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DuPont™ Kalrez® 4079

For Semiconductor Applications

Technical Information—Rev. 4, July 2010

Product Description

DuPont™ Kalrez® 4079 perfluoroelastomer parts are a black, low compression set product for use in many dry and wet semiconductor process environments. It has excellent chemical resistance, good mechanical properties and outstanding thermal stability. Kalrez® 4079 exhibits low weight loss in reactive plasmas and has good response to temperature cycling effects. It is not recommended for use in amines. A maximum continuous service temperature of 316 °C is suggested. Short excursions to higher temperatures are also possible. Ultrapure post-cleaning and packaging is optional.

Performance Features/Benefits

- Excellent thermal stability
- Excellent chemical resistance
- Excellent compression set resistance
- Good response to temperature cycling effects

Typical O-ring Compression Set Performance* (70 hr data)

Material Tested, % C/S at	204 °C	250 °C	300 °C
Kalrez® 4079	37	41	45
Competitive FFKM A2	43	100	Sample Failed

* ASTM D395B and D1414 (AS568 K214 O-ring test specimens)

Typical Physical Properties[1]	
Hardness Shore A, (pellet)[2]	75
Hardness Shore M, (O-ring)[3]	83
100% Modulus[4], MPa	7.24
Tensile Strength at Break[4], MPa	16.88
Elongation at Break[4], %	150
Compression Set[5], % 70 hr at 204 °C, %	25
Maximum Continuous Service Temperature[6], °C	316

[1] Not to be used for specification purposes
[2] ASTM D2240 (pellet test specimens)
[3] ASTM D2240 and ASTM D1414 (AS568 K214 O-ring test specimens)
[4] ASTM D412 (dumbbell test specimens)
[5] ASTM D395B (pellet test specimens)
[6] DuPont proprietary test method

Kalrez® Offers Excellent Resistance to Chemical Attack

For many applications, low volume swell of elastomers is critical for proper equipment operation. Excessive swell may cause permanent seal failure due to equipment hang-up, extrusion, etc. While other physical property testing may be needed to adequately define product performance in a particular application, volume swell is an excellent indicator of resistance to chemical attack. A summary of the internal and external compatibility tests performed to determine the volume swell of Kalrez® 4079UP in various semiconductor wet process environments is provided in the table on the following page.

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Volume Swell[1], %

Immersion Chemistry	Exposure Conditions	DuPont™ Kalrez® 4079UP[2]
UPDI Water	85 °C, 30 days	2.3
Piranha	25 °C, 30 days	0.1
SC-1	25 °C, 30 days	1.1
SC-2	25 °C, 30 days	0.1
49% HF	25 °C, 30 days	0.6
Sulfuric Acid	120 °C, 30 days	0.8
Nitric Acid	85 °C, 7 days	1.5
n-Methylpyrrolidone	85 °C, 7 days	2.4

[1] The volume swell values above should be used as an approximate indicator of relative compatibility performance. Generally <10% volume swell is desirable.

[2] Testing performed on ultrapure-cleaned AS568 K214 O-ring test specimens.

Visit us at **kalrez.dupont.com** or **vespel.dupont.com**

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