

DuPont™ Kalrez® 6221

Perfluoroelastomer Parts

For Pharmaceutical and Food Handling Applications

Technical Information — August 2015

Product Description

DuPont™ Kalrez® 6221 perfluoroelastomer parts are a white product that provide superior chemical resistance and low contamination from extractables in pharmaceutical and food handling applications where FDA compliance is required. DuPont™ Kalrez® 6221 parts are especially suited for Water for Injection (WFI) systems, Steam-in-Place (SIP) cleaning and other critical systems. Kalrez® 6221 parts are thermally stable up to 260°C (500°F), permitting them to be used in Stage II Sterilization processes, where other elastomers lose their sealing ability. Kalrez® 6221 is available as O-rings. For white custom parts, please refer to Kalrez® LS205 parts.

Typical Physical Properties¹

Color	White
Maximum Application Temperature ² , °C (°F)	260 (500)
Durometer, Shore A ³	70
100% Modulus ⁴ , MPa (psi)	7.24 (1049)
Tensile Strength at Break ⁴ , MPa (psi)	15.16 (2199)
Elongation at Break ⁴ , %	150
Compression Set ⁵ , %, 70 hr at 200 °C (392 °F)	27

¹ Not to be used for specification purposes

² DuPont proprietary test method

³ ASTM D2240 (plied sheet test specimen)

⁴ ASTM D1414

⁵ ASTM D395B (Pellet test specimen)

Aggressive Water Resistance

In aggressive pharmaceutical processing environments, seal failure from excess swelling, embrittlement, or decomposition can cause unscheduled downtime or product contamination. Elastomeric materials that come in contact with highly pure and aggressive water (e.g. WFI) must be chosen with care in order to prolong seal life. The perfluoroelastomer compounds used in Kalrez® parts have been shown to have extremely low, to non-detectable extractable levels in aggressive water systems. Because the perfluoroelastomer polymer in Kalrez® parts is fully saturated, it is also well suited for Ozonated Deionized Water service. Kalrez® parts also exhibit very low swell and loss of mechanical properties after repeated steam cycling.

*For additional information on FDA compliance, please refer to Food Contact Notification (FCN) number 101. USP <87> and <88> class VI compliance was tested at 121°C



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General Chemical Resistance

The overall chemical resistance of EPDMs, silicone elastomers and fluoroelastomers (FKM) is limited by their respective polymer structures. Kalrez® parts, on the other hand, offer the same universal chemical resistance as PTFE, but unlike PTFE, they have elastomeric properties, which help them maintain their sealing capabilities. The following table lists the chemical compatibility of Kalrez® 6221 perfluoroelastomer parts and other elastomers used as sealing materials in the pharmaceutical and food handling industries.

Chemical/Product	Kalrez® 6221	EPDM	Si	FKM
Acetic Acid	A	A	A	B
Acetone	A	A	C	U
Citric Acid	A	A	A	A
Hydrogen Peroxide	A	B	B	B
Isopropyl Alcohol	A	A	A	A
Methyl Ethyl Ketone	A	A	U	U
Mineral Oil	A	U	B	A
NaOH	A	A	B	B
Nitric Acid	A	B	B	A
Sodium Hypochlorite	A	B	B	A
Soybean Oil	A	C	A	A
Steam (<150°C)	A	A	C	C
Steam (>150°C)	A	C	U	U
Toluene	A	U	U	A
Xylene	A	U	U	A
Maximum Service Temperature	260°C (500°F)	135°C (275°F)	200°C (392°F)	200°C (392°F)

* Data has been drawn from DuPont tests and industry sources. Data is presented for use only as a general guide and should not be the basis of design decisions. Contact DuPont for further information.

A = little or no effect B = slight swelling and/or loss of physical properties
 properties/limited functionality U = not suitable or recommended
 c = moderate to severe swelling and/or loss of physical

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(07/10) Reference No. KZE-A40032-00-A0815 previously KZE-H82109-00-E0710



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