Kalrez® perfluoroelastomer parts

A Product of DuPont Dow Elastomers

Compound 4079

(colour: black)

General Description

Kalrez® 4079 is a carbon black filled compound having excellent chemical resistance and mechanical properties. It has a maximum operating temperature of 315 °C, although short excursions to higher temperatures are possible. It exhibits low swell in organic and inorganic acids and aldehydes and has good response to temperature cycling effects. Kalrez 4079 has outstanding hot air ageing properties and exhibits very low and stable compression set at high temperatures. Its relatively low modulus can be a great help in assembly.

This is a general purpose material suitable for around 95% of all applications in all industries. Some of its uses are O-rings, diaphragms, seals, gaskets and other custom parts.
Compound 4079 is not recommended for applications involving water/steam and aliphatic amines at higher temperature. It should never be used in applications involving ethylene oxide or propylene oxide. The physical properties and chemical resistance of compound 4079 are as follows:

Physical Properties[1]

Hardness[2]	Shore A ± 5	75
100% Modulus[3]	MPa psi	7,2 1050
TS at break[3]	MPa psi	16,9 2450
Elongation at break[3]	%	150
Compression set[4], 70 h at 204 °C	%	25

[1] Not to be used for specifications
[2] ASTM D2240
[3] ASTM D412, 500 mm/min (20 in/min)
[4] ASTM D395 B, pellets

Chemical Resistance

Material Compound	Kalrez 4079
Chemical resistance to:	
Aromatic / Aliphatic oils	+++*
Acids	+++*
Alkalis	+++*
Alcohols	+++*
Aldehydes	++
Amines	0
Ethers	+++*
Esters	+++*
Ketones	+++*
Steam / Hot Water	0
Strong Oxidizers	0
Ethylene / Propylene Oxide	– –

+++ = excellent
++ = very good
+ = good
0 = marginal
– = poor
– – = not recommended
* = recommended compound for this chemical

The major exceptions to the use of compound 4079 are listed below:

Hot water and steam
– Use Kalrez® 2035 up to 210°C.
– Use Kalrez 1050LF up to 280°C.
– Use Kalrez 3018 for high pressure applications.

Propylene/Ethylene oxide
– Use Kalrez 2035.

Hot aliphatic amines – above 80°C (the major aliphatic amines are ethylene diamine and hexamethylene diamine)
– Use Kalrez 3018 up to 280°C.
– Use Kalrez 1050LF up to 280°C.

Miscellaneous properties

Many miscellaneous properties are of interest for specific applications. Some of these are unaffected by compound choice while others vary with hardness or extensibility. As an example, coefficient of friction typically increases as hardness decreases.

In general, miscellaneous physical properties are similar to those of Viton® fluoroelastomer.

The following are some of the properties for Kalrez:

Physical Properties

Specific gravity, g/cm^3	1,90 – 2,00

Miscellaneous

Oxygen – Autogenous Ignition Temperature	
Compound 1050 LF	313°C
Compound 1045	370°C

Thermal Properties

Linear coefficient of thermal expansion (25 – 250°C)

$L = L_0 (1 + a\Delta T)$

$a = 2{,}3 \times 10^{-4}/°C$

Specific heat

at 50°C = 0,945 J/g (0,226 cal/g)
at 100°C = 0,974 J/g (0,233 cal/g)
at 150°C = 1,053 J/g (0,252 cal/g)

Permeation Rates of Gases

Gas	Nitrogen	Oxygen	Helium	Hydrogen	Argon	Krypton	Xenon
Temperature,°C	RT	RT	RT	93	93	93	93
Rate**	0,05	0,09	2,5	113	6,1	9,9	19,9

$$\frac{** \times 10^{-9}\ cm^3 - cm}{s - cm^2 - cm\ Hg\ \Delta P}$$

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