TRELLEBORG
SEALING SOLUTIONS

Materials
Chemical Compatibility Guide

Your Partner for Sealing Technology

Your Partner for Sealing Technology

Trelleborg Sealing Solutions is a major international sealing force, uniquely placed to offer dedicated design and development from our market-leading product and material portfolio: a one-stop-shop providing the best in elastomer, thermoplastic, PTFE and composite technologies for applications in aerospace, industrial and automotive industries.

With 50 years of experience, Trelleborg Sealing Solutions engineers support customers with design, prototyping, production, test and installation using state-of-the-art design tools. An international network of over 70 facilities worldwide includes 30 manufacturing sites, strategically positioned research and development centers, including materials and development laboratories and locations specializing in design and applications.

Developing and formulating materials in-house, we utilize the resource of our material database, including over 2,000 proprietary compounds and a range of unique products.

Trelleborg Sealing Solutions fulfills challenging service requirements, supplying standard parts in volume or a single custom-manufactured component, through our integrated logistical support, which effectively delivers over 40,000 sealing products to customers worldwide.

Facilities are certified to ISO 9001:2000 and ISO/TS 16949:2002. Trelleborg Sealing Solutions is backed by the experiences and resources of one of the world's foremost experts in polymer technology: the Trelleborg Group.

ISO 9001:2000

ISO/TS 16949:2002

To obtain the best recommendation for a specific application, please contact your local Trelleborg Sealing Solutions marketing company.

This edition supersedes all previous brochures.

TRELLEBORG
SEALING SOLUTIONS

Content

Sealing materials - Elastomers

Equipment manufacturers and end users expect sealing systems to operate leak free and to maintain long service life. Reliability is crucial to effective low maintenance cost operations. To find the perfect sealing solution in each individual case both material performance and seal design are critically important. One of the main used material groups for sealings are the elastomers. They show good properties like elasticity or good chemical compatibility.

The following tables provide a summary of the various elastomer material groups. Trelleborg Sealing Solutions can offer a large number of materials within each group.

Table I Elastomers

Designation	Trade Name*	Abbreviation		
		ISO 1629	ASTM D 1418	TSS
Acrylonitrile-Butadiene Rubber (Nitrile Rubber)	Europrene® Krynac® Nipol N® Perbunan NT Breon®	NBR	NBR	N
Hydrogenated Acrylonitrile-Butadiene Rubber	Therban® Zetpol®	HNBR	HNBR	H
Polyacrylate Rubber	Noxtite® Hytemp® Nipol AR®	ACM	ACM	A
Chloroprene Rubber	Baypren® Neoprene®	CR	CR	WC
Ethylene Propylene Diene Rubber	Dutral® Keltan® Vistalon® Buna EP®	EPDM	EPDM	E
Silicone Rubber	Elastoseal® Rhodorsil® Silastic® Silopren®	VMQ	VMQ	S
Fluorosilicone Rubber	Silastic®	FVMQ	FVMQ	F
Tetrafluorethylene-Propylene Copolymer Elastomer	Aflas®	FEPM	TFE/P**	WT
Butyl Rubber	Esso Butyl®	IIR	IIR	WI
Styrene-Butadiene Rubber	Buna S® Europrene® Polysar S®	SBR	SBR	WB
Natural Rubber		NR	WR	WR
Fluorocarbon Rubber	Dai-El® Fluorel® Tecnoflon® Viton®	FKM	FKM	V
Perfluoro Rubber	Isolast® Kalrez®	FFKM	FFKM	J
Polyester Urethane Polyether Urethane	Zurcon® Adiprene® Pellethan® Vulcollan® Desmopan®	AU EU	AU EU	WU WU
Chlorosulphonated Polyethylene Rubber	Hypalon®	CSM	CSM	WM
Polysulphide Elastomer	Thiokol®	-	TWT	WY
Epichlorohydrin Elastomer	Hydrin®	CO/ECO	CO/ECO	WO

* Selection of registered trade names
** Abbreviation not yet standardised.

ASTM = American Society for Testing and Materials
ISO = International Organisation for Standardisation

Table II The most important types of synthetic rubber, their grouping and abbreviations

Chemical name	Abbreviation	
	ISO 1629	ASTM D 1418
M - Group (saturated carbon molecules in main macro-molecule-chain)		
- Polyacrylate Rubber	AC**M**	AC**M**
- Ethylene Acrylate Rubber	AE**M**	
- Chlorosulphonated Polyethylene Rubber	CS**M**	CS**M**
- Ethylene Propylene Diene Rubber	EPD**M**	EPD**M**
- Ethylene Propylene Rubber	EP**M**	EP**M**
- Fluorocarbon Rubber	FK**M**	FK**M**
- Perfluoro Rubber	FFK**M**	FFK**M**
O - Group (with oxygen molecules in the main macro-molecule chain)		
- Epichlorohydrin Rubber	C**O**	C**O**
- Epichlorohydrin Copolymer Rubber	EC**O**	EC**O**
R - Group (unsaturated hydrogene carbon chain)		
- Chloroprene Rubber	C**R**	C**R**
- Butyl Rubber	II**R**	II**R**
- Nitrile Butadiene Rubber	NB**R**	NB**R**
- Natural Rubber	N**R**	N**R**
- Styrene Butadiene Rubber	SB**R**	SB**R**
- Hydrogenated Nitrile Butadiene Rubber	HNB**R**	HNB**R**
Q - Group (with Silicone in the main chain)		
- Fluorosilicone Rubber	FVMQ	FVMQ
- Methyl Vinyl Silicone Rubber	VMQ	VMQ
U - Group (with carbon, oxygen and nitrogen in the main chain)		
- Polyester Urethane	A**U**	A**U**
- Polyether Urethane	E**U**	E**U**

Application parameters of elastomers

Elastomers as all other organic chemicals have limited use. External influences such as various media, oxygen or ozone as well as pressure and temperature will affect the material properties and therefore their sealing capability.

Elastomers will amongst others swell, shrink or harden and develop cracks or even tears.

Elastomer heat resistance/swelling in oil

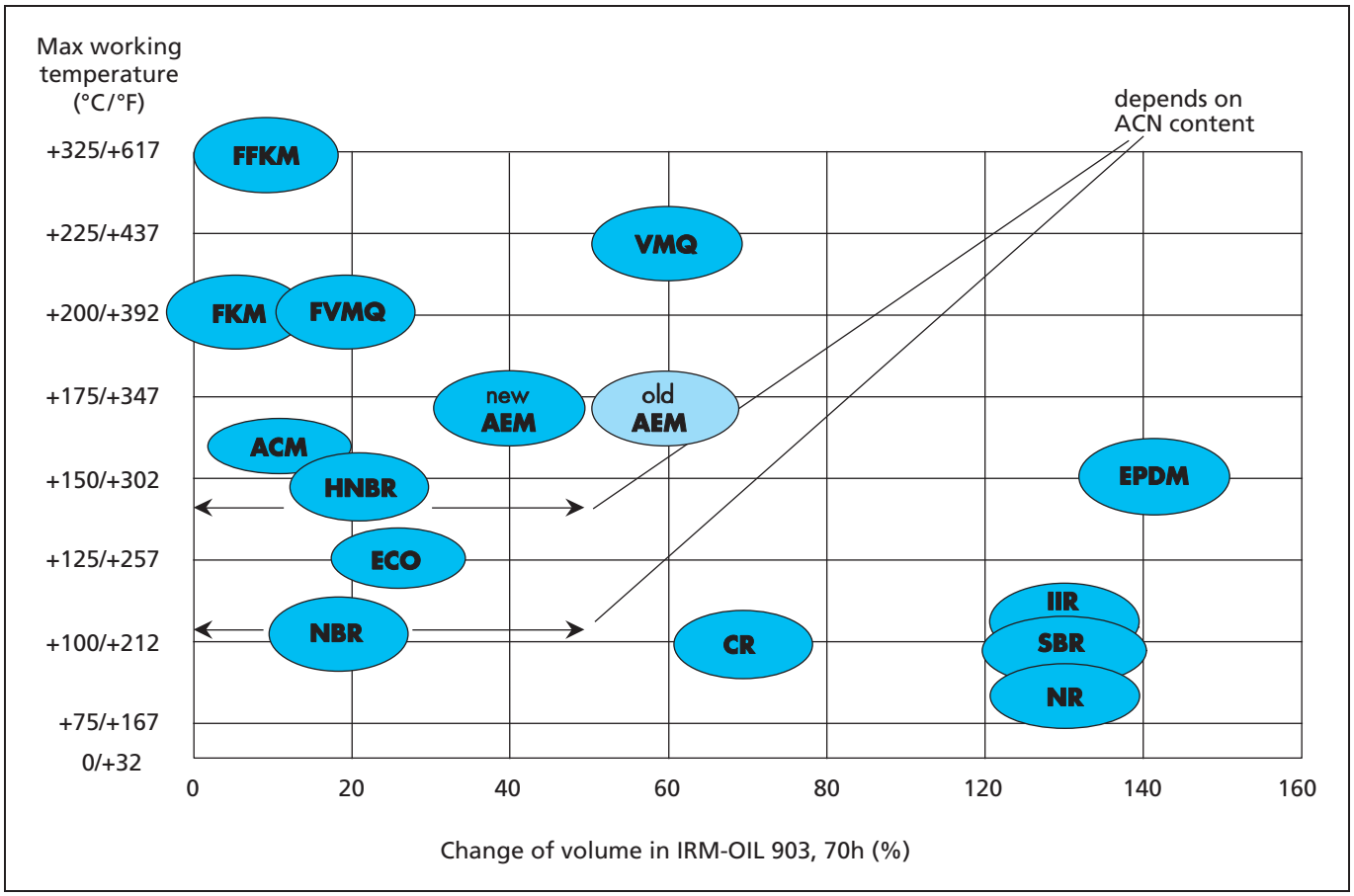

Figure 1 Change of volume in IRM-Oil 903 (old ASTM-Oil No 3)

Temperature range

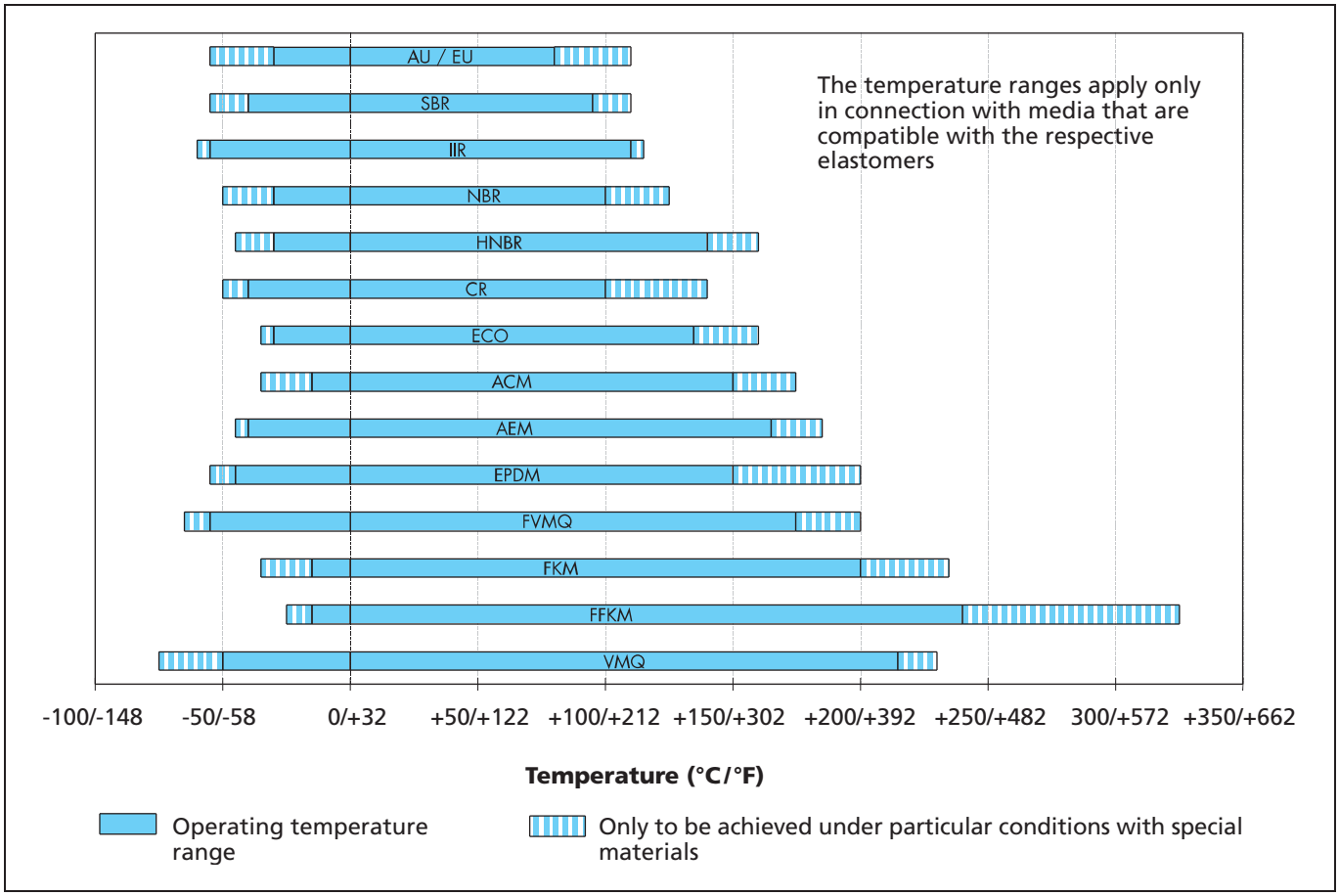

Figure 2 Temperature range of various elastomers

General field of application

Elastomer materials are used to cover a large number of fields of application.

The various elastomers can be characterised as follows:

NBR (Nitrile Butadiene Rubber):

The properties of the Nitrile Rubber depend mainly on the ACN content which ranges between 18% and 50%. In general they show good mechanical properties. The operating temperatures range between -30 °C/-22 °F and +100 °C/+212 °F (for a short period of time up to +120 °C/+248 °F). Suitable formulated NBR can be used down to -60 °C/-76 °F.
NBR is mostly used with mineral based oils and greases.

FKM (Fluorocarbon Rubber)

Depending on structure and fluorine content FKM materials can differ with regards to their chemical resistance and cold-flexibility.

FKM is known especially for its non-flammability, low gas permeability and excellent resistance to ozone, weathering and aging.

The operating temperatures of the Fluorocarbon Rubber range between -20 °C/-4 °F and +200 °C/+392 °F (for a short period of time up to +230 °C/+446 °F). Suitable formulated FKM can be used down to -35 °C/-31 °F. FKM is also often used with mineral based oils and greases at high temperatures.

EPDM (Ethylene Propylene Diene Rubber)

EPDM shows good heat, ozone and aging resistance. In addition they also exhibit high levels of elasticity, good low temperature behaviour as well as good insulating properties.
The operating temperatures of applications for EPDM range between -45 °C/-49 °F and +150 °C/+302 °F (for a short period of time up to +175 °C/+347 °F). With sulphur cured types the range is reduced to -45 °C/-49 °F and +120 °C/+248 °F (for short period of time up to +150 °C/+302 °F).
EPDM can often be found in applications with brake fluids (based on glycol) and hot water.

HNBR (Hydrogenated Nitrile Butadiene Rubber)

HNBR is made via selective hydrogenation of the NBR butadiene groups. The properties of the HNBR rubber depend on the ACN content which ranges between 18% and 50% as well as on the degree of saturation. HNBR shows good mechanical properties.
The operating temperature of HNBR ranges between -30 °C/-22 °F and +140 °C/+284 °F (for a short period of time up to +160 °C/+320 °F) in contact with mineral oils and greases. Special types can be used down to -40 °C/-40°F.

VMQ (Silicone Rubber)

VMQ shows excellent heat resistance, cold flexibility, dielectric properties and especially good resistance to weather, ozone an UV rays.
Specific VMQ formulations are resistant to aliphatic engine and gear oils, water up to +100 °C/+212 °F and high-molecular chlorinated hydrocarbons. The temperature range is between -60 °C/-76 °F and +200 °C/+392 °F (temporary up to +230 °C/+446 °F).

FVMQ (Fluorosilicone Rubber)

FVMQ has a good heat resistance, very good low temperature flexibility, good electrical properties and excellent resistance to weather, ozone and UV rays. FVMQ shows a significant better chemical resistance than standard Silicone especially in hydrocarbons, aromatic mineral oils, fuel and low molecular aromatic hydrocarbons e.g. Benzene and Toluene. The temperature range is between -55 °C/-67 °F and +175 °C/+347 °F (temporary up to +200 °C/+392 °F).

CR (Chloroprene Rubber)

In general the CR materials show relatively good resistances to ozone, weathering, chemicals and aging. Also they show good non-flammability, good mechanical properties and cold flexibility.
The operating temperatures range between -40 °C/-40 °F and +100 °C/+212 °F (for a short period of time up to +120 °C/+248 °F). Special types can be used down to -55 °C/-67 °F. CR materials are found in sealing applications such as refrigerants, for outdoor applications and in the glue industry.

ACM (Polyacrylate Rubber)

ACM shows excellent resistance to ozone, weathering and hot air, although it shows only a medium physical strength, low elasticity and a relatively limited low temperature capability.
The operating temperatures range from -20 °C/-4 °F and +150 °C/+302 °F (for a short period of time up to +175 °C/+347 °F). Special types can be used down to -35 °C/-31 °F.
ACM-materials are mainly used in automotive applications which require special resistance to lubricants containing many additives (incl. sulphur) at high temperatures.

FFKM (Perfluoro Rubber)

Perfluoroelastomers show broad chemical resistance similar to PTFE as well as good heat resistance. They show low swelling with almost all media.
Depending on the material the operating temperatures range between -25 °C/-13 °F and +240 °C/+464 °F. Special types can be used up to +325 °C/+617 °F.
Applications for FFKM can be mostly found in the chemical and process industries and in all applications with either aggressive environments or high temperatures.

Polyurethane (Zurcon® Polyurethane)

Polyurethanes are an exceptionally complex material group. They are individually designed and fit various applications' needs. Therefore it is not possible to unify the materials' properties.
Zurcon® polyurethane materials from Trelleborg Sealing Solutions are customized to appropriate applications and stand out due to their excellent elastic properties and optimum abrasion resistance. Outstanding tensile strength, low compression set and good resistance to O_2 and O_3 are further significant characteristics. Depending on the individual Zurcon® polyurethane type the application temperature range from below -50 °C/-58 °F up to +110 °C/+230 °F, temporary even higher, is feasible.

Chemical compatibility

It is important to recognise that when using this guide, the ratings shown are based on published data and immersion tests. These tests are conducted under laboratory conditions predominantly at room temperature and may not represent adequately the conditions in the field. Relative short term laboratory tests may not pick up all the additives and impurities which may exist in long term service applications.

Care must be taken to ensure that all aspects of the application are considered carefully before a material is selected. For example at elevated temperatures some aggressive fluids can cause a much more marked effect on an elastomer than at room temperature.

Physical properties as well as fluid compatibility need to be considered. Compression set, hardness, abrasion resistance and thermal expansion can influence the suitability of a material for a particular application.

It is recommended that users conduct their own tests to confirm the suitability of the selected material for each application.

Our experienced technical staff can be consulted for further information on specific applications.

Chemical Compatibility Guide for sealing materials

Rating system

A Very good suitability
Elastomer shows little or no effect from exposure. Little effect on performance and physical properties. Very good resistance.

B Good suitability.
Some effects from exposure with some loss of physical properties. Some chemical swelling.

C Limited suitability.
Significant swell and loss of physical properties after exposure. Additional tests should be done.

U The elastomer is unsuitable for application in this media.

– Insufficient information available for service in this media.

A

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Acetaldehyde	U	U	-	B	A	U	B/C	U	U	U	-
Acetamide	-	-	A	A	A	U	A	A	A	A	B
Acetic Acid	C	U	B	A	A	C	A	C	C	C	B
Acetic Acid Chloride	U	U	U	U	A	A	A	A	U	U	U
Acetic Acid Vapors	U	U	C	A	A	U	A	C	U	U	U
Acetic acid, 96-99,5% (Glacial)	U	U	U	B	A	U	B	U	U	U	B
Acetic Anhydride	U	U	C	B	A	U	A	C	U	U	B
Acetone	U	U	U	A	A	U	B	U	U	U	U
Acetophenone	U	U	U	A	A	U	A	U	U	U	U
Acetylacetone	U	U	U	A	A	U	B	U	U	U	U
Acetylchloride	U	U	U	U	A	A	A	A	U	U	U
Acetylene Gas	A	-	B	A	A	A	A	A	A	A	B
Acetylene Tetrabromide	-	U	B	A	A	A	A	-	U	U	-
Acrolein	U	U	C	A	A	U	A	-	C	C	-
Acrylonitrile	U	U	U	U	A	U	C	U	U	U	U
Adipic Acid	U	U	A	A	A	A	A	A	A	A	A
Adipic Aciddiethylester	-	-	-	A	A	U	A	-	U	U	-
Aero Lubriplate	A	A	A	U	A	A	A	A	A	A	B
Aero safe 2300	U	U	U	A	A	U	A	U	U	U	U
Aero safe 2300 W	U	U	U	A	A	U	A	U	U	U	U
Aero Shell 1 AC Grease	A	A	B	U	A	A	A	A	A	A	B
Aero Shell 17 Grease	A	A	B	U	A	A	A	A	A	A	B
Aero Shell 7 A Grease	A	A	B	U	A	A	A	A	A	A	B
Aero Shell 750	B	U	U	U	A	A	A	B	B	B	U
Aero Shell Fluid 4	B	B	U	U	A	A	A	A	A	A	U

Chemical Compatibility Guide

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Aerozene 50 (50% Hydrazine,50% UDMH)	-	U	U	A	B (J9505)	U	A	U	U	U	U
Air	A	A	A	A	A	A	A	A	A	A	A
Alcohol (Methanol)	U	U	A	A	A	U	A	A	A	A	A
Alkyl Arylsulphonic Acid	U	U	C	A	A	U	A	U	C	C	U
Alkyl Benzene	U	U	U	U	A	A	A	A	U	U	U
Allyl Alcohol (2-Propene-1-ol)	U	U	A	A	A	B	A	U	B	B	U
Allyl Chloride (3-Chloro-1-Propene)	-	U	U	U	A	-	A	-	U	U	A
Allyl Ketone	U	U	C	A	A	U	B	U	U	U	B
Aluminium Acetat	U	U	B	A	A	U	A	U	B	B	U
Aluminium Bromide	A	U	A	A	A	A	A	A	A	A	A
Aluminium Fluoride	-	U	A	A	A	A	A	A	A	A	B
Aluminium Nitrate	U	U	A	A	A	A	A	-	A	A	B
Aluminium Phosphate	A	U	A	A	A	A	A	A	A	A	A
Aluminium Sulfate	U	U	A	A	A	A	A	A	A	A	A
Aluminium-Potassiumsulfate Solution	-	-	-	A	A	-	A	-	-	-	-
Aluminum Chloride Solution	A	C	A	A	A	A	A	A	A	A	B
Aluminum Hydroxide Solution	U	U	A	A	A	A	A	A	A	A	A
Aluminum Sulphate Solution	U	-	A	A	A	A	A	A	A	A	A
Ambrex 33 (Mobile)	A	B	B	U	A	A	A	U	A	A	U
Ambrex 830 (Mobile)	A	A	B	U	A	A	A	A	A	A	B
Amines, primary (such as Methyl, Ethyl, Propyl, Allyl)	U	U	U	A	A	U	A	U	U	U	C
Aminoacetic Acid	U	U	A	A	A	A	A	U	B	B	U
Ammonia (gas)	U	U	A	A	A (J9503)	U	A	U	A	A	A
Ammonia (gas, hot)	U	U	B	B	A (J9503)	U	A	U	U	U	U
Ammonia (liquid)	U	U	-	A	A	U	A	-	B	B	-
Ammonia Solution	U	U	-	A	A	U	A	-	B	B	-
Ammonia, anhydrous	U	U	A	A	A (J9503)	U	A	U	A	A	B
Ammonia, aqueous Solution	U	U	A	A	A	U	A	U	C	C	C
Ammonia-Lithium	U	U	U	B	A	U	A	U	B	B	U
Ammonium Acetate	-	U	B	A	A	U	A	-	A	A	-
Ammonium Carbonate	-	U	B	A	A	U	A	-	A	A	-
Ammonium Carbonate Solution	-	-	B	A	A	-	A	-	U	U	-
Ammonium Chloride	B	U	A	A	A	A	A	A	A	A	A
Ammonium Chloride Solution	-	-	A	A	A	-	A	-	A	A	-
Ammonium Fluoride	U	U	B	A	A	B	A	B	A	A	A

Chemical Compatibility Guide

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Ammonium Hydroxide	U	U	A	A	A	U	A	-	U	U	-
Ammonium Hydroxide Solution	U	U	A	A	A	U	A	-	U	U	-
Ammonium Nitrate Solution	U	-	A	A	A	-	A	-	A	A	-
Ammonium Nitrite	-	-	B	A	A	-	A	-	A	A	B
Ammonium Phosphate, Monobasic, Dibasic, Tribasic	-	-	A	A	A	-	A	-	A	A	A
Ammonium Sulfate Solution	U	U	A	A	A	U	A	B	A	A	B
Ammonium Sulfide	U	U	B	A	A	U	A	B	B	B	B
Ammonium Thiocyanate	-	B	-	A	A	-	A	-	A	A	A
Amyl Acetate	U	U	U	A	A	U	A	U	U	U	U
Amyl Alcohol	U	U	B	A	A	B	A	B	B	B	U
Amyl Borate	-	-	A	U	A	-	A	-	A	A	-
Amyl Chloride	U	U	U	U	A	A	A	B	U	U	U
Amyl Naphtalene	U	U	U	U	A	A	A	A	U	U	U
Anderol L-774	A	U	U	U	A	A	A	A	A	A	U
Aniline Chlorohydrate	U	U	B	B	A	B	A	B	B	B	U
Aniline Liquid	U	U	U	A	A	U	A	U	U	U	U
Animal Fats	A	A	B	B	A	A	A	A	A	A	B
Anisole	U	U	U	U	A	U	A	U	U	U	U
Antimony Chloride	B	U	B	A	A	A	A	A	A	A	B
Antimony Chloride, dry	B	B	A	A	A	A	A	A	A	A	A
Aqua Regia (Nitric Acid/Hydrochloric Acid)	U	U	U	U	B	U	U	U	U	U	U
Argon Gas	A	A	A	A	A	A	A	A	A	A	A
Aromatic Fuels (up to 50% Aromatic)	B	B	U	U	A	A	A	A	A	A	U
Aromatic Hydrocarbons (100% Aromatic)	U	U	U	U	A	A	A	A	U	U	U
Arsenic Acid	C	C	A	A	A	A	A	A	A	A	A
Arsenic Acid, Solution	C	C	A	A	A	A	A	A	A	A	A
Asphalt, Emulsion	B	B	B	U	A	A	A	B	B	B	U
ASTM Test Fuel A	B	A	B	U	A	A	A	A	A	A	U
ASTM Test Fuel B	U	U	U	U	A	A	A	A	A	A	U
ASTM Test Fuel C	U	U	U	U	A	A	A	B	B	B	U
ASTM-Oil IRM 902	A	B	B	U	A	A	A	A	A	A	B
ASTM-Oil IRM 903	A	B	U	U	A	A	A	A	A	A	B
ASTM-Oil No.1	A	B	B	U	A	A	A	A	A	A	A
ATM-Brake Fluid (Glycolbased)	U	U	B	A	A	U	A	A	U	U	A
Automatic-Transmission Fluid	U	A	B	U	A	A	A	A	A	A	B
Automotive Gasoline	C	B	U	U	A	A	A	A	A	A	U

B

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Barium Carbonate	-	A	-	A	A	A	A	A	A	A	A
Barium Chloride Solution	U	A	A	A	A	A	A	A	A	A	A
Barium Hydroxide Solution	U	U	A	A	A	A	A	A	A	A	A
Barium Nitrate Solution	U	A	A	A	A	A	A	A	A	A	A
Barium Sulfate	A	A	A	A	A	A	A	A	A	A	A
Barium Sulfide Solution	U	A	A	A	A	A	A	A	A	A	A
Battery Acid (Sulfuric Acid diluted)	U	U	U	A	A	A	A	U	U	U	U
Beef Tallow	C	-	B	U	A	A	A	B	A	A	B
Beer	U	C	A	A	A	A	A	A	A	A	A
Beet Sugar Sap	U	-	B	A	A	A	A	A	A	A	A
Benzaldehyde	U	U	U	B	A	U	A	U	U	U	B
Benzenesulfonic Acid	U	U	B	-	A	A	A	B	U	U	U
Benzine (Gasoline)	C	B	U	U	A	A	A	A	A	A	U
Benzine 50/Benzene 30/Ethanol 20	U	U	U	U	A	B	A	B	U	U	U
Benzine 50/Benzene 50	U	U	U	U	A	B	A	B	U	U	U
Benzine 60/Benzene 40	U	U	U	U	A	B	A	B	U	U	U
Benzine 70/Benzene 30	U	U	U	U	A	A	A	A	B	B	U
Benzine 80/Benzene 20	U	U	U	U	A	A	A	A	B	B	U
Benzoic Acid, Solution	B	U	B	B	A	A	A	A	B	B	B
Benzol (Benzene)	U	U	U	U	A	A	A	B	U	U	U
Benzophenone	U	U	-	B	A	A	A	A	-	-	-
Benzyl Alcohol	U	U	B	B	A	A	A	B	U	U	B
Benzyl Chloride	U	U	U	U	A	A	A	A	U	U	U
Biphenyl	U	-	U	U	A	A	A	B	U	U	U
Bitumen	U	B	U	U	A	A	A	A	U	U	U
Black Liquor	U	U	B	B	A	B	A	-	B	B	-
Blast Furnace Gas	B	U	U	U	A	A	A	B	U	U	A
Bleach Solution	U	U	U	A	A	A	A	B	U	U	U
Bleaching Powder Solution	U	U	B	A	A	A	A	B	C	C	B
Boiler Feed Water	U	U	C	A	A	B	A	B	B	B	C
Bone Oil	A	A	U	U	A	A	A	A	A	A	U
Borax (Sodiumborate)	A	U	B	A	A	A	A	A	B	B	A
Borax Solutions	U	U	U	A	A	B	A	B	B	B	B
Boric Acid	U	B	B	A	A	A	A	A	A	A	A
Brake Fluids (based on glycol ether)	U	U	B	A	A	U	A	U	U	U	U
Brake Fluids (based on mineral oil)	-	A	B	-	A	A	A	-	A	A	-

Chemical Compatibility Guide

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Bromine	U	U	U	U	A	B	B	B	U	U	U
Bromine Solution in Water	U	U	U	U	A	A	A	B	U	U	U
Bromine Vapour	U	U	U	U	A	B	B	B	U	U	U
Bromobenzene	U	U	U	U	A	A	A	B	U	U	U
Bromochlorotrifluoroethan	U	U	U	U	A	A	A	B	U	U	U
Bunker Oil	A	B	U	U	A	A	A	A	B	B	B
Butadiene	U	U	U	U	A	B	A	B	U	U	U
Butandiol	-	U	B	A	A	U	A	U	A	A	U
Butane	A	B	B	U	A	A	A	A	A	A	U
1-Butanethiol	U	-	U	U	A	A	A	U	U	U	U
Butanole	U	U	B	B	A	A	A	A	A	A	B
Butantriol	A	B	B	A	A	A	A	A	A	A	A
Butene	-	B	C	U	A	A	A	B	B	B	U
Buthylphenol	U	U	U	U	A	B	A	-	U	U	U
Butter	B	B	B	B	A	A	A	A	A	A	B
Buttermilk	U	A	A	A	A	A	A	A	A	A	A
Butyl Acetate	U	U	U	B/C	A	U	B/C	U	U	U	U
Butyl Alcohol	U	U	B	A	A	A	A	A	A	A	B
Butyl Amine	U	U	U	-	A (J9503)	U	A	U	U	U	C
Butyl Carbitol	U	-	C	A	A	C	A	U	U	U	U
Butyl Cellosolve	U	U	C	A	A	U	A	U	C	C	-
Butyl Diglycol	-	-	-	A	A	A	A	-	A	A	-
Butyl Phthalate	U	U	U	A	A	U	A	A	U	U	A
Butyl Pyrocatechol	U	-	-	B	A	A	A	B	U	U	-
Butyl Stearate	-	A	U	U	A	A	A	B	B	B	B
Butylbenzoate	U	-	U	A	A	A	A	A	U	U	-
Butylene	-	B	C	U	A	A	A	B	B	B	U
Butylether	U	U	U	U	A	U	A	U	U	U	U
Butyraldehyd	U	-	U	B	A	U	A	U	U	U	U
Butyric Acid	U	U	C	U	A	A	A	B	B	B	U
Butyric Acid Butyl Ester	U	-	U	B	A	B	A	B	U	U	-

C

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Calcium Acetate	U	B	B	A	A	U	A	U	B	B	U
Calcium Bisulfate	-	A	-	A	A	A	A	A	A	A	A
Calcium Bisulfide Solution	C	C	B	A	A	B	A	C	B	B	C
Calcium Carbonate	-	A	A	A	A	A	A	-	A	A	A
Calcium Carbonate Slurry	U	U	A	A	A	A	A	A	A	A	A
Calcium Chloride	B	B	A	A	A	A	A	A	A	A	A
Calcium Chloride, brine	U	B	A	A	A	A	A	A	A	A	A
Calcium Cyanide	-	-	A	A	A	-	A	-	A	A	A
Calcium Hydroxide Solution	U	B	A	A	A	A	A	A	A	A	A
Calcium Hypochlorite Solution	U	U	B	A	A	A	A	A	C	C	B
Calcium Nitrate	B	B	A	A	A	A	A	A	A	A	B
Calcium Oxide	U	A	-	A	A	A	A	A	A	A	B
Calcium Phosphate Slurry	U	U	B	A	A	A	A	A	A	A	A
Calcium Silikate	-	-	A	A	A	A	A	-	A	A	-
Calcium Sulfate	-	A	-	A	A	A	A	A	A	A	A
Calcium Sulfide	U	A	A	A	A	A	A	A	A	A	B
Calcium Sulfite	U	A	A	A	A	A	A	A	A	A	A
Calcium Thiosulfate	U	A	A	A	A	A	A	A	B	B	A
Caliche Solution (Sodium Nitrate)	U	B	B	A	A	A	A	A	B	B	B
Campher	U	U	B	U	A	B	A	U	A	A	U
Campher Oil	-	-	U	U	A	B	A	-	A	A	-
Cane Sugar Sap	U	-	-	A	A	A	A	A	A	A	A
Carbitol	-	U	B	B	A	B	A	B	B	B	B
Carbolic Acid (Penole)	U	C	U	B	A	A	A	A	U	U	U
Carbolineum	U	U	-	B	A	A	A	U	B	B	U
Carbon Dioxide, dry	B	U	B	B	A	A	A	B	A	A	B
Carbon Dioxide, wet	U	U	B	B	A	A	A	B	A	A	B
Carbon Disulfide	U	U	U	U	A	A	A	C	U	U	U
Carbon Monoxide	A	A	B	A	A	B	A	B	A	A	A
Carbonic Acid	U	B	B	A	A	A	A	B	A	A	B
Carboxylic Acids	-	A	A	A	A	A	A	A	A	A	A
Casein	-	-	A	B	A	A	A	A	A	A	A
Castor Oil	A	A	A	B	A	A	A	A	A	A	A
Cellosolve (2-Etho-yethanol)	U	U	U	B	A	U	A	U	U	U	U
Celluloseacetat	-	A	U	B	A	U	A	-	A	A	A
Chile Salpetre (Sodium Nitrate)	U	B	B	A	A	A	A	A	B	B	B

Chemical Compatibility Guide

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Chinawood Oil	-	C	B	U	A	A	A	A	A	A	U
Chloracetic Acid	U	U	U	A	A	U	A	B	U	U	U
Chloracetic Acid Ethylester	U	U	U	U	A	A	A	B	U	U	U
Chloric Acid	U	U	U	B	A	B	A	U	U	U	U
Chloride of Lime	U	U	U	A	A	A	A	A	U	U	B
Chlorine Dioxide	U	-	U	C	B	A	A	B	U	U	-
Chlorine gas, anhydrous	-	-	C	A	A	A	A	-	C	C	-
Chlorine Water	U	U	U	B	A	A	A	U	U	U	U
Chlorine, liquid	U	U	U	B	A	A	A	C	U	U	U
Chloroacetaldehyde	U	U	U	A	B	U	A	C	U	U	U
Chloroacetone	B	U	U	A	A	U	B	U	U	U	U
Chloroamine	U	U	A	A	A	U	A	U	A	A	U
Chlorobenzene	U	U	U	U	A	B	A	B	U	U	U
Chlorobromomethane	U	U	U	B	A	B	A	B	U	U	U
Chlorobutadiene	U	U	U	U	A	B	A	B	U	U	U
Chloroform	U	U	U	U	A	B	A	C	U	U	U
Chloromethyl Ether	U	U	U	C	A	U	A	U	U	U	U
Chloronaphthalene	U	U	U	U	A	A	A	B	U	U	U
(o)-Chlorophenol	U	U	U	U	A	A	A	U	U	U	U
Chlorosulfonic Acid	U	U	U	C	A	U	A	U	U	U	U
Chlorothene	U	U	U	U	A	B	B	B	U	U	U
Chlorotoluene	U	U	U	U	A	A	A	B	U	U	U
Chrome Alum	U	-	A	A	A	A	A	-	A	A	A
Chromic Acid	U	U	U	C	A	A	A	C	U	U	C
Chromo sulfuric Acid	U	U	U	U	A	A	A	U	U	U	U
Cider	U	U	B	A	A	B	A	A	A	A	B
CIP fluids, acidic**	U	U	U	A	A	B	A	U	U	U	U
CIP fluids, alkaline	U	U	U	A	A	U	A	U	U	U	U
Citric Acid	U	U	A	A	A	A	A	A	A	A	A
Citrous Oils	-	U	B	U	A	A	A	-	B	B	B
Coal Tar	-	U	-	U	A	B	A	A	B	B	B
Cobalt Chlorite	B	B	A	A	A	A	A	A	A	A	B
Coca-Cola	U	B	B	A	A	B	A	A	A	A	A
Cocoa Butter	-	B	B	U	A	A	A	B	A	A	C
Coconut Grease	A	B	B	U	A	A	A	A	A	A	A
Coconut Oil	A	A	B	U	A	A	A	A	A	A	A
Coconut, Fatty Acid	A	A	B	U	A	A	A	A	A	A	A
Cod-liver Oil	A	A	B	B	A	A	A	A	A	A	B
Coffee	U	U	A	A	A	A	A	A	A	A	A

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Coffee Extract	U	U	A	A	A	A	A	A	A	A	A
Coke Oven Gas	U	U	U	U	A	A	A	B	U	U	B
Copper Acetate Solution	U	U	C	B	A	U	A	U	U	U	U
Copper Ammonium Acetate	U	U	C	A	A	U	A	U	U	U	U
Copper Chloride, Solution	U	B	B	A	A	A	A	A	A	A	A
Copper Cyanide	A	B	A	A	A	A	A	A	A	A	A
Copper Fluoride	U	-	B	A	A	A	A	U	B	B	U
Copper Nitrate	U	U	B	A	A	A	A	U	B	B	U
Copper Sulfate (Blue Vitriol) Solution	U	U	A	A	A	A	A	A	A	A	A
Corn Oil	B	A	B	U	A	A	A	A	A	A	B
Cotton Oil	A	A	C	C	A	A	A	A	A	A	A
Cottonseed Oil	A	A	B	U	A	A	A	A	A	A	B
Cresol	U	U	U	U	A	A	A	C	U	U	U
Crontonaldehyde	U	U	U	A	A	U	A	U	U	U	U
Crude Oil	-	U	U	U	A	A	A	A	B	B	U
Cumene	U	U	U	U	A	A	A	U	U	U	U
Cuprous Ammonia Acetate Solution	U	U	U	A	A	U	A	U	U	U	U
Cyanic Acid	U	-	B	A	A	A	A	B	B	B	-
Cyanic Acid Solution	U	-	B	A	A	A	A	B	B	B	-
Cyclohexane	B	A	C	U	A	A	A	A	A	A	U
Cyclohexanole	-	-	U	U	A	A	A	A	B	B	-
Cyclohexanone	U	U	U	U	A	U	B	U	U	U	U
Cyclohexylamine	U	U	U	C	A (J9503)	U	A	U	U	U	U
(p)-Cymene	U	U	U	U	A	A	A	B	U	U	U

D

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
DDT Solutions (Kerosene Solvent)	B	B	C	U	A	A	A	A	A	A	U
DDT Solutions (Toluene Solvent)	U	U	U	U	A	A	A	A	U	U	U
Decalin (Decahydronaphtalene)	B	U	U	U	A	A	A	A	U	U	U
Decane	A	U	U	U	A	A	A	A	A	A	B
Dextrin	U	U	A	A	A	A	A	A	A	A	A
Dextrose	B	B	-	A	A	A	A	A	A	A	A

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Di-Isobutyl Ketone	U	U	U	A	A	U	A	U	U	U	U
Di-Isobutylene	U	U	U	U	A	A	A	C	B	B	U
Di-Isooctyl Sebacate	U	U	U	B	A	B	A	U	U	U	U
Di-Isopropyl Benzene	U	U	U	U	A	A	A	A	U	U	U
Di-Isopropyl Ketone	U	U	U	A	A	U	A	U	U	U	U
Diacetone	-	B	-	A	A	U	A	U	-	-	-
Diacetone Alcohol	U	U	B	A	A	U	A	U	U	U	U
1,2-Diaminoethane	U	U	B	A	A (J9503)	U	A	U	B	B	U
Diamylamine	U	U	U	A	A (J9503)	U	A	U	U	U	U
Diazinone	-	-	U	U	A	B	A	B	U	U	U
Dibenzyl Sebacate	U	B	U	B	A	B	A	U	U	U	U
Dibenzylether	C	B	-	B	A	C	A	-	U	U	B
Dibromodifluoromethane	U	U	U	B	A	-	A	U	U	U	U
Dibromomethylbenzene	U	U	U	U	A	A	A	B	U	U	U
Dibutyl Ether	U	U	U	U	A	U	A	U	U	U	U
Dibutyl Phthalate	U	-	U	B	A	C	A	B	U	U	C
Dibutyl Sebacate	U	U	U	B	A	B	A	B	U	U	B
Dibutylamine	U	U	U	U	A (J9503)	U	A	U	U	U	U
Dichloro Acetic Acid	U	U	U	U	A	U	A	-	U	U	U
Dichloro Acetic Acid Methylester	U	U	U	A	A	U	A	U	U	U	U
Dichloro-iso-propylene ether	U	B	U	U	A	U	A	U	U	U	U
Dichlorobutane	U	U	U	U	A	A	A	B	B	B	U
Dichlorobutylene	U	U	U	U	A	B	A	U	U	U	U
Dichloroethane	U	U	U	U	A	B	B	U	U	U	U
Dichloroethylene	-	U	U	U	A	B	B	-	U	U	U
Dichloromethane	U	U	U	U	A	B	A	B	U	U	U
Dichloropentane	U	U	U	U	A	A	A	C	U	U	U
3,1-Dichloropropene	-	U	U	U	A	-	A	-	U	U	A
Dicholorobenzene	U	U	U	U	A	A	A	B	U	U	U
Dicyclohexylamine	U	U	U	U	A (J9503)	U	A	U	U	U	U
Diesel Fuel	U	B	U	U	A	A	A	A	A	A	U
Diesel Oil	B	A	U	U	A	A	A	A	A	A	U
Diethanolamine	U	U	U	B	A	U	A	U	U	U	U
Diethyl Amin	U	U	U	B	A (J9503)	U	A	U	U	U	B
Diethyl Aniline	U	U	U	A	A	U	A	U	U	U	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Diethyl Benzene	U	U	U	U	A	A	A	A	U	U	U
Diethyl Carbonate	U	U	U	U	A	A	A	B	U	U	U
Diethyl Ether	U	B	U	B/C	A	U	A/B	U	U	U	U
Diethyl Formaldehyde	U	U	U	A	A	U	A	U	U	U	U
Diethyl Hydrazine	U	U	C	A	A	U	A	U	C	C	U
Diethyl Maleate	U	U	C	A	A	U	A	U	C	C	U
Diethyl Sebacate	U	U	U	B	A	B	A	B	U	U	B
Diethyl Sulfate	-	U	-	-	A	U	A	-	U	U	U
Diethylene Glycol	U	U	A	A	A	A	A	A	A	A	B
Diethylene Triamine	U	U	U	A	A (J9503)	U	A	U	U	U	U
Diglycolic Acid	U	-	B	A	A	A	A	U	U	U	U
Dihexyl Phthalic Acid Ester	U	-	U	-	A	U	A	-	U	U	U
Dihydroxy Tartaric Acid (Tartaric Acid)	U	U	A	B	A	A	A	A	A	A	A
1,4-Dihydroxybenzene	B	-	U	B	A	U	A	B	U	U	U
Dimethyl Amine	U	U	U	B	A (J9503)	U	A	U	U	U	U
Dimethyl Aniline	U	U	U	B	A	U	A	U	U	U	U
Dimethyl Ether	U	B	U	A	A	U	B	U	U	U	U
Dimethyl Formamide	U	U	U	A/B	A/B	U	B	U	U	U	U
Dimethyl Hydrazine	-	-	B	A	A	U	A	U	B	B	U
Dimethyl Ketone	U	U	U	A	A	U	A	U	U	U	U
Dimethyl Phenol	-	-	U	U	A	U	A	U	U	U	U
Dimethyl Phthalate	U	U	U	B	A	B	A	B	U	U	-
Dimethylbutane	A	-	B	U	A	A	A	A	A	A	U
Dinitro Toluene	U	U	U	U	A	U	A	U	U	U	U
Dinitrogene Oxid	A	A	A	B	A	A	A	A	A	A	A
Dioctyl Amine	U	U	U	A	A (J9503)	U	A	U	U	U	U
Dioctyl Phthalate	U	B	U	B	A	B	A	B	U	U	B
Dioctyl Sebacate	U	B	U	B	A	B	A	U	U	U	U
Dioxane	U	U	U	B	A	U	B	U	U	U	U
Dioxolane	-	U	U	B	A	U	A	U	U	U	U
Dipentene	U	U	U	U	A	A	A	U	B	B	U
Diphenyl	U	U	U	U	A	A	A	B	U	U	U
Diphenyl Ether	U	U	U	U	A	B	A	B	U	U	U
Diphenyle Oxide	-	U	-	U	A	A	A	B	U	U	U
Dipropylene Glycol	B	B	B	B	A	B	A	B	B	B	B
Dithionite	-	-	B	A	A	A	A	U	B	B	U
Divinyl Benzene	U	U	U	U	A	A	A	B	U	U	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
DMT (Dimethyl Terephthalate)	U	U	U	A	A	A	A	B	U	U	U
DNCB (Dinitrochlorobenzene)	U	U	U	U	A	A	A	B	U	U	U
Dodecanol	-	-	A	B	A	A	A	-	B	B	-
Domestic Fuel Oils	A	A	B	U	A	A	A	A	A	A	U
Dowtherm A	U	U	U	U	A	A	A	B	U	U	U
Dowtherm E	U	U	U	U	A	A	A	B	U	U	U
Duodecanol (Laurylalcohol)	B	U	A	B	A	A	A	U	B	B	A

E

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Epichlorhydrin	U	U	U	B	A (J9503)	U	A	U	U	U	U
Essential Oils	U	B	U	U	A	B	A	B	U	U	U
Ethane	A	B	B	U	A	A	A	A	A	A	B
Ethanol Amine	U	U	C	B	A (J9503)	U	A	U	C	C	C
Ether	U	U	U	C	A	U	A	U	U	U	U
Ethyl Acetate	U	U	U	B/C	A	U	C	U	U	U	U
Ethyl Alcohol, Ethanol	U	U	A	A	A	U	A	A	A	A	B
Ethyl Benzene	U	U	U	U	A	B	A	B	U	U	U
Ethyl Bromide	U	U	U	U	A	A	A	A	B	B	U
Ethyl Cellulose	U	U	B	B	A	U	A	U	B	B	U
Ethyl Hexanole	U	U	A	A	A	A	A	A	A	A	B
Ethyl Oxalate	U	A	U	A	A	A	A	B	U	U	U
Ethyl Pentachlorobenzene	U	U	U	U	A	A	A	B	U	U	U
Ethyl Pyridine	U	U	U	A	A	C	A	U	U	U	U
Ethyl Sulfate (Diethyl Sulfate)	U	U	A	A	A	U	A	C	U	U	A
Ethylacrylate	U	U	U	-	A	U	A	U	U	U	U
Ethylchloride	U	U	B	B	A	B	A	A	U	U	U
Ethylchloroacetate	-	U	B	B	A	A	A	U	B	B	U
Ethylene	B	B	C	U	A	A	A	A	A	A	U
Ethylene Bromide	U	U	U	C	A	A	A	C	U	U	U
Ethylene Chloride	-	-	B	B	A	B	A	-	-	-	U
Ethylene Chlorohydrin	U	U	B	B	A	U	A	B	U	U	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Ethylene Diamine	U	U	U	A	A (J9503)	U	B	U	U	U	U
Ethylene Dibromide	U	U	U	U	A	A	A	C	U	U	U
Ethylene Dichloride	U	U	U	U	A	A	A	C	U	U	U
Ethylene Glycol	C	B	B	A	A	A	A	A	A	A	C
Ethylene Glycol Ethylether (Cellosolve)	U	U	U	B	A	U	A	U	U	U	U
Ethylene Oxide	U	U	U	B	A (J9503)	U	A	U	U	U	U
Ethylene Silicate	-	B	A	A	A	A	A	A	A	A	-
Ethylene Trichloride	U	U	U	C	A	B	A	B	U	U	U

F

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Fats (animal/vegetable)	A	A	A	U	A	A	A	A	A	A	B
Fatty Acids	A	A	B	U	A	A	A	A	B	B	A
Ferric Chloride Solution	-	A	B	A	A	A	A	A	A	A	B
Ferric Nitrates	B	B	A	A	A	A	A	A	A	A	B
Ferric Sulfate (Ferric Vitrinol)	B	B	A	A	A	A	A	A	A	A	B
Ferric Sulfate Solution	-	A	A	A	A	A	A	A	A	A	B
Fir Oil	U	B	U	U	A	A	A	A	B	B	U
Fish Oil	A	B	B	U	A	A	A	A	A	A	A
Fluorine	U	-	-	U	B	U	U	U	U	U	U
Fluorobenzene	U	-	U	U	A	B	A	B	U	U	U
Fluorosilicic Acid	-	-	B	A	A	A	A	U	B	B	U
Formaldehyde (Formalin-Solution)	U	U	U	A	A	U	A	U	C	C	C
Formaldehyde (Methanal)	U	U	U	A	A	B	A	U	B	B	B
Formamide	-	U	U	A	A (J9503)	B	B	-	B	B	-
Formic Acid	U	U	B	B	A	U	A	U	U	U	U
Freon 11	-	U	U	U	B	B	B	B	A	A	U
Freon 112	-	B	B	U	A	B	B	B	B	B	U
Freon 113	-	B	A	U	B	B	B	U	A	A	U
Freon 114	-	A	A	A	B	B	B	B	A	A	U
Freon 114 B2	-	B	B	U	B	B	B	B	B	B	U
Freon 115	-	B	A	A	B	B	B	B	A	A	U

Chemical Compatibility Guide

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Freon 12	-	B	A	B	B	B	B	U	B	B	U
Freon 13	-	B	A	A	B	B	B	U	A	A	U
Freon 13 B1	-	B	A	A	B	B	B	U	A	A	U
Freon 134 a	-	-	-	A	B	-	-	-	A	-	-
Freon 14	-	A	A	A	B	B	B	B	A	A	U
Freon 142 b	-	-	A	A	B	U	U	-	A	A	U
Freon 152 a	-	-	A	A	B	U	U	-	A	A	-
Freon 21	U	B	B	U	A	U	U	B	U	U	U
Freon 218	-	-	A	A	B	A	A	-	A	A	-
Freon 22	B	U	A	A	B	U	U	U	U	U	U
Freon 31	-	B	A	A	B	U	U	B	U	U	U
Freon 32	-	B	A	A	B	U	U	B	A	A	U
Freon 502	-	-	A	A	B	B	B	-	B	B	A
Freon BF	-	U	B	U	B	A	A	-	B	B	U
Freon C316	-	-	A	A	B	-	-	-	A	A	U
Freon C318	-	-	A	A	B	B	B	B	A	A	U
Freon MF	-	B	U	U	B	B	B	-	B	B	U
Freon PCA	-	A	A	U	B	B	B	-	A	A	U
Freon T-P35	-	A	A	A	B	A	A	-	A	A	A
Freon TA	-	A	A	A	B	U	U	-	A	A	A
Freon TC	-	A	A	B	B	A	A	-	A	A	U
Freon TF	-	A	A	U	B	A	A	U	A	A	U
Freon TMC	-	B	B	B	B	A	A	-	B	B	U
Freon TWD602	-	A	B	A	B	A	A	U	B	B	-
Fruit Juices	U	U	B	A	B	B	B	A	B	B	A
Fumaric Acid	U	-	B	-	A	A	A	A	A	A	B
Furan	U	U	U	U	A	U	U	U	U	U	U
Furfural (Furfurylaldehyde)	-	C	-	-	A	-	A	-	C	C	-
Furfurylalcohol	-	C	-	-	A	-	A	-	-	-	-

G

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Gallic Acid	U	U	B	B	A	A	A	A	A	A	A
Gas Oil	A	A	B	U	A	A	A	A	A	A	B
Gasoline/Alcohol Mix	U	U	U	U	A	B	A	U	B	B	U
Gasoline, 100 Octane	U	B	U	U	A	A	A	A	A	A	U
Gasoline, 130 Octane	U	B	U	U	A	A	A	A	A	A	U
Gasoline, aromatic	U	A	U	U	A	A	A	A	A	A	U
Gasoline, Ethyl and Regular	U	B	U	U	A	A	A	A	A	A	U
Gasoline, Refined	U	B	U	U	A	A	A	A	A	A	U
Gasoline, Sour	U	B	U	U	A	A	A	A	A	A	U
Gasoline, with Mercaptan	U	B	U	U	A	A	A	A	A	A	U
Gelatin	U	U	A	A	A	A	A	A	A	A	A
Generator Gas	B	A	B	U	A	A	A	B	A	A	B
Glauber's Salt	U	U	B	A	A	B	A	B	B	B	B
Glucose solution	U	U	A	A	A	A	A	A	A	A	A
Glucose, aqueos	C	A	A	A	A	A	A	A	A	A	A
Glycerin (Glycerol)	U	U	A	A	A	A	A	A	A	A	A
Glycerol	U	U	A	A	A	A	A	A	A	A	A
Glycerol Chlorohydrin	-	-	U	B	A	B	A	-	U	U	-
Glycerol Triacetate (Triacetin)	U	U	B	A	A	U	A	U	B	B	B
Glycerol Trinitrate (Nitroglycerin)	U	U	B	A	A	A	A	U	U	U	U
Glycine	U	U	A	A	A	A	A	U	B	B	U
Glycolic Acid	U	U	B	A	A	B	A	A	A	A	A

H

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
HEF-3	U	U	U	U	A	A	A	B	B	B	U
Helium Gas	A	A	A	A	A	A	A	A	A	A	A
Heptane	A	B	B	U	A	A	A	A	A	A	C
Hexachloro Acetone	U	U	U	A	A	U	A	U	U	U	U
Hexachloro Butadiene	U	B	U	U	A	A	A	U	U	U	U
Hexachloro Cyclohexane (Lindane)	U	B	U	U	A	A	A	U	-	-	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
1-Hexadecanol	-	-	A	A	A	-	A	-	A	A	-
Hexafluorosilicic Acid	U	U	B	B	A	A/B	A	-	B	B	U
Hexaldehyd	-	U	B	A	A	U	A	U	U	U	B
Hexalin (Cyclohexanol)	-	-	B	U	A	A	A	A	A	A	U
Hexamine	U	U	U	A	A	U	A	U	U	U	U
Hexanal (Capronaldehyde)	U	U	-	B	A	U	A	U	-	-	B
Hexane	A	B	B	U	A	A	A	A	A	A	C
Hexanetriol	B	U	B	A	A	A	A	A	A	A	A
Hexene	A	B	B	U	A	A	A	A	B	B	U
Hexyl Alcohol	U	U	B	B	A	A	A	B	A	A	B
Hydrazine	C	U	B	A	A (J9503)	C	A	B	B	B	U
Hydrazine Hydrate	C	U	B	A	A (J9503)	C	A	B	B	B	U
Hydrobromic Acid	U	U	U	A	A	A	A	C	U	U	U
Hydrochlorique Acid (Muriatic Acid) 37%	U	U	U	B	A	A	A	U	U	U	U
Hydrocyanic Acid	U	-	B	A	A	A	A	B	B	B	-
Hydrofluoric Acid (cold)	U	U	U	B	A	B	A	U	U	U	U
Hydrofluoric Acid (hot)	U	U	-	U	A	U	B	U	U	U	U
Hydrogen Chloride Gas	-	-	C	A	A	A	A	U	U	U	U
Hydrogen Fluoride	U	U	U	A/B	A	-	A/B	U	U	U	U
Hydrogen Peroxide, concentrated	U	U	U	U	A	A - C	B	B	U	U	B
Hydrogen Sulfide	U	U	U	C	A	U	A	U	U	U	U
Hydrogen, Gas	B	A	A	A	A	A	A	C	A	A	C
Hydrogene Bromide, unhydrous	U	U	U	U	A	A	A	U	U	U	B
Hydrogensulfite Leach	B	U	B	A	A	A	A	-	U	U	-
Hydroquinone	B	-	U	B	A	U	A	B	U	U	U
Hydroxy Acetic Acid	U	U	U	A	A	U	A	U	U	U	B
Hydroxylamine	-	-	-	A	A	A	A	A	A	A	A
Hydroxylamine Sulfate	-	-	B	A	A	A	A	A	A	A	A
Hypochlorous Acid	U	-	U	B	A	A	A	-	U	U	-

I

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Ink	A	A	A	A	A	B	A	A	A	A	A
Iodine	-	-	U	B	A	A	A	A	B	B	-
Iodine tincture	U	U	B	B	A	A	A	B	B	B	B
Iodoform	-	-	-	A	A	A	A	-	-	-	-
Iso-Butane	A	A	U	U	A	A	A	A	A	A	U
Iso-Butyl Alcohol	U	U	A	A	A	B	A	A	B	B	A
Iso-Butyl Methyl Ketone	U	U	U	A	A	U	B	U	U	U	U
Iso-Butylene	U	U	U	U	A	A	A	A	A	A	U
Iso-Butyraldehyde	U	U	U	A	A	U	A	U	U	U	U
Iso-Cyanate	-	-	-	A	A	-	A	-	-	-	-
Iso-Dodecane	U	U	B	U	A	A	A	A	A	A	U
Iso-Octane	A	B	B	U	A	A	A	A	A	A	U
Iso-Pentane	A	B	U	U	A	A	A	A	A	A	U
Iso-Propyl-Acetate	U	U	U	B	A	U	B	U	U	U	U
Iso-Propyl-Alcohol	U	U	B	A	A	A	A	A	B	B	A
Iso-Propyl-Benzene	U	U	U	U	A	A	A	B	U	U	U
Iso-Propyl-Chloride	U	U	U	U	A	A	A	B	U	U	U
Iso-Propyl-Ether	U	U	U	A	A	U	A/B	U	U	U	U

J

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Jet Fuel JP3	B	B	U	U	A	A	A	A	A	A	U
Jet Fuel JP4	B	B	U	U	A	A	A	B	A	A	U
Jet Fuel JP5	B	B	U	U	A	A	A	B	A	A	U
Jet Fuel JP6	B	B	U	U	A	A	A	B	A	A	U
JP3 (Fuel)	U	B	U	U	A	A	A	A	A	A	U
JP4 (Fuel)	U	B	U	U	A	A	A	B	A	A	U
JP5 (Fuel)	U	B	U	U	A	A	A	B	A	A	U
JP6 (Fuel)	B	B	U	U	A	A	A	B	A	A	U
JPX (Fuel)	-	-	B	U	A	U	A	U	A	A	U

K

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Kerosene	C	B	U	U	A	A	A	B	A	A	U
Ketchup	U	B	A	A	A	A	A	A	A	A	A

L

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Lactams	U	U	C	U	A	U	A	U	U	U	U
Lactic Acid	U	B	A	B	A	A	A	A	B	B	B
Lanolin	A	A	B	U	A	A	A	A	A	A	B
Latex	U	U	A	A	A	A	A	A	A	A	A
Laughing Gas (N2O)	A	A	A	B	A	A	A	A	A	A	A
Lavender Oil	B	U	U	U	A	A	A	B	B	B	U
Lead Acetate Salt Solution	U	U	U	A	A	U	A	U	C	C	U
Lead Arsenate	-	A	-	A	A	-	A	-	A	A	A
Lead Nitrate	-	U	B	A	A	A	A	A	A	A	B
Lead Nitrate Solution	-	-	A	A	A	-	A	A	A	A	B
Lead Sulfate	U	A	A	A	A	A	A	A	B	B	B
Lemon Juice	U	-	B	A	A	A	A	-	A	A	A
Ligroin	-	B	B	U	A	A	A	A	A	A	U
Lindol	U	U	U	A	A	U	A	C	U	U	C
Linoleic Acid	-	B	-	U	A	A	A	-	B	B	B
Linseed Oil	B	B	B	C	A	A	A	B	A	A	B
Liqueurs	B	B	A	A	A	A	A	A	A	A	A
Lithium Bromide Brine	U	U	A	A	A	A	A	A	A	A	A
Lithium Chloride	U	U	A	A	A	A	A	A	A	A	A
Lithium Hydroxide	U	U	U	A	A	-	A/B	U	U	U	U

M

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Machinery Oil (mineral)	A	A	B	U	A	A	A	A	A	A	B
Maganese Chloride (Solution)	U	U	A	A	A	A	A	A	A	A	A
Magnesium Acetate Solution	U	U	U	A	A	U	A	U	U	U	U
Magnesium Chloride Solution	-	U	A	A	A	A	A	A	A	A	A
Magnesium Hydroxide (Solution)	U	U	B	A	A	B	A	B	B	B	B
Magnesium Silicate (Talcum)	A	A	A	A	A	A	A	A	A	A	A
Magnesium Sulfate (Epson Salts)	U	U	A	A	A	A	A	A	A	A	A
Maleic Acid	C	C	B	A	A	A	A	B	B	B	C
Maleic Anhydride	U	-	U	U	A	B	A	-	U	U	-
Malic Acid	U	U	B	B	A	A	A	A	A	A	B
Margarine	A	B	B	U	A	A	A	A	A	A	B
Mayonaise	-	U	U	U	A	U	A	U	A	A	A
Menthol	U	U	B	B	A	A	A	U	B	B	U
Mercaptans	U	U	U	A	A	U	A	U	U	U	U
Mercuric Chloride Solution	-	-	A	A	A	A	A	A	A	A	A
Mercury	A	A	A	A	A	A	A	A	A	A	A
Mercury Nitrate	-	-	A	A	A	-	A	-	A	A	A
Mesityl Oxide	U	U	U	A	A	U	A	U	U	U	U
Methacrylic Acid	U	U	U	B	A	U	A	U	U	U	U
Methanal	U	U	U	A	A	B	A	U	B	B	B
Methane	B	U	B	U	A	A	A	C	A	A	U
Methanol	U	U	B	A	A	U	A	A	B	B	A
Methoxy Benzene	U	U	U	U	A	U	A	U	U	U	U
Methoxy Butanol	-	-	B	B	A	A	A	-	A	A	-
Methyl Acetate	U	U	B/C	A	A	U	C	U	U	U	U
Methyl Acetoacetate	U	U	U	A	A	U	B	U	U	U	B
Methyl Acrylate	U	U	U	B	A	U	B	U	U	U	U
Methyl Alcohol	U	U	B	A	A	U	A	A	B	B	A
Methyl Amine	U	U	U	A	A (J9503)	U	A	U	U	U	U
Methyl Aniline	U	U	U	B	A	B	A	-	U	U	-
Methyl Bromide	U	U	U	U	A	A	A	A	U	U	U
Methyl Butyl Ketone	U	U	U	A	A	U	B	U	U	U	U
Methyl Carbonate	U	U	U	U	A	U	A	B	U	U	U
Methyl Cellosolve	U	U	U	B	A	U	A	U	U	U	U
Methyl Cellulose	U	B	B	B	A	B	A	U	B	B	B
Methyl Chloride	U	U	U	B	A	B	A	B	U	U	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Methyl Cyclopentane	U	U	U	U	A	B	A	B	U	U	U
Methyl Ethyl Ketone	U	U	U	B	A	U	B	U	U	U	U
Methyl Formate	-	-	U	B	A	U	B	-	U	U	-
Methyl Glycol	U	U	U	B	A	U	A	U	U	U	U
Methyl Glycol Acetate (Ethyleneglycol)	U	U	U	B	A	U	A	-	U	U	B
Methyl Iso-Butyl Ketone	U	U	U	B	A	U	A	U	U	U	U
Methyl Iso-Propyl Ketone	U	U	U	A	A	U	A	U	U	U	U
Methyl Methacrylate	U	U	U	U	A	U	A	U	U	U	U
Methyl Methacrylic Acid Ester	U	U	U	U	A	U	A	U	U	U	U
Methyl Oleate	-	-	-	B	A	A	A	B	U	U	-
Methyl Phenyl Ether (Anisole)	U	U	U	U	A	U	A	U	U	U	U
Methyl Pyrrolidone	-	U	-	A	A	U	A	-	U	U	B
Methyl Salicylate	-	-	U	B	A	-	A	-	U	U	-
Methylene Chloride	U	U	U	B	A	B	A	C	U	U	U
2-Methylpentane	A	U	-	U	A	A	A	U	A	A	U
3-Methylpentane	A	U	-	U	A	A	A	U	A	A	U
Milk	U	B	A	A	A	A	A	A	A	A	A
Milk of Lime	U	U	B	A	A	B	A	B	U	U	B
Mineral Oil	A	A	B	U	A	A	A	A	A/B	A/B	B
Mineral Spirits	C	B	C	U	A	A	A	A	A	A	U
Molasses	U	U	B	A	A	A	A	A	A	A	A
Monobromobenzene	U	U	U	U	A	B	A	U	U	U	U
Monochloroacetic Acid	U	U	U	A	A	U	A	U	U	U	U
Monochloroacetic Acid Ethyl Ester	U	U	U	B	A	U	A	U	U	U	U
Monochlorobenzene	U	U	U	U	A	B	A	B	U	U	U
Monoethanol Amine	U	U	U	B	A (J9503)	U	A	U	U	U	U
Mononitrochlorobenzene	U	U	U	U	A	A	A	A	U	U	U
Morpholine	U	U	C	B	A	-	A	-	U	U	U
Muriatic Acid (HCl) (Hydrochloric Acid)	U	U	-	B	A	A	A	-	U	U	U
Muriatic Acid (HCl), diluted	U	U	B	A	A	A	A	-	B	B	B

N

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Naphtha	B	B	U	U	A	A	A	B	U	U	U
Naphthalene	U	U	U	U	A	A	A	B	U	U	U
Naphthenic Acid	-	-	U	U	A	A	A	A	B	B	-
Naphtolen ZD	U	-	U	U	A	A	A	-	B	B	U
Natural Gas	A	B	B	U	A	A	A	A	A	A	A
Neats Foot Oil	A	A	U	B	A	A	A	A	A	A	B
Neon Gas	A	A	A	A	A	A	A	A	A	A	A
Nickel Acetate	U	U	B	A	A	U	A	U	B	B	U
Nickel Chloride	C	C	B	A	A	A	A	A	A	A	A
Nickel Nitrate	-	-	A	A	A	A	A	-	A	A	A
Nickel Sulfate	U	C	A	A	A	A	A	A	A	A	A
Nitrating Acids	U	U	U	A	A	U	A	U	U	U	U
Nitric Acid, concentrated	U	U	U	U	A	B	A	U	U	U	U
Nitric Acid, fuming	U	U	U	U	A	B	A	U	U	U	U
Nitro Benzene	U	U	U	U	A	U	A	U	U	U	U
Nitro Glycerin	U	U	C	A	A	A	A	U	U	U	U
Nitro Glycol	U	U	B	A	A	A	A	U	U	U	U
Nitro Methane	U	U	U	B	A	U	A	U	U	U	U
Nitro Propane	U	U	U	B	A	U	A	U	U	U	U
Nitro Toluene	U	U	U	U	A	U	A	U	U	U	U
Nitrogen Gas	A	A	A	A	A	A	A	A	A	A	A
Nitrogen Tetroxide	U	U	U	U	-	U	A	U	U	U	U
Nonanol	-	U	-	A	A	A	A	-	U	U	B
Nut Oil	A	B	B	U	A	A	A	A	A	A	B

O

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Octadecane	B	B	B	U	A	A	A	A	A	A	U
Octal	U	B	U	B	A	B	A	C	U	U	C
Octane	U	U	U	U	A	A	A	B	B	B	U
Octanol (Octylalcohol)	U	U	B	A	A	A	A	B	B	B	B

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Octylalcohol	U	U	B	B	A	A	A	B	B	B	B
Octylcresol	U	U	U	U	A	B	A	U	C	C	U
Oil of Turpentine	U	U	U	U	A	A	A	B	B	B	U
Olefin, crude	A	A	U	U	A	A	A	A	A	A	U
Oleic Acid	-	-	U	U	A	A	A	-	A	A	U
Oleic Alcohol	U	U	A	A	A	A	A	U	A	A	U
Oleum (Sulfuric Acid, 0 to 50%)	U	U	U	A	A	A	A	U	U	U	U
Olive Oil	A	U	B	U	A	A	A	B	A	A	B
Ortho Dichloro Benzene	U	U	U	U	A	A	A	B	U	U	U
Oxalic Acid	-	-	B	A	A	A	A	A	B	B	B
Ozone	B	A	B	A/B	A	A	A	A	B/C	U	A

P

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Palm Kernel Oil	A	-	A	U	A	A	A	-	A	A	-
Palm Oil	A	A	U	U	A	A	A	A	A	A	U
Palmitic Acid	U	B	B	C	A	A	A	A	B	B	U
Para Dichloro Benzene	U	U	-	U	A	A	A	B	U	U	U
Paraffin	A	B	A	U	A	A	A	A	A	A	B
Paraffin Oil	A	B	A	U	A	A	A	A	A	A	B
Peanut Oil	A	A	U	U	A	A	A	A	A	A	B
Pectin	A	A	A	A	A	A	A	A	A	A	A
Penta Chloro Diphenyl	U	U	U	U	A	C	A	U	U	U	U
Penta Chloro Phenol	-	U	-	B	A	-	A	-	U	U	U
Pentane	A	U	B	U	A	A	A	U	A	A	U
Pentanol	U	U	A	A	A	B	A	A	B	B	U
Perchloric Acid	U	U	B	B	A	A	A	C	U	U	U
Perchloro Ethylene	U	U	U	U	A	B	A	B	U	U	U
Petroleum	B	B	B	U	A	A	A	B	A	A	B
Petroleum Ether	A	B	B	U	A	A	A	B	A	A	U
Phenol	C	U	U	U	A	B	A	-	U	U	U
Phenyl Benzene	-	U	U	U	A	B	A	-	U	U	-
Phenyl Ether	U	U	U	U	A	U	A	U	U	U	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Phenyl Hydrazine	U	U	U	U	A (J9503)	B	A	U	U	U	U
Phosphine	U	U	B	A	A	B	A	U	U	U	-
Phosphoric Acid	-	U	U	B	A	A	A	C	U	U	C
Phosphoric Acid 45%	C	U	B	A	A	A	A	A	B	B	B
Phosphorous Trichloride	U	U	U	A	A	A	A	-	U	U	U
Photographic Developing Bath	-	B	A	B	A	A	A	A	A	A	A
Phthalic Acid	-	-	B	A	A	B	A	-	B	B	A
Phthalic Anhydride	-	-	-	A	A	-	A	-	-	-	-
Picoline, alpha	-	-	-	A	A	U	A	-	-	-	-
Picric Acid, Aqueous Solution	-	B	A	B	A	A	A	B	B	B	-
Pine Oil	A	A	U	U	A	A	A	A	B	B	U
Pineapple Juice	U	U	A	A	A	A	A	A	A	A	A
Pinene	U	B	B	U	A	A	A	B	B	B	U
Piperidine	U	U	U	U	A	U	A	U	U	U	U
Polyvinyl Acetates	-	-	B	A	A	U	A	-	-	-	-
Potassium Acetate	U	B	B	A	A	B	A	U	B	B	U
Potassium Aluminium Sulfat	-	-	-	A	A	-	A	-	-	-	-
Potassium Bicarbonite	U	U	A	A	A	A	A	A	A	A	B
Potassium Bisulfate	U	U	B	A	A	A	A	B	A	A	B
Potassium Borate	C	U	B	A	A	A	A	B	A	A	B
Potassium Bromate	C	U	B	A	A	A	A	B	A	A	B
Potassium Bromide	U	U	B	A	A	A	A	A	A	A	A
Potassium Carbonate	C	U	B	A	A	A	A	A	A	A	A
Potassium Chlorate	U	U	B	A	A	A	A	-	U	U	-
Potassium Chloride	C	C	B	A	A	A	A	A	A	A	A
Potassium Chromate	U	U	B	A	A	A	A	-	B	B	-
Potassium Cyanide	U	U	B	A	A	A	A	A	A	A	A
Potassium Dichromate	U	C	B	A	A	A	A	U	A	A	B
Potassium Hydroxide (Solution 50%)	U	U	B	A	A	C	A	C	B	B	C
Potassium Hydroxide, Potassium Lye	U	U	B	A	A	U	A	U	B	B	U
Potassium Hypochlorite (Javelle water)	U	U	-	B	A	A	A	B	B	B	B
Potassium Iodide	U	U	B	A	A	A	A	A	A	A	A
Potassium Nitrate	C	C	B	A	A	A	A	A	B	B	A
Potassium Perchlorate	U	U	B	A	A	A	A	-	U	U	-
Potassium Perfluoroacetate	-	-	B	A	A	U	A	U	B	B	-
Potassium Permanganate	C	B	B	A	A	A	A	U	U	U	U
Potassium Persulfate	U	U	B	A	A	A	A	U	U	U	U
Potassium Phosphate	-	-	-	A	A	A	A	-	A	A	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Potassium Sulfate	U	C	B	A	A	A	A	B	A	A	B
Potassium Sulfite	U	C	A	A	A	A	A	A	A	A	A
Propane	B	B	B	U	A	A	A	B	A	A	U
Propanol	U	U	A	A	A	A	A	A	B	B	B
2-Propanone (Acetone)	U	U	U	A	A	U	B	U	U	U	U
2-Propene-1-ol	U	U	A	A	A	A	A	U	B	B	U
Propinyl Alcohol	U	-	A	A	A	A	A	-	A	A	-
Propion Aldehyde	U	U	U	A	A	U	A	U	U	U	U
Propionic Acid	C	U	B	B	A	A	A	U	A	A	U
Propyl Acetate	U	U	U	B	A	U	B	U	U	U	U
Propyl Acetone	U	U	U	A	A	U	A	U	U	U	U
Propyl Amine	U	U	U	U	A (J9503)	U	A	U	U	U	U
Propyl Nitrate	U	U	U	A	A	U	A	U	U	U	U
Propylene	U	U	U	U	A	A	A	B	U	U	U
Propylene Dichloride	-	-	-	U	A	-	A	-	U	U	U
Propylene Glycol	U	U	A	A	A	A	A	-	A	A	-
Propylene Oxide	U	U	U	B	A (J9503)	U	A	U	U	U	U
Pyridine	U	U	U	B	A	B	A	U	U	U	U
Pyrrole	U	U	U	U	A	U	A	B	U	U	B

R

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Rapeseed Oil	B	B	B	U	A	A	A	B	B	B	U
Roast Gas (dry)	A	-	B	A	A	A	A	A	A	A	A
Rosin (Colophony)	U	U	A	A	A	A	A	A	A	A	A

S

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Salicylic Acid	-	A	A	A	A	A	A	-	B	B	-
Sea Water	U	U	B	A	A	B	A	A	A	A	B
Sewage	-	-	B	A	A	A	A	A	A	A	A
Silcone grease	A	A	A	A	A	A	A	A	A	A	U
Silicic Acid	U	-	B	A	A	A	A	-	A	A	-
Silicon Dioxide	-	A	-	A	A	A	A	-	A	A	A
Silicone Oil	A	A	A	A	A	A	A	A	A	A	U
Silver Cyanide Solution	U	U	A	U	A	A	A	A	U	U	U
Silver Nitrate	B	-	B	A	A	A	A	A	B	B	A
Silver Salts	U	U	A	A	A	A	A	A	A	A	A
Skydrol 500	U	U	U	A	A	U	A	U	U	U	U
Skydrol 7000	U	U	U	A	A	B	A	U	U	U	U
Soap Solution	B	B	B	A	A	A	A	A	A	A	A
Soda (Natrium Carbonate)	U	U	A	A	A	A	A	A	A	A	A
Sodium Acetate	U	U	B	A	A	U	A	U	B	B	B
Sodium Benzoate	U	U	B	A	A	A	A	A	A	A	A
Sodium Bicarbonate Solution	U	U	A	A	A	A	A	A	A	A	A
Sodium Bisulfate Solution	U	U	A	A	A	A	A	A	A	A	A
Sodium Bisulfite Solution	U	U	A	A	A	A	A	A	A	A	A
Sodium Borate (Borax)	U	U	A	A	A	A	A	A	B	B	A
Sodium Carbonate (Soda Ash)	U	U	A	A	A	A	A	A	A	A	A
Sodium Carbonate Solution	-	-	A	A	A	A	A	A	A	A	A
Sodium Chlorate	U	B	B	A	A	A	A	U	B	B	U
Sodium Chloride (Common Salt)	U	U	A	A	A	A	A	A	A	A	A
Sodium Chloride Solution	-	-	A	A	A	A	A	-	A	A	-
Sodium Chlorite	-	-	U	A	A	A	A	-	U	U	-
Sodium Cyanide Solution	-	-	A	A	A	-	A	-	B	B	A
Sodium Dichromate	U	U	A	A	A	A	A	-	B	B	B
Sodium Fluoride	-	B	-	A	A	A	A	-	A	A	B
Sodium Hydroxide	C	C	B	A	A	C	A	C	B	B	C
Sodium Hydroxide, Caustic Soda	B	B	B	A	A	B	A	B	B	B	A
Sodium Hypochlorite Solution	U	U	B	A	A	A	A	B	B	B	B
Sodium Nitrate	U	U	B	A	A	A	A	A	B	B	B
Sodium Nitrite	U	U	B	A	A	A	A	U	U	U	U
Sodium Peroxide Solution	U	U	B	A	A	A	A	A	B	B	U
Sodium Phosphate	-	-	B	A	A	A	A	-	A	A	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Sodium Silicate Solution	-	-	A	A	A	A	A	-	A	A	-
Sodium Sulfate (Glauber's Salt) Solution	U	U	B	A	A	B	A	B	B	B	B
Sodium Sulfhydrate Solution	U	-	A	A	A	A	A	A	A	A	A
Sodium Sulfide	U	U	B	A	A	A	A	A	B	B	B
Sodium Sulfite Solution	U	U	A	A	A	A	A	A	A	A	A
Sodium Tetraborate Solution	U	-	B	A	A	A	A	A	B	B	B
Sodium Thiosulfate (Antichlor)	-	-	A	A		A	A	-	B	B	-
Soy Bean Oil	B	B	B	U	A	A	A	A	A	A	B
Sperm Oil	-	-	-	B	A	A	A	-	A	A	-
Spermacetin	U	U	B	U	A	A	A	U	A	A	U
Spirits	B	B	A	A	A	A	A	B	A	A	A
Stannic Chloride Solution	-	-	U	A	A	A	A	A	A	A	B
Starch	B	B	A	A	A	A	A	A	A	A	A
Stearic Acid	A	A	B	B	A	A	A	A	B	B	B
Stoddard Solvent	A	A	B	U	A	A	A	A	A	A	U
Styrene	U	U	U	U	*	A	A	C	U	U	U
Succinic Acid	U	U	B	A	A	A	A	-	A	A	A
Sucrose Sap	U	U	B	A	A	A	A	A	A	A	A
Sugar Solutions	U	U	B	A	A	A	A	A	A	A	A
Sulfur	U	-	A	A	A	A	A	B	U	U	B
Sulfur Chloride	U	U	U	U	A	A	A	B	U	U	U
Sulfur Dioxide (SO2)	U	U	U	A	A	B	A	B	U	U	B
Sulfur Dioxide Liquid (anhydrous)	U	-	U	A	A	U	A	B	U	U	B
Sulfur Dioxide, gaseous	U	-	U	A	A	U	A	B	U	U	B
Sulfur Hexafluoride (SF6)	B	-	A	A	A	B	A	B	B	B	-
Sulfuric Acid (0 to 50%)	U	U	U	A/B	A	A/B	A	U	U	U	U
Sulfuric Acid, diluted	U	U	U	A	A	A	A	U	B	B	U
Sulfurous Acid	U	U	-	B	A	A	A	-	-	-	U

T

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Talcum	A	A	A	A	A	A	A	A	A	A	A
Tallow	U	B	B	B	A	A	A	U	A	A	B

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Tannins	U	B	B	B	A	A	A	A	B	B	B
Tar	U	U	U	U	A	B	A	C	U	U	-
Tartaric Acid	U	U	B	B	A	A	A	A	A	A	A
Tetrachloroethane	U	U	U	U	A	B	A	C	U	U	U
Tetrachloromethane	-	U	U	U	A	A	A	B	U	U	U
Tetrachoroethylene	U	U	U	U	A	A	A	B	U	U	U
Tetraethyl Lead	-	U	U	U	A	A	A	B	B	B	U
Tetrahydrofuran	U	U	U	U	A	U	C	U	U	U	U
Thionyl Chloride	U	U	U	B	A	A	A	U	U	U	U
Thiophene	U	U	U	U	A	U	A	U	U	U	U
Titanium Tetrachloride	U	U	B	B	A	B	A	B	B	B	U
Toluene (Toluol)	U	U	U	U	A	B	A	B	U	U	U
Town Gas	U	U	U	U	A	A	A	B	B	B	B
Transformer Oil	B	A	U	U	A	A	A	A	B	B	B
Tri-Iso-Propyl Benzene	A	A	U	U	A	A	A	-	A	A	U
Triacetin (Glycerine Triacetate)	U	U	B	A	A	U	A	U	B	B	B
Triaryl Phosphate	U	U	U	A	A	A	A	B	U	U	U
Tributoxy Ethyl Phosphate	B	-	B	B	A	B	A	-	U	U	U
Tributyl Marcaptane	U	-	U	U	A	A	A	U	U	U	U
Tributyl Phosphate	U	U	U	B	A	U	A	U	U	U	U
Trichloro Benzene	U	U	U	U	A	A	A	U	-	-	U
Trichloro Ethane	U	U	U	B/C	A	A	A	B	U	U	U
Trichloro Ethyl Phosphate	-	-	U	-	A	U	A	-	U	U	-
Trichloro Ethylene	U	U	U	B/C	A	B	A	B	U	U	U
Trichloroacetic Acid	U	U	U	B	A (J8325)	U	A	U	B	B	B
Tricresyl Phosphate	U	U	U	B	A	B	A	B	U	U	U
Triethanolamine	U	U	-	A	A	-	A	-	-	-	U
Triethyl Borane	-	-	-	-	A	A	A	-	-	-	-
Triethyl Glycol	C	-	-	A	A	A	A	-	A	A	A
Triethylaluminium	-	-	-	U	A	B	A	-	-	-	-
Trifluoro Ethane	U	U	U	U	A	A	A	B	U	U	U
Trinitrotoluene (TNT)	U	B	B	U	A	B	A	B	U	U	-
Trioctyl Phosphate	U	U	U	A	A	B	A	B	U	U	U
Trisodium Phosphate Solution	C	B	B	A	A	A	A	A	A	A	A
Turpentine	B	C	U	U	A	A	A	A	A	A	U

U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Urea	B	U	B	A	A	A	A	A	A	A	A

V

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Vaseline	B	B	B	U	A	A	A	A	A	A	B
Vaseline Oil	U	U	B	U	A	A	A	B	A	A	B
Vegetable Juices	U	U	B	A	A	A	A	A	A	A	A
Vegetable Oils	B	-	B	U	A	A	A	A	A	A	B
Vinegar	U	U	B	A	A	B	A	B	B	B	A
Vinyl Acetate	-	-	-	-	A	-	A	-	-	-	-
Vinyl Chloride, liquid	-	-	-	-	A	-	A	-	-	-	-
Vinylidene Chloride	U	U	U	U	A	B	A	U	U	U	U

W

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Waste Gas (cont. Carbon Dioxide)	A	-	A	A	A	A	A	A	A	A	A
Waste Gas (cont. Carbon Monoxide)	A	A	A	A	A	A	A	A	A	A	A
Waste Gas (cont. Hydrogen Chloride)	-	-	A	A	A	A	A	-	B	B	-
Waste Gas (cont. Hydrogen Fluoride)	-	-	A	A	A	A	A	-	A	A	A
Waste Gas (cont. Nitrous Fumes)	U	-	A	A	A	A	A	B	-	-	U
Waste Gas (cont. Sulfur Dioxide)	-	-	A	A	A	A	A	-	B	B	-
Waste Gas (cont. Sulfuric Acid)	-	-	B	A	A	A	A	-	U	U	-
Water steam < +150 °C/+302 °F	U	U	U	A	A	U	A	B	U	U	B
Water steam > +150 °C/+302 °F	U	U	U	B	A	U	B	U	U	U	U
Water to +80 °C/+176 °F	U	U	B	A	A	B	A	A	A	B	B
Water to +135 °C/+275 °F	U	U	C	A	A	C	A	A	C	U	U

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Water vapour < +140 °C/+284 °F	U	U	U	A	A	U	A	B	C	U	B
Water vapour > +140 °C/+284 °F	U	U	U	B	A	U	A	B	U	U	B
Wax Alcohols	A	-	B	U	A	A	A	-	A	A	A
Wine + Whiskey	U	U	A	A	A	A	A	A	A	A	A
Wood Spirit	U	U	U	B	A	U	A	U	U	U	-

X

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Xenon	A	A	A	A	A	A	A	A	A	A	A
Xylene (Xylol)	U	U	U	U	A	B	A	U	U	U	U
Xylidines (aromatic Amines)	U	U	U	B	A	U	A	U	U	U	U

Y

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Yeast	B	U	A	A	A	A	A	A	A	A	A

Z

Chemical	ACM	AU	CR	EPDM	FFKM (Isolast®)	FKM	FKM Resifluor™ 500	FVMQ	HNBR	NBR	VMQ
Zeolites	-	-	A	A	A	A	A	-	A	A	-
Zinc Acetate	U	U	B	A	A	B	A	U	B	B	U
Zinc Chloride Solutions	U	U	A	A	A	A	A	A	A	A	-
Zinc Sulfate	U	U	A	A	A	A	A	A	A	A	A

Chemical Compatibility Guide for sealing materials and media used in Semiconductor Manufacturing Processes

Rating system

A Very good suitability
Elastomer shows little or no effect from exposure. Little effect on performance and physical properties. Very good resistance

B Good suitability.
Some effects from exposure with some loss of physical properties. Some chemical swelling.

C Limited suitability.
Significant swell and loss of physical properties after exposure. Additional tests should be done.

U The elastomer is unsuitable for application in this media.

– Insufficient information available for service in this media.

Plasma Processes +180 °C/+356 °F

	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
Chemical	J9610	J9650	J9670	J9675	VCT1S
Ammonium Fluoride	U	U	A	A	A
Argon	U	U	A	A	A
Boron Trichloride	U	U	A	A	A
Carbon Tetrachloride	U	U	A	A	A
Chlorine	U	U	A	A	A
Dichlorodifluoromethane (F-12)	U	U	A	A	A
Fluoroform (F-23)	U	U	A	A	A
Freon 152 a	U	U	A	A	A
Helium	U	U	A	A	A
Hexafluoroethane (F-116)	U	U	A	A	A
Hydrogen	U	U	A	A	A
Hydrogen Bromide	U	U	A	A	A
Hydrogen Chloride	U	U	A	A	A
Nitrogen Trifluoride	U	U	A	A	A
Oxygen	U	U	A	A	A
Perfluoropropane	U	U	A	A	A
Silicon Tetrachloride	U	U	A	A	A
Silicon Tetrafluoride	U	U	A	A	A
Sulphur Hexafluoride	U	U	A	A	A
Tetrafluoromethane (F-14)	U	U	A	A	A
Trifluoromethane (F-23)	U	U	A	A	A
Tungsten Hexafluoride	U	U	A	A	A

Wet Processes

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Acetic Acid (30%)	A	A	U	U	A
Acetic Acid, glacial	A	A	U	U	A
Acetone	A	A	U	U	A
Acetophenone, 4-Hydroxy	A	A	U	U	A
ACT 690C	A	A	U	U	A
ACT 935	A	A	U	U	A
ACT 970	A	A	U	U	A
ACT CMI	A	A	U	U	A
ACT K-101	A	A	U	U	A
ACT K-117	A	A	U	U	A
ACT NE-14	A	A	U	U	A
ALEG 310	A	A	U	U	A
Amino Diglycol	A	A	U	U	A
Aminoethoxyethanol	A	A	U	U	-
Ammonia	A	A	U	U	A
Ammonium Fluoride	A	A	U	U	A
Ammonium Hydroxide, conc.	A	A	U	U	A
Aqua Regia	A	A	U	U	A
Boron Tribromide	A	A	U	U	A
Buffered Oxide Etchants (BOE)	A	A	U	U	A
Butyl Acetate	A	A	U	U	A
Butyl diglycol	A	A	U	U	A
Cellosolve	A	A	U	U	A
Chromic Acid	A	A	U	U	A
Citric Acid	A	A	U	U	A
CKI-888	A	A	U	U	A
Copper Sulfate (Blue Vitriol) Solution	A	A	U	U	A
Cyclohexane	A	A	U	U	A
Deionized Water (UPDI)	A	A	U	U	A
Dichlorofluoroethane (F-114b)	A	A	U	U	A
Dichlorotrifluoroethane (F-123)	A	A	U	U	A
Dimethylacetamide	A	A	U	U	A
EKC 265	A	A	U	U	A
EKC 4000PCT	A	A	U	U	A
EKC 830	A	A	U	U	A
Ethanolamine	A	A	U	U	-
Ethoxyethyl Acetate (EGMEEA)	A	A	U	U	A

Chemical Compatibility Guide

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Ethyl Acetate	A	A	U	U	A
Ethyl Lactate	A	A	U	U	A
Gamma-Butyrolcatone	A	A	U	U	A
Hexymethyldisilizane (HMDS)	A	A	U	U	A
Hydrochloric Acid	A	A	U	U	A
Hydrofluoric Acid	A	A	U	U	A
Hydrogen Peroxide	A	A	U	U	A
Hydroxyethylpyrrolidone	A	A	U	U	A
Hydroxylamine	A	A	U	U	-
Isopropyl Alcohol (IPA)	A	A	U	U	A
Methanol	A	A	U	U	A
Methoxy Propyl Acetate	A	A	U	U	A
Methoxydipropanol	A	A	U	U	A
Methoxyethanol (DGMMA)	A	A	U	U	A
Methoxypropanol	A	A	U	U	A
Methyl (n-) Pyrrolidone (nMP)	A	A	U	U	-
Methyl Ethyl Ketone (MEK)	A	A	U	U	A
Methyl Isobutyl Ketone (MIBK)	A	A	U	U	A
MICROPUR	A	A	U	U	A
Monoethanolamine (MEA)	A	A	U	U	-
N-Cyclohexylpyrrolidone	A	A	U	U	-
Nitric Acid	A	A	U	U	A
Ozonated Deionized Water	A	A	U	U	A
Pentamethyldiethylenetriamine (PMDETA)	A	A	U	U	A
Phosphoric Acid	A	A	U	U	A
Phosphorus Oxychloride	A	A	U	U	A
Piranha	A	A	U	U	A
Potassium Hydroxide	A	A	U	U	A
PRS-1000	A	A	U	U	A
PRS-3000	A	A	U	U	A
QZ 3501 Polyimide Developer	A	A	U	U	A
RER 500	A	A	U	U	A
RER 652	A	A	U	U	A
REZI 28	A	A	U	U	A
SC-1 (Standard Clean-1)	A	A	U	U	A
SC-2 (Standard Clean-2)	A	A	U	U	A
Sodium Hydroxide	A	A	U	U	A
Stoddard Solvent	A	A	U	U	A
Sulfuric Acid	A	A	U	U	A
Tetramethyl Ammonium Hydroxide	A	A	U	U	A

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Tetramethylcyclotetrasiloxane (TMCTS)	A	A	U	U	A
TMAH 25%	A	A	U	U	A
TOK 105 Stripper	A	A	U	U	A
TOK 106 Stripper	A	A	U	U	A
Toluene	A	A	U	U	A
Trichloroethylene (TCE)	A	A	U	U	A
Trichlorofluoromethane (F-11)	A	A	U	U	A
Trichlorophenylsilane	A	A	U	U	A
Trichlorosilane	A	A	U	U	A
Trichlorotrifluoroethane	A	A	U	U	A
Trimethyl Borate (TMB)	A	A	U	U	A
Trimethyl Phosphite (TMP)	A	A	U	U	A
Xylene (Xylol)	A	A	U	U	A

Thermal Processes

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Ammonia	U	A	A	U	A
Dichlorosilane	U	A	A	U	A
Hydrogen Chloride	U	A	A	U	A
Nitrogen	U	A	A	U	A
Oxygen	U	A	A	U	A

Gas Deposition +180 °C/+356 °F

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Ammonia	U	U	A	A	A
Ammonium Fluoride	U	U	A	A	A
Ammonium Persulfate	U	U	A	A	A
Antimony Trioxide	U	U	A	A	A
Argon	U	U	A	A	A
Arsenic Trioxide	U	U	A	A	A
Arsine	U	U	A	A	A
Boron Tribromide	U	U	A	A	A
Boron Trichloride	U	U	A	A	A
Boron Trioxide	U	U	A	A	A
Bromide Anhydrous	U	U	A	A	A
Bromide Pentafluoride	U	U	A	A	A
Bromide Trifluoride	U	U	A	A	A
Bromotrifluoroethylene	U	U	A	A	A
Carbon Dioxide	U	U	A	A	A
Chlorine Trifluoride	U	U	A	A	A
Chlorodifluoromethane (F-22)	U	U	A	A	A
Chloropentafluoroethane (F-115)	U	U	A	A	A
Chlorotrifluoromethane (F-13)	U	U	A	A	A
Diborane	U	U	A	A	A
Dichlorodifluoromethane (F-12)	U	U	A	A	A
Dichlorofluoromethane (F-21)	U	U	A	A	A
Dichlorosilane	U	U	A	A	A
Dichlorotetrafluoroethane (F-114)	U	U	A	A	A
Dimethyl Amine (DMA)	U	U	A	A	A
Dimethyl Ether	U	U	A	A	A
Disilane	U	U	A	A	A
Ethylene	U	U	A	A	A
Fluorine	U	U	A	B	A
Fluoroform (F-23)	U	U	A	A	A
Freon 114 (Dichlorotetrafluoroethane)	U	U	B	B	B
Freon 115 (Chloropentafluoroethane)	U	U	B	B	B
Freon 116 (Hexafluoroethane)	U	U	B	B	B
Freon 12 (Dichlorodifluoromethane)	U	U	B	B	B
Freon 124 (Chlorotetrafluoroethane)	U	U	B	B	B
Freon 125 (Pentafluoroethane)	U	U	B	B	B
Freon 13 (Chlorotrifluoromethane)	U	U	B	B	B

Chemical Compatibility Guide

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Freon 134a (Tetrafluoroethane)	U	U	B	B	B
Freon 13b1 (Bromotrifluoromethane)	U	U	B	B	B
Freon 142b (Difluorochloroethane)	U	U	B	B	B
Freon 21 (Dichlorofluoromethane)	U	U	B	B	B
Freon 22 (Chlorofluoromethane)	U	U	B	B	B
Freon 23 (Fluoroform)	U	U	B	B	B
Germane (Germanium Tetrahydride)	U	U	A	A	A
Helium	U	U	A	A	A
Hexafluoroethane (F116)	U	U	A	A	A
Hydrogen	U	U	A	A	A
Hydrogen Bromide	U	U	A	A	A
Hydrogen Chloride	U	U	A	A	A
Hydrogen Fluoride	U	U	A	A	A
Hydrogen Iodide	U	U	A	A	A
Hydrogen Selenide	U	U	A	A	A
Hydrogen Sulfide	U	U	A	A	A
Iodine Pentafluoride	U	U	A	A	A
Isobutane	U	U	A	A	A
Methane	U	U	A	A	A
Methane Thiol	U	U	A	A	A
Methyl Bromide	U	U	A	A	A
Methyl Chloride	U	U	A	A	A
Monoethanolamine	U	U	A	A	A
Nitrogen	U	U	A	A	A
Nitrogen Trifluoride	U	U	A	A	A
Nitrous oxide	U	U	A	A	A
Oxygen	U	U	A	A	A
Ozone	U	U	A	A	A
Perfluoropropane	U	U	A	A	A
Phosgene	U	U	A	A	A
Phosphine	U	U	A	A	A
Potassium Hydroxide	U	U	A	A	A
Silane	U	U	A	A	A
Silicone Tetrabromide	U	U	A	A	A
Silicone Tetrachloride	U	U	A	A	A
Silicone Tetrafluoride	U	U	A	A	A
Sodium Hydroxide	U	U	A	A	A
Sulfur Hexafluoride	U	U	A	A	A
Sulfur Tetrafluoride	U	U	A	A	A
TEOS	U	U	A	A	A

Chemical	FFKM				FKM
	Isolast® Fab™ Range				Resifluor™ 800
	J9610	J9650	J9670	J9675	VCT1S
Tetrafluoromethane (F-14)	U	U	A	A	A
Titanium Tetrachloride	U	U	A	A	A
Trichloroethane	U	U	A	A	A
Trichloromethane	U	U	A	A	A
Trifluoromethane (F-23)	U	U	A	A	A
Trimethyl Amine	U	U	A	A	A
Trimethyl Borate	U	U	A	A	A
Trimethyl Phosphite	U	U	A	A	A
Tungsten Hexafluoride	U	U	A	A	A
Vinyl Chloride	U	U	A	A	A
Vinyl Fluoride	U	U	A	A	A
Xenon	U	U	A	A	A

General quality criteria and storage guidelines

Quality criteria

The cost-effective use of seals and bearings is highly influenced by the quality criteria applied in production. Seals and bearings from Trelleborg Sealing Solutions are continuously monitored according to strict quality standards from material acquisition through to delivery.

Certification of our production plants in accordance with international standards QS 9000/ISO 9000 meets the specific requirements for quality control and management of purchasing, production and marketing functions.

Our quality policy is consistently controlled by strict procedures and guidelines which are implemented within all strategic areas of the company.

All testing of materials and products is performed in accordance with accepted test standards and specifications, e.g. random sample testing in accordance with ISO 2859-1:2004-01 AQL 1,0 general inspection level II.

Inspection specifications correspond to standards applicable to individual product groups (e.g. for O-Rings: ISO 3601).

Our sealing materials are produced free of chlorofluorinated hydrocarbons and carcinogenic elements.

Storage and shelf live of polymer sealing material

Seals and bearings are often stored for longer time periods. Due to wrong storage conditions the physical properties of elastomers may change during storage. Because of hardening, softening, crack initiation, breakage or other degradation they can become unusable. These types of material deterioration are the result of particular factors or a combination of factors such as deformation, high temperatures, contact with oxygen, ozone, light, humidity or other media.

A few simple precautions can help to extend shelf life of seals considerably. Basic instructions for the storage, cleaning and maintenance of elastomer sealing elements are described in international standards, such as:
DIN 7716/BS 3F68, ISO 2230 or DIN 9088

These standards provide several recommendations for the storage and the shelf life of elastomers, depending on the type of material.

The following requirements for storage of elastomers and other polymers, based on the recommendations of these standards, need to be followed to preserve the physical and chemical properties of such seals.

Heat

The storage temperature should preferably be between +5 °C/+41 °F and +25 °C/+77 °F. Direct contact with heat sources such as boilers, radiators or direct sunlight are to be avoided.During storage at low temperatures, elastomers can stiffen. Therefore the handling of seals at low temperatures must be done very carefully in order to avoid deformation or damage.

Humidity

The relative humidity in the storage area should be below 70 %. Extreme humid or extreme dry conditions are to be avoided. Condensation must not develop.

Light

Elastomer seals must be protected from light sources during storage. In particular direct sunlight and strong artificial light with an ultraviolet content shall be avoided. The original storage bags, especially plastic bags, are to be favored if they provide UV protection.

In case of strong external light exposure it is recommended to mask the windows of the storage rooms with red or orange covers or screens.

Radiation

Elastomer seals are to be stored protected from all sources of ionizing radiation likely to cause damage to the stored parts.

Oxygen and ozone

If possible elastomers should be stored in the original packaging or in airtight containers in order to protect them from circulating air.

Ozone is harmful to many sealing materials. Therefore no equipment producing ozone (i.e. mercury vapor lamps, high voltage electrical equipment, electric motors or other producers of electric sparks or electric discharges) shall be kept in the storage areas. Also combustion emissions and organic vapors should be avoided as they may produce ozone via photochemical processes.

Deformation

If possible elastomer materials should be stored free from tension, compression or other deformation. Parts delivered in a tension-free condition should remain in their original packaging.

Contact with liquids and lubricants

Elastomer seals shall not come in contact with solvents, oils, greases or any other media at any time during storage, unless so packed by the manufacturer.

Contact with metal and non-metals

Direct contact with certain metals such as manganese, iron and particularly copper and its alloys, e.g. brass, are known to have damaging effects on some rubbers. Elastomer seals shall not be stored in contact with such metals.

Because of possible transfer of plasticizers or other ingredients, rubbers shall not be stored in contact with PVC. To avoid a mix-up different rubbers should preferably be stored separately from each other.

Cleaning

If necessary, cleaning should be carried out using soap and water (demineralized water to avoid lime stains) or denatured alcohol. However water shall not come into contact with fabric reinforced components, polyurethane rubbers or metal components without anti-corrosive protection. Disinfectants or other organic solvents as well as sharp-edged objects shall not be used. The cleaned parts should be dried at room temperature and shall not be placed near heat sources.

Shelf life and shelf life control

The shelf life of seals depends to a large extend on the polymer type. When stored under the above recommended conditions the below listed shelf life for the different materials can be considered.

NR, SBR	2 years
AU, TFE/P, Thermoplastics	4 years
CR, CSM, ECO, HNBR, IIR, NBR	6 years
ACM, AEM, EPDM	8 years
FKM, FMQ, FVMQ, VMQ	10 years
FFKM, Isolast®	18 years
PTFE	unlimited

Elastomer seals need to be checked after the above periods. If the seals are OK an extension of the shelf life is possible.

Elastomer parts and components with less than 1.5 mm thickness are stronger affected by oxidation degradation even if stored under ideal conditions according to the above described. Therefore they need to be checked and tested more frequently than mentioned above.

Pre-assembled elastomer parts and seals

Generally it is not recommendable to store elastomer seals in assembled condition. If it is necessary to do so it is recommended that the units should be checked at least every six months. The maximum shelf life period a rubber component is allowed to remain assembled within a stored unit is a total of the initial period stated above and the extension period. The inspection interval will depend on the design and geometry of the unit.

Contact your local marketing company for further information:

Europe	Telephone
AUSTRIA - Vienna (ALBANIA, BOSNIA AND HERZEGOVINA, MACEDONIA, SERBIA AND MONTENEGRO, SLOVENIA)	+43 (0) 1 406 47 33
BELGIUM - Dion-Valmont (LUXEMBOURG)	+32 (0) 10 22 57 50
BULGARIA - Sofia (ROMANIA)	+359 (0)2 969 95 99
CROATIA - Zagreb	+385 (0) 1 24 56 387
CZECH REPUBLIC - Rakovnik (SLOVAKIA)	+420 313 529 111
DENMARK - Hillerød	+45 48 22 80 80
FINLAND - Vantaa (ESTONIA, LATVIA)	+358 (0) 207 12 13 50
FRANCE - Maisons-Laffitte	+33 (0) 1 30 86 56 00
GERMANY - Stuttgart	+49 (0) 711 7864 0
GREECE	+41 (0) 21 631 41 11
HUNGARY - Budaörs	+36 (06) 23 50 21 21
ITALY - Livorno	+39 0586 22 6111
THE NETHERLANDS - Barendrecht	+31 (0) 10 29 22 111
NORWAY - Oslo	+47 22 64 60 80
POLAND - Warsaw (LITHUANIA, UKRAINE, BELARUS)	+48 (0) 22 863 30 11
RUSSIA - Moscow	+7 495 982 39 21
SPAIN - Madrid (PORTUGAL)	+34 (0) 91 71057 30
SWEDEN - Jönköping	+46 (0) 36 34 15 00
SWITZERLAND - Crissier	+41 (0) 21 631 41 11
TURKEY	+41 (0) 21 631 41 11
UNITED KINGDOM - Solihull (EIRE)	+44 (0) 121 744 1221
AFRICA REGIONAL	+41 (0) 21 631 41 11
MIDDLE EAST REGIONAL	+41 (0) 21 631 41 11

Americas	Telephone
AMERICAS - REGIONAL	+1 260 749 9631
BRAZIL - São Paulo	+55 11 3372 4500
CANADA - Etobicoke, ON	+1 416 213 9444
MEXICO - Mexico City	+52 55 57 19 50 05
USA, East - Conshohocken, PA	+1 610 828 3209
USA, Great Lakes - Fort Wayne, IN	+1 260 482 4050
USA, Midwest - Lombard, IL	+1 630 268 9915
USA, Mountain - Broomfield, CO	+1 303 469 1357
USA, Northern California - Fresno, CA	+1 559 449 6070
USA, Northwest - Portland, OR	+1 503 595 6565
USA, South - N. Charleston, SC	+1 843 747 7656
USA, Southwest - Houston, TX	+1 713 461 3495
USA, West - Torrance, CA	+1 310 371 1025

Asia Pacific	Telephone
ASIA PACIFIC REGIONAL	+65 6 577 1778
CHINA - Hong Kong	+852 2366 9165
CHINA - Shanghai	+86 (0) 21 6145 1830
INDIA - Bangalore	+91 (0) 80 2245 5157
JAPAN - Tokyo	+81 (0) 3 5633 8008
KOREA - Anyang	+82 (0) 31 386 3283
MALAYSIA - Kuala Lumpur	+60 (0) 3 9059 6388
TAIWAN - Taichung	+886 4 2382 8886
THAILAND - Bangkok	+66 (0) 2732-2861
SINGAPORE **and all other countries in Asia**	+65 6 577 1778

www.tss.trelleborg.com

TRELLEBORG
SEALING SOLUTIONS

99GBO2CATAE1208