

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : 'O' RINGS - KALREZ®

1. Product and Company Identification

Product name: Kalrez® 'O' rings
Synonyms: None
Item Numbers: Size dependent - see Edwards Product Catalog for details.

European Contact Details

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24 h Emergency telephone number:

Chemtrec: 1-800-424-9300

2. Composition/Information on Ingredients

Ingredient	% Weight	CAS No	Hazard class*	Risk phrase*
Perfluoroelastomer	55-97	Not allocated	Not applicable	Not applicable
Perfluoroalkylpolyether	< 8	Not allocated	Not applicable	Not applicable
Accelerators and curatives	< 6	Not allocated	Not applicable	Not applicable
Magnesium oxide	0 - 5	1309-48-4	Not applicable	Not applicable
Carbon black	0 - 45	1333-86-4	Not applicable	Not applicable
Fillers may include:				
Polyamide fibres	0 - 20	Not allocated	Not applicable	Not applicable
Polytetrafluoroethylene	0 - 20	9002-84-0	Not applicable	Not applicable
Amorphous silica	0 - 10	7631-86-9	Not applicable	Not applicable
Fumed silica	0 - 10	69012-64-2	Not applicable	Not applicable
Microcrystalline silica	0 - 15	14808-60-7	Not applicable	Not applicable
Blanc fixe	0 - 30	7727-43-7	Not applicable	Not applicable

*Hazard class & Risk phrase. These columns are only completed for ingredients which are classified as hazardous under EU Directive (67/548/EEC, as amended) and are present in sufficient concentration to make the overall substance hazardous. In all other situations, the column will be completed as "Not applicable".

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3. Hazards Identification

EMERGENCY OVERVIEW

These products when properly handled according to good working and hygienic practices are not dangerous to human health and the environment.

If heated to temperatures above 400 °C/752 °F, toxic gases (including hydrogen fluoride) can be evolved.

For short and long term exposure effects see Section 11 Toxicological data.

- Eye Effects:** None under normal conditions of use. Dust or particulate fumes evolved after overheating may cause eye irritation.
- Skin Effects:** None under normal conditions of use.
- Ingestion/Oral Effects:** None under normal conditions of use.
- Inhalation Effects:** None under normal conditions of use. Inhalation of fumes from overheating or burning product, or from smoking tobacco or cigarettes contaminated with the product may cause polymer fume fever, a flu-like illness with chills and fever. Symptoms may not occur for several hours after exposure, and go away in 24-48 hours even in the absence of treatment. The results of inhalation of low concentrations of HF (hydrogen fluoride) evolved from overheated product can initially include symptoms of choking, coughing, and severe eye, nose and throat irritation. This can possibly be followed after a symptomless period of 1 to 2 days by fever, chills, difficulty in breathing, cyanosis, and pulmonary oedema. Acute or chronic overexposure to HF can injure the liver and kidneys.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known for the product as supplied.

NFPA Hazard codes		HMIS Hazard codes		Rating System
Health	0	Health	0	0 = No Hazard
Flammability	0	Flammability	0	1 = Slight Hazard
Instability	0	Reactivity	0	2 = Moderate Hazard
				3 = Serious Hazard
				4 = Severe Hazard

4. First Aid Measures

- Eyes:** No effects requiring first aid are expected during normal use. However, if small particles enter the eye, flush with water for at least 15 minutes. If irritation persists seek medical attention. In case of eye contact with thermally degraded product, immediately flush the eyes with cold running water and seek immediate medical assistance.
- Skin:** No effects requiring first aid are expected during normal use. In case of skin contact with molten/thermally degraded product, immediately flush the affected area with cold running water and seek immediate medical assistance.
- Ingestion/Oral:** No effects requiring first aid are expected during normal use. If hot/thermally degraded product is ingested, do not induce vomiting. Seek immediate medical assistance.

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Inhalation: No effects requiring first aid are expected during normal use. If exposed to fumes evolved from hot/thermally degraded product, remove to fresh air and seek immediate medical assistance. If breathing problems occur, a qualified individual should administer oxygen or artificial respiration as indicated.

Other Information: In all cases of exposure to thermally degraded product, seek immediate medical advice, indicating that hydrogen fluoride is a decomposition product.

5. Fire Fighting Measures

Extinguishing Media: Water, dry powder, foam, carbon dioxide.

Fire and Explosion Hazard: When exposed to temperatures above 204 °C/399 °F, the product can liberate fume particles, carbon monoxide and carbon dioxide.
When exposed to temperatures above 400 °C/752 °F, the product degrades to produce toxic and corrosive gases including carbonyl fluoride, hydrogen fluoride and other fluorinated gases.

Special Protective Equipment for Fire Fighters: Fire fighters should wear NIOSH approved self-contained breathing apparatus (SCBA) and full turnout gear. Wear skin/eye protection adequate to protect against contact with thermally degraded products.

Use acid resistant protective clothing (capable of resisting hydrofluoric acid) to handle residue from a fire involving the product, or cooled parts which may contain thermally degraded product.

For Flammability Properties - see Section 9

6. Accidental Release Measures

No specific actions are required for the product as supplied: collect the spilled items and reuse or dispose as in Section 13.

Refer to Section 5 (Fire Fighting Measures) for handling of overheated/degraded product.

7. Handling and Storage

Handling: Avoid contact with eyes, skin and clothing. Avoid breathing vapours and dust. See Section 5 (Fire Fighting Measures), for information on handling of overheated/degraded material.

Storage: Store in original packaging or in closed containers. Store away from food, drink and tobacco products.

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8. Exposure Controls/Personal Protection

Exposure Limits:

Ingredient	ACGIH - TLV -	OSHA - PEL	Occupational Exposure Limits EH40 (UK)
'O' rings as supplied	No data available	No data available	No data available
Ingredients:			
Polytetrafluoroethylene	None established	None established	No data available
Amorphous silica	No data available	80 mg/m ³ / % SiO ₂ - 8 Hr TWA	No data available
Fumed silica	No data available	None established	No data available
Microcrystalline silica	0.025 mg/m ³ , respirable dust, 8 Hr. TWA, A2	Total dust, (30 mg/m ³ / % SiO ₂ + 2) Respirable dust, (10 mg/m ³ / % SiO ₂ + 2) as 8 Hr TWA's	No data available
Blanc fixe	10 mg/m ³ , total dust, 8 Hr. TWA	15 mg/m ³ , total dust, 8 Hr. TWA 5 mg/m ³ , respirable dust, 8 Hr. TWA	No data available
Magnesium oxide	10 mg/m ³ , 8 Hr. TWA, A4	15 mg/m ³ , total dust, 8 Hr. TWA	No data available
Carbon black	3.5 mg/m ³ , 8 Hr. TWA, A4	3.5 mg/m ³ , 8 Hr. TWA	No data available
Degraded product:			
Hydrogen fluoride (HF)	0.5 ppm (TWA) 2 ppm (ceiling limit value)	No data available	1.8 ppm, 1.5 mg/m ³ (TWA) 3 ppm, 2.5 mg/m ³ (STEL)
Carbonylfluoride (COF ₂)	2 ppm (TWA) 5 ppm (STEL)	2 ppm (TWA)	2.5 mg/m ³ (TWA)

Personal Protection:

Engineering Measures:	None required under normal conditions of use. Provide local ventilation where there is the possibility of overheating of the product.
Respiratory Protection:	None required under normal conditions of use. Refer to Section 5 for protection required where the product has been overheated/degraded.
Hand/Skin Protection:	None required under normal conditions of use. Refer to Section 5 for protection required where the product has been overheated/degraded.
Eye/Face Protection:	None required under conditions of normal use. Refer to Section 5 for protection required where the product has been overheated/degraded.

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Hygiene Measures: Wash hands before breaks and immediately after handling the products.

Other/General Protection: Keep the product away from food, drink and tobacco products. Clean clothing which has been contaminated with overheated product before reuse.

9. Physical and Chemical Properties

Appearance and Odour	Black or grey elastomer. Mild aromatic odour.	Boiling point	No data available	°C/°F
pH (as supplied)	No data available	Freezing Point	No data available	°C/°F
Solubility in Water	Insoluble	Auto Ignition	Not applicable	°C/°F
Volatile Content by Volume	No data available	Flash Point	Not applicable	°C/°F
Specific Gravity	No data available			
Vapour Pressure (mbar)	No data available	Vapour Pressure (Torr)	No data available	

10. Stability and Reactivity

Stability: Stable at normal temperatures and storage conditions.

Material/Conditions to Avoid: Alkali metals and interhalogen compounds.
Temperatures higher than 204 °C/399 °F.

Hazardous Decomposition: When exposed to temperatures above 204 °C/399 °F, carbon monoxide and carbon dioxide are evolved.
When exposed to temperatures above 400 °C/599 °F, hydrogen fluoride and perfluoroolefins are evolved.

Hazardous Polymerisation: Will not occur.

11. Toxicological Information

For a comprehensive description for the various toxicological (health) effects which may arise if the user comes into contact with the substance or preparation refer to Section 3 Hazards Identification.

Animal data:

LD50 value: Amorphous silica: > 10,000 mg/kg (oral, rats)
Blance fixe: > 5000 mg/kg (oral, rats)
Magnesium oxide: 230 mg/kg (oral, dogs)

LC50 value: Magnesium oxide: >173 mg/m³ (inhalation, 2 Hr, cats)

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Other animal information:

Perfluoroalkylpolyether:

Inhalation 4 hour ALC: > 19.54 mg/L in rats Skin absorption ALD: > 17,000 mg/kg in rabbits
Oral ALD: > 25,000 mg/kg in rats

In animal tests the compound was a mild skin and eye irritant. A single inhalation exposure produced non-specific effects such as respiratory irritation. Exposure to thermal decomposition products produced irritation, irregular respiration, tremors and increased liver weight.

Carbon black:

Oral ALD, rat: > 25,100 mg/kg

Repeated inhalation exposure of animals to Carbon black caused inflammation of the respiratory tract, lungs and emphysema. Repeated exposure to high doses of Carbon black by ingestion or skin contact caused no significant toxicological effects.

Amorphous silica:

Animal testing indicates Amorphous silica is a mild eye irritant. It is a negligible to slight skin irritant when tested as a 50% aqueous paste. The dust is not expected to be a skin irritant. Animal testing indicates Amorphous Silica is not a skin sensitiser. Single, repeated and long-term exposure by ingestion to Amorphous Silica caused no significant toxicological effects. Single exposure by inhalation to Amorphous Silica caused no significant toxicological effects.

Crystalline silica:

Oral ALD: > 11,000 mg/kg in male rats

Crystalline Silica is not a skin irritant or a skin sensitiser in animals, but is a mild eye irritant. Single doses of 50 mg of Crystalline Silica administered by intratracheal instillation have resulted in pulmonary fibrosis at 60 and 120 days post exposure in rats. Repeated and chronic exposures as low as 0.7 mg instillation and 12 mg/m³ by inhalation resulted in pulmonary fibrosis, inflammation, oedema and emphysema in animals exposed to Crystalline silica.

Blanc fixe

The compound is untested for skin or eye irritancy, and is untested for animal sensitisation. Toxic effects in animals occurring from repeated inhalation exposures are lung changes.

Magnesium oxide

The compound is a mild skin irritant and an eye irritant.

Carcinogenicity:

The following component ingredients are listed as carcinogens: Microcrystalline silica, Carbon black. (See Section 15 for more information.)

12. Ecological Information

No information is available. Toxicity is expected to be low based on the product's insolubility in water.

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13. Disposal Considerations

The uncontaminated/undegraded product can be sent to landfill, however where possible you should recycle the product.

Alternatively (because of its high fuel value), incinerate the product with energy recovery; the incinerator used must be capable of scrubbing out the acidic products of combustion.

Treatment, storage, transportation, and disposal of the product must be in accordance with all applicable federal, state/provincial, and local regulations.

14. Transport Information

This product is not regulated as dangerous under transport regulations.

PARAMETER	EUROPEAN	CANADIAN TDG	UNITED STATES DOT
Proper Shipping Name	Not applicable	Not applicable	Not applicable
Hazard Class	Not applicable	Not applicable	Not applicable
Identification Number	Not applicable	Not applicable	Not applicable
Shipping Label	Not applicable	Not applicable	Not applicable

15. Regulatory Information

European Regulatory Information

This product has been classified in accordance with the Dangerous Substances Directive (67/548/EEC, as amended) and the Preparations Directive (88/379/EEC, as amended), implemented in the UK as the Chemical (Hazard Information and Packing) Regulations 1994 (CHIP, as amended).

Classified as dangerous to supply : No

Risk Phrases : Not applicable

Safety Phrases : Not applicable

Symbols : None

United States Regulatory Information

Product is a manufactured article not subject to TSCA listing.

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product constitutes an "article" and, as such is exempt from SARA 313 reporting requirements (40 CFR Part 372.38, Paragraph B).

California Proposition 65: Release of ingredients contained in this product to the environment is not anticipated.

The following components of the products are listed as carcinogens:

Material	IARC	NTP	ACGIH
Microcrystalline silica	1	X	A2
Carbon black	2B		

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States Right-To-Know information:

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet, with the exceptions indicated.

SUBSTANCES ON THE PENNSYLVANIA HAZARDOUS SUBSTANCES LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.01% FOR SPECIALHAZARDOUS SUBSTANCES) - Carbon black. Some products may contain: magnesium oxide, amorphous silica, polytetrafluoroethylene, crystalline silica, barium sulphate.

WARNING - SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM - Carbon Black, Crystalline Silica.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS) - Carbon black. Some products may contain: magnesium oxide, amorphous silica, crystalline silica, barium compounds.

Canadian Regulatory Information

WHMIS Classification: Product is a manufactured article not subject to WHMIS regulations.

Product is a manufactured item not subject to DSL listing.

16. Other Information

This MSDS is compiled in accordance with ANSI Z400.1 and the EU Safety Data Sheet Directive 91/155/EEC.

Sources of information for this data sheet:

- DuPont Performance Elastomers L.L.C. "KALREZ FLUOROELASTOMER SEMIFINISHED PARTS AND SHAPES IN SYNONYM LIST KRZ042" Material Safety Data Sheet, KRZ042 Revised 15-FEB-2007

Glossary:

ACGIH - American Conference of Governmental Industrial Hygienists; ALC - Average Lethal Concentration; ALD - Average Lethal Dose; ANSI - American National Standards Institute; Canadian TDG - Canadian Transportation of Dangerous Goods; CAS - Chemical Abstracts Service; Chemtrec - Chemical Transportation Emergency Center (US); CHIP - Chemical (Hazard Information and Packing); DSL - Domestic Substances List; EH40 (UK) - HSE Guidance Note EH40 Occupational exposure limits; HMIS - Hazardous Material Information Service; IARC - International Agency for Research on Cancer; LC - Lethal Concentration; LD - Lethal Dose; NFPA - National Fire Protection Association; NIOSH - National Institute for Occupational Safety and Health; NTP - National Toxicology Program; OSHA - Occupational Safety and Health Administration, US department of Labour; PEL - Permissible exposure limit; SARA (Title III) - Superfund Amendments and Reauthorization Act; SARA 313 - Superfund Amendments and Reauthorization Act, Section 313; SCBA - Self-Contained Breathing Apparatus; STEL - Short Term Exposure Limit; TLV - threshold limit value; TSCA - Toxic Substances Control Act Public Law 94-469; TWA - Time Weighted Average; US DOT - US Department of Transportation; WHMIS - Workplace Hazardous Materials Information System.

Revisions:

Nov 2007 - Data Sheet updated to reflect the latest supplier safety information.

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