CHEMICAL COMPATIBILITY GUIDE

SEALING MATERIALS - Elastomers

Equipment manufacturers andend 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 critacally important. One of the main used material groups for sealing 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. Jetseal Sealing Technologies can offer a large number of materials within each group.

Designation	Abbreviation		
	ISO 1629	ASTM D 1418	TSS
Acrylonitrile-Butadiene Rubber (Nitrile Rubber)	NBR	NBR	N
Hydrogenated Acrylonitrile-Butadiene Rubber	HNBR	HNBR	H
Polyacrylate Rubber	ACM	ACM	A
Chloroprene Rubber	CR	CR	WC
Ethylene Propylene Diene Rubber	EPDM	EPDM	E
Silicone Rubber	VMQ	VMQ	S
Fluorosilicone Rubber	FVMQ	FVMQ	F
Tetrafluorethylene-Propylene Copolymer Elastomer	FEPM	TFE/P**	WT
Butyl Rubber	IIR	IIR	WI
Styrene-Butadiene Rubber	SBR	SBR	WB
Natural Rubber	NR	WR	WR
Fluorocarbon Rubber	FKM	FKM	V
Perfluoro Rubber	FFKM	FFKM	J
Polyester Urethane Polyether Urethane	AU EU	AU EU	WU WU
Chlorosulphonated Polyethylene Rubber	CSM	CSM	WM
Polysulphide Elastomer	-	TWT	WY
Epichlorohydrin Elastomer	-	-	WO

ASTM: American Society for Testing and Materials
ISO: International Organisation for Standardisation
** Abbreviation not yet standardised

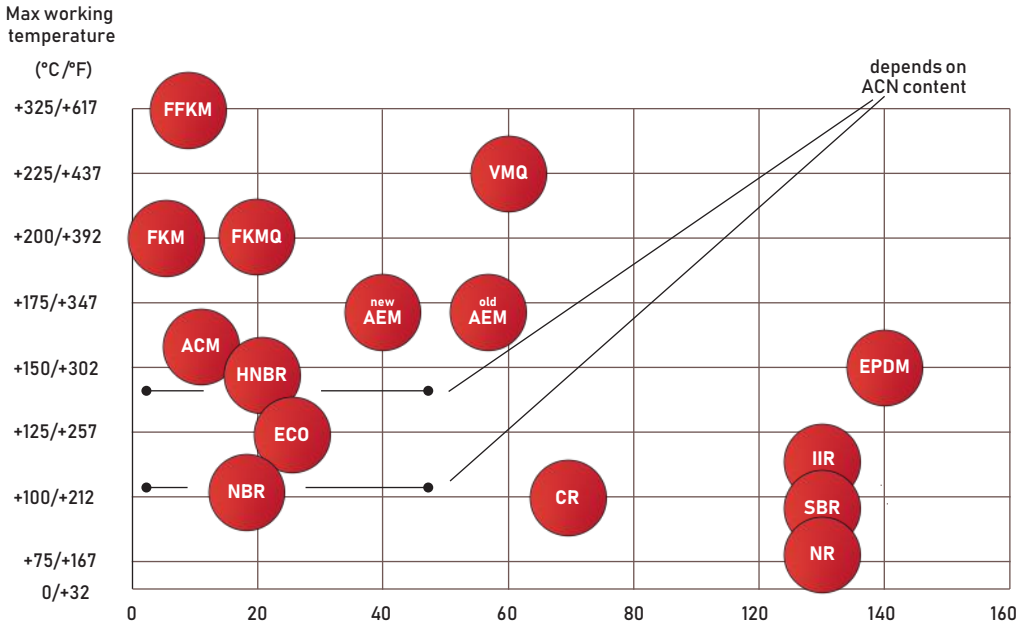
Chemical name	Abbreviation ISO 1629	ASTM D 1418
M - Group (saturated carbon molecules in main macro-molecule-chain)		
- Polyacrylate Rubber	ACM	ACM
- Ethylene Acrylate Rubber	AEM	
- Chlorosulfonated Polyethylene Rubber	CSM	CSM
- Ethylene Propylene Diene Rubber	EPDM	EPDM
- Ethylene Propylene Rubber	EPM	EPM
- Fluorocarbon Rubber	FKM	FKM
- Perfluoro Rubber	FFKM	FFKM
O - Group (with oxygen molecules in the main macro-molecule chain)		
- Epichlorohydrin Rubber	CO	CO
- Epichlorohydrin Copolymer Rubber	ECO	ECO
R - Group (unsaturated hydrogene carbon chain)		
- Chloroprene Rubber	CR	CR
- Butyl Rubber	IIR	IIR
- Nitrile Butadiene Rubber	NBR	NBR
- Natural Rubber	NR	NR
- Styrene Butadiene Rubber	SBR	SBR
- Hydrogenated Nitrile Butadiene Rubber	HNBR	HNBR
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	AU	AU
- Polyether Urethane	EU	EU

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

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.

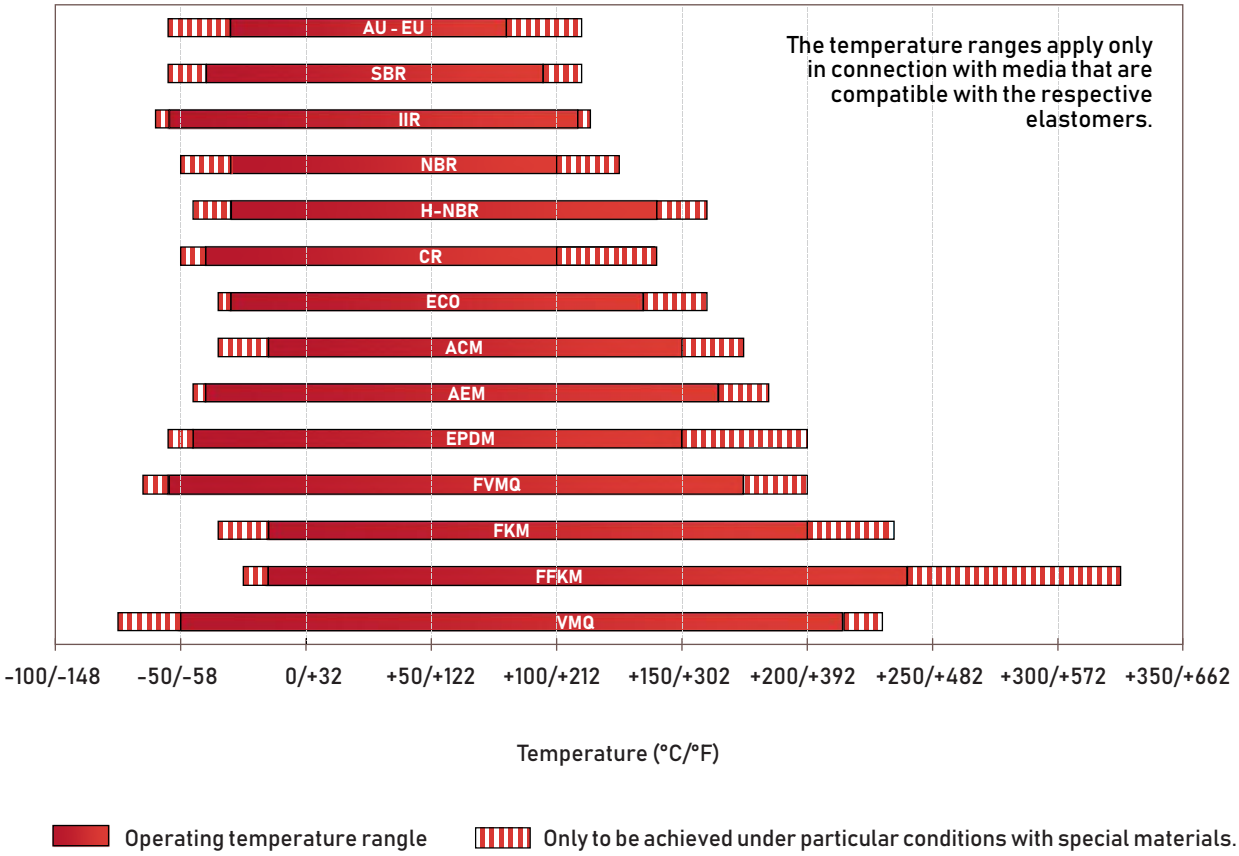
Elastomer Heat Resistance - Swelling in Oil



Change of volume in IRM-OIL 903, 70h (%)

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

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:

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.

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 -35°C/-31°F and +90°C/+194°F (for a short period of time up to +120°C/++248°F). Special types can be used down to -55°C/-67°. CR materials are found in sealing applications and in the glue industry.

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°C). With sulphur cured types the range is reduced to -45°C/-49°F and +130°C/+266°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.

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.

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 and cold-flexibility, 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.

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 hydracarbons e.g. benzene and toluene. The temperature range is between -50°C/-58°F and +175°C/+347°F (temporary up to +200°C/+392°F).

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.

IIR (Butyl Rubber)

Butyl Rubber shows a very low gas and moisture permeability. In addition IIR also exhibits a good resistance to a large number of organic and inorganic chemicals, ozone, weathering, and aging. The electrical insulating properties of IIR are excellent. Its temperature range is between -40°C/-40°F and +110°C/+230°F and for a short period of time up to +120°C/+248°F.

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.

PU (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. Polyurethane materials 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 polyurethane type the application temperature range from below -50°C/-58°F up to +110°C/+230°F, temporary even higher, is feasible.

VMQ (Silicone Rubber)

VMQ shows excellent heat resistance, cold flexibility, dielectric properties and especially good resistance to weather, ozone and 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 -50°C/-58°F and +175°C/+347°F (temporary up to +230°C/+446°F).

Chemical Combatibility

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 therm service applications.

Care must be taken to ensure that all aspects of the applications 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 needs to be considered. Compression set, harness, 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 Combatibility 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 unstuitable for applications in this media.

- Insufficient information available for service in this media.

A - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Acetaldehyde	U	U	-	B	A	U	U	U	U	-
Acetamide	-	-	A	A	A	U	A	A	A	B
Acetic Acid	C	U	B	A	A	C	C	C	C	B
Acetic Acid Chloride	U	U	U	U	A	A	A	U	U	U
Acetic Acid Vapors	U	U	C	A	A	U	C	U	U	U
Acetic acid, 96-99,5% (Glacial)	U	U	U	B	A	U	U	U	U	B
Acetic Anhydride	U	U	C	B	A	U	C	U	U	B
Acetone	U	U	U	A	A	U	U	U	U	U
Acetophenone	U	U	U	A	A	U	U	U	U	U
Acetylacetone	U	U	U	A	A	U	U	U	U	U

A - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Acetylchloride	U	U	U	U	A	A	A	U	U	U
Acetylene Gas	A	-	B	A	A	A	A	A	A	B
Acetylene Tetrabromide	-	U	B	A	A	A	-	U	U	-
Acrolein	U	U	C	A	A	U	-	C	C	-
Acrylonitrile	U	U	U	U	A	U	U	U	U	U
Adipic Acid	U	U	A	A	A	A	A	A	A	A
Adipic Aciddiethylester	-	-	-	A	A	U	-	U	U	-
Aero Lubriplate	A	A	A	U	A	A	A	A	A	B
Aero safe 2300	U	U	U	A	A	U	U	U	U	U
Aero safe 2300 W	U	U	U	A	A	U	U	U	U	U
Aero Shell 1 AC Grease	A	A	B	U	A	A	A	A	A	B
Aero Shell 17 Grease	A	A	B	U	A	A	A	A	A	B
Aero Shell 7 A Grease	A	A	B	U	A	A	A	A	A	B
Aero Shell 750	B	U	U	U	A	A	B	B	B	U
Aero Shell Fluid 4	B	B	U	U	A	A	A	A	A	U
Aerozene 50 (50%Hydrazine, 50% UDMH)	-	U	U	A	B	U	U	U	U	U
Air	A	A	A	A	A	A	A	A	A	A
Alcohol (Methanol)	C	U	B	A	A	C	A	B	B	B
Alkyl Arylsulphonic Acid	U	U	C	A	A	U	U	C	C	U
Alkyl Benzene	U	U	U	U	A	A	A	U	U	U
Allyl Alcohol (2-Propene-1-ol)	U	U	A	A	A	B	U	B	B	U
Allyl Chloride (3-Chloro-1-Propene)	-	U	U	U	A	-	-	U	U	A
Allyl Ketone	U	U	C	A	A	U	U	U	U	B
Aluminium Acetat	U	U	B	A	A	U	U	B	B	U
Aluminium Bromide	A	U	A	A	A	A	A	A	A	A
Aluminium Fluoride	-	U	A	A	A	A	A	A	A	B
Aluminium Nitrate	U	U	A	A	A	A	-	A	A	B
Aluminium Phosphate	A	U	A	A	A	A	A	A	A	A
Aluminium Sulfate	U	U	A	A	A	A	A	A	A	A
Aluminium-Potassiumsulfate	-	-	-	A	A	-	-	-	-	-
Aluminum Chloride Solution	A	C	A	A	A	A	A	A	A	B
Aluminum Hydroxide Solution	U	U	A	A	A	A	A	A	A	A
Aluminum Sulphate Solution	U	-	A	A	A	A	A	A	A	A
Ambrex 33 (Mobile)	A	B	B	U	A	A	U	A	A	U
Ambrex 830 (Mobile)	A	A	B	U	A	A	A	A	A	B
Amines, primary	U	U	U	A	A	U	U	U	U	C
Aminoacetic Acid	U	U	A	A	A	A	U	B	B	U
Ammonia (gas)	U	U	A	A	A	U	U	A	A	A
Ammonia (gas, hot)	U	U	B	B	A	U	U	U	U	U
Ammonia (liquid)	U	U	-	A	A	U	-	B	B	-
Ammonia Solution	U	U	-	A	A	U	-	B	B	-
Ammonia, anhydrous	U	U	A	A	A	U	U	A	A	B
Ammonia, aqueous Solution	U	U	A	A	A	U	U	C	C	C
Ammonia-Lithium	U	U	U	B	A	U	U	B	B	U
Ammonium Acetate	-	U	B	A	A	U	-	A	A	-
Ammonium Carbonate	-	U	B	A	A	U	-	A	A	-
Ammonium Carbonate Solution	-	-	B	A	A	-	-	U	U	-

A - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Ammonium Chloride	B	U	A	A	A	A	A	A	A	A
Ammonium Chloride Solution	-	-	A	A	A	-	-	A	A	-
Ammonium Fluoride	U	U	B	A	A	B	B	A	A	A
Ammonium Hydroxide	U	U	A	A	A	U	-	U	U	-
Ammonium Hydroxide Solution	U	U	A	A	A	U	-	U	U	-
Ammonium Nitrate Solution	U	-	A	A	A	-	-	A	A	-
Ammonium Nitrite	-	-	B	A	A	-	-	A	A	B
Ammonium Phosphate, Monobasic	-	-	A	A	A	-	-	A	A	A
Ammonium Sulfate Solution	U	U	A	A	A	U	B	A	A	B
Ammonium Sulfide	U	U	B	A	A	U	B	B	B	B
Ammonium Thiocyanate	-	B	-	A	A	-	-	A	A	A
Amyl Acetate	U	U	U	A	A	U	U	U	A	B
Amyl Alcohol	U	U	B	A	A	B	B	B	B	B
Amyl Borate	-	-	A	U	A	-	-	A	A	A
Amyl Chloride	U	U	U	U	A	A	B	U	U	U
Amyl Naphtalene	U	U	U	U	A	A	A	U	B	U
Anderol L-774	A	U	U	U	A	A	A	A	A	-
Aniline Chlorohydrate	U	U	B	B	A	B	B	B	U	U
Aniline Liquid	U	U	U	A	A	U	U	U	U	U
Animal Fats	A	A	B	B	A	A	A	A	A	U
Anisole	U	U	U	U	A	U	U	U	B	U
Antimony Chloride	B	U	B	A	A	A	A	A	U	U
Antimony Chloride, dry	B	B	A	A	A	A	A	A	A	A
Aqua Regia	U	U	U	U	B	U	U	U	U	U
Argon Gas	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	U
Aromatic Hydrocarbons (100% Aromatic)	U	U	U	U	A	A	A	U	U	U
Arsenic Acid	C	C	A	A	A	A	A	A	A	A
Arsenic Acid, Solution	C	C	A	A	A	A	A	A	A	A
Asphalt, Emulsion	B	B	B	U	A	A	B	B	B	U
ASTM Test Fuel A	B	A	B	U	A	A	A	A	A	U
ASTM Test Fuel B	U	U	U	U	A	A	A	A	A	U
ASTM Test Fuel C	U	U	U	U	A	A	B	B	B	U
ASTM-Oil IRM 902	A	B	B	U	A	A	A	A	A	B
ASTM-Oil IRM 903	A	B	U	U	A	A	A	A	A	B
ASTM-Oil No.1	A	B	B	U	A	A	A	A	A	A
ATM-Brake Fluid (Glycolbased)	U	U	B	A	A	A	A	U	U	A
Automatic-Transmission Fluid	U	A	B	U	A	A	A	A	A	B
Automotive Gasoline	C	B	U	U	A	A	A	A	A	U

B - CHEMICAL										
Barium Carbonate	-	A	-	A	A	A	A	A	A	A
Barium Chloride Solution	U	A	A	A	A	A	A	A	A	A
Barium Hydroxide Solution	U	U	A	A	A	A	A	A	A	A
Barium Nitrate Solution	U	A	A	A	A	A	A	A	A	A
Barium Sulfate	A	A	A	A	A	A	A	A	A	A
Barium Sulfide Solution	U	A	A	A	A	A	A	A	A	A

B - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Battery Acid (Sulfuric Acid diluted)	U	U	U	A	A	A	U	U	U	U
Beef Tallow	C	-	B	U	A	A	B	A	A	B
Beer	U	C	A	A	A	A	A	A	A	A
Beet Sugar Sap	U	-	B	A	A	A	A	A	A	A
Benzaldehyde	U	U	U	B	A	U	U	U	U	B
Benzenesulfonic Acid	U	U	B	-	A	A	B	U	U	U
Benzine (Gasoline)	C	B	U	U	A	A	A	A	A	U
Benzine 50/Benzene 30/Ethanol 20	U	U	U	U	A	B	B	U	U	U
Benzine 50/Benzene 50	U	U	U	U	A	B	B	U	U	U
Benzine 60/Benzene 40	U	U	U	U	A	B	B	U	U	U
Benzine 70/Benzene 30	U	U	U	U	A	A	A	B	B	U
Benzine 80/Benzene 20	U	U	U	U	A	A	A	B	B	U
Benzoic Acid, Solution	B	U	B	B	A	A	A	B	B	B
Benzol (Benzene)	U	U	U	U	A	A	B	U	U	U
Benzophenone	U	U	-	B	A	A	A	-	-	-
Benzyl Alcohol	U	U	B	B	A	A	B	U	U	B
Benzyl Chloride	U	U	U	U	A	A	A	U	U	U
Biphenyl	U	-	U	U	A	A	B	U	U	U
Bitumen	U	B	U	U	A	A	A	U	U	U
Black Liquor	U	U	B	B	A	B	-	B	B	-
Blast Furnace Gas	B	U	U	U	A	A	B	U	U	A
Bleach Solution	U	U	U	A	A	A	B	U	U	U
Bleaching Powder Solution	U	U	B	A	A	A	B	C	C	B
Boiler Feed Water	U	U	C	A	A	B	B	B	B	C
Bone Oil	A	A	U	U	A	A	A	A	A	U
Borax (Sodiumborate)	A	U	B	A	A	A	A	B	B	A
Borax Solutions	U	U	U	A	A	B	B	B	B	B
Boric Acid	U	B	B	A	A	A	A	A	A	A
Brake Fluids (based on glycol ether)	U	U	B	A	A	U	U	U	U	U
Brake Fluids (based on mineral oil)	-	A	B	-	A	A	-	A	A	-
Bromine	U	U	U	U	A	B	B	U	U	U
Bromine Solution in Water	U	U	U	U	A	A	B	U	U	U
Bromine Vapour	U	U	U	U	A	B	B	U	U	U
Bromobenzene	U	U	U	U	A	A	B	U	U	U
Bromochlorotrifiuoroethan	U	U	U	U	A	A	B	U	U	U
Bunker Oil	A	B	U	U	A	A	A	B	B	B
Butadiene	U	U	U	U	A	B	B	U	U	U
Butandiol	-	U	B	A	A	U	U	A	A	U
Butane	A	B	B	U	A	A	A	A	A	U
1-Butanethiol	U	-	U	U	A	A	U	U	U	U
Butanole	U	U	B	B	A	A	A	A	A	B
Butantriol	A	B	C	A	A	A	A	A	A	A
Butene	-	B	U	U	A	A	B	B	B	U
Buthylphenol	U	U	B	U	A	B	-	U	U	U
Butter	B	B	A	B	A	A	A	A	A	B
Buttermilk	U	A	U	A	A	A	A	A	A	A
Butyl Acetate	U	U	B	B/C	A	U	U	U	U	U

B - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Butyl Alcohol	U	U	U	A	A	A	A	A	A	B
Butyl Amine	U	U	C	-	A	U	U	U	U	C
Butyl Carbitol	U	-	C	A	A	C	U	U	U	U
Butyl Cellosolve	U	U	-	A	A	U	U	C	C	-
Butyl Diglycol	-	-	U	A	A	A	-	A	A	-
Butyl Phthalate	U	U	-	A	A	U	A	U	U	A
Butyl Pyrocatechol	U	-	U	B	A	A	B	U	U	-
Butyl Stearate	-	A	U	U	A	A	B	B	B	B
Butylbenzoate	U	-	U	A	A	A	A	U	U	-
Butylene	-	B	C	U	A	A	B	B	B	U
Butylether	U	U	U	U	A	U	U	U	U	U
Butyraldehyd	U	-	U	B	A	U	U	U	U	U
Butyric Acid	U	U	C	U	A	A	B	B	B	U
Butyric Acid Butyl Ester	U	-	U	B	A	B	B	U	U	-
C - CHEMICAL										
Calcium Acetate	U	B	B	A	A	U	U	B	B	U
Calcium Bisulfate	-	A	-	A	A	A	A	A	A	A
Calcium Bisulfide Solution	C	C	B	A	A	B	C	B	B	C
Calcium Carbonate	-	A	A	A	A	A	-	A	A	A
Calcium Carbonate Slurry	U	U	A	A	A	A	A	A	A	A
Calcium Chloride	B	B	A	A	A	A	A	A	A	A
Calcium Chloride, brine	U	B	A	A	A	A	A	A	A	A
Calcium Cyanide	-	-	A	A	A	-	-	A	A	A
Calcium Hydroxide Solution	U	B	A	A	A	A	A	A	A	A
Calcium Hypochlorite Solution	U	U	B	A	A	A	A	C	C	B
Calcium Nitrate	B	B	A	A	A	A	A	A	A	B
Calcium Oxide	U	A	-	A	A	A	A	A	A	A
Calcium Phosphate Slurry	U	U	B	A	A	A	-	A	A	-
Calcium Silikate	-	-	A	A	A	A	A	A	A	A
Calcium Sulfate	-	A	-	A	A	A	A	A	A	B
Calcium Sulfide	U	A	A	A	A	A	A	A	A	A
Calcium Sulfite	U	A	A	A	A	A	A	B	B	A
Calcium Thiosulfate	U	A	A	A	A	A	A	B	B	B
Caliche Solution (Sodium Nitrate)	U	B	B	A	A	A	U	A	A	U
Campher	U	U	B	U	A	B	-	A	A	-
Campher Oil	-	-	U	U	A	B	A	A	A	A
Cane Sugar Sap	U	-	-	A	A	A	B	B	B	B
Carbitol	-	U	B	B	A	B	B	B	B	B
Carbolic Acid (Penole)	U	C	U	B	A	A	A	U	U	U
Carbolineum	U	U	-	B	A	A	U	B	B	U
Carbon Dioxide, dry	B	U	B	B	A	A	B	A	A	B
Carbon Dioxide, wet	U	U	B	B	A	A	B	A	A	B
Carbon Disulfide	U	U	U	U	A	A	C	U	U	U
Carbon Monoxide	A	A	B	A	A	B	B	A	A	A
Carbonic Acid	U	B	B	A	A	A	B	A	A	B
Carboxylic Acids	-	A	A	A	A	A	A	A	A	A

C - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Casein	-	-	A	B	A	A	A	A	A	A
Castor Oil	A	A	A	B	A	A	A	A	A	A
Cellosolve (2-Etho-yethanol)	U	U	U	B	A	U	U	U	U	U
Celluloseacetat	-	A	U	B	A	U	-	A	A	A
Chile Salpetre (Sodium Nitrate)	U	B	B	A	A	A	A	B	B	B
Chinawood Oil	-	C	B	U	A	A	A	A	A	U
Chloracetic Acid	U	U	U	A	A	U	B	U	U	U
Chloracetic Acid Ethylester	U	U	U	U	A	A	B	U	U	U
Chloric Acid	U	U	U	B	A	B	U	U	U	U
Chloride of Lime	U	U	U	A	A	A	A	U	U	B
Chlorine Dioxide	U	-	U	C	A	A	B	U	U	-
Chlorine gas, anhydrous	-	-	C	A	A	A	-	C	C	-
Chlorine Water	U	U	U	B	A	A	U	U	U	U
Chlorine, liquid	U	U	U	B	A	A	C	U	U	U
Chloroacetaldehyde	U	U	U	A	A	U	C	U	U	U
Chloroacetone	B	U	U	A	A	U	U	U	U	U
Chloroamine	U	U	A	A	A	U	U	A	A	U
Chlorobenzene	U	U	U	U	A	B	B	U	U	U
Chlorobromomethane	U	U	U	B	A	B	B	U	U	U
Chlorobutadiene	U	U	U	U	A	B	B	U	U	U
Chloroform	U	U	U	U	A	B	C	U	U	U
Chloromethyl Ether	U	U	U	C	A	U	U	U	U	U
Chloronaphthalene	U	U	U	U	A	A	B	U	U	U
(o)-Chlorophenol	U	U	U	U	A	A	U	U	U	U
Chlorosulfonic Acid	U	U	U	C	A	U	U	U	U	U
Chlorothene	U	U	U	U	A	B	B	U	U	U
Chlorotoluene	U	U	U	U	A	A	B	U	U	U
Chrome Alum	U	-	A	A	A	A	-	A	A	A
Chromic Acid	U	U	U	C	A	A	C	U	U	C
Chromo sulfuric Acid	U	U	U	U	A	A	U	U	U	U
Cider	U	U	B	A	A	B	A	A	A	B
CIP fluids, acidic*	U	U	U	A	A	B	U	U	U	U
CIP fluids, alkaline	U	U	U	A	A	U	U	U	U	U
Citric Acid	U	U	A	A	A	A	A	A	A	A
Citrous Oils	-	U	B	U	A	A	-	B	B	B
Coal Tar	-	U	-	U	A	B	A	B	B	B
Cobalt Chlorite	B	B	A	A	A	A	A	A	A	B
Coca-Cola	U	B	B	A	A	B	A	A	A	A
Cocoa Butter	-	B	B	U	A	A	B	A	A	C
Coconut Grease	A	B	B	U	A	A	A	A	A	A
Coconut Oil	A	A	B	U	A	A	A	A	A	A
Coconut, Fatty Acid	A	A	B	U	A	A	A	A	A	A
Cod-liver Oil	A	A	B	B	A	A	A	A	A	B
Coffee	U	U	A	A	A	A	A	A	A	A
Chinawood Oil	-	C	B	U	A	A	A	A	A	U
Chloracetic Acid	U	U	U	A	A	U	B	U	U	U
Chloracetic Acid Ethylester	U	U	U	U	A	A	B	U	U	U

* organic/inorganic acids, please contact our specialists

C - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Chloric Acid	U	U	U	B	A	B	U	U	U	U
Chloride of Lime	U	U	U	A	A	A	A	U	U	B
Chlorine Dioxide	U	-	U	C	A	A	B	U	U	-
Chlorine gas, anhydrous	-	-	C	A	A	A	-	C	C	-
Chlorine Water	U	U	U	B	A	A	U	U	U	U
Chlorine, liquid	U	U	U	B	A	A	C	U	U	U
Chloroacetaldehyde	U	U	U	A	A	U	C	U	U	U
Chloroacetone	B	U	U	A	A	U	U	U	U	U
Chloroamine	U	U	A	A	A	U	U	A	A	U
Chlorobenzene	U	U	U	U	A	B	B	U	U	U
Chlorobromomethane	U	U	U	B	A	B	B	U	U	U
Chlorobutadiene	U	U	U	U	A	B	B	U	U	U
Chloroform	U	U	U	U	A	B	C	U	U	U
Chloromethyl Ether	U	U	U	C	A	U	U	U	U	U
Chloronaphthalene	U	U	U	U	A	A	B	U	U	U
(o)-Chlorophenol	U	U	U	U	A	A	U	U	U	U
Chlorosulfonic Acid	U	U	U	C	A	U	U	U	U	U
Chlorothene	U	U	U	U	A	B	B	U	U	U
Chlorotoluene	U	U	U	U	A	A	B	U	U	U
Chrome Alum	U	-	A	A	A	A	-	A	A	A
Chromic Acid	U	U	U	C	A	A	C	U	U	C
Chromo sulfuric Acid	U	U	U	U	A	A	U	U	U	U
Cider	U	U	B	A	A	B	A	A	A	B
CIP fluids, acidic*	U	U	U	A	A	B	U	U	U	U
CIP fluids, alkaline	U	U	U	A	A	U	U	U	U	U
Citric Acid	U	U	A	A	A	A	A	A	A	A
Citrous Oils	-	U	B	U	A	A	-	B	B	B
Coal Tar	-	U	-	U	A	B	A	B	B	B
Cobalt Chlorite	B	B	A	A	A	A	A	A	A	B
Coca-Cola	U	B	B	A	A	B	A	A	A	A
Cocoa Butter	-	B	B	U	A	A	B	A	A	C
Coconut Grease	A	B	B	U	A	A	A	A	A	A
Coconut Oil	A	A	B	U	A	A	A	A	A	A
Coconut, Fatty Acid	A	A	B	U	A	A	A	A	A	A
Cod-liver Oil	A	A	B	B	A	A	A	A	A	B
Coffee	U	U	A	A	A	A	A	A	A	A
Coffee Extract	U	U	A	A	A	A	A	A	A	A
Coke Oven Gas	U	U	U	U	A	A	B	U	U	B
Copper Acetate Solution	U	U	C	B	A	U	U	U	U	U
Copper Ammonium Acetate	U	U	C	A	A	U	U	U	U	U
Copper Chloride, Solution	U	B	B	A	A	A	A	A	A	A
Copper Cyanide	A	B	A	A	A	A	A	A	A	A
Copper Fluoride	U	-	B	A	A	A	U	B	B	U
Copper Nitrate	U	U	B	A	A	A	U	B	B	U
Copper Sulfate (Blue Vitriol) Solution	U	U	A	A	A	A	A	A	A	A
Corn Oil	B	A	B	U	A	A	A	A	A	B
Cotton Oil	A	A	C	C	A	A	A	A	A	A

* organic/inorganic acids, please contact our specialists

C - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Cottonseed Oil	A	A	B	U	A	A	A	A	A	B
Cresol	U	U	U	U	A	A	C	U	U	U
Crontonaldehyde	U	U	U	A	A	U	U	U	U	U
Crude Oil	-	U	U	U	A	A	A	B	B	U
Cumene	U	U	U	U	A	A	U	U	U	U
Cuprous Ammonia Acetate Solution	U	U	U	A	A	U	U	U	U	U
Cyanic Acid	U	-	B	A	A	A	B	B	B	-
Cyanic Acid Solution	U	-	B	A	A	A	B	B	B	-
Cyclohexane	B	A	C	U	A	A	A	A	A	U
Cyclohexanole	-	-	U	U	A	A	A	B	B	-
Cyclohexanone	U	U	U	U	A	U	U	U	U	U
Cyclohexylamine	U	U	U	C	A	U	U	U	U	U
(p)-Cymene	U	U	U	U	A	A	B	U	U	U

* organic/inorganic acids, please contact our specialists

D - CHEMICAL										
DDT Solutions (Kerosene Solvent)	B	B	C	U	A	A	A	A	A	U
DDT Solutions (Toluene Solvent)	U	U	U	U	A	A	A	U	U	U
Decalin (Decahydronaphtalene)	B	U	U	U	A	U	A	U	U	U
Decane	A	U	U	U	A	A	A	A	A	B
Dextrin	U	U	A	A	A	A	A	A	A	A
Dextrose	B	B	-	A	A	A	A	A	A	A
Di-Isobutyl Ketone	U	U	U	A	A	U	U	U	U	U
Di-Isobutylene	U	U	U	U	A	A	C	B	B	U
Di-Isooctyl Sebacate	U	U	U	B	A	B	U	U	U	U
Di-Isopropyl Benzene	U	U	U	U	A	A	A	U	U	U
Di-Isopropyl Ketone	U	U	U	A	A	U	U	U	U	U
Diacetone	-	B	-	A	A	U	U	-	-	-
Diacetone Alcohol	U	U	B	A	A	U	U	U	U	U
1.2-Diaminoethane	U	U	B	A	A	U	U	B	B	U
Diamylamine	U	U	U	A	A	U	U	U	U	U
Diazinone	-	-	U	U	A	B	B	U	U	U
Dibenzyl Sebacate	U	B	U	B	A	B	U	U	U	U
Dibenzylether	C	B	-	B	A	C	-	U	U	B
Dibromodilfiuoromethane	U	U	U	B	A	-	U	U	U	U
Dibromomethylbenzene	U	U	U	U	A	A	B	U	U	U
Dibutyl Ether	U	U	U	U	A	U	U	U	U	U
Dibutyl Phthalate	U	-	U	B	A	C	B	U	U	C
Dibutyl Sebacate	U	U	U	B	A	B	B	U	U	B
Dibutylamine	U	U	U	U	A	U	U	U	U	U
Dichloro Acetic Acid	U	U	U	U	A	U	-	U	U	U
Dichloro Acetic Acid Methylester	U	U	U	A	A	U	U	U	U	U
Dichloro-iso-propylene ether	U	B	U	U	A	U	U	U	U	U
Dichlorobutane	U	U	U	U	A	A	B	B	B	U
Dichlorobutylene	U	U	U	U	A	B	U	U	U	U
Dichloroethane	U	U	U	U	A	B	U	U	U	U
Dichloroethylene	-	U	U	U	A	B	-	U	U	U

D - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Dichloromethane	U	U	U	U	A	B	C	U	U	U
Dichloropentane	U	U	U	U	A	A	C	U	U	U
3.1-Dichloropropene	-	U	U	U	A	-	-	U	U	A
Dicholorobenzene	U	U	U	U	A	A	B	U	U	U
Dicyclohexylamine	U	U	U	U	A	U	U	U	U	U
Diesel Fuel	U	B	U	U	A	A	A	A	A	U
Diesel Oil	B	A	U	U	A	A	A	A	A	U
Diethanolamine	U	U	U	B	A	U	U	U	U	U
Diethyl Amin	U	U	U	B	A	U	U	U	U	B
Diethyl Aniline	U	U	U	A	A	U	U	U	U	U
Diethyl Benzene	U	U	U	U	A	A	A	U	U	U
Diethyl Carbonate	U	U	U	U	A	A	B	U	U	U
Diethyl Ether	U	B	U	B/C	A	U	U	U	U	U
Diethyl Formaldehyde	U	U	U	A	A	U	U	U	U	U
Diethyl Hydrazine	U	U	C	A	A	U	U	C	C	U
Diethyl Maleate	U	U	C	A	A	U	U	C	C	U
Diethyl Sebacate	U	U	U	B	A	B	B	U	U	B
Diethyl Sulfate	-	U	-	-	A	U	-	U	U	U
Diethylene Glycol	U	U	A	A	A	A	A	A	A	B
Diethylene Triamine	U	U	U	A	A	U	U	U	U	U
Diglycolic Acid	U	-	B	A	A	A	U	U	U	U
Dihexyl Phthalic Acid Ester	U	-	U	-	A	U	-	U	U	U
Dihydroxy Tartaric Acid (Tartaric Acid)	U	U	A	B	A	A	A	A	A	A
1.4-Dihydroxybenzene	B	-	U	B	A	U	B	U	U	U
Dimethyl Amine	U	U	U	B	A	U	U	U	U	U
Dimethyl Aniline	U	U	U	B	A	U	U	U	U	U
Dimethyl Ether	U	B	U	A	A	U	U	U	U	U
Dimethyl Formamide	U	U	U	A/B	A/B	U	U	U	U	U
Dimethyl Hydrazine	-	-	B	A	A	U	U	B	B	U
Dimethyl Ketone	U	U	U	A	A	U	U	U	U	U
Dimethyl Phenol	-	-	U	U	A	U	U	U	U	U
Dimethyl Phthalate	U	U	U	B	A	B	B	U	U	-
Dimethylbutane	A	-	B	U	A	A	A	A	A	U
Dinitro Toluene	U	U	U	U	A	U	U	U	U	U
Dinitrogene Oxid	A	A	A	B	A	A	A	A	A	A
Dioctyl Amine	U	U	U	A	A	U	U	U	U	U
Dioctyl Phthalate	U	B	U	B	A	B	B	U	U	B
Dioctyl Sebacate	U	B	U	B	A	B	U	U	U	U
Dioxane	U	U	U	B	A	U	U	U	U	U
Dioxolane	-	U	U	B	A	U	U	U	U	U
Dipentene	U	U	U	U	A	A	U	B	B	U
Diphenyl	U	U	U	U	A	A	B	U	U	U
Diphenyl Ether	U	U	U	U	A	B	B	U	U	U
Diphenyle Oxide	-	U	-	U	A	A	B	U	U	U
Dipropylene Glycol	B	B	B	B	A	B	B	B	B	B
Dithionite	-	-	B	A	A	A	U	B	B	U
Divinyl Benzene	U	U	U	U	A	A	B	U	U	U

D - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
DMT (Dimethyl Terephthalate)	U	U	U	A	A	A	B	U	U	U
DNCB (Dinitrochlorobenzene)	U	U	U	U	A	A	B	U	U	U
Dodecanol	-	-	A	B	A	A	-	B	B	-
Domestic Fuel Oils	A	A	B	U	A	A	A	A	A	U
Dowtherm A	U	U	U	U	A	A	B	U	U	U
Dowtherm E	U	U	U	U	A	A	B	U	U	U
Duodecanol (Laurylalcohol)	B	U	A	B	A	A	U	B	B	A
E - CHEMICAL										
Epichlorhydrin	U	U	U	B	A	U	U	U	U	U
Essential Oils	U	B	U	U	A	B	B	U	U	U
Ethane	A	B	B	U	A	A	A	A	A	B
Ethanol Amine	U	U	C	B	A	U	U	C	C	C
Ether	U	U	U	C	A	U	U	U	U	U
Ethyl Acetate	U	U	U	B/C	A	U	U	U	U	U
Ethyl Alcohol, Ethanol	U	U	A	A	A	U	A	A	A	B
Ethyl Benzene	U	U	U	U	A	B	B	U	U	U
Ethyl Bromide	U	U	U	U	A	A	A	B	B	U
Ethyl Cellulose	U	U	B	B	A	U	U	B	B	U
Ethyl Hexanole	U	U	A	A	A	A	A	A	A	B
Ethyl Oxalate	U	A	U	A	A	A	B	U	U	U
Ethyl Pentachlorobenzene	U	U	U	U	A	A	B	U	U	U
Ethyl Pyridine	U	U	U	A	A	C	U	U	U	U
Ethyl Sulfate (Diethyl Sulfate)	U	U	A	A	A	U	C	U	U	A
Ethylacrylate	U	U	U	-	A	U	U	U	U	U
Ethylchloride	U	U	B	B	A	B	A	U	U	U
Ethylchloroacetate	-	U	B	B	A	A	U	B	B	U
Ethylene	B	B	C	U	A	A	A	A	A	U
Ethylene Bromide	U	U	U	C	A	A	C	U	U	U
Ethylene Chloride	-	-	B	B	A	B	-	-	-	U
Ethylene Chlorohydrin	U	U	B	B	A	U	B	U	U	U
Ethylene Diamine	U	U	U	A	A	U	U	U	U	U
Ethylene Dibromide	U	U	U	U	A	A	C	U	U	U
Ethylene Dichloride	U	U	U	U	A	A	C	U	U	U
Ethylene Glycol	C	B	B	A	A	A	A	A	A	C
Ethylene Glycol Ethylether (Cellosolve)	U	U	U	B	A	U	U	U	U	U
Ethylene Oxide	U	U	U	B	A	U	U	U	U	U
Ethylene Silicate	-	B	A	A	A	A	A	A	A	-
Ethylene Trichloride	U	U	U	C	A	B	B	U	U	U
F - CHEMICAL										
Fats (animal/vegetable)	A	A	A	U	A	A	A	A	A	B
Fatty Acids	A	A	B	U	A	A	A	B	B	A
Ferric Chloride Solution	-	A	B	A	A	A	A	A	A	B
Ferric Nitrates	B	B	A	A	A	A	A	A	A	B
Ferric Sulfate (Ferric Vitrinol)	B	B	A	A	A	A	A	A	A	B
Ferric Sulfate Solution	-	A	A	A	A	A	A	A	C	B

F - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Fir Oil	U	B	U	U	A	A	A	B	B	U
Fish Oil	A	B	B	U	A	A	A	A	A	A
Fluorine	U	-	-	U	B	U	U	U	U	U
Fluorobenzene	U	-	U	U	A	B	B	U	U	U
Fluorosilicic Acid	-	-	B	A	A	A	U	B	B	U
Formaldehyde (Formalin-Solution)	U	U	U	A	A	U	U	C	C	C
Formaldehyde (Methanal)	U	U	U	A	A	B	U	B	B	B
Formamide	-	U	U	A	A	B	-	B	B	-
Formic Acid	U	U	B	B	A	U	U	U	U	U
Freon 11	-	U	U	U	B	B	B	A	A	U
Freon 112	-	B	B	U	A	B	B	B	B	U
Freon 113	-	B	A	U	B	B	U	A	A	U
Freon 114	-	A	A	A	B	B	B	A	A	U
Freon 114 B2	-	B	B	U	B	B	B	B	B	U
Freon 115	-	B	A	A	B	B	B	A	A	U
Freon 12	-	B	A	B	B	B	U	B	B	U
Freon 13	-	B	A	A	B	B	U	A	A	U
Freon 13 B1	-	B	A	A	B	B	U	A	A	U
Freon 134 a	-	-	-	A	B	-	-	A	-	-
Freon 14	-	A	A	A	B	B	B	A	A	U
Freon 142 b	-	-	A	A	B	U	-	A	A	U
Freon 152 a	-	-	A	A	B	U	-	A	A	-
Freon 21	U	B	B	U	A	U	B	U	U	U
Freon 218	-	-	A	A	B	A	-	A	A	-
Freon 22	B	U	A	A	B	U	U	U	U	U
Freon 31	-	B	A	A	B	U	B	U	U	U
Freon 32	-	B	A	A	B	U	B	A	A	U
Freon 502	-	-	A	A	B	B	-	B	B	A
Freon BF	-	U	B	U	B	A	-	B	B	U
Freon C316	-	-	A	A	B	-	-	A	A	U
Freon C318	-	-	A	A	B	B	B	A	A	U
Freon MF	-	B	U	U	B	B	-	B	B	U
Freon PCA	-	A	A	U	B	B	-	A	A	U
Freon T-P35	-	A	A	A	B	A	-	A	A	A
Freon TA	-	A	A	A	B	U	-	A	A	A
Freon TC	-	A	A	B	B	A	-	A	A	U
Freon TF	-	A	A	U	B	A	U	A	A	U
Freon TMC	-	B	B	B	B	A	-	B	B	U
Freon TWD602	-	A	B	A	B	A	U	B	B	-
Fruit Juices	U	U	B	A	B	B	A	B	B	A
Fumaric Acid	U	-	B	-	A	A	A	A	A	B
Furan	U	U	U	U	A	U	U	U	U	U
Furfural (Furfurylaldehyde)	-	C	-	-	A	-	-	C	C	-
Furfurylalcohol	-	C	-	-	A	-	-	-	-	-

G - CHEMICAL										
Gallic Acid	U	U	B	B	A	A	A	A	A	A

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

H - CHEMICAL										
HEF-3	U	U	U	U	A	A	B	B	B	U
Helium Gas	A	A	A	A	A	A	A	A	A	A
Heptane	A	B	B	U	A	A	A	A	A	C
Hexachloro Acetone	U	U	U	A	A	U	U	U	U	U
Hexachloro Butadiene	U	B	U	U	A	A	U	U	U	U
Hexachloro Cyclohexane (Lindane)	U	B	U	U	A	A	U	-	-	U
1-Hexadecanol	-	-	A	A	A	-	-	A	A	-
Hexafluorosilicic Acid	U	U	B	B	A	A/B	-	B	B	U
Hexaldehyd	-	U	B	A	A	U	U	U	U	B
Hexalin (Cyclohexanol)	-	-	B	U	A	A	A	A	A	U
Hexamine	U	U	U	A	A	U	U	U	U	U
Hexanal (Capronaldehyde)	U	U	-	B	A	U	U	-	-	B
Hexane	A	B	B	U	A	A	A	A	A	C
Hexanetriol	B	U	B	A	A	A	A	A	A	A
Hexene	A	B	B	U	A	A	A	B	B	U
Hexyl Alcohol	U	U	B	B	A	A	B	A	A	B
Hydrazine	C	U	B	A	A	C	B	B	B	U
Hydrazine Hydrate	C	U	B	A	A	C	B	B	B	U
Hydrobromic Acid	U	U	U	A	A	A	C	U	U	U
Hydrochlorique Acid (Muriatic Acid) %37	U	U	U	B	A	A	U	U	U	U
Hydrocyanic Acid	U	-	B	A	A	A	B	B	B	-
Hydrofluoric Acid (cold)	U	U	U	B	A	B	U	U	U	U
Hydrofluoric Acid (hot)	U	U	-	U	A	U	U	U	U	U
Hydrogen Chloride Gas	-	-	C	A	A	A	U	U	U	U

H - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Hydrogen Fluoride	U	U	U	A/B	A	-	U	U	U	U
Hydrogen Peroxide, concentrated	U	U	U	U	A	A-C	B	U	U	B
Hydrogen Sulfide	U	U	U	C	A	U	U	U	U	U
Hydrogen, Gas	B	A	A	A	A	A	C	A	A	C
Hydrogene Bromide, unhydrous	U	U	U	U	A	A	U	U	U	B
Hydrogensulfite Leach	B	U	B	A	A	A	-	U	U	-
Hydroquinone	B	-	U	B	A	U	B	U	U	U
Hydroxy Acetic Acid	U	U	U	A	A	U	U	U	U	B
Hydroxylamine	-	-	-	A	A	A	A	A	A	A
Hydroxylamine Sulfate	-	-	B	A	A	A	A	A	A	A
Hypochlorous Acid	U	-	U	B	A	A	-	U	U	-
I - CHEMICAL										
Ink	A	A	A	A	A	B	A	A	A	A
Iodine	-	-	U	B	A	A	A	B	B	-
Iodine tincture	U	U	B	B	A	A	B	B	B	B
Iodoform	-	-	-	A	A	A	-	-	-	-
Iso-Butane	A	A	U	U	A	A	A	A	A	U
Iso-Butyl Alcohol	U	U	A	A	A	B	A	B	B	A
Iso-Butyl Methyl Ketone	U	U	U	A	A	U	U	U	U	U
Iso-Butylene	U	U	U	U	A	A	A	A	A	U
Iso-Butyraldehyde	U	U	U	A	A	U	U	U	U	U
Iso-Cyanate	-	-	-	A	A	-	-	-	-	-
Iso-Dodecane	U	U	B	U	A	A	A	A	A	U
Iso-Octane	A	B	B	U	A	A	A	A	A	U
Iso-Pentane	A	B	U	U	A	A	A	A	A	U
Iso-Propyl-Acetate	U	U	U	B	A	U	U	U	U	U
Iso-Propyl-Alcohol	U	U	B	A	A	A	A	B	B	A
Iso-Propyl-Benzene	U	U	U	U	A	A	B	U	U	U
Iso-Propyl-Chloride	U	U	U	U	A	A	B	U	U	U
Iso-Propyl-Ether	U	U	U	A	A	U	U	U	U	U
J - CHEMICAL										
Jet Fuel JP3	B	B	U	U	A	A	A	A	A	U
Jet Fuel JP4	B	B	U	U	A	A	B	A	A	U
Jet Fuel JP5	B	B	U	U	A	A	B	A	A	U
Jet Fuel JP6	B	B	U	U	A	A	B	A	A	U
JP3 (Fuel)	U	B	U	U	A	A	A	A	A	U
JP4 (Fuel)	U	B	U	U	A	A	B	A	A	U
JP5 (Fuel)	U	B	U	U	A	A	B	A	A	U
JP6 (Fuel)	B	B	U	U	A	A	B	A	A	U
JPX (Fuel)	-	-	B	U	A	U	U	A	A	U
K - CHEMICAL										
Kerosene	C	B	U	U	A	A	B	A	A	U
Ketchup	U	B	A	A	A	A	A	A	A	A

L - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Lactams	U	U	C	U	A	U	U	U	U	U
Lactic Acid	U	B	A	B	A	A	A	B	B	B
Lanolin	A	A	B	U	A	A	A	A	A	B
Latex	U	U	A	A	A	A	A	A	A	A
Laughing Gas (N20)	A	A	A	B	A	A	A	A	A	A
Lavender Oil	B	U	U	U	A	A	B	B	B	U
Lead Acetate Salt Solution	U	U	U	A	A	U	U	C	C	U
Lead Arsenate	-	A	-	A	A	-	-	A	A	A
Lead Nitrate	-	U	B	A	A	A	A	A	A	B
Lead Nitrate Solution	-	-	A	A	A	-	A	A	A	B
Lead Sulfate	U	A	A	A	A	A	A	B	B	B
Lemon Juice	U	-	B	A	A	A	-	A	A	A
Ligroin	-	B	B	U	A	A	A	A	A	U
Lindol	U	U	U	A	A	U	C	U	U	C
Linoleic Acid	-	B	-	U	A	A	-	B	B	B
Linseed Oil	B	B	B	C	A	A	B	A	A	B
Liqueurs	B	B	A	A	A	A	A	A	A	A
Lithium Bromide Brine	U	U	A	A	A	A	A	A	A	A
Lithium Chloride	U	U	A	A	A	A	A	A	A	A
Lithium Hydroxide	U	U	U	A	A	-	U	U	U	U

M - CHEMICAL										
Machinery Oil (mineral)	A	A	B	U	B	A	A	A	A	B
Maganese Chloride (Solution)	U	U	A	A	A	A	A	A	A	A
Magnesium Acetate Solution	U	U	U	A	A	U	U	U	U	U
Magnesium Chloride Solution	-	U	A	A	A	A	A	A	A	A
Magnesium Hydroxide (Solution)	U	U	B	A	A	B	B	B	B	B
Magnesium Silicate (Talcum)	A	A	A	A	A	A	A	A	A	A
Magnesium Sulfate (Epson Salts)	U	U	A	A	A	A	A	A	A	A
Maleic Acid	C	C	B	A	A	A	B	B	B	C
Maleic Anhydride	U	-	U	U	A	B	-	U	U	-
Malic Acid	U	U	B	B	A	A	A	A	A	B
Margarine	A	B	B	U	A	A	A	A	A	B
Mayonaise	-	U	U	U	A	U	U	A	A	A
Menthol	U	U	B	B	A	A	U	B	B	U
Mercaptans	U	U	U	A	A	U	U	U	U	U
Mercuric Chloride Solution	-	-	A	A	A	A	A	A	A	A
Mercury	A	A	A	A	A	A	A	A	A	A
Mercury Nitrate	-	-	A	A	A	-	-	A	A	A
Mesityl Oxide	U	U	U	A	A	U	U	U	U	U
Methacrylic Acid	U	U	U	B	A	U	U	U	U	U
Methanal	U	U	U	A	A	B	U	B	B	B
Methane	B	U	B	U	A	A	C	A	A	U
Methanol	C	U	B	A	A	C	A	B	B	B
Methoxy Benzene	U	U	U	U	A	U	U	U	U	U
Methoxy Butanol	-	-	B	B	A	A	-	A	A	-
Methyl Acetate	U	U	B/C	A	A	U	U	U	U	U

M - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Methyl Acetoacetate	U	U	U	A	A	U	U	U	U	B
Methyl Acrylate	U	U	U	B	A	U	U	U	U	U
Methyl Alcohol	C	U	B	A	A	C	A	B	B	B
Methyl Amine	U	U	U	A	A	U	U	U	U	U
Methyl Aniline	U	U	U	B	A	B	-	U	U	-
Methyl Bromide	U	U	U	U	A	A	A	U	U	U
Methyl Butyl Ketone	U	U	U	A	A	U	U	U	U	U
Methyl Carbonate	U	U	U	U	A	U	B	U	U	U
Methyl Cellosolve	U	U	U	B	A	U	U	U	U	U
Methyl Cellulose	U	B	B	B	A	B	U	B	B	B
Methyl Chloride	U	U	U	B	A	B	B	U	U	U
Methyl Cyclopentane	U	U	U	U	A	B	B	U	U	U
Methyl Ethyl Ketone	U	U	U	B	A	U	U	U	U	U
Methyl Formate	-	-	U	B	A	U	-	U	U	-
Methyl Glycol	U	U	U	B	A	U	U	U	U	U
Methyl Glycol Acetate (Ethyleneglycol)	U	U	U	B	A	U	-	U	U	B
Methyl Iso-Butyl Ketone	U	U	U	B	A	U	U	U	U	U
Methyl Iso-Propyl Ketone	U	U	U	A	A	U	U	U	U	U
Methyl Methacrylate	U	U	U	U	A	U	U	U	U	U
Methyl Methacrylic Acid Ester	U	U	U	U	A	U	U	U	U	U
Methyl Oleate	-	-	-	B	A	A	B	U	U	-
Methyl Phenyl Ether (Anisole)	U	U	U	U	A	U	U	U	U	U
Methyl Pyrrolidone	-	U	-	A	A	U	-	U	U	B
Methyl Salicylate	-	-	U	B	A	-	-	U	U	-
Methylene Chloride	U	U	U	U	A	B	C	U	U	U
2-Methylpentane	A	U	-	U	A	A	U	A	A	U
3-Methylpentane	A	U	-	U	A	A	U	A	A	U
Milk	U	B	A	A	A	A	A	A	A	A
Milk of Lime	U	U	B	A	A	B	B	U	U	B
Mineral Oil	A	A	B	U	A	A	A	A/B	A/B	B
Mineral Spirits	C	B	C	U	A	A	A	A	A	U
Molasses	U	U	B	A	A	A	A	A	A	A
Monobromobenzene	U	U	U	U	A	B	U	U	U	U
Monochloroacetic Acid	U	U	U	A	A	U	U	U	U	U
Monochloroacetic Acid Ethyl Ester	U	U	U	B	A	U	U	U	U	U
Monochlorobenzene	U	U	U	U	A	B	B	U	U	U
Monoethanol Amine	U	U	U	B	A	U	U	U	U	U
Mononitrochlorobenzene	U	U	U	U	A	A	A	U	U	U
Morpholine	U	U	C	B	A	-	-	U	U	U
Muriatic Acid (HCl) (Hydrochloric Acid)	U	U	-	B	A	A	-	U	U	U
Muriatic Acid (HCl), diluted	U	U	B	A	A	A	-	B	B	B

N - CHEMICAL										
Naphtha	B	B	U	U	A	A	B	U	U	U
Naphthalene	U	U	U	U	A	A	B	U	U	U
Naphthenic Acid	-	-	U	U	A	A	A	B	B	-
Naphtolen ZD	U	-	U	U	A	A	-	B	B	U

N - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Natural Gas	A	B	B	U	A	A	A	A	A	A
Neats Foot Oil	A	A	U	B	A	A	A	A	A	B
Neon Gas	A	A	A	A	A	A	A	A	A	A
Nickel Acetate	U	U	B	A	A	U	U	B	B	U
Nickel Chloride	C	C	B	A	A	A	A	A	A	A
Nickel Nitrate	-	-	A	A	A	A	-	A	A	A
Nickel Sulfate	U	C	A	A	A	A	A	A	A	A
Nitrating Acids	U	U	U	A	A	U	U	U	U	U
Nitric Acid, concentrated	U	U	U	U	A	B	U	U	U	U
Nitric Acid, fuming	U	U	U	U	A	B	U	U	U	U
Nitro Benzene	U	U	U	U	A	U	U	U	U	U
Nitro Glycerin	U	U	C	A	A	A	U	U	U	U
Nitro Glycol	U	U	B	A	A	A	U	U	U	U
Nitro Methane	U	U	U	B	A	U	U	U	U	U
Nitro Propane	U	U	U	B	A	U	U	U	U	U
Nitro Toluene	U	U	U	U	A	U	U	U	U	U
Nitrogen Gas	A	A	A	A	A	A	A	A	A	A
Nitrogen Tetroxide	U	U	U	U	-	U	U	U	U	U
Nonanol	-	U	-	A	A	A	-	U	U	B
Nut Oil	A	B	B	U	A	A	A	A	A	B

O - CHEMICAL										
Octadecane	B	B	B	U	A	A	A	A	A	U
Octal	U	B	U	B	A	B	C	U	U	C
Octane	U	U	U	U	A	A	B	B	B	U
Octanol (Octylalcohol)	U	U	B	A	A	A	B	B	B	B
Octylalcohol	U	U	B	B	A	A	B	B	B	B
Octylcresol	U	U	U	U	A	B	U	C	C	U
Oil of Turpentine	U	U	U	U	A	A	B	B	B	U
Olefin, crude	A	A	U	U	A	A	A	A	A	U
Oleic Acid	-	-	U	U	A	A	-	A	A	U
Oleic Alcohol	U	U	A	A	A	A	U	A	A	U
Oleum (Sulfuric Acid, 0 to 50%)	U	U	U	A	A	A	U	U	U	U
Olive Oil	A	U	B	U	A	A	B	A	A	B
Ortho Dichloro Benzene	U	U	U	U	A	A	B	U	U	U
Oxalic Acid	-	-	B	A	A	A	A	B	B	B
Ozone	B	A	B	A/B	A	A	A	B/C	U	A

P - CHEMICAL										
Palm Kernel Oil	A	-	A	U	A	A	-	A	A	-
Palm Oil	A	A	U	U	A	A	A	A	A	U
Palmitic Acid	U	B	B	C	A	A	A	B	B	U
Para Dichloro Benzene	U	U	-	U	A	A	B	U	U	U
Paraffin	A	B	A	U	A	A	A	A	A	B
Paraffin Oil	A	B	A	U	A	A	A	A	A	B

P - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Peanut Oil	A	A	U	U	A	A	A	A	A	B
Pectin	A	A	A	A	A	A	A	A	A	A
Penta Chloro Diphenyl	U	U	U	U	A	C	U	U	U	U
Penta Chloro Phenol	-	U	-	B	A	-	-	U	U	U
Pentane	A	U	B	U	A	A	U	A	A	U
Pentanol	U	U	A	A	A	B	A	B	B	U
Perchloric Acid	U	U	B	B	A	A	C	U	U	U
Perchloro Ethylene	U	U	U	U	A	B	B	U	U	U
Petroleum	B	B	B	U	A	A	B	A	A	B
Petroleum Ether	A	B	B	U	A	A	B	A	A	U
Phenol	C	U	U	U	A	B	-	U	U	U
Phenyl Benzene	-	U	U	U	A	B	-	U	U	-
Phenyl Ether	U	U	U	U	A	U	U	U	U	U
Phenyl Hydrazine	U	U	U	U	A	B	U	U	U	U
Phosphine	U	U	B	A	A	B	U	U	U	-
Phosphoric Acid	-	U	U	B	A	A	C	U	U	C
Phosphoric Acid 45%	C	U	B	A	A	A	A	B	B	B
Phosphorous Trichloride	U	U	U	A	A	A	-	U	U	U
Photographic Developing Bath	-	B	A	B	A	A	A	A	A	A
Phthalic Acid	-	-	B	A	A	B	-	B	B	A
Phthalic Anhydride	-	-	-	A	A	-	-	-	-	-
Picoline, alpha	-	-	-	A	A	U	-	-	-	-
Picric Acid, Aqueous Solution	-	B	A	B	A	A	B	B	B	-
Pine Oil	A	A	U	U	A	A	A	B	B	U
Pineapple Juice	U	U	A	A	A	A	A	A	A	A
Pinene	U	B	B	U	A	A	B	B	B	U
Piperidine	U	U	U	U	A	U	U	U	U	U
Polyvinyl Acetates	-	-	B	A	A	U	-	-	-	-
Potassium Acetate	U	B	B	A	A	B	U	B	B	U
Potassium Aluminium Sulfat	-	-	-	A	A	-	-	-	-	-
Potassium Bicarbonite	U	U	A	A	A	A	A	A	A	B
Potassium Bisulfate	U	U	B	A	A	A	B	A	A	B
Potassium Borate	C	U	B	A	A	A	B	A	A	B
Potassium Bromate	C	U	B	A	A	A	B	A	A	B
Potassium Bromide	U	U	B	A	A	A	A	A	A	A
Potassium Carbonate	C	U	B	A	A	A	A	A	A	A
Potassium Chlorate	U	U	B	A	A	A	-	U	U	-
Potassium Chloride	C	C	B	A	A	A	A	A	A	A
Potassium Chromate	U	U	B	A	A	A	-	B	B	-
Potassium Cyanide	U	U	B	A	A	A	A	A	A	A
Potassium Dichromate	U	C	B	A	A	A	U	A	A	B
Potassium Hydroxide (Solution 50%)	U	U	B	A	A	C	C	B	B	C
Potassium Hydroxide (Potassium Lye)	U	U	B	A	A	U	U	B	B	U
Potassium Hypochlorite (Javelle water)	U	U	-	B	A	A	B	B	B	B
Potassium Iodide	U	U	B	A	A	A	A	A	A	A
Potassium Nitrate	C	C	B	A	A	A	A	B	B	A
Potassium Perchlorate	U	U	B	A	A	A	-	U	U	-

P - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Potassium Perfluoroacetate	-	-	B	A	A	U	U	B	B	-
Potassium Permanganate	C	B	B	A	A	A	U	U	U	U
Potassium Persulfate	U	U	B	A	A	A	U	U	U	U
Potassium Phosphate	-	-	-	A	A	A	-	A	A	U
Potassium Sulfate	U	C	B	A	A	A	B	A	A	B
Potassium Sulfite	U	C	A	A	A	A	A	A	A	A
Propane	B	B	B	U	A	A	B	A	A	U
Propanol	U	U	A	A	A	A	A	B	B	B
2-Propanone (Acetone)	U	U	U	A	A	U	U	U	U	U
2-Propene-1-ol	U	U	A	A	A	A	U	B	B	U
Propinyl Alcohol	U	-	A	A	A	A	-	A	A	-
Propion Aldehyde	U	U	U	A	A	U	U	U	U	U
Propionic Acid	C	U	B	B	A	A	U	A	A	U
Propyl Acetate	U	U	U	B	A	U	U	U	U	U
Propyl Acetone	U	U	U	A	A	U	U	U	U	U
Propyl Amine	U	U	U	U	A	U	U	U	U	U
Propyl Nitrate	U	U	U	A	A	U	U	U	U	U
Propylene	U	U	U	U	A	A	B	U	U	U
Propylene Dichloride	-	-	-	U	A	-	-	U	U	U
Propylene Glycol	U	U	A	A	A	A	-	A	A	-
Propylene Oxide	U	U	U	B	A	U	U	U	U	U
Pyridine	U	U	U	B	A	B	U	U	U	U
Pyrrole	U	U	U	U	A	U	B	U	U	B
R - CHEMICAL										
Rapeseed Oil	B	B	B	U	A	A	B	B	B	U
Roast Gas (dry)	A	-	B	A	A	A	A	A	A	A
Rosin (Colophony)	U	U	A	A	A	A	A	A	A	A
S - CHEMICAL										
Salicylic Acid	-	A	A	A	A	A	-	B	B	-
Sea Water	U	U	B	A	A	B	A	A	A	B
Sewage	-	-	B	A	A	A	A	A	A	A
Silcone grease	A	A	A	A	A	A	A	A	A	U
Silicic Acid	U	-	B	A	A	A	-	A	A	-
Silicon Dioxide	-	A	-	A	A	A	-	A	A	A
Silicone Oil	A	A	A	A	A	A	A	A	A	U
Silver Cyanide Solution	U	U	A	U	A	A	A	U	U	U
Silver Nitrate	B	-	B	A	A	A	A	B	B	A
Silver Salts	U	U	A	A	A	A	A	A	A	A
Skydrol 500	U	U	U	A	A	U	U	U	U	U
Skydrol 7000	U	U	U	A	A	B	U	U	U	U
Soap Solution	B	B	B	A	A	A	A	A	A	A
Soda (Sodium Carbonate)	U	U	A	A	A	A	A	A	A	A
Sodium Acetate	U	U	B	A	A	U	U	B	B	B
Sodium Benzoate	U	U	B	A	A	A	A	A	A	A
Sodium Bicarbonate Solution	U	U	A	A	A	A	A	A	A	A

S - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Sodium Bisulfate Solution	U	U	A	A	A	A	A	A	A	A
Sodium Bisulfite Solution	U	U	A	A	A	A	A	A	A	A
Sodium Borate (Borax)	U	U	A	A	A	A	A	B	B	A
Sodium Carbonate (Soda Ash)	U	U	A	A	A	A	A	A	A	A
Sodium Carbonate Solution	-	-	A	A	A	A	A	A	A	A
Sodium Chlorate	U	B	B	A	A	A	U	B	B	U
Sodium Chloride (Common Salt)	U	U	A	A	A	A	A	A	A	A
Sodium Chloride Solution	-	-	A	A	A	A	-	A	A	-
Sodium Chlorite	-	-	U	A	A	A	-	U	U	-
Sodium Cyanide Solution	-	-	A	A	A	-	-	B	B	A
Sodium Dichromate	U	U	A	A	A	A	-	B	B	B
Sodium Fluoride	-	B	-	A	A	A	-	A	A	B
Sodium Hydroxide	C	C	B	A	A	C	C	B	B	C
Sodium Hydroxide, Caustic Soda	B	B	B	A	A	B	B	B	B	A
Sodium Hypochlorite Solution	U	U	B	A	A	A	B	B	B	B
Sodium Nitrate	U	U	B	A	A	A	A	B	B	B
Sodium Nitrite	U	U	B	A	A	A	U	U	U	U
Sodium Peroxide Solution	U	U	B	A	A	A	A	B	B	U
Sodium Phosphate	-	-	B	A	A	A	-	A	A	U
Sodium Silicate Solution	-	-	A	A	A	A	-	A	A	-
Sodium Sulfate Solution (Glauber's Salt)	U	U	B	A	A	B	B	B	B	B
Sodium Sulfhydrate Solution	U	-	A	A	A	A	A	A	A	A
Sodium Sulfide	U	U	B	A	A	A	A	B	B	B
Sodium Sulfite Solution	U	U	A	A	A	A	A	A	A	A
Sodium Tetraborate Solution	U	-	B	A	A	A	-	B	B	B
Sodium Thiosulfate (Antichlor)	-	-	A	A	-	A	-	B	B	-
Soy Bean Oil	B	B	B	U	A	A	A	A	A	B
Sperm Oil	-	-	-	B	A	A	-	A	A	-
Spermacetin	U	U	B	U	A	A	U	A	A	U
Spirits	B	B	A	A	A	A	B	A	A	A
Stannic Chloride Solution	-	-	U	A	A	A	A	A	A	B
Starch	B	B	A	A	A	A	A	A	A	A
Stearic Acid	A	A	B	B	A	A	A	B	B	B
Stoddard Solvent	A	A	B	U	A	A	A	A	A	U
Styrene	U	U	U	U	-	A	C	U	U	U
Succinic Acid	U	U	B	A	A	A	-	A	A	A
Sucrose Sap	U	U	B	A	A	A	A	A	A	A
Sugar Solutions	U	U	B	A	A	A	A	A	A	A
Sulfur	U	-	A	A	A	A	B	U	U	B
Sulfur Chloride	U	U	U	U	A	A	B	U	U	U
Sulfur Dioxide (SO2)	U	U	U	A	A	B	B	U	U	B
Sulfur Dioxide Liquid (anhydrous)	U	-	U	A	A	U	B	U	U	B
Sulfur Dioxide, gaseous	U	-	U	A	A	U	B	U	U	B
Sulfur Hexafluoride (SF6)	B	-	A	A	A	B	B	B	B	-
Sulfuric Acid (0 to 50%)	U	U	U	A/B	A	A/B	U	U	U	U
Sulfuric Acid, diluted	U	U	U	A	A	A	U	B	B	U
Sulfurous Acid	U	U	-	B	A	A	-	-	-	U

T - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Talcum	A	A	A	A	A	A	A	A	A	A
Tallow	U	B	B	B	A	A	U	A	A	B
Tannins	U	B	B	B	A	A	A	B	B	B
Tar	U	U	U	U	A	B	C	U	U	-
Tartaric Acid	U	U	B	B	A	A	A	A	A	A
Tetrachloroethane	U	U	U	U	A	B	C	U	U	U
Tetrachloromethane	-	U	U	U	A	A	B	U	U	U
Tetrachloroethylene	U	U	U	U	A	A	B	U	U	U
Tetrahydrofuran	U	U	U	U	A	U	U	U	U	U
Thionyl Chloride	U	U	U	B	A	A	U	U	U	U
Thiophene	U	U	U	U	A	U	U	U	U	U
Titanium Tetrachloride	U	U	B	B	A	B	B	B	B	U
Toluene (Toluol)	U	U	U	U	A	B	B	U	U	U
Transformer Oil	B	A	U	U	A	A	A	B	B	B
Tri-Iso-Propyl Benzene	A	A	U	U	A	A	-	A	A	U
Triacetin (Glycerine Triacetate)	U	U	B	A	A	U	U	B	B	B
Triaryl Phosphate	U	U	U	A	A	A	B	U	U	U
Tributoxy Ethyl Phosphate	B	-	B	B	A	B	-	U	U	U
Tributyl Marcaptane	U	-	U	U	A	A	U	U	U	U
Tributyl Phosphate	U	U	U	B	A	U	U	U	U	U
Trichloro Benzene	U	U	U	U	A	A	U	-	-	U
Trichloro Ethane	U	U	U	B/C	A	A	B	U	U	U
Trichloro Ethyl Phosphate	-	-	U	-	A	U	-	U	U	-
Trichloro Ethylene	U	U	U	B/C	A	B	B	U	U	U
Trichloroacetic Acid	U	U	U	B	A	U	U	B	B	B
Tricresyl Phosphate	U	U	U	B	A	B	B	U	U	U
Triethanolamine	U	U	-	A	A	-	-	-	-	U
Triethyl Borane	-	-	-	-	A	A	-	-	-	-
Triethyl Glycol	C	-	-	A	A	A	-	A	A	A
Triethylaluminium	-	-	-	U	A	B	-	-	-	-
Trifluoro Ethane	U	U	U	U	A	A	B	U	U	U
Trinitrotoluene (TNT)	U	B	B	U	A	B	B	U	U	-
Trioctyl Phosphate	U	U	U	A	A	B	B	U	U	U
Trisodium Phosphate Solution	C	B	B	A	A	A	A	A	A	A
Turpentine	B	C	U	U	A	A	A	A	A	U

U - CHEMICAL										
Urea	B	U	B	A	A	A	A	A	A	A

V - CHEMICAL										
Vaseline	B	B	B	U	A	A	A	A	A	B
Vaseline Oil	U	U	B	U	A	A	B	A	A	B
Vegetable Juices	U	U	B	A	A	A	A	A	A	A
Vegetable Oils	B	-	B	U	A	A	A	A	A	B
Vinegar	U	U	B	A	A	B	B	B	B	A
Vinyl Acetate	-	-	-	-	A	-	-	-	-	-
Vinyl Chloride, liquid	-	-	-	-	A	-	-	-	-	-

V - CHEMICAL	ACM	AU	CR	EPDM	FFKM	FKM	FVMQ	HBNR	NBR	VMQ
Vinylidene Chloride	U	U	U	U	A	B	U	U	U	U
W - CHEMICAL										
Waste Gas (cont. Carbon Dioxide)	A	-	A	A	A	A	A	A	A	A
Waste Gas (cont. Carbon Monoxide)	A	A	A	A	A	A	A	A	A	A
Waste Gas (cont. Hydrogen Chloride)	-	-	A	A	A	A	-	B	B	-
Waste Gas (cont. Hydrogen Fluoride)	-	-	A	A	A	A	-	A	A	A
Waste Gas (cont. Nitrous Fumes)	U	-	A	A	A	A	B	-	-	U
Waste Gas (cont. Sulfur Dioxide)	-	-	A	A	A	A	-	B	B	-
Waste Gas (cont. Sulfuric Acid)	-	-	B	A	A	A	-	U	U	-
Water steam < +150 °C / +302 °F	U	U	U	A	A	U	B	U	U	B
Water steam > +150 °C / +302 °F	U	U	U	B	A	U	U	U	U	U
Water to +80 °C / +176 °F	U	U	B	A	A	B	A	A	B	B
Water to +135 °C / +275 °F	U	U	C	A	A	C	A	C	U	U
Water vapour < +140 °C / +284 °F	U	U	U	A	A	U	B	C	U	B
Water vapour > +140 °C / +284 °F	U	U	U	B	A	U	B	U	U	B
Wax Alcohols	A	-	B	U	A	A	-	A	A	A
Wine + Whiskey	U	U	A	A	A	A	A	A	A	A
Wood Spirit	C	U	B	A	A	C	A	B	B	B
X - CHEMICAL										
Xenon	A	A	A	A	A	A	A	A	A	A
Xylene (Xylol)	U	U	U	U	A	B	U	U	U	U
Xylidines (aromatic Amines)	U	U	U	B	A	U	U	U	U	U
Y - CHEMICAL										
Yeast	B	U	A	A	A	A	A	A	A	A
Z - CHEMICAL										
Zeolites	-	-	A	A	A	A	-	A	A	-
Zinc Acetate	U	U	B	A	A	B	U	B	B	U
Zinc Chloride Solutions	U	U	A	A	A	A	A	A	A	-
Zinc Sulfate	U	U	A	A	A	A	A	A	A	A

GENERAL QUALITY CRITERIA & STORAGE GUIDELINES

General Quality Criteria

The cost-effective use of seals and bearings is highly influenced by the quality criteria applied in production. Seals and bearings from Jetseal Sealing Technologies 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, normal inspection. 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.

Guidelines for the Storage of Polymer Products Based on ISO 2230

Many polymer products and components are stored for long periods of time before being put into service, so it is important they are stored in conditions that minimize unwanted changes in properties. Such changes may result from degradation, in which case they may include excessive hardening, softening, cracking, crazing and other surface effects. Other changes may be caused by deformation, contamination or mechanical damage.

Packaging

Unless otherwise specified in the appropriate product specification, rubber products should be enclosed in individual sealed envelopes. The packaging should be carried out in an atmosphere in which the relative humidity is less than 70 %, or if polyurethanes are being packed, less than 65 %. Where there is serious risk of ingress of moisture (e.g. rubber-metal-bonded parts), aluminum foil/paper/polyethylene laminate or other similar means of protection should be used to ensure protection from ingress of moisture.

Temperature

The storage temperature should be below 25 °C /77 °F and the products should be stored away from direct sources of heat such as boilers, radiators and direct sunlight. If the storage temperature is below 15 °C /59 °F, care should be exercised during handling of stored products, as they may have stiffened and have become susceptible to distortion if not handled carefully.

Humidity

The relative humidity should be such that, given in the variations of temperature in storage, condensation does not occur. In all cases, the relative humidity of the atmosphere in storage should be less than 70 %, or if polyurethanes are being stored, less than 65 %.

Light

Rubber should be protected from light sources, in particular direct sunlight or intense light having a high ultra-violet content. It is advisable that any windows of storage rooms be covered with a red or orange coating or screen.

Radiation

Precautions should be taken to protect stored products from all sources of ionizing radiation likely to cause damage to the products.

Ozone

Ozone has a particularly harmful effect on rubber. Storage rooms should not contain any equipment that is capable of generating ozone, such as mercury vapor lamps or high-voltage electrical equipment giving rise to electric sparks or electrical discharges. Combustion gases and organic vapors should also be excluded, as they may give rise to ozone via photo-chemical processes. When equipment such as a fork-lift truck is used to handle large rubber products, care needs to be taken to ensure this equipment is not a source of pollution that may affect the rubber. Combustion gases should be considered separately. While they are responsible for generating ground-level ozone, they may also contain unburned fuel which, by condensing on rubber products, can cause additional deterioration.

Deformation

Rubber should be stored free from tension, compressive stresses or other causes of deformation. Where products are packaged in a strain-free condition, they should be stored in their original packaging. In case of doubt, the manufacturer's advice should be sought. It is advisable that rings of large internal diameter are formed into three equal loops so as to avoid creasing or twisting. It is not possible to achieve this condition by forming just two loops.

Contact with Liquids & Semi-Liquid Materials

Rubber should not be allowed to come into contact with liquid or semi-liquid materials (for example, petrol, greases, acids, disinfectants, cleaning fluids) or their vapors at any time during storage, unless these materials are by design an integral part of the product or the manufacturer's packaging. When rubber products are received coated with their operational media, they should be stored in this condition.

Contact with Metals

Certain metals and their alloys (in particular, copper and manganese) are known to have harmful effects on some rubbers. Rubber should not be stored in contact with such metals except when bonded to them. They should be protected by wrapping in, or by separation with, a suitable material, e.g. paper or polyethylene.

Contact with Dusting Powder

Dusting powders should only be used for the packaging of rubber items in order to prevent adhesion. In such cases, the minimum quantity of powder to prevent adhesion should be used. Any powder used should be free from any constituent that would have a harmful effect on therubber or the subsequent application of the rubber.

Contact Between Different Products

Contact between products made from rubbers of different compositions should be avoided. This includes products of the same type but differing in color.

Rubber to Metal Bonded Products

The metal part of rubber-to-metal bonded products should not come into contact with the rubber of other products. Preservative used on the metal should be of a type that it will not adversely affect the rubber or the bond to such an extent that it does not comply with the product specification.

Storage Life

This is the maximum period of time that a rubber product, appropriately packaged, may be stored. After this time the product is regarded as unserviceable for the purposes for which it was originally manufactured. The storage life of a rubber product is influenced by its shape and size as well as its composition. Thick products usually undergo slower changes through degradation than thinner ones.

Initial Storage Period

This is the maximum period, starting from the time of manufacture, for which a rubber product, appropriately packaged, may be stored under specified conditions before a sample needs to be inspected or re-tested.

Extension Storage Period

This is the period for which a rubber product, appropriately packaged, may be stored after the initial storage period, before further inspection and re-testing is necessary.

Assembly

These are products or components containing more than one element, one or more of which is made of rubber. Generally it is not recommended to store elastomeric products in an assembled condition. If it is necessary to do so, the units should be checked more often. The inspection interval depends on the design and geometry of the components.

Inspection Before Extension Storage

Before any items are to be stored for an extension period, representative samples of each type should be selected for inspection at the end of the appropriate initial storage period. Inspection should be in accordance with the relevant product specification.

Visual Inspection

Inspect each of the items for the following:

- Permanent distortions, such as creases or flats.
- Mechanical damage, such as cuts, tears, abraded areas or delaminated plies.
- Surface cracking when viewed under a microscope at x10 magnification.
- Changes in surface condition, such as hardening, softening or tackiness.

Assessment at the End of the Initial Period

If, following the visual inspection procedure the items arenot satisfactory, they should not be stored for an extended period. If the items are satisfactory and are stored for an extended period a record should be kept of the date initial storage began as well as the date the extended storage period began. Items stored for an extended period should be inspected and tested at, or before, the expiry of the extension storage period before they are put into service or stored for a further extended period.

Initial & Extension Storage Periods for Unassembled Components

Material Group	Initial Storage Period	Extension Storage Period
AU, EU, NR, SBR	5 years	2 years
ACM, AEM, CR, ECO, HNBR, IIR, NBR	7 years	3 years
CSM, EPDM, FKM, VMQ, FVMQ	10 years	5 years
FFKM	20 years	5 years
Polyurethane	10 years	5 years
PTFE	Unlimited	-

NOTE I: If the storage temperature is over or under 25 °C/77 °F this will influence the storage time. Storage at 10 °C/50 °F higher will reduce the storage time by about 50 %. Storage at 10 °C/50 °F lower will increase the storage time by around 100 %.

NOTE II: In application areas such as aerospace the storage periods can differ from this specification. These specific storage conditions have to be agreed between the supplier and the buyer.