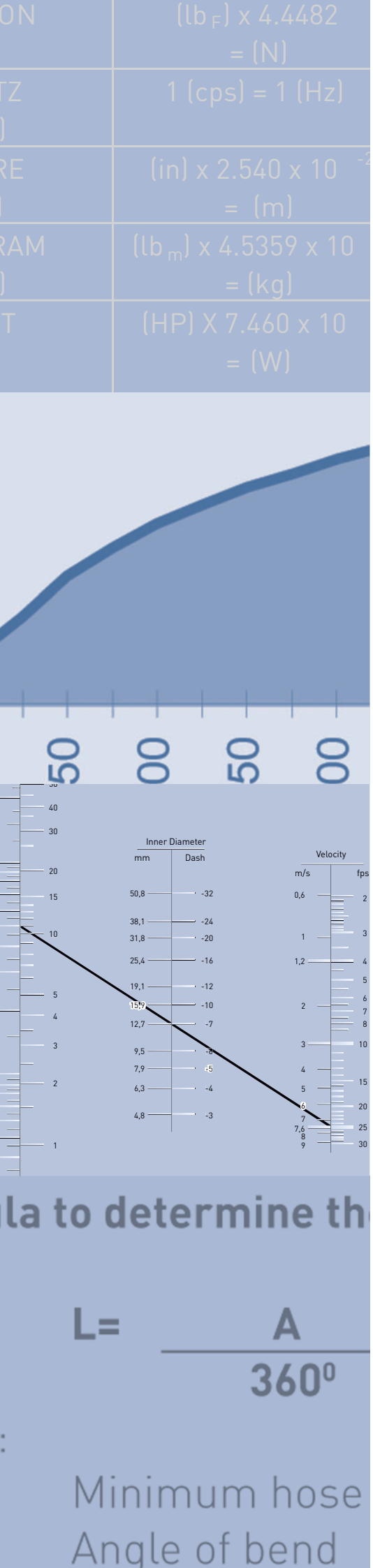


Group 20

Technical Information

FLUID CONTROL®

INDEX

WORTH KNOWING ABOUT HOSES IN GENERAL

Many factors affect the lifespan of hoses. Some examples are: High-temperature, external environment, sunlight (UV radiation), wear and tear, scratches, crushing, etc. It is therefore impossible to estimate a hose´s expected lifetime.
The right choice of rubber / PVC / thermo plastic materials both outside and inside the hose is crucial.
The various rubber PVC and thermo plastic materials have different characteristics and react differently to oils, chemicals, UV radiation, temperature etc.
It is rare that a hose is worn out because of internal influences by the medium it transports if the right inner liner is chosen. The exception is when hoses are used for transport of dry, hard media such as granules, cement, baryte, slurry, etc.
By focusing on the external environment and ensuring that the hoses´ damaging external influences are minimized, the longest lifespan for the hoses is achieved. We are happy to help you achieve this.

The working pressures in tables are generally between 15-25°C
High temperature reduces the hose working pressure.

PRESSURE EQUIPMENT DIRECTIVE (PED) AND HOSES

The Pressure Equipment Directive covers general pressure equipment which exceeds 0.5 bar.
Equipment that falls under the Pressure Equipment Directive must be type approved and CE marked.
Hoses (flexibles) are exempt from the directive. Everything that is delivered to floating installations and ships are also exempt.
Fluid Control AS has had a thorough review with DNV to determine which of our products fall under the Pressure Equipment Directive and concluded that it only applies to ball valves and manifolds.

More about the Pressure Equipment Directive can be found at: www.dsb.no

FLEXIBILITY AND BEND RADIUS

Flexibility and minimum bend radius are important factors in hose length calculation and hose selection if the hose will be subjected to sharp curvatures in normal use.

Adequate flexibility means the hose should be able to conform to the smallest anticipated bend radius without too much stress. The minimum bend radius is generally specified for each hose in this catalogue. This is the radius to which the hose can be bent in service without damaging or appreciably shortening its life. The radius is measured to the inside of the curvature.

Formula to determine the minimum hose length, given (minimum) bend radius and the angle of the bend required:

$$L = \frac{A}{360^0} \times 2\pi B$$

Where:
L= Minimum hose length to make bend (bend must be made as long as this portion of hose length)
A= Angle of bend
B= Given minimum bend radius of hose
π= 3.14

Example: To make a 60^0 bend where the hose´s minimum bend radius is 15 cm

$$L = \frac{60^0}{360^o} \times 2 \times 3.14 \times 15 \approx 16 \text{ CM}$$

Thus, the bend must be made over approximately 16 cm of hose length. The bend radius must be equal to or greater than the rated minimum bend radius. Bending the hose to a smaller bend radius than minimum may kink the hose which can result in hose damage and early failure.

ELECTRICAL PROPERTIES

In accordance with ASTM D991 a standard rubber hose is classified as:
A. Electrically conductive, if the resistance is at the most 10^4 ohm/m
B. Anti-static, if the resistance is 10^4 – 10^8 ohm/m
C. Electrically non-conductive, if the resistance is 10^{10} ohm/m minimum

Any special requirements in respect to electrically properties must be stated when ordering.

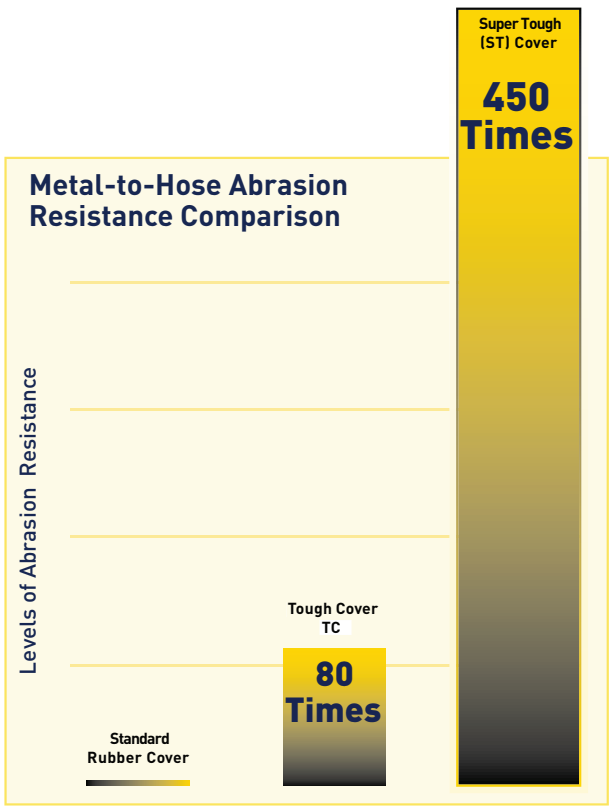
SAFE HOSE ASSEMBLY

APPLICATION

There are so many operational factors affecting the functionality and service life of hydraulic rubber hoses and there is such a wide variety of external circumstances they have to work in that some few basic parameters such as pressure, size and fitting types cannot provide a sufficient basis for selecting and producing the proper product.

The only unfailing way is to start ... from the end – to learn and thoroughly understand the application the hose assembly will work in.

HOSE HINT
You do not always need additional sleeve to protect the hose against abrasion!
Parker high and extremely high abrasion resistant **TOUGH Cover** and **Super TOUGH** versions with 80-times and 450-times higher abrasion resistance do the same, but better and cheaper!



MAIN OPERATIONAL FACTORS:

- Market (agriculture, construction, marine, mining, ...)
- Machine / equipment type
- Hydraulic system pressure
- Static / dynamic
- Extreme pulses (frequency, amplitude)
- Surges, peaks, spikes
- Suction strains
- Flow rate
- Ambient / fluid temperature (permanent, peak)
- Biodegradable oil
- Other fluid – liquid / gaseous
- Bend radius
- etc.

MAIN EXTERNAL CIRCUMSTANCES:

- Extreme environmental conditions
- Ultraviolet light / sunlight
- Ozone / smog / salt water
- Restricted space
- Abrasives / sharp-edged objects
- Mechanical loads (strain , stress, torsion)
- Mechanical vibrations
- Fittings heated
- Fittings under voltage / current
- Electrical / magnetic field
- Heat exposure
- Flame / fire exposure
- etc.

OTHER REQUIREMENTS:

- Certificate / approval needed
- Special (OEM) specification
- Environmental requirements
- Work safety requirements

SAFE HOSE ASSEMBLY

ROUTING

The **routing** of the hose assembly and the environment in which the hose assembly operates directly influence the service life of the hose assembly. The following diagrams indicate the correct routing of hose assemblies that will maximise its service life and assure a safe working functionality.

When hose installation is straight, it must be assured that there is enough slack in the hose to allow for changes in length that occur when pressure is applied. When pressurized, hose that is too short may pull loose from its hose fittings or stress the hose fitting connections, causing premature metallic or seal failures.

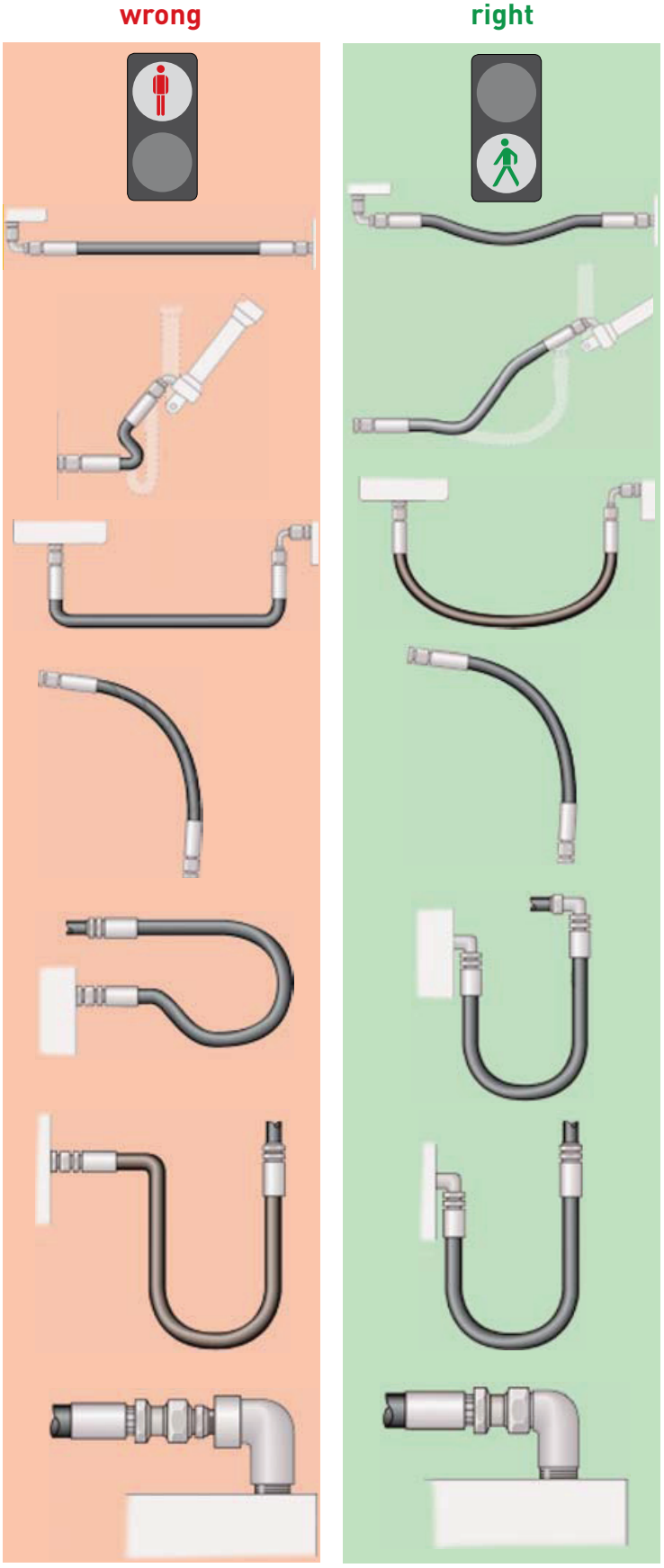
The **hose length** must be determined so that the hose assembly has enough slack to allow the system components to move or vibrate without creating tension in the hose.

However, care needs to be taken not to allow too much slack and therefore introduce the risk of the hose snagging on other equipment or rubbing on other components.

Mechanical straining of the hoses needs to be avoided, so the hose must not be bent below its minimum bend radius or twisted during installation. The minimum bending radii for each hose is stated in the hose tables in the catalogue.

The plane of movement must also be considered and the hose routing selected accordingly.

Hose routing also plays an important role on the selection of the hose fittings, as the correct fittings can avoid straining the hoses, unnecessary hose length or multiple threaded joints.



SAFE HOSE ASSEMBLY

INSTALLATION

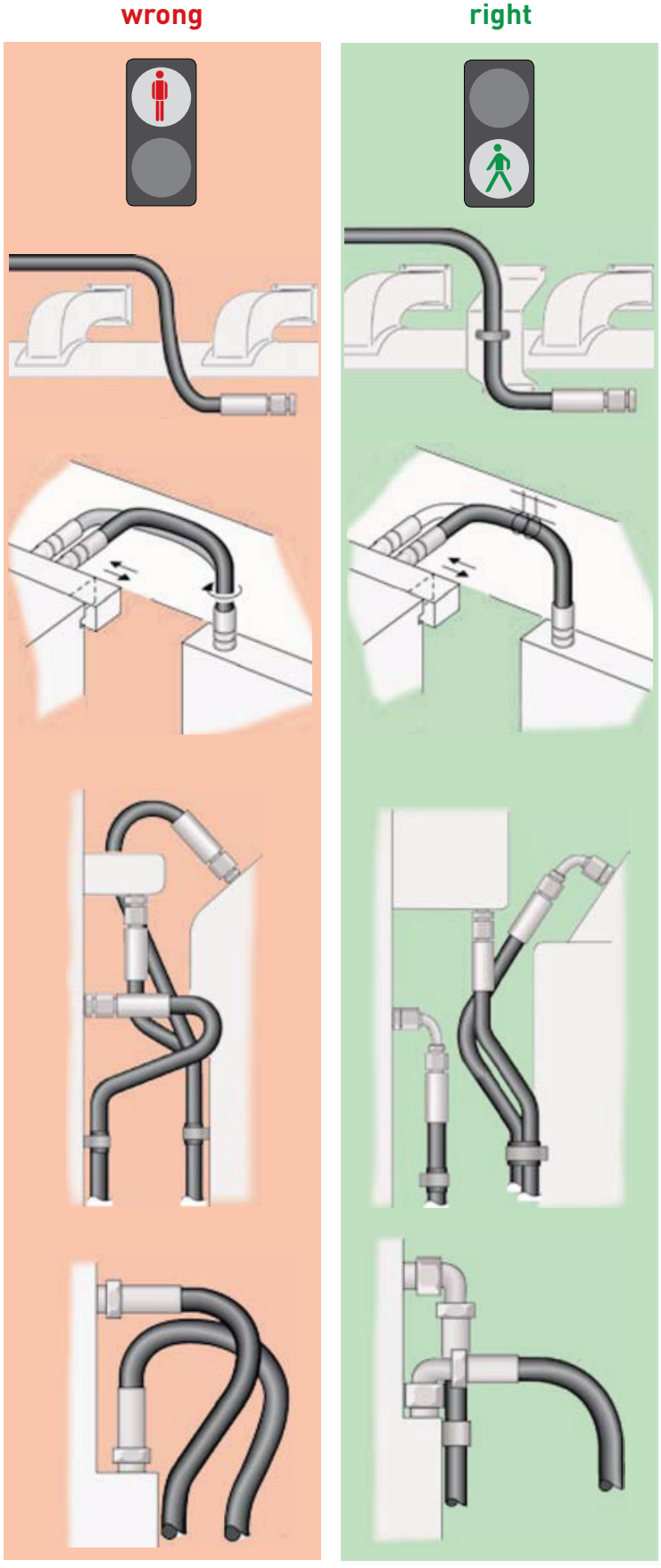
Correct clamping (holding/supporting) of the hose should be exercised to securely route the hose or to avoid the hose contacting surfaces that will cause the hose damage.
It is however, vital that the hose be allowed to keep its functionality as a "flexible-pipe" and not be restricted from changing in length when under pressure.

It should also be noted that hoses for high- and low-pressure lines shall not be crossed or clamped together, as the difference in changes in length could wear the hose covers.
Hose should not be bent in more than one plane. If hose follows a compound bend, it shall be coupled into separate segments or clamped into segments that each flex in only one plane.

Hoses should be kept away from hot parts as high ambient temperatures shorten hose life. Protective insulation may need to be used in unusually high ambient temperature areas.

Whilst the importance of the functionality is primate the aesthetics and practicality of the installation should also be considered in the design.

It should be considered that maintenance might be necessary at some stage in the future, so prohibitive design routings should be avoided.

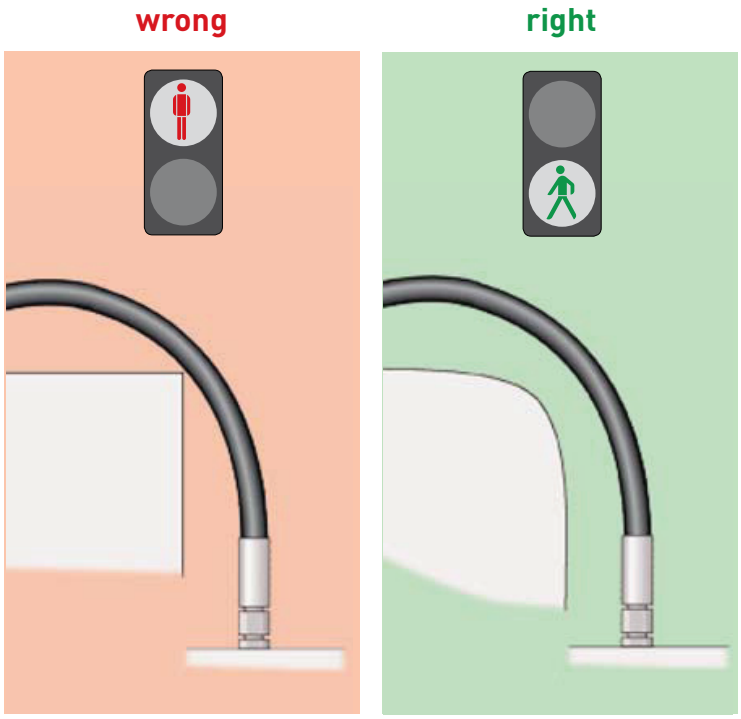


SAFE HOSE ASSEMBLY

ENVIRONMENTAL INFLUENCES

ABRASIVE INFLUENCES
In general care should be taken that the hose is not exposed to direct surface contact that will cause abrasive wearing of the outer cover (either hose to object or hose to hose contact). If however, the application is such that this cannot be avoided, either a hose with a higher abrasion resistant hose cover or a protective sleeve need to be used.

Parker (TC) or (ST) covers offer 80 times or respectively 1000 times the abrasion resistance of standard rubber covers.



SAFE HOSE ASSEMBLY

HOSES STORAGE – BEST PRACTICES

Store hoses and hose assemblies in a cool, dark and dry room with capped ends in closed boxes (preferably in the original Parker packaging) and in the manner facilitating inspection of the hose condition and the first-in first-out (FIFO) inventory control system.

The main factors determining the hose storage are:

a) Temperature
Preferably between 15 °C and 25 °C, without rapid and frequent fluctuation.

b) Humidity
Preferably not higher than 65 %, protect hose against moisture and avoid atmospheric humidity condensation.

c) Heat
Store hose away from heat sources.

d) Light
Protect hose against direct sun light, light of discharge lamps and other ultraviolet sources.

e) Corrosive liquids and fumes
Do not store in the same room with corrosive chemicals.

f) Ozone
Avoid using high power electrical equipment and electrical spark sources in the storage room.

g) Oils and greases
Avoid direct contact.

h) Space and bends
Keep hose in stress-free shape never bent below the min. bend radius.

i) Electrical and magnetic fields
Store hose away from powerful electric transformers, motors and generators that could induce current in the hose metal reinforcement.

j) Rodents and insects
Protect against rodents and insects.

FITTINGS STORAGE – BEST PRACTICES

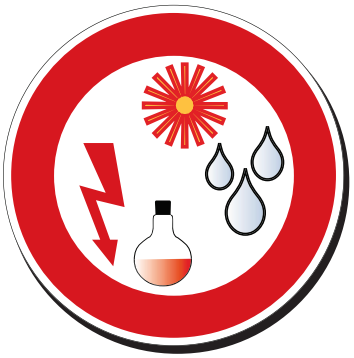
For storing fittings the same rules as for hose are applicable (especially for fittings with rubber sealing), in addition:

a) Mismatching and confusing
Avoid unnecessary repacking and store fittings in clearly marked closed containers (preferably in the original Parker packaging).

b) Damage of threads and sealing surfaces
Avoid unnecessary reloading and handling.

c) Fittings with O-rings
Assure that storage period of fittings with O-rings or other rubber sealing does not exceed 2 years (remember: first in-first out).

d) Caps
Hose assemblies fittings should be capped against damage and contamination.



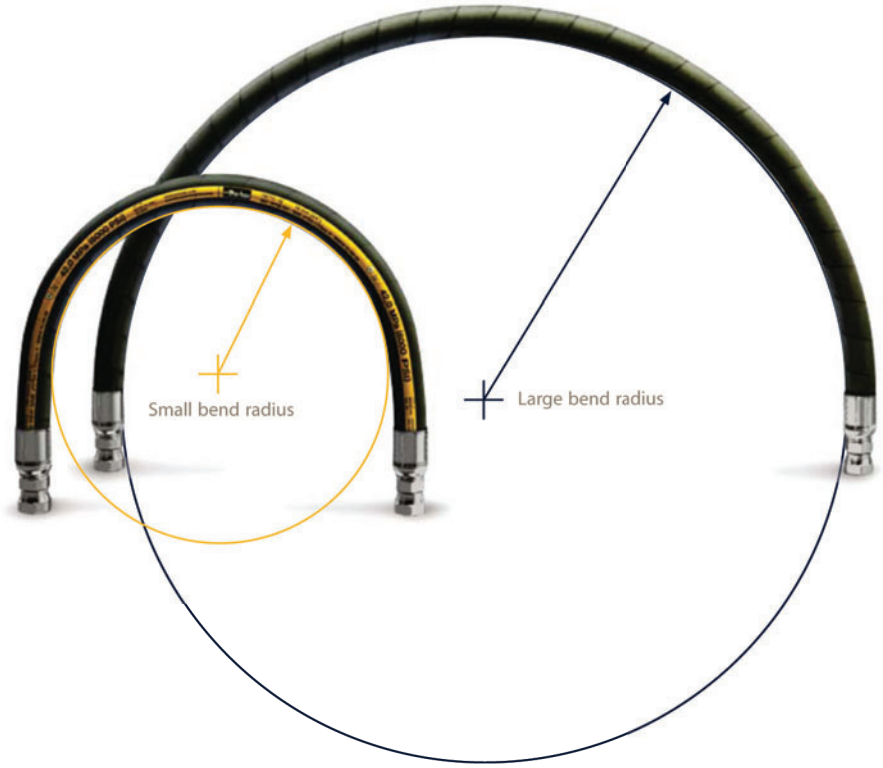
SAFE HOSE ASSEMBLY

HOSE BEND RADIUS

The role of hydraulic hose is to provide a connection of relatively movable parts of the circuit and so its bending is a natural state the hose is designed for. However, the layout of the reinforcement wire or fibre inside a bent hose **may** shift to less appropriate positions.

The tube and cover are stretched and become thinner and so the pressure resistance of a bent hose considerably decreases. For this reason working pressure and bend radius are negatively interdependent parameters and the maximum working pressures specified in this catalogue are conditioned by respecting the min. bend radius.

REMEMBER
In order not to displace the hose reinforcement and/or damage its tube or cover, hydraulic hoses must never be bent below the min. bend radius specified in this catalogue – even without any pressure or even in bulk when stored or packed!



HOSE HINT
Bend radius and bending force are two different things! Not even apparently "flexible" hoses (with low bending force) may be bent below the min. allowed radius!

RECOMMENDED FLUIDS

As the power transmitting – not fluid conveying – element, hydraulic hose should be first of all used for the primary applications and with the recommended fluids specified in this catalogue!

CHEMICAL GUIDE

This section is intended as a general indication of the compatibility of the various materials used in hoses, with the liquids and chemicals listed.

1. TEMPERATURE
Higher temperatures increase the effect of chemicals on rubber compounds. The effect of a temperature change varies depending on the polymer and the chemicals used. A compound which is suitable at room temperature might fail very quickly at higher temperatures.

2. SERVICE CONDITIONS
A rubber compound usually swells when exposed to a chemical. With a given amount of swell, a hose or tube may function satisfactorily if the hose is in a static condition, but fail quickly if the hose is subject to flexing.

3. THE GRADE OR BLAND OF THE RUBBER COMPOUND
Basic rubber polymers are sometimes mixed or blended together to enhance a particular property for a specific service. The reaction to a particular chemical blend of polymers may, therefore, somewhat differ from the reaction to the single one. When in doubt, a sample of the compound should always be tested with the particular chemical.

GENERAL CHEMICAL RESISTANCE OF HOSE RUBBER COMPOUNDS

Common Name	Code	Composition	Properties
Natural	NR	Isoprene Rubber (Natural)	Excellent physical properties, including abrasion resistance. Not oil resistant.
SBR	SBR	Styrene-Butadiene Rubber	Good physical properties, including abrasion resistance. Not oil resistant.
EPM or EPDM	EPDM	Ethylene-propylene-diene-terpolymer	Good general purpose polymer. Excellent heat, ozone and weather resistance. Not oil resistant.
Neoprene	CR	Chloroprene	Excellent weathering resistance. Fire retardant. Good oil resistance. Good physical properties.
Buna-N or Nitrile	NBR	Nitrile-Butadiene	Excellent oil resistance. Good physical properties.
Hypalon®	CSM	Chloro-sulfonated polyethylene	Excellent ozone-, weathering and acid resistance. Good abrasion and heat resistance. Can be compounded for good oil resistance.
Chlorinated Polyethylene (CPE)	CM	Chloro-polyethylene	Good long term resistance to UV and weathering. Good oil and chemical resistance. Excellent flame resistance. Good low temperature impact resistance.
Cross Linked Polyethylene	XLPE	Cross Linked Polyethylene	Excellent resistance to most solvents, oils and chemicals. Do not confuse with chemical properties of standard polyethylene.
Butyl	IIR	Isobutene-isoprene	Very good weathering resistance, low permeability to air. Good physical properties. Poor resistance to petroleum based fluids.
Viton	FKM	Fluorocarbon Rubber	Excellent high temperature resistance, particularly in air or oil. Good physical properties. Very good chemical resistance.
Fluorcarbon Resin (Teflon)	TFE	Polytetra-fluoroethylene	Excellent chemical and solvent resistance, inert to most materials. Smooth anti-adhesive surface - easy to clean.
ALFATER XL	EPDM+PP	Ethylene-propylene diene-terpolymer + polypropylene	Good general purpose polymer. Excellent heat, ozone and weather resistance. Fair/good oil resistance.

STEAM HOSE SAFETY FACTORS

Handling steam is a very hazardous situation. Using care and some safety precaution can minimise or eliminate personal or property damage.

SELECTING AND USING STEAM HOSE

1. Make sure steam hose is identified as a steam hose. It should be branded as such, stating working pressure and temperature rating
2. Make sure working pressure and temperature is not exceeded.
3. Do not allow hose to remain under pressure when not in use.
4. Avoid excess bending or flexing of hose near the coupling. Straight line operation is preferred. If bends are necessary as part of operation, spring guards may help.
5. Be sure and use recommended steam hose couplings and clamps on hose.

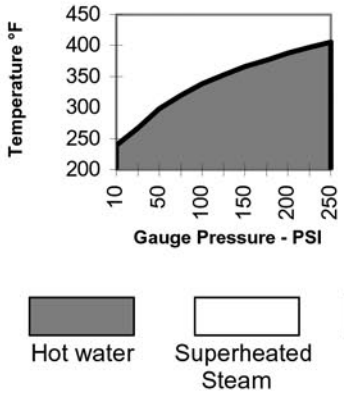
MAINTENANCE OF STEAM HOSE

1. Periodic inspection of hose should include looking for cover blisters and lumps.
2. Check for kinked areas that could damage hose.
3. **Drain hose after each use to avoid tube damage before hose is put back in operation, to avoid *"popcorning"* of the tube.**
4. Check tightness of clamps bolts after each use.
5. Check to see if clamps halves are touching. If they do, recouple hose with smaller clamps to insure proper tightness or grip around hose.
6. Do not store hose over hooks.
7. Steam hose lying on metal racks or installed around steel piping will dry out the hose, causing tube and cover cracking.
8. For service in sub-zero application, use only T-331 Chlorobuthyl hose.

The charts represent the three forms of water when subjected to heat and pressure. Use only hoses specifically designed for the application.

STEAM HOSE CHART
Saturated steam

Gauge Pressure (PSI)	Temperature of Saturated Steam (°F)
10	239
25	267
50	298
75	320
100	338
125	353
150	366
175	377
200	388
225	397
250	406



TEMPERATURE OF SATURATED STEAM

Gauge Pressure lbl/m²	Gauge Pressure kgf/cm²	Gauge Pressure Atm	Gauge Pressure Bar	Temperature °C	Temperature °F	Gauge Pressure lbl/m²	Gauge Pressure kgf/cm²	Gauge Pressure Atm	Gauge Pressure Bar	Temperature °C	Temperature °F
25	1.76	1.70	1.73	130	267	120	8.44	8.16	8.28	177	350
30	2.11	2.04	2.07	134	274	140	9.84	9.52	9.66	182	361
35	2.46	2.38	2.42	138	281	160	11.25	10.88	11.04	188	371
40	2.81	2.72	2.76	141	287	180	12.65	12.24	12.42	193	379
45	3.16	3.06	3.11	144	292	200	14.06	13.60	13.80	198	388
50	3.52	3.40	3.45	148	298	225	15.82	15.30	15.53	203	397
60	4.22	4.08	4.14	153	307	250	17.58	17.00	17.25	208	406
70	4.92	4.76	4.83	158	316	275	19.33	18.70	18.98	212	414
80	5.62	5.44	5.52	162	324	300	21.09	20.40	20.70	216	422
90	6.32	6.12	6.21	166	330	325	22.85	22.10	22.43	221	429
100	7.03	6.80	6.90	170	338	350	24.61	23.80	24.15	225	437

CORROSIVE STEAM

When the water used to generate steam contains dissolved air, oxygen or carbon dioxide, then these gases end up as contaminants in the steam. At high temperatures of steam both oxygen and carbon dioxide are extremely corrosive.
Carbon dioxide is acidic and therefore attacks metals whereas the oxygen corrodes metals and oxidises rubbers. Corrosion of metals in the presence of both oxygen and acids is forty times faster than with either alone. Boiler water is therefore normally treated not only to remove the "hardness" which would cause "furring" of the boiler but also to remove dissolved oxygen and carbon dioxide and to ensure that the steam is not only not acidic but even slightly alkaline. Boiler water treatment is a specialised subject beyond the scope of this technical sheet but correct steam generation is important.

DETERIORATION OF STEAM HOSE

Like all rubber products steam hoses have a finite life and are subject to gradual deterioration with use. However, it sometimes happens that hoses which have been giving a good life suddenly start failing without apparent reason. In such cases it is often a change in the steam conditions causing a rapid acceleration of a normal failure mode. It is therefore useful to consider how steam hoses normally last and thus how the condition of the steam affects hose life.

PRESSURE CONVERSION TABLE

METRIC TO PSI
(1 kPa = 145 psi)

Kilo Pascals (kPa)	Mega Pascals (MPa)	Bar (Bar)	Pounds per Square Inch (psi)
100	0.1	1	14.5
200	0.2	2	29.0
300	0.3	3	43.5
400	0.4	4	58.0
500	0.5	5	72.5
600	0.6	6	87.0
700	0.7	7	101.5
800	0.8	8	116.0
900	0.9	9	130.5
1,000	1.0	10	145.0
2,000	2.0	20	290.1
3,000	3.0	30	435.1
4,000	4.0	40	580.2
5,000	5.0	50	725.2
6,000	6.0	60	870.2
7,000	7.0	70	1,015
8,000	8.0	80	1,160
9,000	9.0	90	1,305
10,000	10	100	1.450
20,000	20	200	2,901
30,000	30	300	4,351
40,000	40	400	5,802
50,000	50	500	7,252
60,000	60	600	8,702
70,000	70	700	10,153
80,000	80	800	11,603
90,000	90	900	13,053
100,000	100	1,000	14,504
200,000	200	2,000	29,008
300,000	300	3,000	43,511

PSI TO METRIC
(1 psi = 6.89 kPa)

Pounds per Square Inch (psi)	Kilo Pascals (kPa)	Mega Pascals (MPa)	Bar (Bar)
10	68.9	0.07	0.7
20	137.9	0.14	1.4
30	206.8	0.21	2.1
40	275.8	0.28	2.8
50	344.7	0.34	3.4
60	413.7	0.41	4.1
70	482.6	0.48	4.8
80	551.6	0.55	5.5
90	620.5	0.62	6.2
100	689	0.7	6.9
200	1,379	1.4	13.8
300	2,068	2.1	20.7
400	2,758	2.8	27.6
500	3,447	3.4	34.5
600	4,137	4.1	41.4
700	4,826	4.8	48.3
800	5,516	5.5	55.2
900	6,205	6.2	62.1
1,000	6,895	6.9	68.9
2,000	13,790	13.8	147.9
3,000	20,684	20.7	206.8
4,000	27,579	27.6	275.8
5,000	34,474	34.5	344.7
6,000	41,369	41.4	413.7
7,000	48,263	48.3	482.6
8,000	55,158	55.2	551.6
9,000	62,053	62.1	620.5
10,000	68,948	68.9	689
20,000	137,895	147.9	1,379
30,000	206,843	206.8	2,068
40,000	275,790	275.8	2,758

MILLIMETRES TO INCHES

1 mm = 0.0397 inch
1 inch = 25.4 mm

mm	inches
10	3/8
13	1/2
16	5/8
19	3/4
22	7/8
25	1
28	1 1/8
30	1 3/16
32	1 1/4
35	1 3/8
38	1 1/2

mm	inches
40	1 9/16
42	1 5/8
45	1 3/4
48	1 7/8
51	2
55	2 1/8
57	2 /
60	2 3/8
63	2 1/2
65	2 5/8
70	2 7/8

mm	inches
76	3
80	3 1/8
90	3 1/2
102	4
105	4 1/8
110	4 5/16
115	4 1/2
127	5
140	5 1/2
152	6
170	6 5/8

TEMPERATURE CONVERSION TABLE

To use table, start in the center column
- To convert from F to C use value to the left
- To convert from C to F use value to the right

Celsius $^0C = 5/9 (^0F - 32)$

Fahrenheit $^0F = 9/5\ ^0C + 32$

°C	°F / °C	°F	°C	°F / °C	°F	°C	°F / °C	°F	°C	°F / °C	°F	°C	°F / °C	°F
-273,0	-459,4		-17,8	0	32,0	10,0	50	122,0	37,8	100	212,0	260,0	500	932,0
-267,8	-450		-17,2	1	33,8	10,6	51	123,8	43,3	110	230,0	265,6	510	950,0
-262,2	-440		-16,7	2	35,6	11,1	52	125,6	48,9	120	248,0	271,1	520	968,0
-256,7	-430		-16,1	3	37,4	11,7	53	127,4	54,4	130	266,0	276,7	530	986,0
-251,1	-420		-15,6	4	39,2	12,2	54	129,2	60,0	140	284,0	282,2	540	1004,0
-245,6	-410		-15,0	5	41,0	12,8	55	131,0	65,6	150	302,0	287,8	550	1022,0
-240,0	-400		-14,4	6	42,8	13,3	56	132,8	71,1	160	320,0	293,3	560	1040,0
-234,4	-390		-13,9	7	44,6	13,9	57	134,6	76,7	170	338,0	298,9	570	1058,0
-228,9	-380		-13,3	8	46,4	14,4	58	136,4	82,2	180	356,0	304,4	580	1076,0
-223,3	-370		-12,8	9	48,2	15,0	59	138,2	87,8	190	374,0	310,0	590	1094,0
-217,8	-360		-12,2	10	50,0	15,6	60	140,0	93,3	200	392,0	315,6	600	1112,0
-212,2	-350		-11,7	11	51,8	16,1	61	141,8	98,9	210	410,0	321,1	610	1130,0
-206,7	-340		-11,1	12	53,6	16,7	62	143,6	104,4	220	428,0	326,7	620	1148,0
-201,1	-330		-10,6	13	55,4	17,2	63	145,4	110,0	230	446,0	332,2	630	1166,0
-195,6	-320		-10,0	14	57,2	17,8	64	147,2	115,6	240	464,0	337,8	640	1184,0
-190,0	-310		-9,4	15	59,0	18,3	65	149,0	121,1	250	482,0	343,3	650	1202,0
-184,4	-300		-8,9	16	60,8	18,9	66	150,8	126,7	260	500,0	348,9	660	1220,0
-178,9	-290		-8,3	17	62,6	19,4	67	152,6	132,2	270	518,0	354,4	670	1238,0
-173,3	-280		-7,8	18	64,4	20,0	68	154,4	137,8	280	536,0	360,0	680	1256,0
-169,4	-273	-459,4	-7,2	19	66,2	20,6	69	156,2	143,3	290	554,0	365,6	690	1274,0
-167,8	-270	-454,0	-6,7	20	68,0	21,1	70	158,0	148,9	300	572,0	371,1	700	1292,0
-162,2	-260	-436,0	-6,1	21	69,8	21,7	71	159,8	154,4	310	590,0	376,7	710	1310,0
-156,7	-250	-418,0	-5,6	22	71,6	22,2	72	161,6	160,0	320	608,0	382,2	720	1328,0
-151,1	-240	-400,0	-5,0	23	73,4	22,8	73	163,4	165,6	330	626,0	387,8	730	1346,0
-145,6	-230	-382,0	-4,4	24	75,2	23,3	74	165,2	171,1	340	644,0	393,3	740	1364,0
-140,0	-220	-364,0	-3,9	25	77,0	23,9	75	167,0	176,7	350	662,0	398,9	750	1382,0
-134,4	-210	-346,0	-3,3	26	78,8	24,4	76	168,8	182,2	360	680,0	404,4	760	1400,0
-128,9	-200	-328,0	-2,8	27	80,6	25,0	77	170,6	187,8	370	698,0	410,0	770	1418,0
-123,3	-190	-310,0	-2,2	28	82,4	25,6	78	172,4	193,3	380	716,0	415,6	780	1436,0
-117,8	-180	-292,0	-1,7	29	84,2	26,1	79	174,2	198,9	390	734,0	421,1	790	1454,0
-112,2	-170	-274,0	-1,1	30	86,0	26,7	80	176,0	204,4	400	752,0	426,7	800	1472,0
-106,7	-160	-256,0	-0,6	31	87,8	27,2	81	177,8	210,0	410	770,0	432,2	810	1490,0
-101,1	-150	-238,0	0,0	32	89,6	27,8	82	179,6	215,6	420	788,0	437,8	820	1508,0
-95,6	-140	-220,0	0,6	33	91,4	28,3	83	181,4	221,1	430	806,0	443,3	830	1526,0
-90,0	-130	-202,0	1,1	34	93,2	28,9	84	183,2	226,7	440	824,0	448,9	840	1544,0
-84,4	-120	-184,0	1,7	35	95,0	29,4	85	185,0	232,2	450	842,0	454,4	850	1562,0
-78,9	-110	-166,0	2,2	36	96,8	30,0	86	186,8	237,8	460	860,0	460,0	860	1580,0
-73,3	-100	-148,0	2,8	37	98,6	30,6	87	188,6	243,3	470	878,0	465,6	870	1598,0
-67,8	-90	-130,0	3,3	38	100,4	31,1	88	190,4	248,9	480	896,0	471,1	880	1616,0
-62,2	-80	-112,0	3,9	39	102,2	31,7	89	192,2	254,4	490	914,0	476,7	890	1634,0
-56,7	-70	-94,0	4,4	40	104,0	32,2	90	194,0				482,2	900	1652,0
-51,1	-60	-76,0	5,0	41	105,8	32,8	91	195,8				487,8	910	1670,0
-45,6	-50	-58,0	5,6	42	107,6	33,3	92	197,6				493,3	920	1688,0
-40,0	-40	-40,0	6,1	43	109,4	33,9	93	199,4				498,9	930	1706,0
-34,4	-30	-22,0	6,7	44	111,2	34,4	94	201,2				504,4	940	1724,0
-28,9	-20	-4,0	7,2	45	113,0	35,0	95	203,0				510,0	950	1742,0
-23,3	-10	14,0	7,8	46	114,8	35,6	96	204,8				515,6	960	1760,0
-17,8	0	32,0	8,3	47	116,6	36,1	97	206,6				521,1	970	1778,0
			8,9	48	118,4	36,7	98	208,4				526,7	980	1796,0
			9,4	49	120,2	37,2	99	210,2				532,2	990	1814,0
						37,8	100	212,0				537,8	1000	1832,0

CONVERSION FACTORS

To convert	Into	Multiply by
atmospheres	cms of mercury	76.0
atmospheres	ft of water (at 4 C)	33.90
atmospheres	in of mercury (at 0 C)	29.92
atmospheres	kgs/sq cm	1.0333
atmospheres	kgs/sq meter	10,332
atmospheres	pounds/sq in	14.70
Bar	Newton/sq m	10^{5}
bar	atmospheres	0.9869
bar	at (tech.)	1.0197
bar	psi	14.504
Barrels-Oil	gals-oil	42
BT Units	kg-calories	0.2520
BTUs	ft-lbs	777.9
BTUs	hp-hrs	3.927×10^{4}
BTUs	kgs-meters	107.5
BTUs	kw-hrs	2.928×10^{4}
BTU/Min	ft-lb/sec	12.96
BTU/min	hp	0.02356
BTU/min	kw	0.01757
BTU/min	watts	17.57
Centimetres	inches	0.3937
cm	meters	0.01
cm	mm	10
cms mercury	atm	0.01316
cms mercury	ft water	0.4461
cms mercury	kgs/sq meter	136.0
cms mercury	lbs/sq ft	27.85
cms mercury	lbs/sq in	0.1934
cms/second	ft/min	1.969
cms/sec	ft/sec	0.03281
cms/sec	km/hr	0.036
cms/sec	meter/min	0.6
cms/sec	miles/hr	0.02237
cms/sec	miles/min	3.728×10^{4}
Cms/Sec/Sec	ft/sec/sec	0.03281
Cubic Cms	cu ft	3.531×10^{5}
cu cms	cu in	6.102×10^{2}
cu cms	cu meters	10^{6}
cu cms	cu yds	1.308×10^{6}
cu cms	gals	2.642×10^{4}
cu cms	litres	10^{3}
cu cms	pints (liq)	2.113×10^{3}
cu cms	quarts (liq)	1.057×10^{3}

To covert	Into	Multiply by
cubic feet	cubic cms	2.832×10^{4}
cu ft	cu inches	1728
cu ft	cu meters	0.02832
cu ft	cu yds	0.03704
cu ft	gals	7.48052
cu ft	litres	28.32
cu ft	pints (liq)	59.84
cu ft	quarts (liq)	29.92
cu ft/min	cu cms/sec	472.0
cu ft/min	gals/sec	0.1247
cu ft/min	litres/sec	0.4720
cu ft/min	lbs water/min	62.43
cu ft/sec	gals/min	448.831
cu inches	cc	16.39
cu ins	cu ft	5.787×10^{4}
cu ins	cu meters	1.639×10^{5}
cu ins	cu yds	2.143×10^{5}
cu ins	gals	4.329×10^{3}
cu ins	litres	1.639×10^{2}
cu ins	pints (liq)	0.03463
cu ins	quarts (liq)	0.01732
cu Meters	cc	10^{4}
cu M	cu ft	35.31
cu M	cu ins	61,023
cu M	cu yds	1.308
cu M	gals	264.2
cu M	litres	10^{3}
cu M	pints (liq)	2113
cu M	quarts (liq)	1057
cu yards	cu cms	7.646×10^{5}
cu yds	cu ft	27
cu yds	cu ins	46,656
cu yds	cu meters	0.7646
cu yds	gals	202.0
Decimetres	meters	0.1
Degrees (Angle)	minutes	60
Degrees (angle)	radians	0.01745
Degrees (angle)	sec's	3600
Degrees/sec	radians/sec	0.01745
Degrees/sec	revs/min	0.1667
Degrees/sec	revs/sec	0.002778
Feet	cms	30.48
ft	ins	12
ft	meters	0.3048
ft	yds	$^{1}/_{3}$

CONVERSION FACTORS

To convert	Into	Multiply by
Ft of Water	atms	0.02950
ft of w	ins mercury	0.8826
ft of w	kgs/sq cm	0.03048
ft of w	lbs/sq ft	62.32
ft of w	lbs/sq in	0.4328
feet/min	cm/sec	0.5080
ft/min	ft/sec	0.01667
ft/min	kms/hr	0.01829
ft/min	meters/min	0.3048
ft/min	miles/hr	0.01136
ft/sec/sec	cms/sec/sec	30.48
ft/sec/sec	Meters/sec/sec	0.3048
ft-pounds	BTUs	1.286×10^{3}
ft lbs	hp-hrs	5.050×10^{7}
ft lbs	kg-calories	3.241×10^{4}
ft lbs	kg-meters	0.1383
ft lbs	kw-hrs	3.766×10^{7}
ft-lbs/min	BTUs/min	1.286×10^{3}
ft-lbs/min	ft-lbs/sec	0.01667
ft-lbs/min	hp	3.030×10^{5}
ft-lbs/min	kg-calories/min	3.241×10^{3}
ft-lbs/min	kws	2.260×10^{5}
ft-lbs/sec	BTUs/min	7.717×10^{2}
ft-lbs/sec	hp	1.818×10^{3}
ft-lbs/sec	kg-calories/min	1.945×10^{2}
ft-lbs/sec	kws	1.356×10^{3}
gallons	ccs	3785
gals	cu ft	0.1337
gals	cu ins	231
gals	cu meters	3.785×10^{3}
gals	litres	3.785
gals	pints (liq)	8
gals	quarts (liq)	4
gallons, Imp	US gals	1.20095
gallons, US	imp gals	0.83267
Gals Water	lbs water	8.3304
gallons/min	cu ft/sec	2.228×10^{3}
gal/min	litres/sec	0.06308
gal/min	cu ft/hr	8.0208
horse-power	BTUs/min	42.44
hp	ft-lbs/min	33,000
hp	ft-lbs/sec	550
hp	hp (metric)	1.014
hp	kg-calories/min	10.70

To convert	Into	Multiply by
hp	kws	0.7457
hp	watts	745.7
Hp-Hours	BTUs	2547
hp-hrs	ft-lbs	1.98×10^{6}
hp-hrs	kg-calories	641.7
hp-hrs	kg-meters	2.737×10^{5}
hp-hrs	kw-hrs	0.7457
Inches	cms	2.540
Ins Mercury	atms	0.03342
ins mercury	ft water	1.133
ins mercury	kgs/sq cm	0.03453
ins mercury	lbs/sq ft	70.73
ins mercury	lbs/sq in	0.4912
Ins of Water	atms	0.002458
ins of w	ins mercury	0.07355
ins of w	kgs/sq cm	0.002540
ins of w	lbs/sq ft	5.202
ins of w	lbs/sq in	0.03613
Kilograms	dynes	980,665
kgs	lbs	2.205
kgs	tons (short)	1.102×10^{3}
kgs	grams	1000
Kgs/Sq Cm	atms	0.9678
kgs/sq cm	ft water	32.81
kgs/sq cm	ins mercury	28.96
kgs/sq cm	lbs/sq ft	20.48
kgs/sq cm	lbs/sq in	14.22
kilometres	cms	10^{5}
kms	ft	3281
kms	meters	10^{3}
kms	miles	0.6214
kms/hr	cms/sec	27.78
kms/hr	ft/min	54.68
kms/hr	ft/sec	0.9113
kms/hr	meters/min	16.67
kms/hr	miles/hr	0.6214
Kms/Hr/Sec	cms/sec/sec	27.78
kms/hr/sec	ft/sec/sec	0.9113
kms/hr/sec	Meters/sec/sec	0.2778
kilowatts	BTUs/min	56.92
kws	ft-lbs/min	4.425×10^{4}
kws	ft-lbs/sec	737.6
kws	hp	1.341
kws	kg-calories/min	14.34

CONVERSION FACTORS

To convert	Into	Multiply by
kws	watts	10^{3}
Kilowatt-Hrs	BTUs	3415
kw-hrs	ft-lbs	2.655×10^{6}
kw-hrs	hp-hours	1.341
kw-hrs	kg-calories	860.5
kw-hrs	kg-meters	3.671×10^{5}
litres	ccs	10^{3}
litres	cu ft	0.03531
litres	cu ins	61.02
litres	cu meters	10^{-2}
litres	gals	0.2642
litres	quarts (liq)	1.057
Litres/min	gals/sec	4.403×10^{3}
Meters	cms	100
meters	ft	3.281
meters	ins	39.37
meters	kms	10^{3}
meters	mms	10^{3}
meters/min	cms/sec	1.667
meters/min	ft/min	3.281
meters/min	ft/sec	0.05468
meters/min	kms/hr	0.06
meters/min	miles/hr	0.03728
Meters/Sec	ft/min	196.8
meters/sec	ft/sec	3.281
meters/sec	kms/hr	3.6
meters/sec	kms/min	0.06
meters/sec	miles/hr	2.237
meters/sec	miles/min	0.03728
Micron	meters	10^{6}
microns	in	39×10^{6}
Miles/Hr	cms/sec	44.70
miles/hr	ft/min	88
miles/hr	ft/sec	1.467
miles/hr	kms/hr	1.609
miles/hr	meters/min	26.82
Millimetres	cms	0.1
mms	ins	0.0397
Minute (Angle)	radians	2.909×10^{4}
Newton	kgs	0.1020
Ounces	lbs	0.0625
Ozs	gram	28.349527

To convert	Into	Multiply by
Ozs (Fluid)	cu in	1.805
Ozs (fluid)	litters	0.02957
Pounds	Ozs	16
lbs	tons (short)	0.005
lbs	newton (N)	4.44
lbs	gram	453.5924
Lbs of water	cu ft	0.01605
lbs of water	cu in	27.73
lbs of water	gals	0.1204
Lbs of Water/Min	cu ft/sec	2.679×10^{4}
Pounds/Cu Ft	lbs/cu in	5.787×10^{4}
Pounds/Cu In	lbs/cu ft	1728
Pounds/Sq In	atms	0.06804
lbs/sq in	ft water	2.311
lbs/sq in	in mercury	2.036
lbs/sq in	kgs/sq cm	0.07031
Radians	degrees	57.29578
tons (long)	kgs	1016
tons (long)	lbs	2240
tons (long)	tons (short)	1.12000
Tons (Short)	kgs	2000
tons (short)	kps	907.18486
tons (short)	tons (long)	0.89287
tons (short)	tons (metric)	0.90718
Watts	BTUs/min	0.05692
watts	ft-lbs/min	44.26
watts	ft-lbs/sec	0.7376
watts	hp	1.341×10^{3}
watts	kg-calories/min	0.01434
watts	kws	10
Watts/Hours	BTUs	3.415
watts-hrs	ft-lbs	2655
watts-hrs	hp-hrs	1.341×10^{3}
watts-hrs	kg-calories	0.8605
watts-hrs	kg-meters	367.1
watts-hrs	kw-hrs	10

CONVERSION FACTORS

Unit	Factor	Conversion unit
Work		
(Basic unit J - Joules)		
1J = 1 NM = 1 Ws		
ft.-lb. - foot-pound	1,35582	J - Joules
in.-lb. - inch-pound	0,112985	J - Joules
J - Joules	0,737561	ft.-lb. - foot-pound
J - Joules	8,850732	in.-lb. - inch-pound
Pressure		
(Basic unit Pa)		
1 Pa = 1 N/m^2 1 $\frac{Kg}{m \times s^2}$		
bar	10^{-1}	Mpa - Mega-Pascal
bar	10^5	Pa - Pascal
bar	14.503768	psi - pound per square inch
in.-Hg - inch Hg	33.863788	mb - Millibar
mb - Millibar	0.029528	in.-Hg - inch Hg
Mpa - Mega-Pascal	10	bar
Pa - Pascal	10^{-5}	bar
psi - pound per square inch	0.068948	bar
Area		
(Basic unit m^2) 1 m^2 = 10^4 cm^2		
cm^2 - square centimetre	0,1550	sq. in. - square inch
m^2 - square metre	10,76391	sq. ft. - square foot
sq. in. - square inch	6,4516	cm^2 - square centimetre
sq. ft. - square foot	0,092903	m^2 - square metre
Flow rate		
(Basic unit m^3/s)		
1 m^3/s = 10^3 dm^3/s = 10^3 l/s		
cu. ft./min. - cubic foot per minute	28,3168	dm^3 /min (l/min) -cubic decimetre per minute (litre per minute)
dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)	0,035315	cu. ft./min. - cubic foot per minute
dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)	0,016667	dm^3 /s (l/s) - cubic decimetre per second (litre per second)
dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)	0,219969	gal. /min. - gallon per minute (UK)
dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)	0,264172	gal. /min. - gallon per minute (USA)
dm^3 /min (l/min) - cubic decimetre per second (litre per second)	60	dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)
gal. /min. (UK) - gallon per minute	4,54609	dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)
gal. /min. (USA) - gallon per minute	3,78541	dm^3 /min (l/min) - cubic decimetre per minute (litre per minute)
l/min - litre per minute	see dm^3/min	
l/s - litre per second	see dm^3/s	
Velocity		
(Basic unit m/s)		
1m/s = 3,6 km/h		
ft./sec- - foot per second	1,09728	km/h - kilometre per hour
ft./sec. - foot per second	0,3048	m/s - metre per second
km/h - kilometre per hour	0,911344	ft./sec. - foot per second
mil./h - mile per hour	0,44704	m/s - metre per second
m/s - metre per second	3,28084	ft./sec. - foot per second
m/s - metre per second	2,236936	mil./h - mile per hour

Unit	Factor	Conversion unit
Weight		
(Basic unit kg)		
1 kg =10^3 g = 10^{-3} Mg		
g - gram	0,035274	oz. - ounce
kg - kilogram	2,204622	lb. - pound
lb. - pound	0,453592	kg - kilogram
Mg megagram	1	t - ton
oz. - ounce	28,349525	g - gram
t - ton	0,984206	(Long) ton (UK)
t-ton	1,102311	(Short) ton (USA)
(Long) ton (UK)	1,016047	t - ton
(Short) ton (USA)	0,907185	t - ton
1 lb./ft. - pound per foot	1,488	kg/m - kilogram per metre
kg/m - kilogram per metre	0,672	1 lb./ft. - pound per foot
Length		
(Basic unit m)		
1m =10^3 mm =10^{-3} km		
ft. - foot	0,3048	m - metre
in. - inch	25,4	mm - millimetre
m - metre	3,28084	ft. - foot
m - metre	1,09362	yd. - yard
mm - millimetre	0,03937	in. - inch
yd. - yard	0,9144	m - metre
Power		
(Basic unit W)		
1W=1J/s=1Nm/s=10^{-3} kW		
Btu/hr. - British thermal unit per hour	0,293071	W - watt
ft.-lbf./sec.-foot-pound force per second	1,35582	W - watt
hp - horsepower	0,7457	kW - kilowatt
kW - kilowatt	1,341022	hp - horsepower
kW - kilowatt	1,3596	PS- horsepower
hp - horsepower	0,7355	kW - kilowatt
W - watt	3,41242	Btu/hr. - British thermal unit per hour
W - watt	0,737561	ft.-lb./sec. - foot-pound force per second
Volume		
(Basic unit m^3) 1 m^3 = 10^3 dm^3 = 10^3 l = 10^6 cm^3		
cm^3 - cubic centimetre	0,061204	cu.in. - cubic inch
cu. ft. - cubic foot	28,3168	dm^3 - cubic decimetre (l - litre)
cu.in. - cubic inch	16,3871	dm^3 - cubic decimetre (l - litre)
cu. yd. - cubic yard	0,764555	m^3 - cubic metre
dm^3 - cubic decimetre (l - litre)	0,035315	cu. ft. - cubic foot
dm^3 - cubic decimetre (l - litre)	0,219969	gal. - gallon (UK)
dm^3 - cubic decimetre (l - litre)	0,264172	gal. - gallon (USA)
gal. - gallon (UK)	4,54609	dm^3 - cubic decimetre (l - litre)
gal. - gallon (USA)	3,78541	dm^3 - cubic decimetre (l - litre)
l - litre	see dm^3	
m^3 - cubic metre	1,30795	cu. yd. - cubic yard

THREAD ABBREVIATIONS

API	American Petroleum Institute Taper Thread
ASAE	American Society of Agricultural Engineers
ASSPT	American National Straight Pipe Thread
ASTPT	American National Taper Pipe Thread
BSP	British Standard Parallel Pipe Thread
BSTP	British Standard Taper Pipe Thread
FIEI	Farm and Industrial Equipment Institute
FPT	Female Pipe Thread
GHT	Garden Hose Thread
IPT	American Iron Pipe Thread-Straight
JIC	Joint Industry Conference (SAE 37°)
JIS	Japanese Industrial Standard
M/MM	Metric Thread
NPS	American National Pipe Thread - Straight
NPSM	American National Pipe Thread - Straight Mechanical
NPT	American National Pipe Thread - Taper
NPTF	American National Pipe Thread - Taper (Dry Seal)
NST	American National Standard Thread - Straight
ORFS	O-ring front seal
R	Rørgjenge (BSP)
RT	British Round Thread
SAE	Society of Automative Engineers (45°)
URT	Dennis Urgan Round Thread
UNC	Unified Coarse Thread
UNF	Unified Fine Thread
VEE	Shelvoke & Drewry "VEE" Round Thread
W	Whithwort Thread

STANDARD ABBREVIATIONS

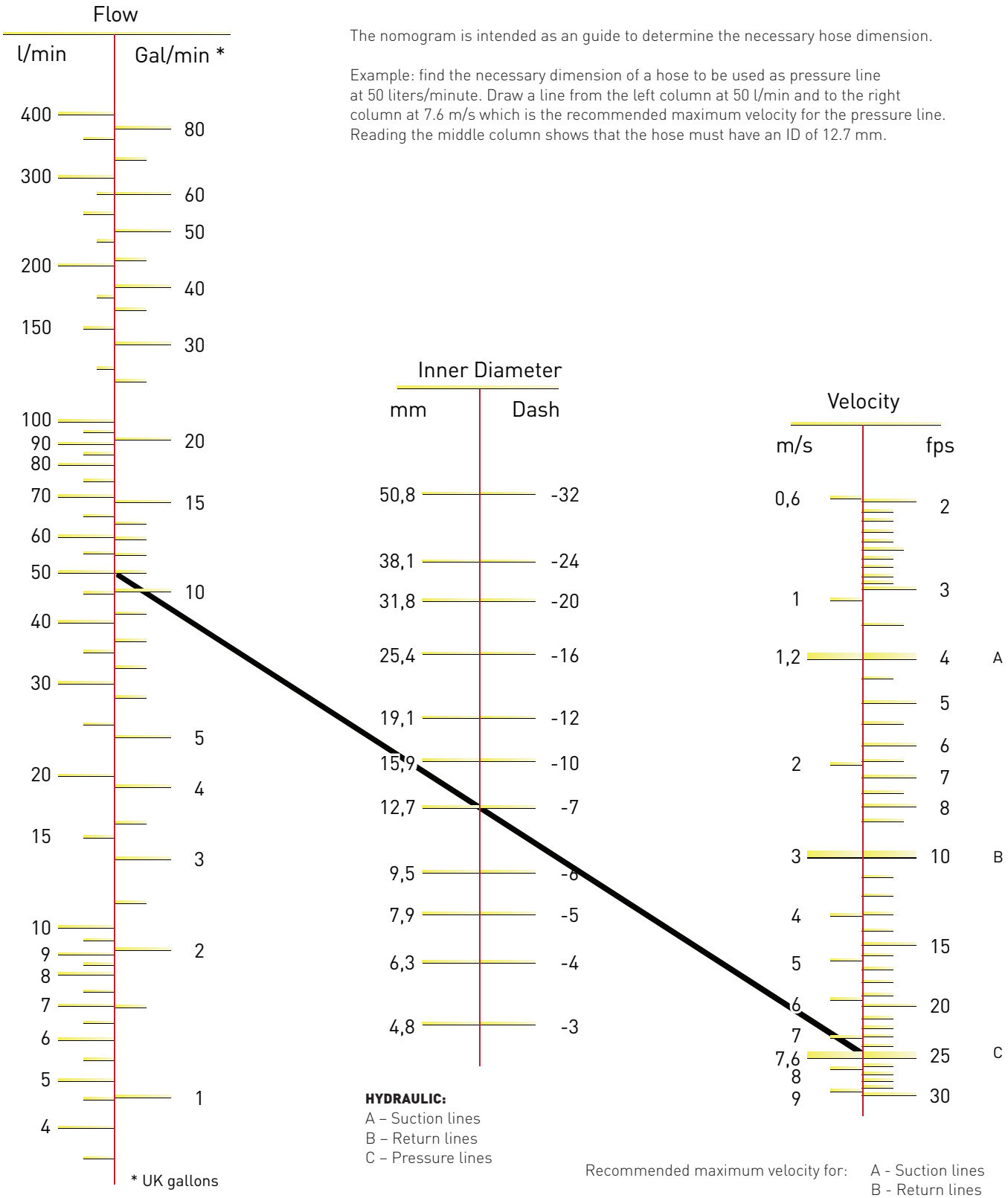
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASM	American Society for Metals
ASME	American Society for Mechanical Materials
BS	British Standard
DIN	Deutche Industrie Normen
EN	Europeisk standard
ISO	International Organization for Standardization
JIS	Japanese Industrial Standard
MIL-STD	Military Standard (USA)
MSS	Manufactures Standardizaion Society (Valve and Fittings Industry)
NF	Norme Francaise
NS	Norsk Standard
SAE	Society of Automotive Engineers
SIS	Svensk Standard
SMS	Sveriges Mekanfôrbunds Standardcentral
SSG	Standardisation Group of the Swedish Forest Industry
UL	Underwriters Laboratories
UNI	Instuto Nationale Unifacacione (Italia)
USCG	United States Coast Guard

THREAD TABLE FOR HYDRAULIC COUPLINGS

OD mm	ID mm		Type
8,00	6,92	MM	8x1
9,73	8,57	BSP	1/8" x 28
10,00	8,92	MM	10 x 1
10,27	8,77	NPTF	1/8" x 27
11,11	9,74	JIC	7/16" x 20
12,00	10,38	MM	12 x 1,5
12,70	11,33	JIC	1/2" x 20
13,16	11,45	BSP	1/4" x 19
13,57	11,31	NPTF	1/4" x 18
14,00	12,38	MM	14 x 1,5
14,29	12,76	JIC	9/16 x 18
15,88	14,35	SAE	5/8" x 18
16,00	14,38	MM	16 x 1,5
16,66	14,95	BSP	3/8" x 19
17,06	14,80	NPTF	3/8" x 18
18,00	16,38	MM	18 x 1,5
19,05	17,33	JIC	3/4" x 16
20,00	18,38	MM	20 x 1,5
20,96	18,63	BSP	1/2" x 14
21,22	18,32	NPTF	1/2" x 14
22,00	20,38	MM	22 x 1,5
22,23	20,26	JIC	7/8" x 14
22,91	20,59	BSP	5/8" x 14
24,00	22,38	MM	24 x 1,5
26,00	24,38	MM	26 x 1,5
26,44	24,12	BSP	3/4" x 14
26,57	23,67	NPTF	3/4" x 14
26,99	25,10	JIC	1.1/16 x 12
28,00	26,38	MM	28 x 1,5
30,00	27,83	MM	30 x 2
30,16	28,20	JIC	1.3/16" x 12
30,20	27,88	BSP	7/8" x 14
31,23	29,61	NPTF	1" x 11,5
33,25	30,29	BSP	1" x 11
33,34	31,40	JIC	1.5/16" x 12
36,00	33,83	MM	36 x 2
41,28	39,30	JIC	1.5/8" x 12
41,91	38,95	BSP	1.1/4" x 11
41,99	38,45	NPTF	1.1/4" x 11,5
42,00	39,83	MM	42 x 2
45,00	42,83	MM	45 x 2
47,63	45,80	JIC	1.7/8" x 12
47,80	44,85	BSP	1.1/2" x 11
48,05	44,52	NPTF	1.1/2" x 11,5
52,00	49,83	MM	52 x 2
59,61	56,66	BSP	2" x 11
60,09	56,56	NPTF	2" x 11,5
63,20	60,80	JIC	2.1/2 x 12
65,71	62,75	BSP	2.1/4" x 11
72,70	67,62	NPTF	2.1/2" x 8
75,18	72,23	BSP	2.1/2" x 11
87,88	84,93	BSP	3" x 11
88,61	85,53	NPTF	3" x 8
113,03	110,07	BSP	4" x 11
113,97		NPT	4" x 8
140,95		NPT	5" x 8
167,79		NPT	6" x 8
218,44		NPT	8" x 8

NOTE! NPTF to be measured on the fourth thread top

FLOW CAPACITY NOMOGRAM



The nomogram is intended as an guide to determine the necessary hose dimension.

Example: find the necessary dimension of a hose to be used as pressure line at 50 liters/minute. Draw a line from the left column at 50 l/min and to the right column at 7.6 m/s which is the recommended maximum velocity for the pressure line. Reading the middle column shows that the hose must have an ID of 12.7 mm.

HYDRAULIC:
A – Suction lines
B – Return lines
C – Pressure lines

Recommended maximum velocity for:
A - Suction lines
B - Return lines
C - Pressure lines

* Recommended velocities are according to hydraulic fluids with maximum viscosity of 315 S.S.U. and at 38°C, with an ambient temperature between 18° and 68°C

RECOMMENDED FITTING AND ADAPTER INSTALLATION TORQUE

SAE J514 37°C Flare (JIC)

Dash	(Inch)	Lb. ft. Min	Lb. ft. Max	N.m Min	N.m Max
-4	1/4	11	12	15	16
-5	5/16	14	15	19	21
-6	3/8	18	20	24	28
-8	1/2	36	39	49	53
-10	5/8	57	63	77	85
-12	3/4	79	88	107	119
-16	1	108	113	147	140
-20	1 1/4	127	133	172	181
-24	1 1/2	158	167	215	226
-32	2	245	258	332	350

BSPP

Dash	(Inch)	Lb .ft.	N.m
-2	1/8	15	20
-4	1/4	19	25
-6	3/8	36	49
-8	1/2	44	60
-12	3/4	87	118
-16	1	100	137
-20	1 1/4	123	167
-24	1 1/2	151	206

SAE J51453 O-ring Seal

Dash	(Inch)	Lb.ft. Min	Lb.ft. Max	N.m Min	N.m Max
-4	1/4	10	12	14	16
-6	3/8	18	20	24	27
-8	1/2	32	35	43	47
-10	5/8	46	50	60	68
-12	3/4	65	70	90	95
-14	7/8	65	70	90	95
-16	1	92	100	125	135
-20	1 1/4	125	140	170	190
-24	1 1/2	150	165	200	225

JIS (B8363)

Dash	(Inch)	Lb.ft.	N.m
-4	1/4	19	25
-6	3/8	25	34
-8	1/2	43	59
-10	5/8	87	118
-12	3/4	87	118
-16	1	100	137
-20	1 1/4	123	167
-24	1 1/2	151	206
-32	2	180	245

SAE J518 Code 61 Flange Half Bolt

Dash	(Inch)	Lb.ft. Min	Lb.ft. Max	N.m Min	N.m Max
-8	1/2	15	19	20	25
-12	3/4	21	29	28	40
-16	1	27	35	37	48
-20	1 1/4	35	46	48	62
-24	1 1/2	46	58	62	79
-32	2	54	66	73	90
-40	2 1/2	79	91	107	124
-48	3	137	149	186	203

Metric

Thread mm	Lb.ft.	N.m
M12x1.5	15	1
M14x1.5	19	25
M16x1.5	33	45
M18x1.5	37	50
M20x1.5	52	70
M22x1.5	55	75
M24x1.5	74	100
M26x1.5	81	110
M30x2	96	160
M36x2	162	220
M42x2	170	230
M45x2	220	300
M52x2	367	500

SAE J518 Code 62 - Flange Half Bolt

Dash	Lb. ft. (Inch)	Lb. ft. Min	N.m Max	N.m Min	Max
-8	1/2	15	19	20	25
-12	3/4	25	33	34	45
-16	1	42	50	56	68
-20	1 1/4	62	75	85	102
-24	1 1/2	116	133	158	181
-32	2	199	216	271	294

Chemical Resistance Chart – Material Composition

CLASSIFICATION AND CONDITIONS
This chemical recommendation table should only be used as a guide to selecting the most useful hose that is resistant to solvents, acids, salts and other chemical solutions.

The specific classifications in this table are based on empirical experience, as well as laboratory experiments.

Unless otherwise specified, the classification is based on concentrated or diluted solutions at room temperature 20°C (68°F).

When the working temperature for a given chemical differs from the temperature given in classification table, reduced hose lifespan is expected. The reduced duration can only be determined by user evaluation of the hose in each case. Contact Fluid Control for recommendation and assistance if in doubt.

CODES:

Blank	=	No data
E	=	Excellent
G	=	Good
F	=	Fair
C	=	Conditional
X	=	Unsatisfactory

ASTM Codes	Trade Name	Polymer Description
AU	Estane, Desmopan	Polyurethane
IIR	Enjay Butyl	Isobutylene-isoprene-butyl
CM	Tyrin	Chlorinated Polyethylene-butyl
CR	Neoprene, Bayprene	Polycloroprene
CSM	Hypalon	Chloro-sulfonyl-Polyethylene
EPDM	Dutral	Ethylene-Propylene-Diene
TPES	Hytrel	Thermoplastic Polyester
NBR	Chemigun-Perbunan N	Acrylonitrile-Nitrile
PA	Nylon, Zytel	Polyamide
NR	SMR	Natural rubber
T	Thiokol	Polysulfide
SBR		Styrene-Butadiene
EPDM/PP	ALFATER XL	EPDM + PP
PTFE	Teflon	Fluorocarbon resin
FKM	Viton	Fluoroelastomer
XLPE		Crosslinked Polyethylene

CHEMICAL RESISTANCE CHART

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
ACETALDEHYDE	X	E		F	C	G		X	E		X	X		G		E	G
ACETIC ACID, GLACIAL	X	G	G	X	X	G	E	C	X	X	X	X	X	C	X	E	E
ACETIC ACID, 10%	X	E	E	F	F	E	E	X	E	F	F	F	E	G	C	E	G
ACETIC ACID, 50%	X	E	E	X	X	E	E	X	C	G	F	X	C	G	C	E	E
ACETIC ANHYDRIDE	X	E	E	G	G	E	C	X	G	F	G	X	X	G	X	E	G
ACETIC OXIDE		E	E		G					F		G		E	X	E	G
ACETONE	X	E	E	X	F	E	G	X	E	C	E	C	E	G	X	E	E
ACETONE CYANOHYDRIN		E	E		F					F		F			X	E	G
ACETONITRILE			E														
ACETOPHENONE	X	E		X	X	E		X		X		X		E	X		
ACETYL ACETONE	X	G	G	X	X	E		X		X		X			X	E	G
ACETYL CHLORIDE	X	X	E	X	X	X		X		X		X		G	E	G	G
ACETYL OXIDE		E	E		G					F		G			X	E	G
ACETYLENE	C	E		G	E	E	E	E	E	E	E	E		F	F	F	E
ACETYLENE DI-+TERA CHLORIDE		X			X					X		X			G	G	G
ACROLEIN		E			G					G		F			E	E	G
ACRYLENITRILE	X	X	E	X	C	X		X	G	X		X		G	X	C	G
ACRYLIC ACID			E														G
ADIPIC ACID	E	E		G	E	G		G				G					
AIR, +300F	X			X	X	X		X		X		X			X		
ALK-TRI		X			X			X		X					E	E	I
ALLYL ALCOHOL		E	E		E					E		E			E	E	E
ALLYL BROMIDE		X	G		X					X		X			G	G	G
ALLYL CHLORIDE		F	G	X	X	X				X		X			G	G	G
ALUM		E	E	E	E	E		E	C	E	E	E		E	E	E	E
ALUMINIUM ACETATE	X	G	E	G		E		F		X		X		E	X	E	E
ALUMINIUM CHLORIDE	E	E	E	E	E	E	C	E	X	E	E	E		E	E	E	E
ALUMINIUM FLUORIDE	C	E		E	E	E		E	X	G		E		E	C	E	
ALUMINIUM FORMATE		G			X					X		X			X	E	E
ALUMINIUM HYDROXIDE			E	E	G			G		E							E
ALUMINIUM NITRATE	C	E	E	E	E	E		E		E		E		E	E	E	
ALUMINIUM SULFATE	X	E	E	E	E	E	C	E	X	E	E	E		E	E	E	E
ALUMUS-NH3-CR-K		E		E	E	E		E	X	E		E		E	E		
AMINES-MIXED	X	G		G	X	G		X		G		G			X		
AMINOBENZENE			G														G
AMINODIMETHILBENZENE			C														
AMINOETHANO			E														E
AMINOXYLENE			C														
AMMONIUM CARBONATE	G	E		E		E		X	G	E		E			C		
AMMONIUM CHLORIDE	E	E	E	E	E	E	E	E	X	E	E	E		E	C	E	E
AMMONIUM HYDROXIDE	X	E	E	E	G	E	C	X	E	X	C	X		E	C	E	E
AMMONIUM NITRATE	X	E		E	E	E		E	E		C	E		E	C	E	E
AMMONIUM PHOSPHATE, DIBASIC		E	E	E	E	E		E	E	E		E		E	C	E	E
AMMONIUM SULPHATE	E	E	E	E	E	E	C	E	E	E	C	E		E	X	E	E
AMMONIUM SULPHITE		E	E		E					E		E			E	E	E
AMMONIUM THIOSULFATE	G	E	E		E					E		E		E	E	E	E
AMYL ACETATE	X	E	C	X	X	X	C	X	E	X	E	X	X	C	X	E	E
AMYL ACETONE		G			X					X		X			X	E	
AMYL ALCOHOL	X	E	E	G	E	E	E	X	E	E	E	E	X	E	G	E	E
AMYL BROMIDE			C														
AMYL CHLORIDE	C	X	G	X	X	X				X		X		E	G	G	E
AMYL ETHER			E														
AMYLAMINE		E	G		F					G		G					E
ANETHOLE		X	X		X				G	X		X			G	G	F
ANILINE	X	E	G	X	X	C	X	X	X	X	X	X	E	E	C	E	E
ANILINE DYES	X	G	G	G	G	G		X	X	G		G		F	G	E	G
ANILINE OIL	X	G		X	X	G		X		X		X			C		G
ANIMAL FATS	C	G	E	C	X	C	E	E	E	X	E	X	X		E	E	E
ANTIMONY PENTACHLORIDE		X			X					X		X				E	E
AQUA REGIA	X	X	G	X	C	C		X		X		X		E	G	G	G
ARGON	E	G		X	X	E	E	C	E	X		X		E			
ARSENIC ACID	C	E	E	E	E	E		E		E		E		E	E	E	E
ASPHALT	G	X		X	X	X	C	X	E	X	F	X		E	E	X	X
ASTM FUEL A	E	X	E	E	G	X	E	E	E	X		X	X	E	E		
ASTM FUEL B	E	X	G	X	X	X	E	E	E	X		X	X	E	E		
ASTM FUEL C	X	X	G	X	X	X	E	G	E	X		X	X	E	E		
ASTM OIL NO.1	E	X	E	E	G	X	E	E	E	X	E	X	X	E	E	E	E
ASTM OIL NO.2	E	X	E	G	X	X	E	E	E	X		X	X	E	E	E	E
ASTM OIL NO.3	E	X	G	X	X	X	C	E	E	X	E	X	X	E	E	E	E
ASTM OIL NO.4	X	X		X	X	X		G		X		X			E		
AUTOMATIC TRASMISSION FLUID	G	X	E	G	C	X		E		X		X			E		

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
BANANA OIL		C	G			C		X				X					
BARIUM CHLORIDE	G	E	E	E	E	E		E	X	E	G	E		E	E	E	E
BARIUM HYDROXIDE	E	E	E	E	E	E	C	E	E	E	G	E		E	E	E	E
BARIUM SULFIDE	E	E	E	E	E	E		E	F	E		E		E	E	E	E
BEER	X	E	E	G	E	G	G	C	G	E		E		E	E		
BEET SUGAR LIQUORS	X	E	E	G	E	E		E	E	E		E		E	E		
BENZAL CHLORIDE		G	X													E	E
BENZALDEHYDE	X	E	C	X	X	E	X	X	E	X		X	X	C	X	E	E
BENZENE	X	X	X	X	X	X	C	X	E	X	F	X	X	G	E	E	G
BENZENE CARBOXYLIC ACID			E														
BENZINE	G	X		G	X	X		E	E	X	E	X		E	E	E	E
BENZOIC ACID	X	X	E	X	X	X		X	G	X		X		G	E	E	E
BENZOL			G			X		X	F					E			G
BENZOTRICHLORIDE			X													G	F
BENZYL ACETATE		G	G		X					X		X			X	E	E
BENZYL ALCOHOL	X	X	E	C	F	X		X	C	X		X	X	E	E	E	E
BENZYL CHLORIDE		G	X	X	C	G		X		C	X	C		E	C	E	E
BENZYL ETHER			C														
BIS (2-CLOROETHYL) ETHER			G														
BLACK SULFATE LIQUOR	X	E		G	G	E		G	F	G	X	G		E	E		E
BLEACH	X	G		X	F	G		X		X	X	X		E	G	G	F
BORAX SOLUTION	G	E	E	E	E	E	E	C	E	G	X	G	G	E	E	E	
BORIC ACID	E		E	E	E	E	E	E	E	E	X	E	E	E	E	E	
BRAKE FLUID (HD-557)12 DAYS		G	E	G	G	E		C	E		X	E		E	X		
BRINE		E	E	E	E	E		F	C	E		E		E	E	E	E
BROMACIL						E											
BROMOBENZENE	X	X	X	X	X	X		X		X	C	X			G	C	G
BROMOCHLOROMETANE		G	G	X	X	G		X		X	X	X			X	G	F
BROMOETHANE			G														
BROMOTOLUENE		X	X		X					X		X			G	F	X
BUGDIOXANE																E	
BUNKER OIL	G	X		X	X	X		E		X	E	E		E	E	E	G
BUTADIENE	X	X		X	C	X		X		X	C	X		E	G	E	
BUTANE	E	E	G	E	G	X	E	E	E	X	E	X		E	E	E	
BUTANOIC ACID			E														
BUTANOL (BUTYL ALCOHOL)	G	E	E	E	E	G	E	E	E	E	G	E	G	E	E	E	E
BUTANONE	X		G				X	X	E				X	G		E	G
BUTOXYETHANOL			E														
BUTYL ACETATE	X	G	G	X	X	C	C	X		X	X	X		C	X	E	E
BUTYL ACRYLATE		X	G	X	X	X		X		X	G				X	G	G
BUTYL ALCOHOL	G	E	E	E	E	E		E		E	G	E		G	E	E	E
BUTYL ALDEHYDE		E	G							F					X	E	E
BUTYL BENZYL PHTHALATE		E		X	X	E		C		X	C	X			C	E	E
BUTYL CARBITOL		E	E	C	C	E		X		X	C	X		E	C	C	E
BUTYL CELLUSOLVE	E	E	E	X	X	G		C		X	E	X		E	X	E	E
BUTYL CHLORIDE		F	C		X					X		X			G	G	G
BUTYL ETHER	G	C	E	X	X	C		C		X	G	X			X	E	E
BUTYL ETHER ACETALDEHYDE		E			X					X		X			X	E	E
BUTYL ETHYL ETHER		G			X					X		X				E	E
BUTYL OLEATE		G		X	X	G		X		X		X			E		
BUTYL PHTHALATE		E	C		X					X		X			F	E	E
BUTYL STEARATE		X	G	X	X	X		G		X	E	X		E	C	E	E
BUTYLENE	X	X		C	X	X		G		X	G	X			E		F
BUTYRALDEHYDE	X	E	G	X	X	G		X		X	C	X		E	X	E	E
BUTYRIC ACID		F	E	X	X	G	C	X		F		X		E	G	E	E
BUTYRIC ANHYDRIDE		F			G					F		X			X	E	E
CADMIUM ACETATE		G	E		X					X		X				E	E
CALCIUM ALUMINATE		E			E					E		E			E	E	E
CALCIUM BICHROMATE		E			F											G	F
CALCIUM BISULFIDE				C		X	G	E	F					E			
CALCIUM CHLORIDE	E	E	E	E	E	E	E	E	C	E	E	E		E	E	E	E
CALCIUM HYDROXIDE	E	E	E	E	G	E	E	E	E	E	X	G		E	E	E	E
CALCIUM HYPOCHLORITE	X	G	E	X	F	E	E	X	X	X	X	X		E	X	C	G
CALCIUM NITRATE	E	E	E	E	E	E		E	E	E	E	E		E	E	E	E
CALCIUM SULFIDE	E	E	E	E	E	E		G		E	X	E		E	E	E	E
CALCIUM ACETATE	X	G	E	G	X	E		G		X	X	X		E	X	E	E
CAPRYLIC ACID		F	E		G					F		X				E	E
CARBAMIDE			E														
CARBITOL	X	F	E	G	X	G		G		X	G	X		E	G	E	E
CARBOLIC ACID PHENOL		E	E	X	X	G		X		X	X	X		E	E	E	E
CARBON DIOXIDE	E	E		C	E	C	E	X	E	E	E	E		E	G	E	E
CARBON DISULFIDE	X	X	C	X	X	X		X	X	X	G	X		E	E	C	F
CARBON MONOXIDE	G	E		C	E	C	E	E	E	E	X	G		E	E	E	
CARBON TETRACHLORIDE	X	X	X	X	X	X	C	X	G	X	C	X	X	E	E	G	G

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
CARBON ACID	X	E	E	X	E	G	X	X	X	E	E	E	X	E	E	E	E
CASTROL OIL	G	E	E	E	E	G	G	E	E	F	X	G		E	E	E	
CAUSTIC SODA (SEE SODIUM HYDROXIDE)																	E
CELLOSOLVE ACETATE	X	E		X	X	G		X	F	X	E	X		E	X	E	E
CELLUGUARD	X	E		E	E	G		E	E	E	E	E		E	E		
CETYLIC ACID			E														
CHINA WOOD OIL (TUNG OIL)	C	C		G	X	X		E		X	C	X			E		
CHLORINATED SOLVENTS	X	X		X	X	X		X	C	X	X	X		E	E	G	G
CHLORO-2-PROPANONE			X														
CHLOROACETIC ACID	X	F		X	X	X	X	X	X	X	X	X	X	C	X	E	E
CHLOROACETONE	X	G	X	X	X	E		X		X	X	X		E	X	E	E
CHLOROBENZENE	X	X	X	X	X	X	X	X	E	X	X	X	X	E	E	G	G
CHLOROBUTANE		F	C		X					X		X			E	G	F
CHLORODANE						E		E									
CHLOROTHYL BENZENE		X	X		X					X		X			G	E	E
CHLOROFORM	X	X	X	X	X	X	X	X	X	X	X	X	X	E	E	G	G
CHLOROPENTANE		X	G		X					X		X			E	E	E
CHLOROSULFONIC ACID	X	X	X	C	X	X	X	X	X	X		X		C	X	G	X
CHLOROTOLUENE	X	X	X	X	X	X		X		X	X	X		E	G	G	G
CHLOROX	X	G	E	G	G	G		G		X	X	X			E		
CHROME PLATING SOLUTIONS	X	X		X	X	G		X		X	X	X			E		
CHROMIC ACID	X	F	E	X	G	C	X	X	X	X	X	X	X	E	C	G	G
CHROMIUM TRIOXIDE			E														
CINNAMENE			C														
CIS-9-OCTADECENOIC ACID		G	E		X					X		X			C	E	
CITRIC ACID	E	E		E	E	E	E	E	E	E	X	E	E	E	C	E	
COAL OIL		X			X	X		X	E	X		X	X		E	E	E
COAL TAR		X		G	X	X		E		X		X			E	E	E
COAL TAR NAPHTHA		X			X					X		X			E	E	E
COCONUT OIL	C	G		G	X	C		E		X	X	X		E	C	E	
COKE OVEN GAS	X	X		X	X	X		X	E	X	X	X		C	E	E	
COOLANOL (MONSANTO)	X			E	G	X	X	E		X	X	X			E		
COPPER CHLORIDE	G	E	G	C	E	E	E	C	C	F	X	E		X	E	E	E
COPPER CYANIDE	E	E		E	E	E		E		E		E		E	E	E	
COPPER HYDRATE		E			G					F		G			F	E	E
COPPER HYDROXIDE		E			G					F		G			F	E	E
COPPER SULFATE	G	E	E	E	E	E	E	E	X	F	X	E		E	E	E	E
CORN OIL	G	E	G	C	X	C	G	E	G	X	X	X		G	E	E	
COTTONSEED OIL	G	C	G	C	X	C	G	C	E	X	X	X		E	E	C	G
CREOSOTE	C	X		C	X	X		C	X	X	C	X	X	E	E	E	E
CRESOLS	X	X	E	X	X	X		X	X	X	X	X	X	E	E	E	E
CRESYLIC ACID	X	X		X	X	X		X		X	X	X		E	E	E	E
CROTONALDEHYDE		E	E		X					X		X			X	E	E
CRUDE OIL		X		X	X	X		G	E	X		X		E	E	E	E
CUMENE	X	X	C	X	X	X		X		X	G	X		E	E	E	E
CUPRIC CARBONATE		E	E		E					F		E			E	E	E
CUPRIC HYDROXIDE			E														
CUPRIC NITRATE	G	E	E		E					F		E			E	E	E
CUPRIC SULFATE	G	E	E		E					F		E			E	E	E
CUTTING OIL	E	X		G	G	X		E		X	E	X		E	E		
CYCLOHEXANE	G	X	E	X	X	X	E	G	E	X	G	X	X	E	X	G	E
CYCLOHEXANOL		X	E	G	X	X		C	E	X	G	X	X	E	E	E	E
CYCLOHEXANONE	X	X	C	X	X	X		X	E	X	G	X	X	E	X	E	E
CYCLOPENTANE		X	G		X					X		X			E	E	E
CYCLOPENTANOL		X	E		X					X		X			G	E	E
CYCLOPENTANONE		X	G		X					X		X				E	E
CYCLOPENTIL ALCOHOL			E														
D-FURALDEHYDE			E														
DDT IN KEROSENE		X		F	X	X		E	E	X	E	X		E	E	E	E
DECAHYDRONAPHTHALENE			C														
DECAHYDROXYNHAPHTHALENE			C														
DECALIN		X	X	X	X	X		X		X	G	X		E	E	E	X
DECYL ALCOHOL		E	E		E					E		E			G	E	E
DECYL ALDEHYDE		E			X					X		X			X	E	E
DECYL BUTYL PHTHALATE		E			X					X		X			F	E	E
DECIL CARBINOL			E														
DETERGENT, WATER SOLUTION	X	E	G	G	G	E		E		G		G		E	E		
DEVELOPING FLUID (PHOTO)		G		E	E	G		E		E	E	G			E		
DEXTRON	G	X		G	X	X		E		X		X			E		
DI (2ETHYLHEXYL) ADIPATE			C														
DI (2ETHYLHEXYL) PHTHALATE			C														
DI-ISO-BUTYLENE	X	X		X	X	X		G		X	E	X			E	E	
DI-ISO-DECYL PHTHALATE			E														

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
DI-ISO-PROPANOLAMINE		E	E														
DI-ISO-PROPYL ETHER		F	E		X					X		X				E	
DI-ISO-PROPYL KETONE	X	G	C	X	X	E		X		X	G	X		E	X	E	
DI-P-MENTHA-1,8-DIENE			G														
DIACETONE ALCOHOL	X	E	E	X	X	X		X		X	C	X		E	X	C	E
DIACETYLMETHANE			E														
DIALLYLPHTHALATE			G														
DIAMMONIUM PHPSPHATE									E								
DIAMYL NAPHTHALENE		E			X					X		X			F	E	
DIAMYLAMINE		E	E		G					F		G					E
DIAMYLENE		X	G		X					X		X			E	E	E
DIAMYLPHENOL		X	E		X					X		X			E	E	E
DIBENZYL ETHER	G	E	C	X	X	X		X		X	C	X		E	X	E	E
DIBROMOBENZENE		X			X					X		X			E	E	G
DIBROMOMETHANE			C														
DIBUTYL ETHER	C	G	E	X	X	C		X		X	E	X		E	C	E	E
DIBUTYL PHTHALATE	X	C	C	X	X	C	E	X	E	X	G	X		E	C	E	E
DIBUTYL SEBACATE	X	E	G	X	X	G		X		X	G	X		E	F	E	E
DIBUTYLAMINE	X	X	E	X	X	X		X		X	X	X		E	X		E
DICALCIUM PHOSPHATE		E			E					E		E			E	E	E
DICHLORO ETHYLENE	C						X		C				X				F
DICHLOROACETIC ACID		F	G		X					G		X			X	E	E
DICHLOROBENZENE	X	X	X	X	X	X	X	X	E	X	C	X	X	G	E	G	G
DICHLOROBUTANE	X	X	C	X	X	X		G		X	C	X			E	E	E
DICHLORODIFLUOROMETHANE		X			X					X		X			G		I
DICHLOROETHANE		X	C		X					X		X			E	E	E
DICHLOROETHYL ETHER		X	G		X					X		X				E	E
DICHLOROHEXANE		X	C		X					X		X			E	E	E
DICHLOROMETHANE		X	C		X					X		X			E	E	E
DICHLOROPENTANE		X	C		X					X		X			E	E	E
DICHLOROPROPANE		X	C		X					X		X		E	E	E	E
DICHLOROPROPENE														E	E	E	
DICHLOROTOLUENE			X														
DIESEL OIL	C	X		C	C	X	C	E	E	X	E	X	X	E	E	C	E
DIETHANOL AMINE		E	E		F		C			G		G					E
DIETHYLBENZINE	X	X	C	X	X	X		X		X	G	X			E	E	E
DIETHYL ETHER	G	X	E	C	X	X		X	G	X	E	X		G	X	E	
DIETHYL KETONE		G	C		X					F		X			X	E	E
DIETHYL OXALATE		E	E		X					E		E				E	E
DIETHYL PHTHALATE		E	G	X	X	G	E		E	X		X		E	F	E	E
DIETHYL SEBACATE	X	E	G	X	X	C	G	X		X	G	X	E		E		E
DIETHYL SULFATE			E														E
DIETHYLAMINE	C	E	E	C	C	G		C		G	G	G		E	X	C	E
DIETHYLENE GLYCOL	X	E	E	E	E	E		E		E	X	E			E	C	E
DIETHYLENE OXIDE			G														
DIETHYLENETRIAMINE		E	E		F					G		G					E
DIETHYLTRIAMINE		E	E		F					G		G					E
DIHYDROXY SUCCINIC ACID			E														
DIHYDROXYDIETHYL ETHER		E	E		E					E		E			E		E
DIISOBUTYL KETONE		G		X	X	G		X		X	E	X			X	E	E
DIISODECYL PHTHALATE		E			X					X		X			F	E	E
DIISOOCTYL ADIPATE		E			X					X		X			F	E	E
DIISOOCTYL PHTHALATE		E			X					X		X			F	E	E
DIMETHYL CARBINOL			E														E
DIMETHYL KETONE			E														E
DIMETHYL PHTHALATE		G	E	X	X	G		X		X	G	X		E	G	E	E
DIMETHYL SULFATE			E														E
DIMETHYL SULFIDE			G														G
DIMETHYL-3-PENTANONE			C														
DIMETHYL-4-HEPTANONE			C														
DIMETHYLAMINE			E											E		E	E
DIMETHYLANILINE		C	C	C	X	G		C				C		E			
DIMETHYLBENZENE			X														E
DIMETHYLBUTANE			G														
DIOCTYL ADIPATE			C														E
DIOCTYL PHTHALATE	X	E	C	X	X	C	G	C	G	X	G	X		G	G	E	E
DIOXALANE	X	C	G	X	X	G		X		X	X	X		E	X	E	E
DIOXANE	X	G	G	X	X	G		X		X	X	X		E	X		E
DIPENTENE	X	X	G	X	X	X		G		X	E	X		E	E		
DIPENTYLAMINE			G														
DIPROPYLAMINEOLAMINE		E	G		G					G		G					E
DIPROPYLENE GLYCOL		E	E		E					E		E			E		E
DISODIUM PHOSPHATE		E	E		E					E		E				E	E

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
DIVINYL BENZENE		X	X		X					X		X			E	E	E
DOWELL INHIBITOR			G														
DOWFAX 2A1 SOLVENT			E														
DOWFAX 2A1 TA			E														
DOWFAX 6A1 SOLVENT			G														
DOWFAX 6A1 TA			E														
DOWTHERMN, A AND E		X	C	X	X	X		X	C	X	X	X		E	E	E	E
DRY CLEANING FLUIDS		X		X	X	X		C				X			E		
DUCGKIRIOEBAANE		X															
DURD AW-16,31						X		E	E					E			
DURO FR-HD						X		E	E					E			
ETHANOIC ACID			E											C			
ETHANOL (GRAIN ALCOHOL)	X	E		E	E	E	E	C	E	E	E	E	E	C	C	E	E
ETHANOLAMINE		E	E	G	C	E		G		G	G	G		E	X	C	E
ETHERS	G	X		X	X	C		X	E	X	E	X		E	C		
ETHYL ACETATE	X	G	G	X	X	C	C	X	E	X	G	X	E	E	X	E	E
ETHYL ACETOACETATE		G	E	X	X	G		X		X		X		E	X	E	E
ETHYL ACETONE			G														
ETHYL ACRYLATE		G	G	X	X	G		X		X		X			X	G	E
ETHYL ALCOHOL		E		E	E	E	E	C	E	E	E	E	E	C	C	E	E
ETHYL ALDEHYDE		E								F					X	E	E
ETHYL ALUMINIUM DICHLORIDE		X			X					X		X			G	G	F
ETHYL BENZENE		X	X	X	X	X		X		X		X		E	E	E	E
ETHYL BROMIDE	C	X	C	X	X	X		G		X					E		
ETHYL BUTYL ACETATE		G			X					X		X			X	E	E
ETHYL BUTYL ALCOHOL		E			E					E		E			G	E	E
ETHYL CELLULOSE	G	G		G	G	G		G	C	G	X	G		E	X	E	
ETHYL CHLORIDE	C	F		X	X	X	X	X	E	X	X	X	X	E	E	G	G
ETHYL DICHLORIDE		X	C		X					X		X			G	G	G
ETHYL DIISOBUTYLTHIO-CABARMATE										E	F	E					
ETHYL ETHER	G	C	E	X	X	X		C		X	E	X		E	X	E	E
ETHYL FORMATE		G	E	G	X	G		X		X	X	X		E	X	E	E
ETHYL IODIDE		X	C		X					X		X			G	G	F
ETHYL OXALATE	E	X	E	X	X	X		X		X	E	X		E	E	E	E
ETHYL PHTHALATE			G														E
ETHYL SILICATE		E	E	E	G	E		E		F	G	F		E	E	E	E
ETHYL-N-BUTYL KETONE		G	C		X					X		X			X	E	E
ETHYL-1-BUTANOL		E	E		E					E		E			E	E	E
ETHYLAMINE		G	E		F					F		F					E
ETHYLENE CHLOROHYDRIN	X	G		C	G	C	X	X		G	G	G	X	E	E	E	G
ETHYLENE DIAMINE	X	E	G	E	F	E		E		G	X	G		E	X	E	E
ETHYLENE DIBROMIDE	X	X	C	X	X	C		X		X	X	X			G	G	F
ETHYLENE DICHLORIDE	X	X	C	X	X	X	X	X	E	X	X	X	X	E	G	G	G
ETHYLENE G. MONOETHYL E ACETATE												E					
ETHYLENE G. MONOBUTYL ETHER																E	
ETHYLENE G. MONOETHYL ETHER																E	
ETHYLENE G. MONOEHEXIL ETHER																E	
ETHYLENE GLYCOL	E	E	E	E	E	E	E	E	E	E	C	E	E	E	E	C	E
ETHYLENE OXIDE	X	C		X	X	C	E	X	E	X		X		X	X		E
FATTY ACIDS		X	G	C	X	X		C	E	X	X	X	X	E	E	E	G
FERRIC BROMADE		E			E					E		E			E	E	E
FERRIC CHLORIDE	E	E	E	G	E	E	C	E	X	E	E	E		E	E	E	E
FERRIC NITRATE	E	E	E	E	E	E		E	E	E	E	E		E	E	E	
FERRIC SULFATE		E	E	E	E	E		E	X	E	E	E		E	E	E	E
FERROUS ACETATE		G			X					X		X			X	E	E
FERROUS CHLORIDE	E	E		E	E	E	E	E	E	E	E	E		E	E	E	E
FERROUS SULFATE	E	E	E	E	E	E	E	G	E	E		E		E	E	E	E
FLUOBORIC ACID		E	E	C	E	E		C		E	X	G		E	C	C	G
FLUORINE	X	C		X		X		X	X	X	X	X	X	X	G	X	X
FLUOSILICIC ACID		E	E	C	E	E	C	C		E	X	C		E	C	C	G
FORMALDEHYDE	X	E	E	C	C	G	C	X	E	G	G	C	E	E	X	E	E
FORMALIN		E	E		E					G		G			E	E	E
FORMIC ACID	X	E	E	C	F	E	C	X	X	G	C	G	E	E	X	C	E
FREON SO2				E		E			E				X	E			
FREON 113				E	E	C	E	E		C		G	X	E	G		
FREON 12	G	X	E	G	X	X	G	G	E	X	G	X	X	X	G	C	E
FREON 22	X	F	E	X	X		X	X	X	X	X	X	X	X	X	C	E
FUEL A (ASTM)		X		G	X	X		E		X	E	X			E	G	G
FUEL B (ASTM)		X		F	X	X		E		X	E	X			E	G	G
FUEL OIL	X	X	E	G	C	X	X	E	E	X	E	X		E	E	C	E
FURAN		X	E	X	X	C		X		X	G	X					
FURFURAL		E	E	X	X	C		X		X	X	X	E	E	X	E	E
FURFURAN			E	X	X	C		X		X		X		E			

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
FURFURYL ALCOHOL	X	F	E	X	X	G		X	E	X	X	X	E	G	G	E	E
GALLIC ACID	X	G	E	X	C	G		C		E	C	C		E	C	C	E
GALLOTANNIC ACID			E														
GAS, COAL									E				X				
GAS, HIGH OCTANE	C			X		X	E	G	E				X	E			
GASOLINE	G	X	G	X	X	X	E	E	E	X	E	X		E	E	E	G
GLACIAL ACRYLIC ACID																E	
GLUCONIC ACID		F	E		G					X		X				E	E
GLUCOSE	X	E		G	E	G		G	G	E	X	E		G	E	E	G
GLYCERINE	X	E	E	E	E	E	E	E	E	E	G	E	X	E	E	C	E
GLYCEROL	X	E	E	E	E	E		E	E	E	E	E		E	E		
GLYCOGENIC ACID			E														
GLYCOLS	X	E	E	E	E	E	G	E	E	E	E	E	G	E	E	E	G
GLYCONIC ACID			E														
GLYCLYL ALCOHOL			E														
GREASE	E	X		X	X	X	E	E	E	X	E	X	X	E	E	G	E
GREEN SULPHATE LIQUOR		E	G	G	E	E		G	C	E	X	E		E	E	E	E
HALON 1211				E				E									
HELIUM	G	E		E	E	E	G	E	E	E	E	E		G	E		
HEPTALDEHYDE			G														
HEPTANAL		E	G		X					X		X				E	E
HEPTANE	G	X	E	G	X	X	G	E	E	X	E	X		E	E	G	E
HEPTANE CARBOXYLIC ACID			E														E
HEPTANOIC ACID			E														
HEPTANONE			C														
HEXADECANOIC ACID			E														
HEXALDEHYDE	G	G		E	C	E		X		X	G	X		E	X	E	E
HEXANE	G	X	G	C	X	X	X	C	E	X	E	X		E	E	G	G
HEXANOL		E	E		E					E		E			G	E	E
HEXENE		X	E	G	G	X		G		X		X		E	E	E	G
HEXYL ALCOHOL	X	C	E	G	C	C		E		E	E	E		E	G	E	E
HEXYL METHYL KETONE		G			X					X		X			X	E	E
HEXYLAMINE		E	G		F					G		G					E
HEXYLENE GLYCOL		E	E		E					E		E			E		E
HISTOWAX			E														
HYDRAULIC & MOTOR OIL	E	X	E	C	G	X	E	E	E	X	E	X	X	E	E	E	
HYDRAZINE	X	E	C	G	E	X	G	X	E	X	E			X			
HYDROBROMIC ACID	X	E	E	X	E	E		X	X	E	C	X		E	C	C	G
HYDROCLORIC ACID	C	F	E	X	X	X	C	X	X	E	X	X	E	E	E	E	E
HYDROCIANIC ACID		E	C	E	C	C	X	C	G	X	G		E	E			
HYDROFLUORIC ACID	X	E	E	X	E	X	X	X	X	X	X	X	X	E	G	C	E
HYDROFLUOSILICIC ACID		E	E	C	E	E	C		E	X	C		E	C	C		G
HYDROGEN CHLORIDE ANHYDROUS			E														
HYDROGEN DIOXIDE (10%)		F								X		X			E		G
HYDROGEN GAS	E	E	E	E	G	E	E	E	E	G	C	G		E	C	E	E
HYDROGEN PEROXIDE OVER 10%		X	E	X	X	X		X	X	X	X	X		E	E	C	F
HYDROGEN PEROXIDE 10%		F	E	F	F	F		X	X	X	X	X		E	E	C	G
HYDROGEN SULFIDE (WET)	X	E	G	C	X	E	E	X	X	X	E	X		E	X	E	G
HYDROXY BENZENE			E														
HYDROXYISOBUTYRONIRILE			E														
HYDROXYTOLUENE			E														
HYVAR VXL						E											
IMINODI-2-PROPANOL			E														
IMINODIETHANOL			E														
IODINE		C	E	X	E	C		C		C	C	C			C	C	E
IODINE PENTAFLUORIDE	X	X		X	X	X		X		X	X	X			X		
IODOFORM				X		X		E		X		X					
ISO-BUTANAL			G														E
ISO-BUTYLAMINE			G														E
ISO-BUTYLBROMIDE			C														G
ISO-BUTYLCARBINOL			E														E
ISOCYANATES																E	E
ISOOCTANE	E	X	G	C	X	X	E	E	E	X	E	X	X	E	E	E	G
ISOPROPYL ACETATE	X	G		X	X	X		X		X	G	X		E	X	E	E
ISOPROPYL ALCOHOL	X	E	E	C	E	E	E	C	E	E	E	E		E	E	E	E
ISOPROPYL ETHER	E	X		X	C	X		C		X	E	X		E	X	E	E
JET FUELS		X		G	X	X		E		X	E	X			E	E	E
JP-4 OIL	C	X		X	X	X	C	G	E	X	G	X	C	E	E		
KEROSENE	E	X	E	C	X	X	C	E	E	X	E	X	X	E	E	E	E
KETONES	X	E		X	X	E	C	C	E	X	G	X	X	E	X		
LACQUER SOLVENTS	X	X		X	X	X	C	X	E	X	E	X		E	X	G	
LACTIC ACID - COLD	E	E		E	G	X	C	X	X	G	X	G		E	C	C	
LACTIC ACID - HOT				X	C	X	C	X	X	X	X	X		E	E		

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
LARD		X	E	C	X	X		E		X	X	X		E	C	C	
LAVENDER OIL	X	X		X	X	X		G		X	G	X		E	E	G	
LEAD ACETATE	X	G	E	G	X	E		G		E	X	X		E	X	E	E
LEAD NITRATE		E	E	E	X	E		E		E	X	E					
LEAD SULFATE			E	E	E	E					E		E		E	E	E
LIME			E	C		G		X	G					G			
LIME BLEACH		E		G	G	E		E		E	X	G			E		
LIME SULFUR		E		E	E	E		X		X	X	X		E	E	E	
LIMONENE			G														
LINOLEIC ACID		X		X	X	X		G		X	X	X		E	G		
LINSEED OIL	G	C	E	C	C	X	C	E	E	X	F	X		E	E	C	E
LIQUID PETROLEUM GAS (LPG)	E	X	G	G	X	X		E		X	E	X		E	E	E	X
LUBRICATING OIL	E	X	E	C	F	X	E	G	E	X	E	X		E	E	E	E
LYE SOLUTIONS	X	E	E	G	E	E		G		G	G	G			G		G
MEK	X	G	C	X	X	E	C	X	E	X	G	X	X	E	X	E	G
MAGNESIUM ACETATE		G	E													E	E
MAGNESIUM CHLORIDE	E	E	E	E	E	E	C	E	X	E	C	E			E	E	E
MAGNESIUM HYDRATE		E			G					E		G			G	E	E
MAGNESIUM HYDROXYDE	G	E	E	G	G	E	C	G	X	E	C	G		E	G	E	E
MAGNESIUM SULFATE & SULPHITE		E	E	E	E	E		E	E	E	E	E		E	E	E	E
MALEIC ACID		X		X	X	X		X	C	X	G	X			E	G	E
MALEIC ANHYDRIDE		X		X	X	X		X		X		X			X		
MALIC ACID		X		C	G	X		C		C	C	C		E	C	C	G
MANGANOUS SULFATE			E														
MAPP				E		G		E				G					
MERCURY	G	E	E	E	E	E	G	E	E	E	E	E		E	E	E	
MERCURY VAPORS		E		E	E	E		E		E		E			E		
MESITYL OXIDE	X	G	G	X	X	G		X		X	G	X		E		E	E
METHALLYL ALCOHOL		E	E		E					E		E			X	E	E
METHALLYL CHLORIDE			C														
METHANE CARBOXYLIC ACID			E	G		X			E					E			
METHANOIC ACID			E														
METHANOL (METHYL ALCOHOL)	X	E	E	E	E	E		E	E	E	G	E		E	E		E
METHANOL (WOOD ALCOHOL)	E	E	E	E	E	E	E	E	E	E	E	E	E	E	X	E	E
METHOXY ETHANOL			E														
METHOXYETHOXY ETHANOL			E														
METHOXYPROPENYL BENZENE			X														
METHYL ACETATE	X	G	E	X	X	E		X	E	X	G	X		E	X	E	E
METHYL ACETOACETATE	X	G	E	X	X	G		X		X	G	X			X	E	E
METHYL ACETONE		G	E		X					F		X			X	E	E
METHYL ACETYLENE PROPADIENE				E		G		E				G					
METHYL ALLYL ALCOHOL			E														
METHYL ALLYL CHLORIDE		F	C		X					X		X			F	G	E
METHYL AMYL CARBINOL		E			E					E		E			X	E	E
METHYL BENZENE		X	C		X					X		X			E	E	E
METHYL BROMIDE		X		X	X	X		C	E	X		X	X	E	E	G	
METHYL BUTANE			E														
METHYL BUTYL ALCOHOL			E														E
METHYL BUTYL KETONE	X	G		X	X	E		X		X	E	X			X		E
METHYL CARBITOL		F	E		X					X		X				E	E
MRTHYL CELLOSOLVE	X	E	E	C	X	G		C		X		X		E	X		E
METHYL CHLORIDE	X	C	X	X	X	X	X	X	X	X	X	X	X	E	E	G	E
METHYL CYANIDE			E														
METHYL ETHYL KETONE	X	G	C	X	X	E	C	X	E	X	G	X	X	E	X	E	E
METHYL HEXANOL		E			E					E		E			F	E	E
METHYL METHACRILATE		X	C	X	X	C		X	C	X		X	C	E	X	G	G
METHYL NORMAL AMYL KETONE		G			X					X		X			X	E	E
METHYL PROPYL ETHER		G			X					X		X				E	E
METHYL SALYCILATE		G		X	X	G		X		C		C		E	C		
METHYL STYRENE			C														
METHYL SULFIDE			C														
METHYL TERTIARY METYL ETHER		G	X	X				X				X		G	X		
METHYL 1-2, 4-PENTANEDIOL			E														
METHYL-ISO-AMYL-KETONE			C														
METHYL-L-PROPANOL			E														
METHYL-2-BUTANOL		E	E		E					E		E			F	E	
METHYL-2-BUTANONE		G	G		X					X		X			X	E	
METHYL-2-HEXANONE		G	C		X					X		X			X	E	
METHYL-2-PENTANOL			E														
METHYL-2-PENTANONE			C														
METHYL-2-PROPEN-L-OL			E														
METHYL-3-PENTEN-1-ONE			C														
METHYL-4-ISOPROPYL BENZENE			C														

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
METHYLALLYL ACETATE		G			X					X		X			X	E	
METHYLAMYL ALCOHOL		E	E		E					E		E			X	E	E
METHYLCYCLOEXANE		X	G		X					X		X			G	G	E
METHYLENE BROMIDE			C														G
METHYLENE CHLORIDE	X	X	X	X	X	X	C	X	X	X		X	X	E	G	G	G
METHYLETYL KETONE	X	G	C	X	X	E	C	X	E	X	G	X	X	E	X	E	
METHYLEXYL KETONE		G	C		X					X		X			X	E	
METHYLISOBUTYL CARBINOL		E	E	G	C	E		G		G	C	G			C	C	E
METHYLISOBUTYL KETONE	X	C	C	X	X	C	C	X	E	X	G	X	X	E	X	E	E
METHYLISOPROPYL KETONE	X	G	G	X	X	X		X	E	X	G	X		E	X	E	E
METHYLLACTONITRILE			E														
METHYLPHENOL			E														
METHYLPROPYL CARBINOL		E	E		G					G		G			F	E	E
METHYLPROPYL KETONE		G	G		X					X		X			X	E	E
MIL-A-6091	X	E		E	E	E		G		E	E	E			E		
MIL-C-4339	X	X		X	X	X		E		X	E	X			E		
MIL-C-7024	G	X		X	X	X		E		X	E	X			E		
MIL-E-9500	X	E		E	E	E		E		E	E	E			E		
MIL-F-16884	C	X		C	C	X		E		X	E	X			E		
MIL-F-17111	C	X		G	X	X		E		X	E	X			E		
MIL-F-25558 (RJ-1)				G		X		E							E		
MIL-G-10924	G	X		X	G	X		E		X	E	X			E		
MIL-G-25013	C	X		G	G	X		E		X	G	X			E		
MIL-G-25537				G		X		E							E		
MIL-G-3545	C	X		G	C	X		E		X	C	X			E		
MIL-G-5572	G	X		X	X	X		E		X	E	X			E		
MIL-G-7711	E	X		X	X	X		E		X	E	X			E		
MIL-H-05606 (HFA)				G		X		E							E		
MIL-H-13910	X	G		E	G	E		E		G	C	E			E		
MIL-H-19457	X	E		X	X	E		X		X	X	X			X		
MIL-H-22251		E		G	G	E		G			X	G			C		
MIL-H-27601				G		X		E							E		
MIL-H-5606 (J43)				G		X		E	E					E	E		
MIL-H-6083	G	X		E	G	X		E	E	X	E	X		E	E		
MIL-H-8446 (MLO-8515)	X	X		E		X		G		X	G	X			E		
MIL-J-5161	C	X		X	X	X		G		X	E	X			E		
MIL-J-5624 (JP-3,JP-4,JP-5)	C	X		X	X	X		E		X	G	X			E		
MIL-L-15016	E	X		G	G	X		E		X	E	X			E		
MIL-L-17331	E	X		G	G	X		E		X	E	X			E		
MIL-L-2104	E	X		G	C	X		E	E	X	E	X		E	E		
MIL-L-21260	E	X		G	G	X		E		X	E	X			E		
MIL-L-23699	C	X		C	C	X		G		X	G	X			E		
MIL-L-25681				G		E		G							E		
MIL-L-3150	G	X		G	G	X		E		X	E	X			E		
MIL-L-4343	E	C		E	G	C		E		X	E	X			E		
MIL-L-6082	E	X		G	G	X		E		X	E	X			E		
MIL-L-6085	C	X		X	X	X		G		X	G	X			E		
MIL-L-7808	X	X		X	X	X		G	X	X	G	X		E	E		
MIL-L-7870	X	X		G	X	X		E		X		X			E		
MIL-L-9000	C	X		G	C	X		E		X	G	X			E		
MIL-L-9236	X	X		X	X	X		G		X	G	X			E		
MIL-P-27402				G		E		G							C		
MIL-R-25567 (RP-1)			E		X		E							E			
MIL-S-3136 TYPE 1 FUEL	G	X		G	C	X		E		X	E	X			E		
MIL-S-3136 TYPE 2 FUEL	C	X		X	X	X		G		X	E	X			E		
MIL-S-3136 TYPE 3 FUEL	C	X		X	X	X		G		X	E	X			E		
MIL-S-3136 TYPE 4 OIL, LOWSWELL	E	X		E	E	X		E		X	E	X			E		
MIL-S-3136 TYPE 5 OIL, MEDSWELL	G	X		G	G	X		E		X	E	X			E		
MIL-S-3136 TYPE 6 OIL, HI SWELL	G	X		X	X	X		E		X	E	X			E		
MIL-S-81087				E		E		E							E		
MINERAL OIL	E	X	E	C	F	X	E	E	E	X	E	X	X	E	E	E	
MINERAL SPIRITS		X		F	X	X		E		X	E	X			E	E	E
MOBILE HFA						X		E	E					E			
MOLTEN SULFUR		G			F					X		X			G	X	
MONO-CHLOROACETIC ACID		F	E		X					G		X			C	E	E
MONOBUTYL ETHER		F			X					X		X			X	E	
MONOCHLOROBENZENE	X	X		X	X	X	C	X	G	X	X	X	X	E	E	G	G
MONOCHLORODIFLUOROMETHANE		F			X					X		X			X	C	I
MONOETHANOL AMINE	X	E		X	X	E		X		E	X	X			X	E	E
MONOETHYL AMINE		G	E		F					F		F		E	C	C	E
MORPHOLINE						X		X	X					E			
MOTOR OIL, 40W			E														
MTBE		G	X	X				X				X		G	X		F

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
MURIATC ACID		F	E	X	X	F		X		E	X	X			E	E	E
N-BUTANAL			G														
N-BUTYLAMINE	X	X	G	X	X	X		C		X	X	X			X		
N-BUTYLBENZENE		X	C		X					X		X			E	E	
N-BUTYLBROMIDE		X	C		X					X		X			G	G	
N-BUTYLBUTYRATE		F	C		X					X		X			X	G	
N-BUTYLCARBINOL			E														
N-NONYL ALCOHOL			E														
N-OCTANE	X	X	E	G	X	X		G		X	G	X			E	G	
N-SERV (75% XYLENE)									E					E	E	C	
NA-K						X		X						X			
NAPHTHA	E	X	E	X		X	E	C	E	X	E	X	X	E	E	E	E
NAPHTHALENE	C	F	E	X	X	X	C	X	E	X	C	X	X	E	C	E	E
NAPHTHENIC ACID			E	X	X	X		G		X	G	X		E	E		
NATURAL GAS	C	X	E	E	F	X		E	G	X	E	X	X	E	C	C	
NEOHEXANE		X	G		X					X		X			E	E	E
NEON GAS	E	E		E	E	E		E	E	E	E	E	E	E	E		
NEU-TRI		X			X					X		X			E	E	E
NICKEL ACETATE	X	E		G	X	E		G		E	X	X		E	X	E	
NICKEL CHLORIDE	C	E	E	G	E	E		E	X	E	E	E		E	E	E	E
NICKEL NITRATE		E	E	E	E	E				E		E			E	E	E
NICKEL SULFATE		E	E	E	E	E		E	E	E	C	E		E	E	E	E
NIETYLENE										E							
NITRIC ACID, CONC (16N)	X	C	X	X	G	X	C	X	X	X	X	X	X	E	C	G	
NITRIC ACID, RED FUMING	X	G	X	X	X	X	C	X	X	X	X	X	X	E	X	X	X
NITRIC ACID, 10%	X	G		X	X	C	C	X	X	X	X	X	E	E	X	C	E
NITRIC ACID, 13N			E											E			
NITRIC ACID, 13N +5%			E											E			
NITRIC ACID, 20%		G		X	X	G	F	X		X	X	X		E	C	E	E
NITRIC ACID, 30%	C	F		X	X	C	X	X	X	X	X	X		G	C	E	G
NITRIC ACID, 30% - 70%		F		X	F	F		X		X	X	X			C	G	F
NITRILOTRIETHANOL			E														
NITROBENZENE	X	F	C	X	X	X	C	X	E	X	X	X	C	E	G	E	E
NITROETHANE	X	G	E	C	G	G		X		G		G		E	X	E	
NITROGEN	E	E	E	E	E	E		E	G	E	E	E		E	E	E	E
NITROMETHANE	X	G		C	C	G		X		G		C		E	X	E	
NITROUS OXIDE GAS									X					E			E
NONANOIC ACID			E														
NONANOL			E														
NUTO H						X		E	E					E			
NYVAC LIGHT						E		X	E					E			
OCTANOIC ACID			E														
OCTANOL		E	E		G					G		G			G	E	E
OCTYL ACETATE		G	C		X					X		X			X	E	E
OCTYL ALCOHOL	X	E	E	G	E	C		G		E	G	E		E	E	E	E
OCTYL ALDEHYDE		E	E		X					X		X			X	E	E
OCTYL AMINE		E	G		F					G		G			C	C	E
OCTYL CARBINOL		E	E		E					E		E			G	E	E
OCTYLENE GLYCOL		E			E					E		E			E	C	E
OIL-PETROLEUM		X		G	F	X		E		X	E	X			E	E	G
OLEIC ACID	G	G	E	X	X	X	E	C	E	X	X	X		E	G	E	E
OLEUM (FUMING SULFURIC ACID)	C	X		X	X	X	X	C	E	X	X	X		E	X	X	X
OLIVE OIL	E	E	G	E	F	E		E		X	C	X		E	E	C	
ORTHO-DICHLOROBENZENE	X	X		X	X	X		X		X	G	X		G	E	G	E
ORTHO-DICHLOROBENZOL		X			X					X		X			G	G	E
ORTHOXYLENE		X			X					X		X			E	E	G
OXALIC ACID	E	E	E	X	X	E		X	X	X	X	X	E	E	C	C	E
OXYDIETHANOL			E														
OZONE	G	G	E	C	G	E		X	X	X	F	X		E	C	C	E
P-CYMENE	X	X	X	X	X	X		X		X	X	X		E	E	E	
PAINT THINNER	X	X		X	X	X		X		X	G	X	X	E	G		
PALMITIC ACID	E	E	E	C	C	C	E	E	X	X	F	X	E	E	C	C	E
PAPERMAKERS ALUM		E		E	E	E		E		E	E	E			E	E	E
PARA-DICHLOROBENZENE	X	X		X	X	X		X		X	X	X			E	G	
PARAFFIN WAX		X	E	G	X	X		E		X	E	X			E	X	E
PARALDEHYDE		E								F					X	E	E
PARAXYLENE		X			X					X		X			E	E	E
PCB														E	E		
PELARGONIC ALCOHOL		E	E		X					X		X				E	
PENTACHLOROETHANE		X			X					X		X			E	E	E
PENTADIONE			G														
PENTAMETHYLENE			G														
PENTANE	X	X	E	G	F	X		E		X	E	X			E	G	G

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
PENTANOL			E														E
PENTANONE		G	C		X					X		X			X	E	E
PENTASOL		E		E	E					E		E			E	E	
PENTYL ACETATE			C														
PENTYL ALCOHOL			E														
PENTYL BROMIDE			C														
PENTYL CHLORIDE			C														
PENTYL ETHER			E														
PENTYLAMINE			G														
PERCHLORIC ACID - 2N	X	G		C	G	C	X	X	C	X	X	X	X	E	E	E	
PERCHLOROETHYLENE	X	X	C	X	X	X	X	X	X	X	X	X	X	E	E	G	G
PERCHLOROMETHANE			C														
PETROLEUM CRUDE	E	X	E	G	X	X		E		X	E	X			E	E	E
PETROLEUM ETHER		X	E		X	X		G	E	X		X		E	E	E	E
PETROLEUM OILS		X		G	X	X		X	G	X	E	X		E	E	E	E
PHENBO	X																
PHENOL	X	E	E	X	X	X	X	X	X	X	X	X	X	E	E	E	E
PHENOLSULFONIC ACID		F	E		X					X		X			X	G	F
PHENYLAMINE			G						C								G
PHENYLBROMIDE			X														
PHENYLBUTANE			C														
PHENYLCHLORIDE		X	X		X					X		X			E	E	E
PHENYLETHYLENE			C														
PHENYLMETHANE			C														
PHENYLMETHANOL			X														
PHENYLMETHYL ACETATE			G														
PHOSPHATE ESTERS	X					E	X	X	E				E	E			
PHOSPHORIC ACID 10%		E	E	X	E	X		X	X	E	C	E		E	E	E	E
PHOSFORIC ACID 10% - 85%	X	G	E	X	E	X		X	C	G	C	X	E	E	E	E	E
PHOSPHORUS TRICHLORIDE		E	X	X	X	E		X		X		X		E	E		
PIRIC ACID, H20 SOLUTION	X		G	C	G	X	C	X	X	G		G	X	E	E		
PINE OIL		X	G	X	X	X		X		X	G	X		E	E	E	E
PINENE	G	X	G	F	X	X		G		X	G	X		E	E	E	E
POLY CHLORINATED BIPHENOL														E	E		
POLYETHYLENE GLYCOL E-400		E	E		E					E		E			E		E
POLYOL ESTER		X		X		X		G		X					G		
POLYPROPYLENE GLYCOL		E			E					E		E			E		E
POTASSIUM ACETATE	X	G	E	G	X	E		G		X	X	X		E	X	E	E
POTASSIUM BISULFATE		E	E		E					E		E			E	E	E
POTASSIUM BISULFITE		E	E		E					E		E			E		E
POTASSIUM CARBONATE		E	E	E	E	E			G	E		E			E	E	E
POTASSIUM CHLORIDE	E	E	E	E	E	E		E	E	E	E	E		E	E	E	E
POTASSIUM CHROMATE		E	E		F											G	G
POTASSIUM CYANIDE	E	E	E	E	E	E		E	E	E	E	E		E	E	E	
POTASSIUM DICHROMATE	G	E	E	E	F	E	C	E		G	E	G		E	E	G	G
POTASSIUM HYDRATE		E			G					E		G			F	E	E
POTASSIUM HYDROXYDE	C	E	E	C	G	E	G	X	C	E	X	G		E	X	E	G
POTASSIUM NITRATE	E	E	E	E	E	E		E	E	E	E	E		E	E	E	E
POTASSIUM PERMANGANATE, 5%							X										
POTASSIUM SILICATE		E	E		E					E		E			E	E	E
POTASSIUM SULFATE	G	E	E	E	E	E		E	E	E		E		E	E	E	E
POTASSIUM SULFIDE			E														E
POTASSIUM SULFITE		E	E	E	E	E				E		E			E	E	E
PRESTONE ANTIFREEZE				E		E		E							E		
PRODUCER GAS		X		G	G	X		E		X		E		E	E		
PROPANE	E	X	E	C	G	X		E	E	X	E	X		E	E	E	
PROPANEDIOL		E	E		E					E		E			E		E
PROPANETRIOL			E														
PROPANOL		E	E		E					E		E			F	E	E
PROPANOLAMINE			E														E
PROPANONE			E														
PROPEN-L-OL			E														
PROPENEDIAMENE			E														
PROPENENITRILE			E														
PROPENYL ALCOHOL			E														
PROPENYLANISOLE			X														
PROPIONIC ACID						E		X								E	
PRIOPIONITRILE				G		X		E							E		
PROPYL ACETATE	X	G	G	X	X	G		X		X	G	X			X	E	E
PROPYL ALCOHOL	C	E	E	E	E	E		E		E	E	E			E	E	E
PROPYL ALDEHYDE		E								F					X	E	E
PROPYL BENZENE			C														E
PROPYL CHLORIDE		F	C		X					X		X			G	G	G

CHEMICAL RESISTANT CHART

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
PROPYL ETHER			E														
PROPYL NITRATE		G	G	X	X	G		X		X		X			X		
PROPYLENE	X	X	E	X	X	X		X		X	G	X			E		
PROPYLENE DIAMINE		E			F					G		G					E
PROPYLENE GLYCOL	E	E			E					E		E		E	E		E
PYDRAUL, 'E' SERIES			G	X	X	E	E	X	E	X		X		E	X	E	
PYDRAULIC 'C'				X		X	E	X						E	E		
QUINTOLUBRIC 822 SERIES		X		X		X		G		X					G		
RED OIL	G	X	E	G	G	X		E		X	E	X		E	E		
REFRIGERANT 11				X		X		G							G		
REFRIGERANT 12				G		X		E							G		
REFRIGERANT 22				G		X		X							G		
RESORCINOL	X						X	X	X				X	E			
SAE NO. 10 OIL	E			C	X		E	G	E				X	E	X		
SAL AMMONIAC	E	E	E	E	E	E		E		E		E			E		
SEA WATER	E	E		G	E	E	E	E	E	E	X	E	E	E	E	E	E
SEWAGE	X	F	E	E	E	F		E	E	F	F	F		E	C	E	E
SILICATE ESTERS		X		E	E	X		G	E	X		X		E	E		
SILICATE OF SODA		E	E		E					E		E			E	E	E
SILICONE GREASE		E	E	E	E	E	E	E		E		E		E	E		
SILICONE OIL		E	E	E	E	E		E		E		E			E		
SILVER NITRATE	E	E	E	E	E	E		G		E		E		E	E	E	
SKYDROL 500 TYPE 2				X	X	E		X						E	X		
SKYDROL 500B	C	G	G	X	X	E	E		E				E	E	X		
SKYDROL 500C		G	G	X	X		E							E	X		
SKYDROL 7000 TYPE 2				X		E		X						E	G		
SOAP SOLUTIONS	C	E	E	G	E	E	E	E	E	G	X	E	E	E	E	E	E
SODA ASH		E	E	E	E	E		E	E	E	X	E		E	E	E	E
SODA LIME		E			G					E		G			F	E	E
SODA NITER		E	E		E					E		E			E	E	E
SODIUM ACETATE	E	G	E	G	X	E		G		X	X	X		E	X	E	E
SODIUM ALUMINATE		E	E		E					E		E			E	E	E
SODIUM BICARBONATE		E		E	E	E		E		E	C	E		E	E		
SODIUM BISULFATE		F	E	E	E	E		E	E	F	F	F		E	C	E	E
SODIUM BISULFITE		E	E	E	E	E		E		E	C	E		E	E	C	E
SODIUM BORATE		E	E	E	E	E		E		E	E	E		E	E	E	
SODIUM CARBONATE		E	E	E	E	E		E		E	C	E			E	E	E
SODIUM CHLORIDE	E	E	E	E	E	E	E	E	E	E	C	E	E	E	E	E	E
SODIUM CYANIDE		E	E	E	E	E		E	E	E	E	E		E	C	E	
SODIUM DICHROMATE		E	E	C	F	E	X	C		C	C	C			C	G	E
SODIUM HYDRATE		E			G					E		G			F	E	E
SODIUM HYDROCHLORITE		G		X	F	G		X		X	X	X			G	G	E
SODIUM HYDROXIDE (CAUSTIC SODA)	G	E	E	G	G	E	G	X	C	E	X	G		E	G	E	E
SODIUM HYPOCHLORITE	X	G	E	X	F	G	E	G	X	X	X	X	E	E	E	G	G
SODIUM METAPHOSPHATE		E	E	G	G	E		E		E		E		E	E	E	
SODIUM NITRATE	X	E	E	G	E	E		G	E	E	C	E		E	C	E	E
SODIUM PERBORATE		E		G	G	E		G	E	G	G	G		E	E	E	
SODIUM PEROXIDE	X	E	G	G	G	E	C	G		G		G		E	E	E	
SODIUM PHOSPHATE	E	E	E	G	E	E		E	E	E		E		G	E	E	
SODIUM SILICATE		E	E	E	E	E		E	E	E	C	E		E	E	E	E
SODIUM SULFATE		E	E	E	E	E		E	E	E	C	E		E	E	E	E
SODIUM SULFIDE	E	E	E	E	E	E		E	E	E	C	E			E	E	E
SODIUM SULFITE	E	E	E	E	E	E		E		E	C	E			E	E	E
SODIUM THIOSULFATE	E	E	E	E	E	E		G	E	E	C	E		E	E	E	E
SOYBEAN OIL	G	E		G	G	C	C	E	E	X	E	X		E	E	E	G
STANNIC CHLORIDE		E	E	X	E	E		E	E	E	X	E		E		E	E
STANNIC SULFIDE		E			E					E		E				E	E
STANNOUS CHLORIDE		E	E	E	E	E	C	E		E	X	E		E	C	E	E
STANNOUS SULFIDE		E			E					E		E				E	E
STEAM, BELOW 350 DEG F	X	G	X	X	X	E	C	X	X	X	X	X		E	X	X	
STEARIC ACID	E	G	E	G	X	G	C	G	E	X	C	X	E	E	C	E	E
STODDARD SOLVENT	E	X	E	G	X	X		E		X	E	X		E	E	E	E
STYRENE	E	X	C	X	X	X	X	X	E	X	X	X		E	G	G	G
SULFAMIC ACID		E	E	G	G	E		G		G	C	G			C	C	F
SULFUR		F		X	F	F		X		X	X	X		E	G	X	
SULFUR CHLORIDE		X		C	G	X		C	G	X	X	X		E	E	E	
SULFUR DIOXIDE		G		X	G	G	C	X	X	C	C	C		E	C	C	G
SULFUR TRIOXIDE, DRY		G	X	X	X	G		X	X	G		G		E	E	G	
SULFURIC ACID 60% (200F)			G														G
SULFURIC ACID, CONC.	X	X	X	X	E	X	C	X	X	X	X	X		C	E	E	X
SULFURIC ACID, FUMING		X	X	X	X	X	X	X		X	X	X		E	X	X	X
SULFURIC ACID, 25%	X	E		X	X	E	X	X	X	G	X	X		E	F	E	E
SULFURIC ACID, 25%-50%	X	E	E	X	X	E	X	X	X	G	X	X		E	G	E	G

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
SULFURIC ACID, 50%-96%	X	X		X	G	X	X	X	X	X	X	X		E	E	E	G
SULFUROUS ACID, 10%		E	E	X	E	G	G	X		E	X	G		E	C	E	E
SULFUROUS ACID, 10%-85%		E	E	X	E	G	G	X		E	X	X		E	C	E	E
SUTAN														E	F	E	
T-BUTYL AMINE					X	G											
TALL OIL		X		G	X	X		E		X	C	X			E	C	E
TALLOW		X		G	X	X		E		X	C	X			C	C	E
TANNIC ACID	C	E	E	G	E	E	E	E	X	E	C	F	E	E	C	C	E
TAR		X		G	X	X		X	X	X	G	X		E	E	X	X
TAR BITUMINOUS		X		C	X	X		G		X		X		E	E		
TARTARIC ACID	C	E	E	G	E	G	C	E	X	C	C	X	E	E	C	C	E
TELONE 2																E	
TERITARY BUTYL ALCOHOL	X	E	G	G	E	G		G		E	G	E		E	E	E	E
TERPINOL	G	C	E	X	X	C		G		X	E	X		E	E	G	
TERTIARY BUTYL AMINE					X	G											
TERTIARY BUTYL MERCAPTAN		X		X	X	X		X		X		X		E	E		
TEST ENTRY	X	G	C	E			X				F	X					
TEST ENTRY 1							E										
TETRACHLOROBENZENE		X			X					X		X			G	G	G
TETRACHLOROETHANE		X			X					X		X			E	E	G
TETRACHLOROETHYLENE	X	X	X	X	X	X		X	C	X	X	X			E	E	E
TETRACHLOROMETHANE		X	C		X					X		X			E	E	E
TETRACHLORONAPHTHALENE		X			X					X		X			G	G	G
TETRAETHYLENE GLYCOL		E			E					E		E			E		E
TETRAETHYLORTHOSILICATE			E														
TETRAHYDROFURAN	X	X	X	X	X	X	G	X	C	X	E	X	X		X	C	G
THF							G		C		E					C	I
TIN CHLORIDE		E			E					E		E				E	E
TITANIUM TETRACHLORIDE	X	X	X	X	X	X		G		X	C	X			E		G
TOLUENE	X	E	X	X	X	X	C	X	E	X	C	X	X	E	E	G	E
TOLUIDINE			C														F
TOLUOL			C														E
TRANSFORMER OIL	E	X	E	G	C	X		E		X	E	X		E	E		F
TRANSMISSION 'A' OIL	E	X	E	G	X	X		E	E	X	E	X		E	E	F	G
TRI(2-HYDROXYETHYL) AMINE			E														E
TRIBUTYL PHOSPHATE	X	E	C	X	X	G		X	E	X	E	X		E	X	E	E
TRIBUTYLAMINE		E	E	G	F					G		G					E
TRICHLOROACETIC ACID	X	G		X	X	G		G		C		G		E	C	E	
TRICHLOROBENZENE		X	X		X					X		X			G	G	G
TRICHLOROETHANE	X	X	X	X	X	X		X		X	X	X		E	E	G	E
TRICHLOROETHYLENE	X	X	X	X	X	X	C	X	E	X	X	X		X	E	G	F
TRICHLOROMETHANE			X														
TRICHLOROTOLUENE			X														
TRICRESYL PHOSPHATE	X	E	E	X	X	X		X		X	C	X		E	G	E	E
TRIETHANOLAMINE	X	E	E	G	G	G	X	C		E	C	X		E	X	E	E
TRIETHYLAMINE		E	E		F					G		G					E
TRIETHYLENE GLYCOL		E	E		E					E		E			E		E
TRIHYDROXYBENZOIC ACID			E														
TRIMETHYL PENTANES (MIXED)			E														
TRIMETHYL PENTENE			E														
TRIMETHYLAMINE			E											E		E	
TRISODIUM PHOSPHATE	E	E	E	E	E	E	E	E	E	E	E	E		E	E	E	E
TRITOYL PHOSPHATE			E														
TUNG OIL				G													
TUNG OIL (CHINA OIL)	C	C		G	C	X	C	E		X	G	X		E	E	E	
TURPENTINE	E	X	G	X	X	X		X	E	X	F	X	X	E	E	G	E
UDMH				G	E	E		G		E		E			X		
UNDECYL ALCOHOL			E														
UREA	E	E	E	E					E					E		E	E
URETHANE FORMULATIONS								E	E					E			
URIC ACID									E				E				
VARNISH	C	X		X	X	X	G	G	E	X	E	X		E	E		
VEGETABLE OILS		E	E	C	X	C		E		X	C	X		E	E	E	
VERSILUBE F44								E	E					E			
VERSILUBE F55						X		E	E					E			
VINEGAR	X	E	G	F	F	E	E	X	E	E	C	F		E	C	X	
VINEGAR ACID			G														
VINYL ACETATE		G	E		X					X		X			X	E	E
VINYL BENZENE		X	C		X					X		X			G	G	E
VINYL CHLORIDE		X	X	X	X	X		X		X		X		E	E	E	E
VINYL CYANIDE			E														
VINYL ETHER		G			X					X		X				E	E
VINYL STYRENE			X														

CHEMICAL OR MATERIAL CONVEYED	COMPOUND																
	AU	IIR	CM	CR	CSM	EPDM	TPES	NBR	PA	NR	T	SBR	EPDM_PP	PTFE	FKM	XLPE	UHMWPE
VINYL TOLUENE		X	C		X					X		X			E	E	E
VINYL TRICHLORIDE		X	G		X					X		X			E	E	E
VITAL, 4300,5310						X		X	E					E			
VM & NAPHTHA		X		F	X	X		E		X	E	X			E	X	E
WATER	E	E	E	G	E	E	E	E	E	E	E	F	E	E	E	E	E
WATER, BOILING				E		E	G										
WATER, SODA							E		E				E	E			
WEMCO C	E	X		G	X	X		E		X	E	X			E		
WHISKEY	X	E	E	E	E	E		E	E	E	X	E		E	X	X	
WHITE OIL	E	X		E	X	X		E		X	X	X		E	X	X	E
WHITE PINE OIL		X		X	X	X		G		X	G	X			E		
WINES	X	E	E	E	E	E		E	E	E	X	E		E	X	X	
WOOD ALCOHOL	X	E		E	E	E		E		E	G	E			X	E	E
WOOD OIL	C	X		G	C	X		E		X	G	X		E	E	E	
XENON	E	E		E	E	E		E		E	E	E			E		
XYLENE, XYLON	C	X	X	X	X	X	C	X	E	X	F	X	X	E	E	G	G
XYLIDINE	X	X	C	C	X	G		C		C	X	C		E	X	G	G
ZEOLITES		E		E	E	E		E		E		E			E		
ZINC ACETATE	X	E	E	E	E	E		E		E	X	X		E	X		
ZINC CARBONATE		E			E					E		E			E	E	E
ZINC CHLORIDE	E	E	X	E	E	E	E	E	X	E	E	E		E	E	E	E
ZINC CHROMATE		E			F											G	E
ZINC SULFATE		E	X	E	E	E		E	E	E	E	E		E	E	E	E
O-AMINOTOLUENE			G														
1 UNDECANOL		E	E		E					E		E			G	E	G
1-AMINO-2-PROPANOL			E														
1-AMINOBUTANE			G														
1-AMINOPENTANE			G														
1-BROMO-2-METHYL PROPANE			G														
1-BROMO-3-METHYL BUTANE			G														
1-BROMOBUTANE			G														
1-CHLORO-2-METHYL PROPANE			C														
1-CHLORO-3-METHYL BUTANE			C														
1-DECANOL		E	E		E					E		E			G	E	E
1-HENDACANOL			E														
1,4-DIOXANE		G	G	X	X	E				X		X			X	E	
2(2AMINOETHYLAMINO) ETHANOL			E														
2(2ETHOXYETHOXY) ETHANOL			E														
2(2ETHOXYETHOXY) ETHYL ACETATE			E														
2-AMINOETHANOL		E	E		G					G		G					
2-CHLORO-1-HYDROXY-BENZENE			C														
2-CHLOROPHENOL	X	X	C	X	X	X		X		X	X	X			E	G	E
2-CHLOROPROPANE			G	X	X	X				X		X			X	E	E
2-ETHOXYETHANOL			E														
2-ETHOXYETHYL ACETATE			G														
2-ETHYL(BUTYRALDEHYDE)		E	C		X					X		X			X	E	E
2-ETHYL-1-HEXANOL	X	E	E	E	E	E		E		E	G	E			G	E	E
2-ETHYLHEXANOIC ACID			E														E
2-ETHYLHEXYL ACETATE			G														E
2-OCTANONE			C														
2,4-DI-SEC--PENTYLPHENOL			E														
3-BROMOPROPENE			G														
3-CHLORO-2-METHYL PROPANE			G														
3-CHLOROPROPENE			G														
3OAL OIL																E	
4-HYDROXY-4-METHYL-2-PENTANONE			E														

PVC CHEMICAL RESISTANT CHART

CODES:

A: Satisfactory
C: Questionable - Suggest testing
U: Unsatisfactory
Blank: No data available

Chemical	Concentration	Temperature 20°C 60°C 68°F 140°F		Chemical	Concentration	Temperature 20°C 60°C 68°F 140°F	
Acetate Solvents		U	U	Chlorine	Wet Gas	C	U
Acetic Acid	10%	A	C	Chlorine	Water	U	U
Acetic Acid	Glacial	C	U	Chlorobenzene		U	U
Acetone		U	U	Chlorinated Hydrocarbons		U	U
Acrylonitrile		A	C	Chloroform		U	U
Adipic Acid		A	C	Chromic Acid	10%	A	C
Alcohol Butyl		A	C	Citric Acid		A	A
Alcohol Ethyl		A	C	Coal Tar		U	U
Alcohol Isopropyl		A	C	Copper Chloride		A	A
Alcohol Methyl		A	C	Copper Nitrate		A	A
Aluminum Acetate		A		Copper Sulphate		A	A
Aluminum Chloride		A	A	Cottonseed Oil			
Aluminum Hydroxide		A		Creosote		U	U
Aluminum Sulfate		A	A	Cresol		A	C
Allyl Chloride				Cresylic Acid		U	U
Ammonia	0.88 S.G. (Aqueous)	A	A	Cyclohexane		A	C
Ammonia	Dry Gas	A		Cyclohexanone		U	U
Ammonia	Liquid	U	U	DDT Weed Killer		A	C
Ammonium Chloride		A	A	Detergent Synthetic		A	A
Ammonium Hydroxide		A		Developers Photographic		A	A
Animal Oils				Dextrin		A	A
Amyl Acetate		U	U	Dextrose		A	A
Aniline Oils				Dibutyl Phthalate		U	U
Aromatic Hydrocarbons		U	U	Dichlorobenzene		U	U
Asphalt		U	U	Diesel Oil			
ASTM Fuel A		A	A	Diethylene Glycol		A	A
ASTM Fuel B		U	U	Diethyl Ether		U	U
ASTM 1 Oil				Di-isodecyl Phthalate		U	U
ASTM 3 Oil				Dicotyl Phthalate		U	U
Barium Chloride		A	A	Emulsifiers		A	A
Barium Hydroxide		A	A	Emulsions Photographic		A	A
Barium Sulfide		A	A	Ethyl Acetate		U	U
Benzene		U	U	Ethylene Dichloride		U	U
Benzine		C	C	Ethylene Glycol		A	A
Bordeaux Mixture		A	A	Fatty Acid		A	A
Borax		A	A	Ferric Chloride		A	A
Boric Acid		A	A	Ferric Sulphate		A	A
Brine		A	A	Ferrous Chloride		A	A
Bromine Traces		U	U	Ferrous Sulphate		A	A
Butyl Acetate		U	U	Fixing Solution Photographic	A	A	
Calcium Hydroxide		A	A	Fluorine		U	U
Calcium Hypochlorite		A	A	Formaldehyde	40%	U	U
Carbonic Acid		C	U	Formic Acid	40%	A	A
Carbon Dioxide		A	A	Formic Acid	50%	C	U
Carbon Disulphite		U	U	Formic Acid	100%	U	U
Carbon Monoxide		A	A	Fuel Oil			
Carbon Tetrachloride		U	U	Glacial Acetic Acid		C	U
Casein		A	C	Glucose		A	A
Chlorine	Dry gas	A	A	Glycerine		A	A

PVC CHEMICAL RESISTANT CHART

Chemical	Concentration	Temperature 20°C 68°F	Temperature 60°C 140°F
Grape Sugar		A	A
Grease			
Heptane		C	U
Hexane		C	U
Hydrobromic Acid		A	A
Hydrochloric Acid	10%	A	A
Hydrochloric Acid	40%	A	U
Hydrofluoric Acid	10%	A	C
Hydrofluoric Acid	40%	A	U
Hydrofluoboric Acid		A	A
Hydrofluosilicic Acid		A	A
Hydrogen Peroxide		A	
Hydrogen Sulphide		A	
Iso-octan		A	C
Isopropyl Acetate		U	U
Kerosene		C	C
Ketones		U	U
Lactic Acid	10%	A	
Lactic Acid	100%	U	U
Lacquer Solvents		C	U
Linseed Oil			
Lubricating Oils			
Magnesium Chloride		A	A
Magnesium Hydroxide		A	A
Magnesium Sulphate		A	A
Malic Acid		A	A
Methyl Acetate		U	U
Methyl Bromide		U	U
Methyl Ethyl Ketone		U	U
Methylene Chloride		U	U
Mineral Oils			
Monochlorobenzene		U	U
Naphtha		C	U
Napthalene		C	U
Nitric Acid	10%	A	A
Nitric Acid	40%	A	C
Nitric Acid	70%	U	U
Nitrobenzene		U	U
Nitrogen Fertilizers		A	
Oleic Acid		A	C

Chemical	Concentration	Temperature 20°C 68°F	Temperature 60°C 140°F
Oxalic Acid		A	A
Palmitic Acid		A	A
Paraffin		A	A
Pentane		C	U
Perchloroethylene		U	U
Phenol		C	U
Phosphoric Acid		A	A
Pitch		A	C
Potassium Hydroxide		A	A
Propane		A	A
Sea Water		A	A
Sodium Hydroxide (caustic soda)	10%	A	A
Sodium Hydroxide (caustic soda)	50%	A	U
Sodium Cyanide		A	A
Soybean Oil			
Stearic Acid		A	A
Styrene		U	U
Sulphur Dioxide	Dry	A	A
Sulphur Dioxide	Moist	C	U
Sulphur Dioxide	Liquid	U	U
Sulphuric Acid	45%	A	A
Sulphuric Acid	60%	C	C
Sulphuric Acid	98%	U	U
Sulphurous Acid	30%	A	
Tannic Acid		A	A
Tartaric Acid		A	A
Tetrahydrofuran		U	U
Toluene		U	U
Trichlorethylene		U	U
Triethanolamine		A	A
Tricresyl Phosphate		U	U
Turpentine		C	U
Urea		A	A
Vinegar		A	A
Vinyl Acetate		U	U
Vinyl Chloride		U	U
Water		A	A
Xylene		U	U
Zinc Chloride		A	A
Zinc Sulphate		A	A