomers

Kalrez® Spectrum™ 6375

Product Overview

For over 25 years, Kalrez parts have been the sealing material of choice for long term reliable sealing in the harshest chemical environments. Today, elastomeric seals are expected to perform in a variety of even more aggressive chemicals and at higher temperatures. To meet the needs of chemical processors, DuPont Dow has developed a new product that expands on the capabilities of existing Kalrez parts with broader chemical resistance while maintaining the high temperature stability you've come to expect from Kalrez.

Kalrez Spectrum 6375, designed specifically for the chemical process industry, combines new polymer technology with innovative patented curing technology. Compound 6375 is designed to give outstanding performance in the widest possible range of chemicals and temperature. This product is an excellent choice for use in acids, bases, amines, steam, ethylene oxide and many other aggressive chemicals. Mixed streams, once a problem for many chemical processors, can now be handled by 6375. The new curing system also allows for a continuous upper service temperature of 275° C. This is approximately 55° C higher than other products claiming broad chemical resistance. This high temperature stability translates to increased chemical resistance over all temperature ranges, especially if high temperature process excursions occur. This combination of chemical and thermal resistance provides advantages for chemical processors. Today, chemical processors use several perfluoroelastomer parts, including compounds 4079, 1050LF and 2035, to optimize chemical and thermal performance. 6375 may be used in many applications to displace these products.

Table 1 Typical Physical Properties[1]

Hardness, Shore-A	± 5	75
100 % modulus[2]	MPa	7,2
Tensile at break	MPa	15,1
Elongation at break	%	160
Compression set[3], (70 h at 204° C)	%	30
Maximum service temperature	°C	275
Lower service temperature	°C	–20

[1] Not to be used for specifications
[2] ASTM D412, 500 mm/min
[3] ASTM D395 B, O-rings

However, if optimum chemical resistance is required, then applications must be individually reviewed for the optimum compound selection.

Table 2 Chemical Resistance

Compound	Kalrez Spectrum 6375	Kalrez 4079	Kalrez 2035	Kalrez 1050LF
Chemical resistance to:				
Aromatic/Aliphatic oils	+++	+++	+++	+++
Acids	+++	+++	+++	++
Alkalis	+++	+++	+++	+++
Alcohols	+++	+++	+++	+++
Aldehydes	+++	++	+++	+++
Amines	++	0	+	+++
Ethers	+++	+++	+++	+++
Esters	+++	+++	+++	+++
Ketones	+++	+++	+++	+++
Steam/Hot water	+++	0	+++	++
Oxidizers*	+	+	+	+
Ethylene oxide	+++	−−	+++	−−
Hot air	++	+++	+	++

+++ = excellent
++ = very good
+ = good
0 = marginal
− = poor
−− = not recommended
* = for strong oxidizers white compounds like Kalrez 2037 are recommended

Chemical Resistance

For many applications, low volume swell of elastomers is critical to proper operation of equipment. Excessive swell may cause permanent seal failure due to equipment hang-up, extrusion, etc. The following data is the result of lab testing to determine the volume swell of Kalrez Spectrum 6375 when exposed to various fluids. Other physical property testing is needed to further define product performance; however, volume swell is an excellent predictor of performance. The following chemicals were chosen since they are representative of some of the most aggressive applications in the industry. These test results are an indication of the performance of compound 6375; however, all applications are unique, and it is strongly recommended that immersion testing be performed in the actual process fluids.

Table 3 Chemical Resistance

Chemical	Temp. °C	6375 Rating	Nearest Competitive FFKM
Water	225	A	F (70 h)
Glacial acetic acid	100	A	A
Nitric acid (70%)	85	B	C
Sulphuric acid (98%)	150	A	C
Ammonium hydroxide	100	B	B
Ethylene oxide	50	A	A
Epichlorohydrin	100	A	A
Butyraldehyde	70	A	B
Toluene diisocyanate	100	A	B
HCFC 134a	25	A	A

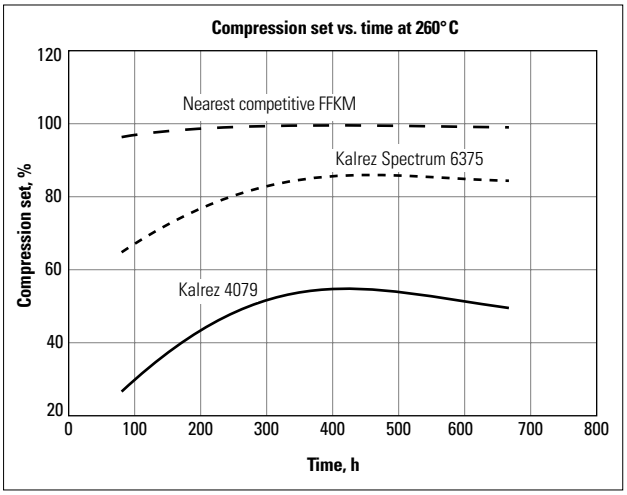
Exposure time = 672 hours

Rating system:

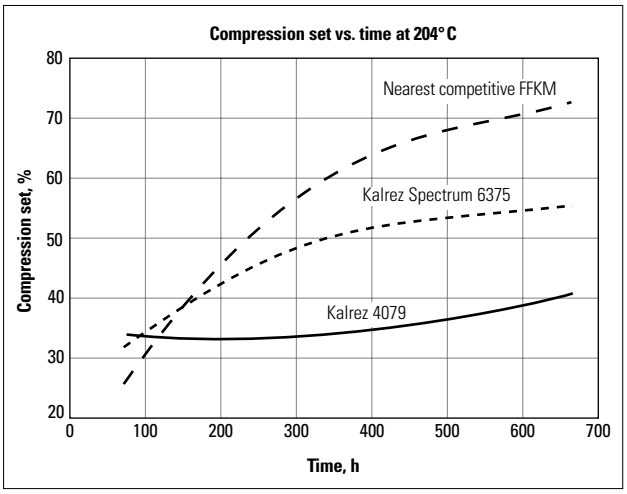
A : 0-10% Volume swell
B : 10-20% Volume swell
C : 20-30% Volume swell
F : >50% Volume swell

Thermal Resistance

Kalrez® Spectrum™ 6375 has excellent heat resistance to go along with the outstanding chemical resistance. New patented curing technology allows this compound to have a continuous use service temperature of 275°C. This results in the best combination of chemical resistance and thermal resistance of any elastomer on the market today. One method of predicting heat resistance is compression set. This is defined as: the amount by which a standard test piece (typically an O-ring or pellet) fails to return to its original thickness after being subjected to a standard compressive load or deflection for a fixed period of time. The charts following show some elastomer comparisons with regard to compression set resistance.



Size 214 O-rings – ASTM D395B



Size 214 O-rings – ASTM D395B

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