

DuPont™ Kalrez® LS390

Perfluoroelastomer Parts

For Pharmaceutical and Food Handling Applications

Technical Information — September 2016

Product Description



DuPont™ Kalrez® LS390 perfluoroelastomer parts are a grey product for use as sanitary seals in food handling, beverage, and pharmaceutical applications where FDA, USP <87> and <88> Class VI compliance are required. In addition, Kalrez® LS390 parts also meet Japan Pharmacopeia, edition 16*.

Typical problems experienced in sanitary seal applications are usually related to thermal and chemical resistance challenges, compression set (permanent deformation) and high static friction (stiction). These factors can cause intrusion in the production line or dead space, which increases the risk of contamination or leakage unless seals are continually tightened.

Kalrez® LS390 has been designed to address these

issues by offering high hardness properties, low stiction, temperature resistance up to 220°C (428°F) and excellent chemical resistance (Tables 1 and 2) to process chemicals, WFI (water for injection), as well as SIP and/or CIP processes. These properties, enable increased MTBR (Mean Time Between Repair). Because of its unique grey color, LS390 parts are easy to identify for proper material selection and application. For use in applications other than sanitary seals, please contact your DuPont™ Kalrez® perfluoroelastomer parts representative.

Typical Physical Properties¹

Color	Grey
Maximum Application Temperature ² , °C (°F)	220 (428)
Durometer, Shore A ³	88
100% Modulus, MPa	11.16
Tensile Strength at Break ⁴ , MPa	18.60
Elongation at Break ⁴ , %	147
Compression Set ⁵ , 70 hrs. at 200°C (392°F), %	30

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 (AS568-214 O-ring)

*For additional information on FDA compliance, please refer to Food Contact Notification (FCN) number 1116. USP <87> and <88> class VI compliance was tested at 121°C. Japan Pharmacopeia, edition 16 requirements for section 7.03 – Rubber Closure for Aqueous Infusions.



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Table 1: Chemical Immersion Data⁶ – % Volume Swell (168 hrs. exposure)

Chemical/Product	Temp. °C	Kalrez® LS390	General EPDM
CIP AC-101™ ⁷ (5% diluted NaOH)	95	4	22
CIP HOROLITH V ⁷ (5% diluted HNO ₃)	95	17	46
CIP Oxonia Active ⁷ (5,000 ppm Peracetic acid)	95	5	43

Table 2: Chemical Immersion Data⁶ – % Volume Swell (502 hrs. exposure)

Chemical/Product	Temp. °C	Kalrez® LS390	Kalrez® LS205
CIP-100 ⁸	70	1	1
CIP-200 ⁸	70	1	1
Bleach	70	1	0
Distilled water (SIP)	130	6	8

⁶ ASTM D471 (size AS568-214 O-rings)

⁷ ECOLAB

⁸ Steris Life Sciences

Application Success Stories

Listed below are application success stories with Kalrez® Life Sciences Products. Additional application success stories are available upon request. Please contact a Kalrez® Application Engineer for more information.

Customer: Major Japanese Pharmaceutical Manufacturer

Kalrez® LS390 has successfully been used in a Japanese infusion-drop product operation that used pure-steam SIP. In this instance, the manufacturer chose Kalrez® LS390 because of its improved chemical resistance and low stiction performance. The company had previously experienced problems with its existing material (silicone rubber seals), which had issues with steam resistance, high stiction and a maintenance period of six months. After switching to Kalrez® LS390, the performance improvements were substantial. Kalrez® LS390 sanitary seals provided excellent resistance to chemicals and pure-steam SIP. The sanitary seals lasted a year without any damage on the contacting surface, which increased productivity, lowered maintenance costs and minimized unscheduled downtime, resulting in a lower total cost of ownership.

Process: Pure Steam (SIP) for Infusion Drop Production Process

Temperature: <140°C

Pressure: <0.4MPa

Evaluation Period: August 2014 through August 2015

Incumbent Seal: Silicone Rubber

Performance Issues w/Incumbent Seal: Poor steam resistance and high “stiction” (sticking) resulted in a more frequent maintenance cycle.

Kalrez® LS390 Performance: Kalrez® LS390 Sanitary Seals lasted for 1 year without any reported performance issues.



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