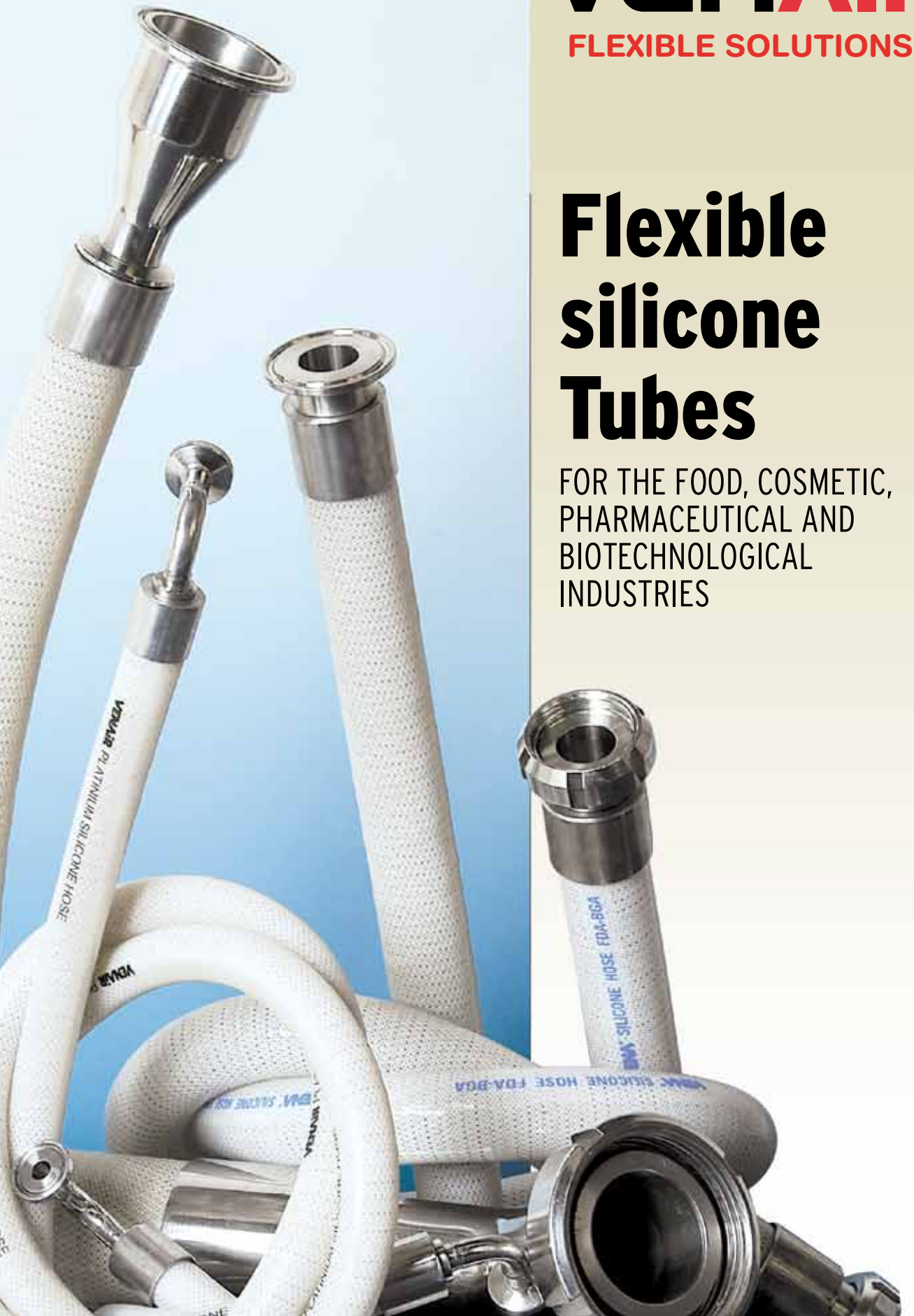
venAir

FLEXIBLE SOLUTIONS

Flexible silicone Tubes

FOR THE FOOD, COSMETIC, PHARMACEUTICAL AND BIOTECHNOLOGICAL INDUSTRIES



Introduction

The food, cosmetic, pharmaceutical and biotechnological industries have always worked intensively towards improving processes and materials to avoid any problem that could directly affect the health of the final consumer. This has meant that over the last few years various Standards and Certifications have appeared which are now being consolidated at a global level.

This catalogue confirms that VENAIR is able to offer the product that the client requires while fulfilling the highest quality demands that are essential for this market.

At VENAIR Technosil, we have been granted ISO 9001 certification on our entire product range, ranging from flexible silicone hoses to the well-known SZR (without retention zone) connection systems. We are also certified under ISO 14001 and EMAS environmental standards. This clearly shows our commitment to environmental issues, as well as our constant drive to perfect our products.

One particular key factor in this type of industry is the purity of the materials that need to be in contact with the processed products. At VENAIR Technosil we offer a product line that is platinum cured, in order to guarantee the high standards of our products in this area. We are constantly striving to ensure that our clients can always choose the most suitable top-quality product.

This continual drive for perfection during our 25 years of existence has put us in the position where today we can offer a wide range of the highest quality products to fully meet your needs. Even so, we will still continue to strive for improvements in every area possible.

VENAIR

ISO 9001 ISO 14001 EMAS

Flexible Silicone Hoses 3A Fitted Hoses

FOR USE IN THE FOOD, COSMETIC, PHARMACEUTICAL, AND BIOTECHNOLOGICAL INDUSTRIES.

Characteristics and applications:
Food-grade silicone elastomer hoses for conveying liquid or semi-liquid products by suction or pumping in the food, pharmaceutical and cosmetic industries.
All our silicone hoses are platinum cured in accordance with US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600, the German BfR Standard part XV and the US USP Class VI standard.

THE VENAIR PRODUCTS ARE NOT AUTHORISED FOR ANY APPLICATION FOR THAT IT IS NOT EXPRESSED CERTIFIED. It is the user's responsibility to ensure the suitability and safety of the VENAIR products for all intended uses.

Silicone properties:
This elastomer is fully non-toxic, stable, odorless, non-stick, hydrophobic, and steam sterilizable (for a maximum recommended time of 1.5 hrs at 135°C (275°F).
The raw material used can operate unaltered at temperatures of between -80°C to +240°C (-112°F to +464°F).

Platinum cured:
VENAIR Technosil's platinum cured silicone hoses (peroxide free) are recommended for any process within the food industry and especially the pharmaceutical industry. They guarantee a superior level of hygiene compared to peroxide cured silicone, as shown by the high level of purity in the chromatography phase.

High Quality SZR System & 3A Hose Assemblies:
We recommend our hoses for high-grade aseptic quality requirements, since they can be connected using 316L stainless steel connection terminals equipped with the SZR system (without retention place system)*. This allows the connection area between the hose and the metal connection terminal to be completely free of any areas of possible contamination, thus facilitating CIP (cleaning in place).
Moreover, our crimped hoses can be Certified according to the 3A Sanitary Standard 62-02 for hose assemblies.

Main standards and regulations:
Our Silicone:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI
- ISO 10993 (optional)
- 3A Sanitary Standard 18-03 Class I (optional)

Our crimped silicone hoses:
- 3A Sanitary Standard 62-02 for hose assemblies (optional)

Other characteristics:

Temperature:
The mechanical properties of the hoses remain unaltered at working temperatures of between -60°C (-76°F) and +180°C (+356°F). We can also produce silicone hoses that can withstand more extreme temperatures.
PVMQ Silicone for very low temperatures (-100°C / -148°F).
THT Silicone for very high temperatures (+300°C/+572°F).

Length:
Depending on the model.

Color:
Standard color: translucent
The outer color can be changed as required by the customer to facilitate product identification.

Construction:
Elastomer: VMQ Silicone
Internal reinforcement: Polyester
Other options: MIF Polyester, Nomex**
Hardness range: 55 - 75 Shore
Stainless steel wire reinforcement: in VENA SIL 650/V and VENA SIL 655 models.

* SZR is a registered trademark of Venair.
** Nomex is a registered trademark of Dupont.

VENA SIL 640

Elastomer: Platinum cured silicone produced in accordance with:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI standard

Fabric reinforcement: Polyester fabric reinforcement.
It is possible to produce a more reinforced version named VENA SIL 640 MIF, manufactured with a special high tenacity polyester fabric for higher pressure.
Stainless steel inside: No
Inner appearance: Translucent and smooth.
Outer appearance: Translucent, white or colored, and smooth.
Length of manufacture: The standard length of manufacture is 4m (13'). Upon request, 6m length hoses (19' 8") can be manufactured.
Temperature scale: -60° C / +180° C (-76° F / +356° F).

Applications: For use in straight sections equipped with metal fittings terminals, where flexibility is not required.
This model is often used to detect metal particles which may occur during filling of food products such as cream or baby food.
This model is not recommended for operation with negative pressure (vacuum).

Inner Diameter*		Wall Thickness	Working pressure**				Bursting pressure**			
			bar at 20°C ISO1402/1994		psi at 68°F ISO1402/1994		bar at 20°C ISO1402/1994		psi at 68°F ISO1402/1994	
(mm)	(inch)	+1 -0.5 (mm)	640	640 MIF	640	640 MIF	640	640 MIF	640	640 MIF
6	1/4	4.5	11,7	23,6	169	342	35	71	508	1030
8	5/16		10,7	20,5	155	297	32	61	464	885
10	3/8		9,7	18,3	140	265	29	55	421	798
13	1/2		8,7	16,0	126	232	26	48	377	696
16	5/8		8,0	14,5	116	210	24	43	348	624
19	3/4		7,7	12,9	111	187	23	39	334	566
22	7/8		7,0	12,3	102	178	21	37	305	537
25	1		6,7	11,6	97	168	20	35	290	508
32	1 1/4		5,7	10,2	82	148	17	31	247	450
38	1 1/2		5,0	9,4	73	136	15	28	218	406
51	2		4,0	8,1	58	117	12	24	174	348
63	2 1/2		3,3	6,9	48	100	10	21	145	305
76	3		2,7	5,7	39	83	8	17	116	247
102	4		1,7	3,3	24	48	5	10	73	145

*Other diameters can also be manufactured. Please consult.
**Pressure data is noted at ambient temperature. Please reduce pressure values by 20% for each increase of 100°C / 212°F.

VENA SIL 650 V

Elastomer: Platinum cured silicone produced in accordance with:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI standard
- ISO 10993
- 3A Sanitary Standard 18-03 Class I

Fabric reinforcement: Polyester fabric reinforcements.
Stainless steel inside: Stainless steel wire spring encased inside the hose wall.
Inner appearance: Translucent and smooth.
Outer appearance: Translucent, white or colored, and smooth.
Length of manufacture: The standard length of manufacture is 4m (13'). Upon request, 6m length hoses (19' 8") can be manufactured.
Temperature scale: -60° C / +180° C (-76° F / +356° F).

Applications: Broad application field due to the balance between strength and flexibility, with a small bending radius.
Ideal for use in proportioning and loading tanks in any length. These hoses compensate vibrations and level differences. Suitable for pressure or vacuum.

Inner Diameter*		Wall Thickness	Theoretical outer diameter		Bending Radius (mm) ISO 1746/1983	Working pressure**		Bursting pressure**		Vacuum tolerance
						bar at 20°C ISO 1402/1994	psi a 68°F ISO 1402/1994	bar at 20°C ISO 1402/1994	psi at 68°F ISO 1402/1994	
(mm)	(inch)	+1 -0.5 (mm)	(mm)	(inch)						
6	1/4		17	0,67	29	13,0	188	38,9	565	
8	5/16		19	0,75	31	12,0	174	36,0	522	684 Torr (mmHg)
10	3/8		21	0,83	34	11,0	159	32,9	478	
13	1/2		24	0,94	39	9,9	144	29,8	433	0,91 bar
16	5/8		27	1,06	45	9,1	132	27,4	397	
19	3/4	5,5	30	1,18	54	8,3	120	24,8	359	0,90 atm
22	7/8		33	1,30	60	7,9	114	23,7	343	
25	1		36	1,42	68	7,4	107	22,2	321	9,29 mH2O
32	1 1/4		43	1,69	94	6,4	93	19,3	279	
38	1 1/2		49	1,93	112	5,7	83	17,2	250	13,23 psi
51	2		62	2,44	144	4,6	67	13,8	200	
63	2 1/2		74	2,91	181	3,8	55	11,3	164	26,93 inHg
76	3	6	88	3,46	232	3,0	44	9,1	132	
102	4	6	114	4,49	367	1,9	27	5,6	82	

*Other diameters can also be manufactured. Please consult.
**Pressure data is noted at ambient temperature. Please reduce pressure values by 20% for each increase of 100°C / 212°F.

VENA SIL 655

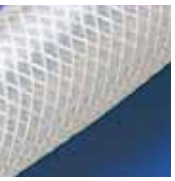
Elastomer: Platinum cured silicone produced in accordance with:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI standard

Fabric reinforcement: Polyester fabric reinforcements.
Stainless steel inside: Double stainless steel wire spring encased inside the hose wall at different levels.
Inner appearance: Translucent and smooth.
Outer appearance: Translucent, white or colored, and smooth.
Length of manufacture: The standard length of manufacture is 4m (13'). Upon request, 6m length hoses (19' 8") can be manufactured.
Temperature scale: -60° C / +180° C (-76° F / +356° F).

Applications: It is the strongest hose of the VENA SIL range. Designed for use at specific points where there may be sudden high pressure surges (hammering).
Ideal for use in proportioning and loading tanks in any length. These hoses compensate vibrations and level differences. Suitable for pressure or vacuum.

Inner Diameter*		Wall Thickness	Theoretical outer diameter		Bending Radius (mm) ISO 1746/1983	Working pressure**		Bursting pressure**		Vacuum tolerance
						bar at 20°C ISO 1402/1994	psi at 68°F ISO 1402/1994	bar at 20°C ISO 1402/1994	psi at 68°F ISO 1402/1994	
(mm)	(inch)	+1 -0.5 (mm)	(mm)	(inch)						
6	1/4		19	0,75	43	21,0	305	63	914	
8	5/16		21	0,83	46	19,3	280	58	841	684 Torr (mmHg)
10	3/8		23	0,91	49	18,0	261	54	783	
13	1/2		26	1,02	54	16,3	237	49	711	0,91 bar
16	5/8		29	1,14	59	15,0	218	45	653	
19	3/4	6,5	32	1,26	68	13,7	198	41	595	0,90 atm
22	7/8		35	1,38	72	13,3	193	40	580	
25	1		38	1,50	80	12,3	179	37	537	9,29 mH2O
32	1 1/4		45	1,77	100	11,0	160	33	479	
38	1 1/2		52	2,05	121	10,0	145	30	435	13,23 psi
51	2		65	2,56	185	8,0	116	24	348	
63	2 1/2	7	77	3,03	273	6,7	97	20	290	26,93 inHg
76	3		90	3,54	318	5,7	82	17	247	
102	4		116	4,57	423	4,0	58	12	174	

*Other diameters can also be manufactured. Please consult.
**Pressure data is noted at ambient temperature. Please reduce pressure values by 20% for each increase of 100°C / 212°F.



VENA TECHNOSIL

Elastomer: Extruded Platinum cured silicone produced in accordance with:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI standard
- 3A Sanitary Standard 18-03 Class I

Fabric reinforcement: Polyester braiding.
Stainless steel inside: No
Inner appearance: Translucent and smooth.
Outer appearance: Translucent or colored, and smooth.
Standard length of manufacture: 10m and 20m.
Temperature scale: -60° C / +180° C (-76° F / 356° F).

Applications: For conveying liquids at low pressure where a tight bending radius is not required.
Ideal for use in proportioning and loading tanks in any length.
These hoses compensate vibrations and level differences.
It is not recommended for vacuum.

Inner Diameter		Outer Diameter	Working pressure* ISO 1402/1994		Bursting pressure* ISO1402/1994		Bending radius
(mm)	(inch)	(mm)	bar at 20°C	psi at 68°F	bar at 20°C	psi at 68°F	(mm) ISO1746/1983
6,35	1/4	13,2	9,3	135,4	28	406	40
7,93	5/16	15,0	7,7	111,2	23	334	45
9,52	3/8	16,6	7,0	101,5	21	305	55
12,70	1/2	20,3	5,7	82,2	17	247	70
15,87	5/8	24,5	4,3	62,9	13	189	85
19,05	3/4	27,9	3,7	53,2	11	160	95
22,22	7/8	31,3	3,3	48,3	10	145	110
25,40	1	34,5	3,0	43,5	9	131	135
31,75	1 1/4	40,8	2,3	33,8	7	102	160

*Pressure data is noted at ambient temperature of 20°C / 68°F. Please reduce pressure values by 20% for each increase of 100°C / 212°F.

VENA TECHNOSIL DB

Elastomer: Extruded Platinum cured silicone produced in accordance with:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI standard (inner liner)

Fabric reinforcement: Double polyester braiding.
Stainless steel inside: No
Inner appearance: Translucent and smooth.
Outer appearance: White and smooth.
Standard length of manufacture: 10m and 20m.
Temperature scale: -60° C / +180° C (-76° F / 356° F).
Pressure Resistance: 3 times higher than the standard Vena Technosil (please, check the Technical Data Sheet).

Applications: Due its special construction, this product is specially recommended for applications where a high Pressure resistance and a small bending radius is required.

It is not recommended for vacuum.

Elastomer: Extruded Platinum cured silicone produced in accordance with:
- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones
- US USP Class VI standard (inner liner)

Fabric reinforcement: Fiberglass braiding.
Stainless steel inside: No
Inner appearance: Translucent and smooth.
Outer appearance: Orange and smooth.
Available diameters: from 1/4" (6,35 mm) to 1 1/4" (31,75 mm)
Standard length of manufacture: : 10 and 20m
Temperature scale: : -60° C / +200° C (-76° F / +392° F).
Pressure resistance: Pressure resistance:Double value than the standard Vena Technosil (please, check the Technical Data Sheet)
Applications: For conveying liquids at high temperature where a tight bending radius is not required.
It can withstand a low vacuum although it is not specially designed for this purpose.
For more information please consult the technical Datasheet.

VENA TECHNOEX EXTRUDED SILICONE TUBING

Elastomer: Extruded peroxide or platinum cured silicone produced in accordance with the U.S. FDA Standard 21 CFR 177.2600, the German BfR Standard part XV, and optinally the USP class VI standard.
Fabric reinforcement: No
Appearance: Translucent and smooth.
Diameter: upon request (from 3 to 32 mm).
Standard lenght of manufacture: 25m
Temperature scale: -60°C / +180°C (-76°F / 356°F)
Applications: For conveying liquids at very low pressure. Not recommended for vacuum.
Silicone material option:
- FDA / BfR part XV
- FDA / BfR part XV platinum cured
- USP Class VI platinum cured

VENA SIL KITCHEN®

VENA TECHNOSIL H-PTV

SILICONE SLEEVES

Silicone sleeves are food and pharmaceutical grade, with or without textile reinforcement, to convey liquids or semi liquids at low pressure (gravity drop) or protecting against contamination outer-inner or inner-outer in areas of product handling, for example in stirrers with Universal joints.
The high flexibility allows a perfect absorption of vibrations.
The translucent aspect allows a visual of the conveyed product.
Standard constructions:
- Sleeve without textile reinforcement with a wall thickness of 1,3mm (+1/-0,5mm)
- Sleeve with 1 textile reinforcement with a wall thickness of 2,3mm (+1/-0,5mm)

Maximum length of manufacture: 4m.
Possibility of producing other wall thicknesses by request.

Silicone material option:
- FDA / BfR part XV
- FDA / BfR part XV platinum cured
- USP Class VI platinum cured

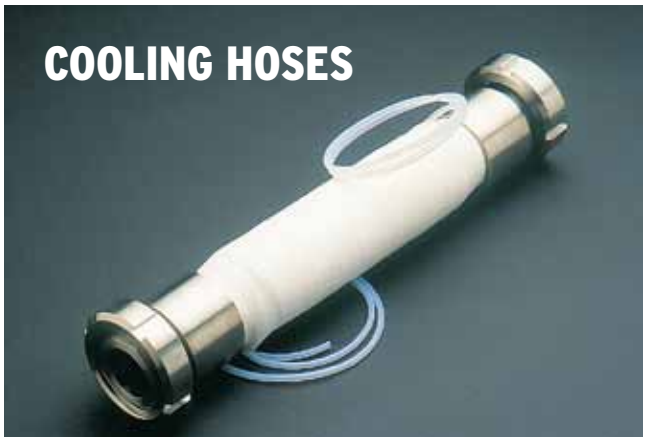
Elastomer: Extruded silicone produced in accordance with the U.S. FDA Standard 21 CFR 177.2600, the German BfR Standard part XV.
Fabric reinforcement: Polyester braiding.
Stainless steel inside: No
Inner appearance: translucent and smooth.
Outer appearance: grey with a yellow strip.
Temperature scale: -60°C / +180°C (-76°F / +392°F)
Working pressure: 6 bar (87 psi)
Available Diameters: 12, 15, 19mm (1/2", 5/8", ¾")
Available Lengths: 5, 10, 20, 76mm (15', 33', 60', 250').
Applications: Hi-Tech silicone recommended for industrial Kitchens and Catering. Product chemically resistant. Long life product, can be exposed indefinitely to sunlight and bad weather without drying out or hardening and staying always flexible.
Sil Kitchen® can be supplied with brass fittings suitable for many standard ends.

PHARMALOADER®

The Pharmaloader® is a flexible compensator for the pharmaceutical and food industries.
Made from platinum-catalysed silicone, it complies with the requirements of the FDA 21 CFR 177.2600 and BfR part XV and USP class VI standards.
It is made with pressure-resistant polyester reinforcements between the silicone layers. To obtain the correct elastic compensation, it is fitted with 3 stainless steel rings, which also prevent volumetric dilatation.
The Pharmaloader® is a standard element fitted with molded Tri-Clamp seals on the ends of the compensator.
The counter-flange elements are made from INOX 304L steel.
It is the ideal solution for all tank, hopper, pump and weighing tank outlets to compensate vibrations and level differences.
Autoclavable and sterilisable, the Pharmaloader® can work at a temperature range of between -50°C and 180°C (-76°F / 356°F).

Nominal clamp Ø (inch)	Clamp head Ø (mm)	Inner Ø (mm)	Overall length (inches) (mm)	Working pressure (bar)
1”	50,5	22,1	4” (102)	1,00
1 1/2”	50,5	34,7	4” (102)	0,90
2”	64	47,5	4” (102)	0,80
2 1/2”	77,5	60	4” (102)	0,70
3”	91	73	6” (152)	0,60
4”	119	97,6	5” (152)	0,50
5”	155	125	7” (178)	0,40
6”	183	150	7” (178)	0,35
8”	233,5	200	7” (178)	0,20
10”	270	250	8” (204)	0,10

COOLING HOSES

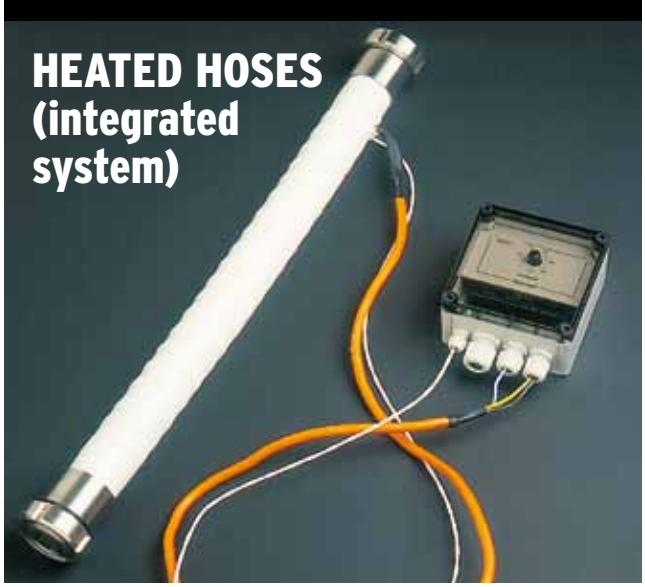


Characteristics: Silicone hose equipped with a cylindrical PTFE (Teflon*) conduit encased in spiral along the length of the hose. Fittings are assembled on both ends.
This system provides a regular temperature of the conveyed product by steam or hot water through the inside of the PTFE conduit, and nitrogen for cooling.

Main applications: For products that require high or low handling temperatures.

*Teflon is a registered trademark of Dupont.

HEATED HOSES (integrated system)



Characteristics: Silicone hose equipped with an electrical resistance encased inside the wall in order to provide a regular temperature to the hose for an optimum fluidity of the conveyed product.
Inner cable is connected to an electronic regulator and is also equipped with a PT 100 Ohm gauge connected to the regulator through a cooled end.

Voltage: Depending on specific user needs.
Temperature: +5°C / +150°C (+41°F / +302°F) - Polyester textile
+5°C / 200°C (+41°F / +392°F) - Nomex** textile

Main applications: To convey viscous products that needs to maintain a regular temperature during the production process, such as caramel, glycerin or chocolate.

**Normex is a registered trademark of Dupont.

SPECIAL SILICONE SHAPES WITH OR WITHOUT SZR*** COUPLINGS / VENA ADAPTSIL®

According to your requirement we produce standard silicone shapes such as bend pipes (45° and 90° elbows, reductions), expansion compensators and also customized shapes according to your specifications

For example our new special range “ADAPTSIL®”, which allow you to easily connect two, three, four or even more metal connections with a flexible silicone hose adaptor crimped with any standard or special fitting upon request. For more information about ADAPTSIL®” please consult the technical Datasheet.

***According to our SZR SYSTEM (without Retention Zone)

ADAPTSIL®

The first line of flexible adaptors in silicone designed for the Food, Pharm and Biotech industries.

We recommend ADAPTSIL adaptors to convey fluids in the food, Pharm and Biotech industries.

These adaptors are FDA approved, made out of USP class VI/ platinum cured silicone and meet all the certifications required in these industries. The fittings are made of 316 L Stainless Steel and crimped according to SZR® (non retention zone system). The standard fittings are SMS, DIN and sanitary TRI-CLAMP but others ara available upon request.

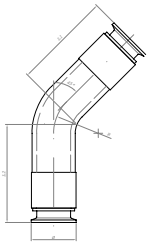
ADAPTSIL® offers 7 different standard geometrical configurations but we can custom make any piece according to your customer's needs.

ADAPTSIL® products can be vulcanized, sterilized and Cleaned in Place (CIP) with steam or any other common product (caustic soda, 4% diluted acid...). We recommend ADAPTSIL® to compensate system vibrations as well as to optimize the overall life of the hose or tube connections.

ADAPTSIL® is the best solution for handling system miss-alignments as well as increased ease in hose or tube installation.

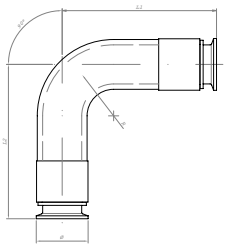
ADAPTSIL® offers sound dampening characteristics in your process systems due to its elastic and flexible construction.

45° Elbow CL/CL



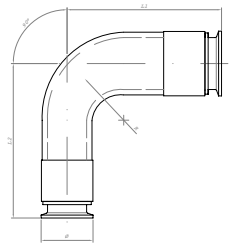
		L1		L2		R	
Ø3/8"	(10 mm)	4 3/8	111	4 3/8	111	5/8	15
Ø1/2"	(13 mm)	4 1/2	113	4 4/8	113	6/8	20
Ø1"	(25 mm)	4 7/8	125	4 7/8	125	1 1/2	38
Ø1 1/4"	(32 mm)	4 7/8	125	4 7/8	125	1 5/8	40
Ø1 1/2"	(38 mm)	5	127	5	127	1 3/4	45
Ø2"	(51 mm)	5 1/4	134	5 1/4	134	3	75
Ø2 1/2"	(63 mm)	5 5/8	144	5 5/8	144	3 1/2	90
Ø3"	(76 mm)	6 1/8	155	6 1/8	155	4 1/8	105
Ø4"	(102 mm)	6 5/8	167	6 5/8	167	5 7/8	150

90° Elbow CL/CL



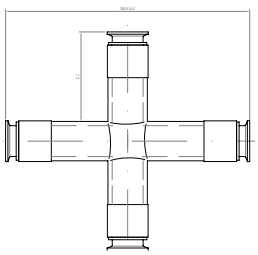
		L1		L2		R	
Ø3/8"	(10 mm)	4 3/4	120	4 3/4	120	5/8	15
Ø1/2"	(13 mm)	4 7/8	125	4 7/8	125	3/4	20
Ø1"	(25 mm)	5 7/8	148	5 7/8	148	1 1/2	38
Ø1 1/4"	(32 mm)	5 7/8	150	5 7/8	150	1 5/8	40
Ø1 1/2"	(38 mm)	6 1/8	155	6 1/8	155	1 3/4	45
Ø2"	(51 mm)	7 1/8	180	7 1/8	180	3	75
Ø2 1/2"	(63 mm)	7 7/8	200	7 7/8	200	3 1/2	90
Ø3"	(76mm)	8 5/8	220	8 5/8	220	4 1/8	105
Ø4"	(102mm)	10 1/4	260	10 1/4	260	5 7/8	150

90° Elbow Reducer CL/CL



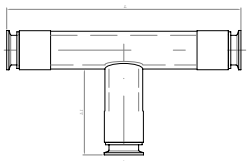
		L1		L2		R	
Ø1/2-3/8"	Ø13/10	4 7/8	125	4 7/8	125	6/8	20
Ø1-1/2"	Ø25/13	5 3/4	147	5 5/8	142	1 1/2	37
Ø1 1/4-1"	Ø32/25	6 1/4	160	6 1/4	160	2	50
Ø1 1/2-1"	Ø38/25	6 1/4	160	6 1/4	160	2	50
Ø1 1/2-1 1/4"	Ø38/32	6 1/4	160	6 1/4	160	2	50
Ø2-1"	Ø51/25	7 1/8	180	7 1/4	185	3	75
Ø2- 1 1/2"	Ø51/38	7 1/8	180	7 1/8	180	3	75
Ø2 1/2-1 1/2"	Ø63/38	8 1/4	210	8 1/8	205	3 6/8	95
Ø2 1/2 - 2"	Ø63/51	8 1/4	210	7 7/8	200	3 6/8	95
Ø3 - 2"	Ø76/51	8 1/2	215	8 2/8	210	4 1/8	105
Ø 3 - 2 1/2"	Ø76/63	8 1/2	215	8 5/8	220	4 1/8	105
Ø4 - 3"	Ø102/76	10 1/4	260	10 2/8	260	5 7/8	150

Cross-Shape CL/CL



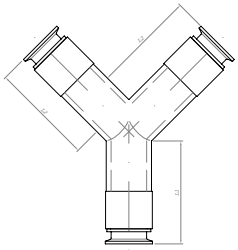
		L1		L	
Ø3/8"	(10mm)	4 1/2	115	9 7/8	252
Ø1/2"	(13 mm)	4 1/2	115	10	255
Ø1"	(25 mm)	4 3/4	120	10 7/8	277
Ø1 1/4"	(32 mm)	4 3/4	120	11 1/8	284
Ø1 1/2"	(38 mm)	4 3/4	120	11 3/8	290
Ø2"	(51 mm)	4 1/2	115	11 1/2	293
Ø2 1/2"	(63 mm)	4 3/4	120	12 3/8	315
Ø3"	(76 mm)	4 7/8	125	13 1/4	338
Ø4"	(102 mm)	4 3/4	120	13 7/8	354

Tee-Shape CL/CL



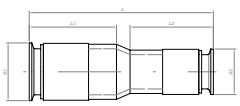
		L1		L	
Ø3/8"	(10mm)	4 1/2	115	9 7/8	252
Ø1/2"	(13 mm)	4 1/2	115	10	255
Ø1"	(25 mm)	4 3/4	120	10 7/8	277
Ø1 1/4"	(32 mm)	4 3/4	120	11 1/8	284
Ø1 1/2"	(38mm)	4 3/4	120	11 3/8	290
Ø2"	(51 mm)	4 1/2	115	11 1/2	293
Ø2 1/2"	(63mm)	4 3/4	120	12 3/8	315
Ø3"	(76mm)	4 7/8	125	13 1/4	338
Ø4"	(102 mm)	4 3/4	120	13 7/8	354

Y-Shape CL/CL



		L1		L2	
Ø3/8"	(10 mm)	4 1/8	105	4 1/2	115
Ø1/2"	(13 mm)	4 1/8	105	4 1/2	115
Ø1"	(25 mm)	4 3/8	110	4 3/4	120
Ø1 1/4"	(32 mm)	4 3/8	110	4 3/4	120
Ø1 1/2"	(38 mm)	4 3/8	110	4 3/4	120
Ø2"	(51 mm)	4 1/8	105	4 1/4	115
Ø2 1/2"	(63 mm)	4 3/8	110	4 3/4	120
Ø3"	(76 mm)	4 1/2	115	4 7/8	125
Ø4"	(102 mm)	4 3/8	110	4 3/4	120

Reducer Straight CL/CL



		L1		L2		L	
Ø1/2-3/8"	Ø13/10	3 3/4	95	3 3/4	95	7 1/2	190
Ø1-1/2"	Ø25/13	3 7/8	100	3 3/4	95	7 5/8	195
Ø1 1/4-1"	Ø32/25	3 7/8	100	3 7/8	100	7 7/8	200
Ø1 1/2-1"	Ø38/25	3 7/8	100	3 7/8	100	7 7/8	200
Ø1 1/2-1 1/4"	Ø38/32	3 7/8	100	3 7/8	100	7 7/8	200
Ø2-1"	Ø51/25	3 3/4	95	3 7/8	100	7 5/8	195
Ø2- 1 1/2"	Ø51/38	3 3/4	95	3 7/8	100	7 5/8	195
Ø2 1/2-1 1/2"	Ø63/38	3 7/8	100	3 7/8	100	7 7/8	200
Ø2 1/2 - 2"	Ø63/51	3 7/8	100	3 3/4	95	7 5/8	195
Ø3 - 2"	Ø76/51	4 1/8	105	3 3/4	95	7 7/8	200
Ø 3 - 2 1/2"	Ø76/63	4 1/8	105	3 7/8	100	8 1/8	205
Ø4 - 3"	Ø102/76	3 7/8	100	4 1/8	105	8 1/8	205

VENAFLON

Characteristics: Silicone hose with an inner liner of smooth PTFE, polyester textile reinforcements and stainless steel spiral encased inside the wall.
Temperature scale: -60°C / +180°C (-76°F / +356°F)
Maximum length of manufacture: 4 o 6m, depending on the diameter.
Main applications: To conveying agressive chemical products.

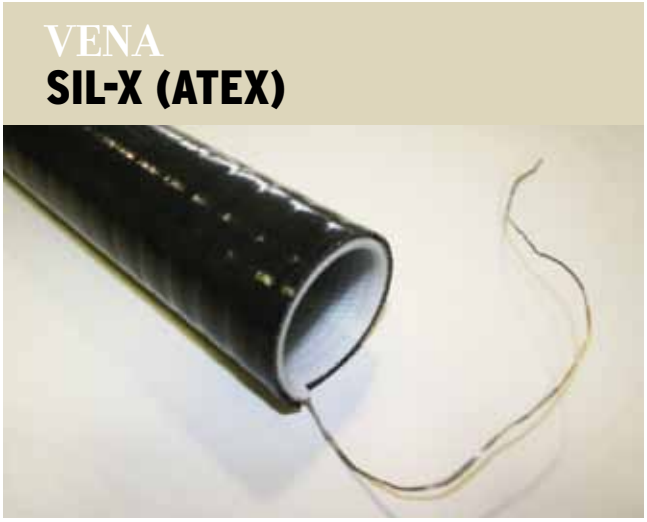
Ø Inner Diameter (mm)	Wall thickness (mm)	Working pressure (bar)	Bursting pressure (bar) Water at 20º C	Vacuum(bar) Water at 20º C	Bending radius (mm)
13	6,2	26,0	78	-0,95	88
19	6,2	21,7	65	-0,90	135
25	6,2	17,7	53	-0,90	182
32	6,2	15,3	46	-0,90	228
38	6,2	14,0	42	-0,90	275
51	6,2	10,7	32	-0,85	318

Characteristics:
When the product conveyed is not compatible with the silicone elastomer, VENAIR can produce the standar hoses SIL 640, SIL 650V, SIL 655 with an inner liner of white, Class A, food grade Viton®* in accordance with the FDA and BfR part XV Standards.

Main applications: To conveying fluids particularly aggressive with silicone, such as some acids or fats, in a temperatura scale of -30°C to +180°C (-22°F to +356°F).

*Viton is a registered trademark of DUPONT

All our standard hoses (SIL 640, SIL 650 V, SIL 655) can be equipped with several tin-plated copper wires joined to the metal fittings by a welding point. The completely equipotent joint ensures that users will be protected from discharges of static electricity resulting from contact with the hose.



Conductive silicone cover for explosive environments

All our standard hoses (VENA SIL 640, SIL 650 V, SIL 655) can be modified externally in order to fulfill the ATEX norm for potentially explosive atmosphere: (but the hose is not designed to convey explosive substances)

- Electrical Surface Resistance of the exterior ply < 10^3 Ω according to the specification EN 60079-0 Part 26.13
- Meets the requirements of European ATEX directive 94/9/EC.
- The hose must be properly grounded, to permit the correct dissipation of the static charge (grounding the hose metal fittings or directly the copper wire of both ends of the hose). Will be customer's responsibility to properly ground the hose.

VENA BUTYLFOOD

Characteristics:
- Rubber hoses manufactured with food grade Butyl in accordance with FDA 1 CFR 177.2600.
- Equipped with textile reinforcements inside the wall of the hose, with double steel spring wire and copper braiding to ensure an equipotent joint with the metal fittings and to protect from discharges of static electricity.
- Hoses with strong, durable construction that can withstand excessive physical handling.
- Operable with pressure or vacuum.

Inner appearance: White, smooth
Outer appearance: violet, smooth. Includes white information strip.
Operating pressure: 10 bar / 145 psi (all diameters)
Bursting pressure: 30 bar / 435 psi (all diameters)
Maximum operating temperature:
-30°C to +120°C (-22°F to +248°F)

Sterilization temperature: 130°C (266°F)
Can be sterilized on-site by major Cleaning in Place (CIP) products.
Maximum manufacturing length: 40 metres
Major applications: The Butylfood flexible tube is recommended for all types of food products, even at high temperatures (milk, chocolate, drinking water, fruit juice, fresh cream, oil, cosmetic cream, alcohol, etc)

Inner diameter		Outer diameter		Bending radius	Working pressure		Working pressure	
(mm)	(inch)	(mm)	(inch)	(mm)	bar at 20°C ISO 1402/1994	psi at 68°F ISO 1402/1994	bar at 20°C ISO1402/1994	psi at 68°F ISO 1402/1994
15,8	5/8	26	1	40				
19,05	3/4	29	1 1/8	45				
25,4	1	37	1 7/6	50				
31,7	1 1/4	45	1 3/4	60				
38,1	1 1/2	51	2	65	10	145	30	435
50,8	2	65	2 9/16	85				
63,5	2 1/2	78	3 1/16	130				
76,2	3	92	3 5/8	220				
101,6	4	120	4 3/4	320				

VENA TECHNIPUR FDA-X

New transparent polyurethane hose for the food and pharmaceutical industries. In accordance with FDA standard 21 CFR 177.2600 (e) & (f) and generally acceptable* for pneumatic transport of bulk materials and suction of all types of abrasive particles. Hose with Electrical resistance <10^8 Ω/m according to EN ISO 8031:2009. For more information please consult the technical Datasheet.It is suitable for incorporation to Equipments conform to the requirements of European ATEX directive 94/9/EC.*
Possible diameters: from 50 to 450mm.
Produced with stainless steel wire.

Alternatives:
- Antistatic: With a cupper wire parallel to the wire spiral for better electrostatic discharge.

*For your intended purpose please consult your supplier for the Risk assessment.

PROTECTION FOR THE CONNECTIONS

VENAIR Technosil offers supplementary protection devices for its entire product line in order to increase service life.

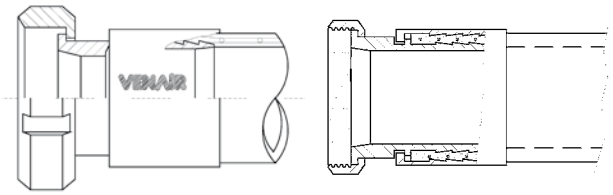
SILICONE COVER FOR THE METALLIC CONNECTIONS
In order to avoid burns while handling any hot metallic connections after a sterilization process.

ANTI-SHOCK STOPS
Used to protect the metal fittings of our hoses in order to prevent damage and deformation in case of dropping or excessive hose assembly handling.

HOSE ASSEMBLIES

SZR* SYSTEM SZR* SYSTEM (Without retention zone) & 3A Hose Assemblies

The concept of SZR* has been fully researched for the flexible hoses produced by VENAIR. This system ensures that the hoses equipped with metal fittings on both ends satisfy even the most demanding requirements of the food, pharmaceutical, cosmetics and chemical market, since all areas where contamination may occur between the joint of the hose and the fittings are eliminated by placing them at the same level.



The SZR* system is designed to prevent the utmost differences in diameter between the metal fitting and the hose, ensuring continuous product flow without inner turbulence. This leads to time saving by allowing on-site cleaning (CIP) to be performed without disassembly. The SZR assembly system ensures a higher level of non-retention in the flexible hoses, as well as greater safety of use. Moreover, our crimped hoses can be Certified according to the 3A Sanitary Standard 62-02 for hose assemblies.

*SZR is a registered trademark of VENAIR

QUALITY OF FINISH

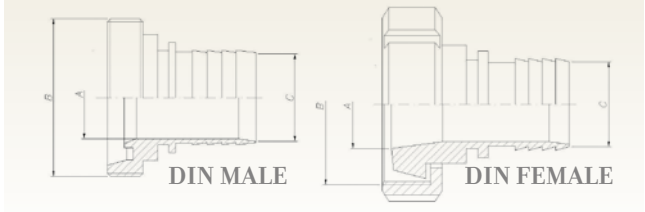
The roughness of the inner surface of the SZR* fittings presents a maximum rugosity of 0.8 microns and can be improved on request. The batch number for the raw material used is indicated on each fitting.
All connections are manufactured in a single block, without welds, and the flexed 45° or 90° connections are secured by an orbital weld.

STAINLESS STEEL FITTINGS 316L

Available in 316L stainless steel, with the exception of the nuts and ferrules which are made of 304 stainless steel. Other fittings can be assembled upon request (RJT, FIL, ISS, MACON, GAS JIC, flanges). Clamps and auxiliary parts for welding can also be manufactured.

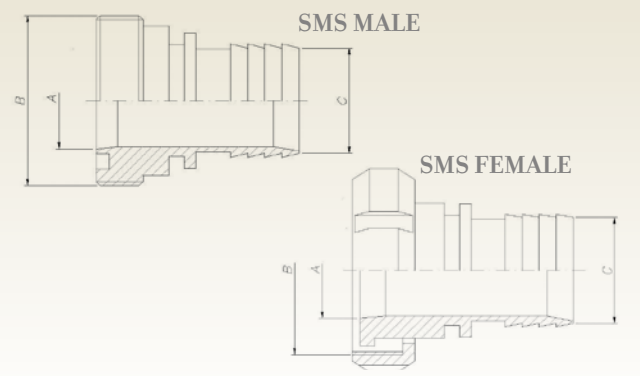
DIN 11851

DN	A	B(DIN405)	C	Part Number	Part Number
	(mm)	thread	(mm)	MALE	FEMALE
10	10	28x1/8”	10	021100001010	021000001010
15	16	34x1/8”	15	021100001516	021000001615
20	20	44x1/6”	20	021100002020	021000002020
25	26	52x1/6”	25	021100002525	021000002525
32	32	58x1/6”	32	021100003232	021000003232
40	38	65x1/6”	38	021100003840	021000003840
50	50	78x1/6”	50	021100005050	021000005050
65	66	95x1/6”	63	021100006365	021000006365
80	81	110x1/4”	75	021100007580	021000007580
100	100	130x1/4”	102	021100102100	021000102100
125	125	160x1/4”	127	021100127125	021000127125
150	150	190x1/4”	152	021100150152	021000150152



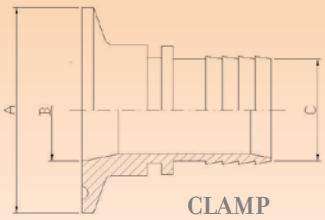
SMS

DN	A	B	C	Part Number	Part Number
	(mm)	thread	(mm)	MALE	FEMALE
25	22.5	39.7x1/6”	25	021400002525	021300002525
38	35.5	59.8x1/6”	38	021400003838	021300003838
51	48.5	69.8x1/6”	50	021400005051	021300005051
63	60.5	84.8x1/6”	63	021400006363	021300006363
76	72.8	97.5x1/6”	75	021400007576	021300007576
101.6	97.6	132x1/6”	102	021400100102	021300102102
104	100	124.4x1/6”	102	021400102104	021300102104



TRI-CLAMP

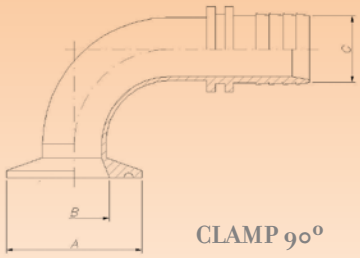
A (mm)	B (mm)	C (mm)	Part Number
25	6,0	6	021276060625
34	8,0	8	021276080834
50	8,0	8	021276080850
25	10,0	10	021276101025
34	10,0	10	021276101034
50	10,0	10	021276101050
25	10,0	13	021276101325
34	10,0	13	021276101334
25	13,0	13	021276131325
34	13,0	13	021276131334
50	13,0	13	021276131350
25	16,0	16	021276161625
34	16,0	16	021276161634
50	16,0	16	021276161650
25	16,0	20	021276162025
50	16,0	20	021276162050
34	18,0	18	021276181834
50	18,0	18	021276181850
34	20,0	20	021276202034
50	20,0	20	021276202050
50	22,5	18	021276221850
50	22,5	20	021276222050
50	22,5	25	021276222550
64	22,5	25	021276222564
50	29,0	32	021276293250
64	32,0	32	021276323264
50	35,5	20	021276352050
50	35,5	25	021276352550
50	35,5	38	021276353850
64	35,5	38	021276353864
64	38,0	38	021276383864
64	48,5	50	021276485064
77	60,3	63	021276606377
91	72,9	76	021276737691
119	101,0	102	021276101119



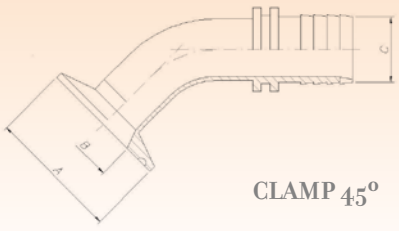
CLAMP

TRI-CLAMP IMPERIAL

DN (inch)	A (mm)	A (inch)	B (mm)	C (mm)	C (inch)	Part Number
1/2	25	1	9.5	6.35	1/4	021277100625
3/4	25	1	15.8	6.35	1/4	021277160625
1/2	25	1	9.5	9.52	3/8	021277101025
3/4	25	1	15.8	9.52	3/8	021277161025
1/2	25	1	9.5	12.7	1/2	011277101325
3/4	25	1	15.8	12.7	1/2	021277161325
1/2	25	1	9.5	19.05	3/4	021277101925
3/4	25	1	15.8	19.05	3/4	021277161925
1	50	2	22.1	6.35	1/4	021277220650
1 1/2	50	2	34.8	6.35	1/4	021277350650
1	50	2	22.1	9.52	3/8	021277221050
1 1/2	50	2	34.8	9.52	3/8	021277351050
1	50	2	22.1	12.7	1/2	021277221250
1 1/2	50	2	34.8	12.7	1/2	021277351250
1	50	2	22.1	19.05	3/4	021277221950
1 1/2	50	2	34.8	19.05	3/4	021277351950
1	50	2	22.1	25.4	1	021277222550
1 1/2	50	2	34.8	25.4	1	021277352550
2	64	2 1/2	47.5	25.4	1	021277482564
1 1/2	50	2	34.8	38.1	1 1/2	021277353850
2	64	2 1/2	47.5	38.1	1 1/2	021277483864
2	64	2 1/2	47.5	50.8	2	021277485064
2 1/2	77	3	60.2	50.8	2	021277605077
2 1/2	77	3	60.2	63.5	2 1/2	021277606377
3	91	3 9/16	72.9	63.5	2	021277736391
3	91	3 9/16	72.9	76.2	3	021277737691
4	119	4 11/16	97.4	101.6	4	021277102119



CLAMP 90°

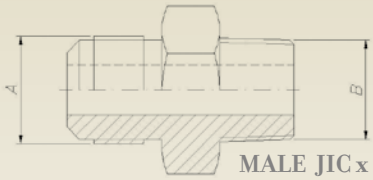


CLAMP 45°

All Tri-Clamp fittings can be assembled in 90° or 45°.

Male JIC x Male NPTF Adaptor

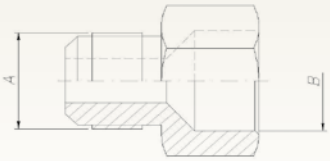
A male JIC	B male NPT	Part Number
7/16	1/4	021534700613
1/2	1/4	021534700813
3/4	3/8	021534701217
7/8	1/2	021534701621
1 1/16	3/4	021534702026
1 5/16	1	021534702533
1 5/8	1 1/4	021534703242
1 7/8	1 1/2	021534703848



MALE JIC x MALE NPTF

Male JIC x Female NPTF Adaptor

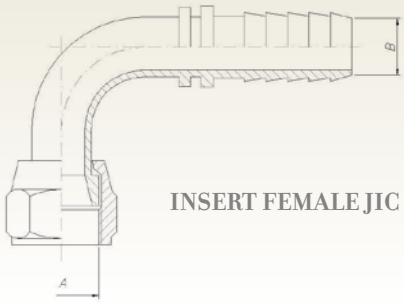
A male JIC	B male NPT	Part Number
7/16	1/4	021550000613
1/2	1/4	021550000813
3/4	3/8	021550001217
7/8	1/2	021550001621
1 1/16	3/4	021550002026
1 5/16	1	021550002533
1 5/8	1 1/4	021550003242
1 7/8	1 1/2	021550003848



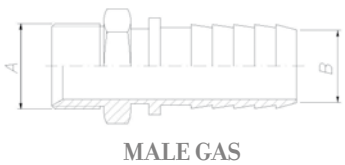
MALE JIC x FEMALE NPTF

INSERT FEMALE JIC ELBOW 90°

A	B Ø For hose		
(inch)	(inch)	(mm)	Part Number
7/16	1/4	6.35	021574600671
1/2	1/4	6.35	021574600804
3/4	3/8	9.52	021574601206
7/8	1/2	12.7	021574601408
1 1/16	3/4	19.05	021574601712
1 5/16	1	25.4	021574602116
1 5/8	1 1/4	31.75	021574602620
1 7/8	1 1/2	38.10	021574603024



INSERT FEMALE JIC ELBOW 90°

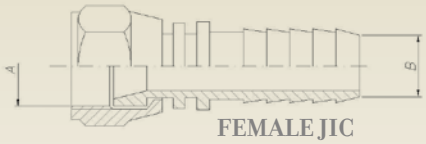


MALE GAS

FEMALE GAS

Female JIC Straight Insert

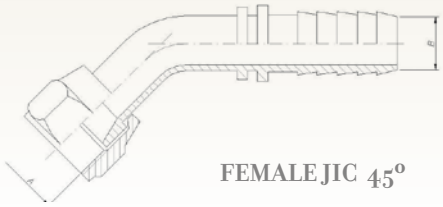
A	B Ø FOR HOSE		
(inch)	(inch)	(mm)	Part Number
7/16	1/4	6.35	021564600671
1/2	1/4	6.35	021564600804
3/4	3/8	9.52	021564601206
7/8	1/2	12.7	021564601408
1 1/16	3/4	19.05	021564601712
1 5/16	1	25.4	021564602515
1 5/8	1 1/4	31.75	021564602620
1 7/8	1 1/2	38.10	021564603024



FEMALE JIC

Female JIC Elbow 45º Insert

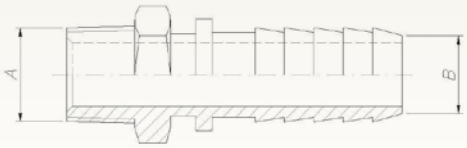
A	B Ø For hose		
(inch)	(inch)	(mm)	Part Number
7/16	1/4	6.35	021564610704
1/2	1/4	6.35	021564610804
3/4	3/8	9.52	021564611206
7/8	1/2	12.7	021564611408
1 1/16	3/4	19.05	021564611712
1 5/16	1	25.4	021564612116
1 5/8	1 1/4	31.75	021564612620
1 7/8	1 1/2	38.10	021564613024



FEMALE JIC 45°

Insert male NPT

A	B Ø For hose		
(inch)	(inch)	(mm)	Part Number
1/8	1/4	6.35	021534650204
1/4	1/4	6.35	021534650404
3/8	3/8	9.52	021534650606
1/2	1/2	12.7	021534650808
3/4	3/4	19.05	021534651212
1	1	25.4	021534651616
1 1/4	1 1/4	31.75	021534652020
1 1/2	1 1/2	38.10	021534652424



INSERT MALE NPT

Male Gas, Female Gas

A	B
(thread)	(mm)
1/4"	6
3/8"	8
3/8"	10
1/2"	10
1/2"	13
5/8"	16
3/4"	19
1"	25
1 1/2"	38

REFERENCES

VENAIR Technosil's reputation as a worldwide leader in flexible silicone tubes has caught the attention of some of the most well-known brands across many sectors:

FOOD:
DANONE
NESTLE
SCHWEPPES
COCA COLA
KRONENBOURG

PHARMACEUTICAL:
PFIZER
GLAXO-WELLCOME
AVENTIS
MILLIPORE
SCHERING-PLOUGH

COSMETICS:
L'OREAL
NIVEA
ROC
LANCASTER

CHEMICAL:
RONE POULENC
BAYER
HENKEL

PRECAUTIONS FOR USE

STERILISATION
All flexible hoses must be sterilized before use and must only be used for the intended purpose for which they were designed.

All hoses can be hot-air sterilized at a temperature of +250° C (+482° F) or steam sterilized at +135° C (+275° F) and a pressure of with 3.5 bars.
Recommended maximum time: 1.5 hours +135° C (+275° F).
A minimum of 1 hour must be left between successive sterilisation treatments in order for the hose to stabilise.
It is important to note that steam alters the mechanical and volumetric properties of the silicone elastomer. We therefore recommend that all hoses are examined after 150 hours of steam sterilization treatments.
The product may suffer from the effects of hydrolysis if the sterilisation time is exceeded.

COMPATIBILITY OF THE PRODUCTS FOR TRANSPORTATION
Ensure that the flexible hose used is chemically compatible with the product.
Cleaning products, such as caustic soda and nitric acid will not alter the quality of the product when diluted to 5 %.
The type of fluid to be transported, the usage temperature and the maximum pH of the product must always be known. Silicone hoses are not recommended for conveying abrasive products.

CRUSHING
A vehicle driving over a hose can cause the hose's textile elements to fray under the pressure, even if the hose does not have an inner spiral. Avoid stepping on hoses. The sudden pressure could damage them.

PRESSURE
The pressure and temperature levels should be those indicated for each type of hose. During use, ensure that "water hammer" that could affect the hose does not occur. Water hammer can multiply the initially expected operating pressure by ten.

USE. STORAGE.
Under no circumstances should flexible hoses be used to attempt to pull heavy loads.
Avoid dragging hoses along the floor.
If the hoses are temporarily out of service, they should be stored in a clean, dry place on non-sulfur steel shelving to avoid any reactions. Protect from light and ozone.
Elbow adaptors of 45° or 90° must be connected to the bypass frame to eliminate any excessive curvature of the hose.
Our flexible hoses have a useful life of between 10 and 20 times that of conventional hoses.
Remember that once the hose is installed, it is a live and moving element. These hoses that have been manufactured with the greatest care, especially for use in such demanding industries. Taking good care of them will ensure a return on your investment.

VENAIR Technosil shall not be held responsible for improper use of its hoses. Failure to comply with the precautions for use may result in unfavorable conditions.

GOOD PRACTICE GUIDELINES

Fascicle of documentation published by Afnor, September 1986.
Correspondence:
At the time that this fascicle was published, the ISO/DIN 18831 standard on the same subject already existed. Both documents are equivalent.
Analysis:
The present fascicle is intended to help users of rubber or plastic based elastic and flexible hoses to obtain optimal hose life by considering the different conditions of use.

The purpose of the present fascicle is to provide users of rubber or plastic-based flexible hoses with recommendations to enable them to maintain the hoses in a similar condition to when supplied once they are in operation and to obtain an optimal service life by considering the conditions of use.

These good practice guidelines are comprised of two parts:
PART A: GENERAL RECOMMENDATIONS
Chapter 1 – Selection criteria
Chapter 2 – Storage conditions
Chapter 3 – Rules for use and maintenance

CRITERIA FOR SELECTION

PART B: ADDITIONAL RECOMMENDATIONS FOR SPECIFIC APPLICATIONS
Chapter 1 – Bending radius / Abrasive products
Chapter 2 – Corrosive and aggressive products
Chapter 3 – Inflammable products

PART A: GENERAL RECOMMENDATIONS

1. SELECTION CRITERIA

1.1 When choosing a flexible hose for a certain application the following points must be considered:
1.1.1 Pressure – Vacuum
Operational pressure and vacuum values
Water hammer

1.1.2 Conveyed products
Nature, designation, concentration, working temperature.
Form: liquid, gas, or solid. In the case of the latter: granulated, density, behavior of transported solid product, nature, speed of travel and flow of transported fluid. Frequency of use.

1.1.3 Environment
Place of use, ambient temperature, hygrometric grade, exposure or lack of exposure to atmospheric agents and ozone. Products that may be in contact with the end of the flexible hose.

1.1.4 Mechanical limitations
Minimum bending radius in service. Limitations in terms of traction, torsion, flexion, vibration or compression. Risk of impact, abrasion, corrosion. Work position: on the floor, suspended or submerged.

1.1.5 Connection used or expected to be used
Connection: type, dimension and class of thread.
Hose: Outer and inner diameter. Adjustment length.

1.1.6 Particular conditions
With relation to this matter, it is in the user's interest to choose flexible hoses that conform to the standards in force in the country of use, provided that these exist within the field of application in question.
1.2 In cases of difficulties regarding interpretation or where the necessary information does not appear in the available documentation, the user of the flexible hose is advised to consult the manufacturer.

2. STORAGE CONDITIONS

2.1 General information
During use, flexible hoses are exposed to different factors which can cause their physical properties to alter, which in turn may lead to the hoses being unsuitable for use when the time comes. Listed below are some general storage conditions that will help prevent the deterioration of the products during storage.

2.2 Length of storage
Storage length should be reduced as much as possible. Therefore stock rotation should be ensured, applying the rule "first in, first out". When long term storage cannot be avoided, e.g. for one year, the item should be thoroughly checked before it is put into operation.

2.3 Temperature and humidity
Storage temperature should be kept at between 0°C and 35°C wherever possible (optimum temperature 15°C). Relative humidity should preferably not exceed 65%.

2.4 Light
Items should be stored in a dark place, away from direct sunlight and intense artificial lighting. If storage facilities have windows or glazed areas, these should be covered with red, orange or white paint.

2.5 Environment
The hoses must not come into contact with certain products or be exposed to their vapors, particularly in the case of solvents, fuels, oils, fats, volatile components, acids, disinfectant products, etc. Moreover, some materials such as copper, iron and manganese can be harmful to some rubber-based mixtures.

2.6 Heat source
The distance between heat sources (e.g. heating units) and stored items must be sufficient to ensure that the temperature remains within the temperature limits defined in paragraph 2.3. If this is impossible, a heat screen should be used.

2.7 Electric or magnetic field
Electric or magnetic field variations should be prevented in the storage area since they can induce current in the metal connections and cause them to heat up. These fields can be caused by high voltage lines or high frequency generators.

2.8 Storage conditions
Flexible hoses should be stored without excessive restriction, lengthening or deformation.
All contact with sharp or angular objects or material must be avoided. Hoses must be stored in a dry place in storage boxes wherever possible. Flexible hoses that are coiled up should be stored flat and preferably not stacked. In cases where this is impossible, the height of stacks should be limited so that the items at the bottom of the stack are not deformed. Heavier items should be placed at the bottom and lighter items should be placed at the top. The coil must be at least equal to the minimum curvature radius specified by the product manufacturer or standards. Hanging coiled hoses from spikes or hooks is not recommended. Flexible hoses that are supplied in lengths should be stored flat without folds.

2.9 Rodents
Flexible hoses must be protected from rodents and suitable precautions should be taken if there is any risk.

2.10 Removal from storage
Precautions should be taken to ensure that the hoses requested are in perfect condition and are the correct hoses for the required use. Therefore, the ability to identify the different hoses stored is essential. Furthermore, and particularly in the case of flexible hoses that have been in storage for a long period of time, the metal connection elements should be checked to confirm they are correctly fitted.

2.11 Return to storage
Hoses that have been removed from service must be emptied of the substances they have carried before being returned to storage. Special care must be taken with items that have transported chemical, explosive, inflammable, or corrosive products. After cleaning, and before storage, their condition and suitability for later use must be checked.

2.12 Cleaning
Cleaning with brushes, sponges or cloths must be carried out with soap and water or surfactant based products. Metal brushes and abrasive, pointed or sharp instruments must not be used and the use of solvents should be avoided.

3. RULES FOR USE

3.1 Handling
Flexible hoses should always be handled with some minimum precautions. For example: they should not be scraped over sharp or abrasive surfaces, subjected to impacts or cut, deformed or squashed by vehicles.
Heavy flexible hoses supplied in lengths should be transported appropriately, especially when being lifted..

3.2 Impermeability test
A pressurized hydraulic test is recommended after fitting the metal connectors to ensure they are in good condition (no leaks and connector has not moved on the hose). The test pressure value is usually indicated by the hose manufacturer if it is not specified by test regulations or by standards.

If in doubt, check with the manufacturer.

3.3 Elimination of static electricity
The manufacturer's advice should be strictly followed when considering electrical conductivity requirements and a check should be carried out after installing the connections.

3.4 Fixed installations
Flexible hoses used for fixed installations must be connected using the appropriate fixing device wherever possible. This device should not hinder normal variations in the flexible hose when under pressure, such as longitudinal or diametric variations and/or torsion. When used under special conditions whether mechanical, pressurized, vacuum or geometric, the manufacturer should be consulted.

3.5 Moving parts
When flexible hoses need to be installed on moving parts, care must be taken to ensure that the motion does not cause the hose is not be subjected to impacts, blockages or friction and that the hose is not forced into abnormal curvatures, folds, traction or torsion.

3.6 References
Apart from some fields of use where special standards exist, all flexible hoses must be subjected to regular controls to ensure their suitability for continued use. In particular, attention needs to be paid to the condition of the connections and to the appearance of certain faults indicating hose degradation, whether due to normal ageing or to damage attributable to improper use or accidents during maintenance.
It is therefore particularly important to check for the appearance of:
- Cracks, scratches, breaks or tears in the coating that reveal the structure.
- Deformities, blisters, or swellings that appear when the hose is subjected to pressure.
- Leaks.
These faults require the affected hose to be replaced. In certain areas of use, and for safety reasons, there may be a use-by-date which will be indicated on the marking of the flexible hose. This use-by-date must be observed even if the hose shows no apparent signs of wear and tear.

3.7 Repairs
Repairing hoses is not generally recommended.
However, in the particular cases when hoses can be repaired, the manufacturer's recommendations must be strictly adhered to and a pressure test must be carried out after the repair. If there is any deterioration as a result of a cut at one end and if the length of the remaining hose is in good condition, then the hose can be repaired by cutting away the defective part.

PART B: ADDITIONAL RECOMMENDATIONS

In addition to the general recommendations in part A there are some other particular points that should also be noted.

1. BENDING RADIUS/ABRASIVE PRODUCTS

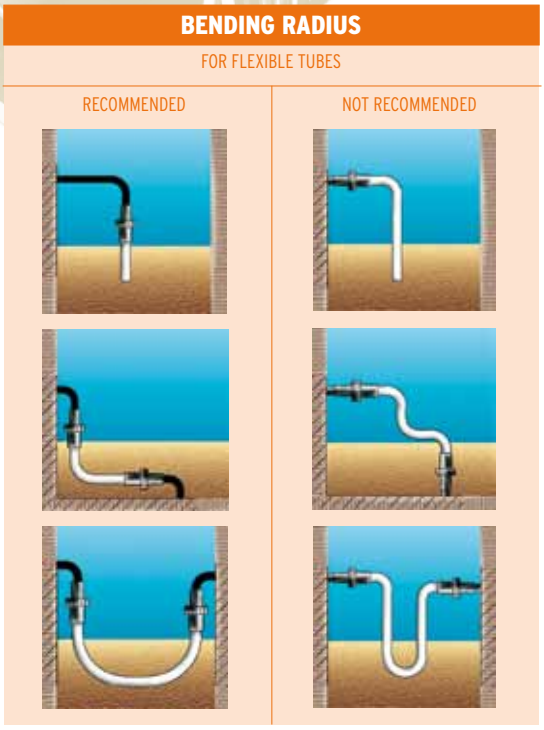
In order to obtain the optimal useful life, flexible hoses must be kept as straight as possible, avoiding any unnecessary curvature. The widest possible bending radius should therefore be used, since a radius that is too small will cause unwanted turbulence inside the hose. Good electrical conductivity will also need to be tested. This is ensured in these hoses with the effective discharge of the static electricity generated by rubbing the friction of transported particles against the wall of the hoses.
With regard to connections, it should be ensured that exterior connections are not subjected to abrasion. However, connections included in the hoses avoid the formation of turbulence that, as already mentioned, can cause increased and unsuitable consumption.

2. CORROSIVE OR AGGRESSIVE PRODUCTS

This point refers specifically to acids, bases, solvents, agro-pharmaceutical products and other chemical products. Should these products not appear in the list of compatible products specified in the technical documentation or if the temperature and concentration limits do not fall within acceptable parameters, the hose manufacturer should be consulted. Fluids should not be allowed to stagnate in the flexible hoses, especially in the case of solutions or emulsions, as the resulting decantation can cause concentrations that exceed the admissible limits. Cleaning and rinsing should be performed after each use in order to prevent this phenomenon. It is essential that all necessary technical precautions are taken in order to avoid leaks caused by the accidental explosion of the flexible hoses.

3. INFLAMMABLE PRODUCTS

This family of products is comprised in part by liquid hydrocarbons (essences, petroleum, and kerosene) or gaseous hydrocarbons (LPG). Most countries have regulations governing the storage and transport of these products. In the field of flexible hoses, attention must be paid to the regulations concerning electrical resistance, as well as the nature and frequency of controls for checking suitability for use over time.
In the case of hydrocarbons, care must be taken to ensure that the percentage of aromatic hydrocarbons (benzene, toluene, xylene) falls within the limits established by the flexible hose manufacturers.



COMPATIBILITY TABLE

The following guidelines are RECOMMENDATIONS that do not imply responsibility of VENAIR under any circumstances. Our specialists are available to advise you on the most suitable tube for all chemical products.

Resistance to different products:
A - excellent
B - good
C - insufficient
D - unsatisfactory
E - please, consult

	SILICONE	FLUOSIL	BUTYFLOOD	VITOSIL	VENAFLON
A					
acetaldehyde	A	D	A	D	A
acetamide	B	A	A	B	A
acetic acid 5%	A	B	A	A	A
acetic acid 30%	A	B	A	B	A
acetic acid, hot high press	C	D	C	D	A
acetic acid, glacial	B	D	B	D	A
acetic anhydride	C	D	B	D	A
acetone	B	D	A	D	A
acetophenone	D	D	A	D	A
acetyl acetone	D	D	A	D	A
acetyl chloride	C	A	D	A	A
acetylene	B	E	A	A	A
acetylene tetrabromide	E	E	A	A	A
acrylonitrile	D	D	D	D	A
adipic acid	E	A	E	E	A
aero lubriplate	B	A	D	A	A
aero safe 2300	C	C	A	D	A
aero safe 2300 w	C	C	A	D	A
aero shell IAC	B	A	D	A	A
aero shell 7 A grease	B	A	D	A	A
aero shell 17 grease	B	A	D	A	A
aero shell 750	D	B	D	A	A
aerozene 50 (50% hydrazine 50% UDMH)	D	D	A	D	A
air-below 300° F	A	A	B	A	A
air-above 300° F	A	B	D	A	A
alkazene	D	B	D	B	A
alum NH3 Cr-K	A	E	A	D	A
aluminum acetate	D	D	A	D	A
aluminum bromide	A	A	A	A	A
aluminum chloride	B	A	A	A	A
aluminum fluoride	B	A	A	A	A
aluminum nitrate	B	E	A	A	A
aluminum phosphate	A	E	A	A	A
aluminum salts	A	A	A	A	A
aluminum sulfate	A	A	A	A	A
ambrex 33 mobile	D	C	D	A	A
amines, mixed	B	D	B	D	A
ammonia anhydrous(liquid)	C	D	A	D	A
ammonia gas, cold	A	A	A	D	A
ammonia gas, hot	A	D	B	D	A
ammonia & lichium metali solution	D	D	B	D	A
ammonium carbonate	E	E	A	E	A
ammonium chloride	E	E	A	A	A
ammonium hydroxide (concentrated)	A	B	A	B	A
ammonium nitrate	E	E	A	E	A
ammonium nitrite	B	E	A	E	A
ammonium persulfate solution	E	E	A	E	A
ammonium persultate 10%	E	E	A	E	A
ammonium phosphate	A	E	A	E	A
ammonium phosphate, mono-basic	A	E	A	E	A
ammonium phosphate, dibasic	A	E	A	E	A
ammonium phosphate, tribasic	A	E	A	E	A
ammonium salts	A	C	A	C	A
ammonium sulfate	A	A	A	A	A
ammonium sulfide	E	E	A	D	A
amyl acetate	D	D	A	D	A
amyl alcohol	D	A	A	B	A
amyl borate	E	E	D	E	A
amyl chloride	D	B	D	A	A
amyl chloronaphthalene	D	B	D	A	A
amyl naphthalene	D	A	D	A	A
anderol L 774 (di-ester)	D	B	D	A	A
anderol L 826 (di-ester)	D	B	D	A	A
anderol L 829 (di-ester)	D	B	D	A	A
ang-25 (glycerol ester)	B	B	A	A	A
ang-25 (di-ester base)	B	B	D	A	A
anhydrous ammonia	B	D	A	D	A
anhydrous hydrazine	E	D	B	D	A
anhydrous hydrogen fluo	E	D	A	D	A
aniline	D	C	B	C	A
aniline dyes	C	B	B	B	A
aniline hydrochloride	D	B	C	B	A
aniline oils	D	C	B	C	A
animal fats	B	A	B	A	A
animal oil (lard oil)	B	A	B	A	A
AN-0-3 grade M	B	A	D	A	A
AN-0-6	D	A	D	A	A
AN-0-366	D	A	D	A	A
AN-V V-0-366 b hydrofluid	D	A	D	A	A
ansul ether	D	C	C	D	A
aqua regia	D	C	C	B	A
argon	B	B	A	A	A
aroclor 1248	B	B	B	A	A
aroclor 1254	C	B	B	A	A
aroclor 1260	A	A	E	A	A
aromatic fuel 50%	D	B	D	A	A
arsenic acid	A	A	A	A	A
arsenic trichloride	E	E	E	E	A
askatel	D	B	D	A	A
asphalt	D	B	D	A	A
ASTM oil #1	A	A	D	A	A
ASTM oil #2	D	A	D	A	A
ASTM oil #3	C	A	D	A	A
ASTM oil #4	D	B	D	A	A
ASTM reference fuel A	D	A	D	A	A
ASTM reference fuel B	D	A	D	A	A
ASTM reference fuel C	D	B	D	A	A
ATL-857	D	B	D	A	A
atlantic dominion F	D	A	D	A	A
aurex 903R mobil	D	D	D	A	A
automatic transmission fluid	D	E	D	A	A
automotive brake fluid	C	D	A	D	A
B					
bardol B	D	B	E	A	A
barium chloride	A	A	A	A	A
barium hydroxide	A	A	A	A	A
barium salts	A	A	A	A	A
barium sulfate	A	A	A	A	A
barium sulfide	A	A	A	A	A
bayol D	D	A	D	A	A
beer	A	A	A	A	A
beet sugar liquors	A	A	A	A	A
benzaldehyde	D	D	A	D	A
benzene	D	A	D	A	A
benzene sulfonic acid	D	B	D	A	A
benzine	D	A	D	A	A
benzochloride	E	A	A	A	A
benzoic acid	B	B	D	A	A
benzophenone	E	A	B	A	A
benzyl alcohol	E	B	B	A	A
benzyl benzoate	E	A	B	A	A
benzyl chloride	D	A	D	A	A
black point 77	C	C	A	A	A
black sulphate liquors	B	B	B	A	A
blast furnace gas	A	B	D	A	A
bleach solution	B	B	A	A	A
borax	B	B	A	A	A
bordeaux mixture	B	B	A	A	A
boric acid	A	A	A	A	A
boron fluids (HEF)	D	B	D	A	A
brake fluid (non petroleum)	C	D	A	D	A
bray GG-130	D	B	D	A	A
brayco 719-R (VV-H-910)	B	B	A	D	A
brayco 885 MIL-L-6085 A	D	B	D	A	A
brayco 910	D	D	A	D	A
bret 710	D	D	A	D	A
brine	E	E	A	E	A
brom-113	D	E	D	E	A
brom-114	D	E	D	B	A
bromine	D	B	D	A	A
bromine anhydrous	C	B	E	A	A
bromine pentafluoride	D	D	D	D	A
bromine trifluoride	D	D	D	D	A
bromine water	D	B	D	A	A
bromobenzene	D	A	D	A	A
bromochloro trifluoroethane	D	B	D	A	A
bunker oil	B	A	D	A	A
butadiene	D	B	D	B	A
butane	D	A	D	A	A
butane 2.2-dimethyl	D	A	D	A	A
butane 2.3-dimethyl	D	A	D	A	A
butanol (butyl alcohol)	B	A	B	A	A
1-butane.2-ethyl	D	C	D	A	A
butter	B	A	B	A	A
butyl acetate	D	D	B	D	A
butyl acetyl ricinoleate	E	B	A	A	A
butyl acrylate	E	D	D	D	A
butyl alcohol	B	A	B	A	A
butyl amine	B	D	D	D	A
butyl benzoate	E	A	B	A	A
butyl butyrate	E	A	A	A	A
butyl carbitol	D	D	A	C	A
butyl cellosolve	E	D	A	D	A
butyl cellosolve adipate	B	B	B	B	A
butyl ether	D	C	C	D	A
butyl oleate	E	B	B	A	A
butyl stearate	E	B	B	A	A
butylene	D	B	D	A	A
butyraldehyde	D	D	B	D	A

Resistance to different products:
A - excellent
B - good
C - insufficient
D - unsatisfactory
E - please, consult

	SILICONE	FLUOSIL	BUTYFLOOD	VITOSIL	VENAFLON
butyric acid	E	E	B	B	A
C					
calcine liquors	E	A	A	A	A
calcium acetate	D	D	A	D	A
calcium bisulfite	A	A	D	A	A
calcium carbonate	A	A	A	A	A
calcium chloride	A	A	A	A	A
calcium cyanide	A	E	A	E	A
calcium hydroxide	A	A	A	A	A
calcium hypochloride	E	A	A	A	A
calcium hypochlorite	B	B	A	A	A
calcium nitrate	B	A	A	A	A
calcium phosphate	A	E	A	A	A
calcium salts	B	A	A	A	A
calcium silicate	E	E	A	A	A
calcium sulfide	B	A	A	A	A
calcium sulfite	A	A	A	A	A
calcium thiosulfate	A	A	A	A	A
caliche liquors	B	A	A	A	A
cane sugar liquors	A	A	A	A	A
caproic aldehyde	B	D	B	D	A
carbanate	E	A	B	A	A
carbitol	B	B	B	B	A
carbolic acid	D	A	B	A	A
carbon bisulfide	E	A	D	A	A
carbon dioxide, dry	B	B	B	B	A
carbon dioxide, wet	B	B	B	B	A
carbon disulfide	E	A	D	A	A
carbon monoxide	A	B	A	A	A
carbon tetrachloride	D	A	D	A	A
carbonic acid	A	A	A	A	A
castor oil	A	A	B	A	A
cellosolve	D	D	B	D	A
cellosolve acetate	D	D	B	D	A
cellosolve butyl	D	D	B	D	A
celluguard	A	A	A	A	A
cellulube A60 (now fyrquel)	E	C	A	B	A
cellulube 90,100,150,220, 300 and 500	A	B	A	A	A
cellutherm 2505A	E	B	D	A	A
cetate (hexadecane)	D	C	D	A	A
china wood oil (tung oil)	D	B	C	A	A
chloracetic acid	E	D	B	D	A
chlorodane	D	B	D	A	A
chlorextol	D	B	D	A	A
chlorinated salt brine	D	A	D	A	A
chlorinated solvents, dry	D	A	D	A	A
chlorinated solvents, wet	D	A	D	A	A
chlorine, dry	D	A	D	A	A
chlorine, wet	E	B	C	A	A
chlorine dioxide	E	B	C	A	A
chlorine dioxide (8%Cl as NAC102 in solution	E	B	D	A	A
chlorine trifluoride	D	B	D	D	A
chloroacetone	D	D	A	D	A
chloroacetic acid	E	E	B	E	A
chlorobenzene	D	B	D	A	A
chl orobenzene (mono)	D	B	D	A	A
chlorobromo methane	D	B	B	B	A
chlorobutadiene	D	B	D	A	A
chrorododecane	D	A	D	A	A
chloroform	D	B	D	A	A
O-chloroaphtanene	D	B	D	A	A
I-chloro- I-nitro ethane	D	D	D	C	A
chlorosulfonic acid	D	D	D	C	A
chlorotoluene	D	B	D	A	A
chlorox	E	A	B	A	A
O-chlorphenol	D	B	D	A	A
chrome alum	A	E	A	A	A
chrome plating solution	B	B	D	A	A
chromic acid	C	C	C	A	A
chromic oxide 88 Wt, % aqueous solution	B	B	B	A	A
circo light process oil	D	A	D	A	A
citric acid	A	A	A	A	A
city service koolmotor-AP gear oil 140 E, P, Lube	D	A	D	A	A
city service pacemaker #2	D	A	D	A	A
city service #65, #120, #250	D	A	D	A	A
cobalt chloride	B	A	A	A	A
cobalt chloride, 2N	A	A	A	A	A
cocoanut oil	A	A	C	A	A
cod liver oil	B	A	A	A	A
coffee	A	A	A	A	A
coke oven gas	B	B	D	A	A
coliche liquors	E	E	B	E	A
convelex 10	D	E	E	E	A
coolanol (monsanto)	D	B	D	A	A
coolanol 45 (monsanto) +A269	D	B	D	A	A
copper acetate	D	D	A	D	A
copper chloride	A	A	A	A	A
copper cyanide	A	A	A	A	A
copper salts	A	A	A	A	A
copper sulfate	A	A	B	A	A
copper sulfate 10%	A	A	B	A	A
copper sulfate 50%	A	A	B	A	A
corn oil	A	A	C	A	A
cottonseed oil	A	A	C	A	A
creosols	D	B	D	A	A
creosote	D	C	D	A	A
creosote, coal tar	D	A	D	A	A
creosote, wood	D	A	D	A	A
creosylic acid	D	B	D	A	A
crude oil	D	B	D	A	A
cumene	D	B	D	A	A
cutting oil	D	A	D	A	A
cyclohexane	D	A	D	A	A
cyclohexanol	D	A	D	A	A
cyclohexanone	D	D	B	D	A
P-cymene	D	B	D	A	A
D					
decalin	D	A	D	A	A
decane	B	A	D	A	A
delco brake fluid	C	D	A	D	A
denatured alcohol	A	A	A	A	A
detergent solutions	A	A	A	A	A
developing fluids (photo)	A	A	B	A	A
dextron	D	B	D	A	A
diacetone	D	D	A	D	A
diacetone alcohol	D	D	A	D	A
diazinon	D	B	D	B	A
dibenzyl ether	E	E	B	D	A
dibenzyl sebacate	C	C	B	B	A
dibromoethyl benzene	D	B	D	A	A
dibutylamine	C	D	D	D	A
dibutyl ether	D	C	C	C	A
dibutyl phthalate	B	C	C	B	A
dibutyl sebacate	B	B	B	B	A
0-dichlorobenzene	D	B	D	A	A
P-dichlorobenzene	D	E	D	E	A
dichloro-butane	D	B	D	A	A
dichloro-isopropyl ether	D	C	C	C	A
dicyclohexylamine	E	D	D	D	A
diesel oil	D	A	D	A	A
di-ester lubricant MIL-L-7808	D	B	D	A	A
di-ester synthetic lubricants	D	B	D	A	A
diethylamine	B	D	B	D	A
diethyl benzene	D	C	D	A	A
diethyl ether	D	C	D	D	A
diethyl sebacate	B	B	B	B	A
diethylene glycol	B	B	A	A	A
difluorodibromomethane	D	E	B	E	A
diisobutylene	D	C	D	A	A
diisooctyl sebacate	C	C	C	B	A
diisopropyl benzene	E	B	D	A	A
diisopropyl ketone	D	D	A	D	A
dimethyl aniline	E	D	B	D	A
dimethyl formamide	B	D	B	D	A
dimethyl phthalate	E	B	B	B	A
dinitro toluene	D	D	D	D	A
dioctyl phthalate	C	B	B	B	A
dioctyl sebacate	C	C	B	B	A
dioxane	D	D	B	D	A
dioxolane	D	D	B	D	A
dipentene	A	D	D	A	A
diphenyl	D	B	D	A	A
diphenyl oxides	C	B	D	A	A
dow chemical 50-4	E	D	A	D	A
dow chemical ET378	D	E	E	E	A
dow chemical ET588	E	D	B	D	A
dow corning-3	C	A	A	A	A
dow corning-4	C	A	A	A	A
dow corning-5	C	A	A	A	A
dow corning-11	C	A	A	A	A
dow corning-33	C	A	A	A	A
dow corning-44	C	A	A	A	A
dow corning-55	C	A	A	A	A
dow corning-200	C	A	A	A	A
dow corning-220	C	A	A	A	A
dow corning-510	C	A	A	A	A
dow corning-550	C	A	A	A	A
dow corning-704	E	E	A	A	A
dow corning-705	E	E	A	A	A
dow corning-710	C	A	A	A	A
dow corning-1208	C	A	A	A	A
dow corning-4050	C	A	A	A	A
dow corning-6620	C	A	A	A	A
dow corning-F60	C	A	A	A	A
dow corning-F61	B	A	A	A	A
dow corning-XF60	C	A	A	A	A
dow guard	A	A	A	A	A
dowtherm oil	B	A	D	A	A
dowtherm A or E	D	B	D	A	A
dowtherm 209.50%solution	C	E	A	D	A
driking water	A	A	A	A	A
dry cleaning fluids	D	B	D	A	A
DTE light oil	D	A	D	A	A
E					
elco 28-EP lubricant	B	A	D	A	A
epichlorohydrin	D	D	B	D	A
epoxy resins	E	E	A	D	A
esam-6 fluid	E	D	A	D	A
esso fuel 208	B	A	D	A	A
esso golden gasoline	D	A	D	A	A

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	SILICONE	FLUOSIL	BUTYFLOOD	VITOSIL	VENAFLON
esso motor oil	D	A	D	A	A
esso transmission fluid (typeA)	D	A	D	A	A
esso WS3812 (MIL-L-7808 A)	D	A	D	A	A
esso SP90-EP lubricant	D	A	D	A	A
esstic 42, 43	B	A	D	A	A
ethane	D	B	D	A	A
ethanol	A	C	A	A	A
ethanol amine	B	D	B	D	A
ethers	D	C	C	C	A
ethyl acetate-organic ester	B	D	B	D	A
ethyl acetoacetate	B	D	B	D	A
ethyl acrylate	B	D	B	D	A
ethyl acrylic acid	D	D	B	E	A
ethyl alcohol	B	A	A	A	A
ethyl benzene	D	A	D	A	A
ethyl benzoate	D	A	D	A	A
ethyl bromide	E	A	D	A	A
ethyl cellosolve	D	D	B	D	A
ethyl cellulose	C	D	B	D	A
ethyl chloride	D	A	A	A	A
ethyl chlorocarbonate	D	B	D	A	A
ethyl chloroformate	D	B	D	A	A
ethyl cyclopentane	D	A	D	A	A
ethyl ether	D	C	C	D	A
ethyl formate	E	A	B	A	A
ethyl hexanol	B	A	A	A	A
ethyl mercaptan	C	E	D	B	A
ethyl oxalate	D	B	D	A	A
ethyl pentachlorobenzene	D	B	D	A	A
ethyl silicate	E	A	A	A	A
ethylene	E	A	E	A	A
ethylene chloride	D	C	D	B	A
ethylene chlorohydrin	C	B	B	A	A
ethylene diamine	A	D	A	D	A
ethylene dibromide	D	C	C	A	A
ethylene dichloride	D	C	C	A	A
ethylene glycol	A	A	D	A	A
ethylene oxide	D	D	C	D	A
ethylene trichloride	D	C	C	A	A
ethylmorpholene stannous octoate (50/50 mixture)	E	E	B	D	A

F

F-60 fluid (dow corning)	D	A	A	A	A
F-61 fluid (dow corning)	D	A	A	A	A
fatty acids	C	E	D	A	A
FC-43 hetacosofluorotri-butylamine	A	A	A	A	A
FC75 fluorocarbon	A	B	A	B	A
ferric chloride	B	A	A	A	A
ferric nitrate	C	A	A	A	A
ferric sulfate	B	A	A	A	A
fish oil	A	A	A	A	A
fluoboric acid	E	E	A	E	A
fluorine (liquid)	D	E	C	B	A
fluorobenzene	D	B	D	A	A
fluorocarbon oils	E	E	A	E	A
fluorolube	A	B	A	B	A
fluorinated cyclic ethers	E	E	A	E	A
fluosilicie acid	E	E	E	E	A
formaldehyde	B	D	A	D	A
formic acid	B	C	A	C	A
freon, 11	D	B	D	A	A
freon, 12	D	D	B	B	A
freon, 12 & ASTM-oil #2 (50/50 mixture)	D	B	D	A	A
freon, 12 & SUNISO 4G (50/50 mixture)	D	B	D	A	A
freon, 13	D	D	A	A	A
freon, 13B1	D	B	A	A	A
freon, 14	D	E	A	A	A
freon, 21	D	E	D	D	A
freon, 22	D	D	A	D	A
freon, 22 & ASTM OIL #2D (50/50 mixture)	B	D	B	A	
freon, 31	E	E	A	D	A
freon, 32	E	E	A	D	A
freon, 112	D	E	D	A	A
freon, 113	D	D	D	B	A
freon, 114	D	B	A	B	A
freon, 114B2	D	E	D	B	A
freon, 115	D	E	A	B	A
freon, 142b	E	E	A	D	A
freon, 152a	E	E	A	D	A
freon, 218	E	E	A	A	A
freon, C316	E	E	A	E	A
freon, C318	E	E	A	A	A
freon, 502	E	E	A	B	A
freon, BF	D	E	D	A	A
freon, MF	D	E	D	B	A
freon, TF	D	E	D	B	A
freon, TA	A	E	A	C	A
freon, TC	D	E	B	A	A
freon, TMC	C	E	B	A	A
freon, T-P35	A	E	A	A	A
freon, T-WD602	D	E	B	A	A
freon, PCA	D	E	D	B	A
fuel oil	D	A	D	A	A
fuel oil acidic	A	A	D	A	A
fuel oil #6	A	A	D	A	A
fumaric acid	B	A	E	A	A
fuming sulphuric acid (20/25% oleum)	D	E	D	A	A
furan (fufuran)	E	E	C	E	A
fufural	D	E	B	D	A
fufuraldehyde	D	E	B	D	A
fufuraly alcohol	D	D	B	E	A
furyl carbinol	D	D	B	E	A
fyrquel A60	C	D	B	D	A
fyrquel 90, 100, 150, 220, 300, 500	A	B	A	A	A

G

galic acid	E	A	B	A	A
gasoline	D	A	D	A	A
gelatin	A	A	A	A	A
grilling brake fluid	E	D	A	D	A
glacial acetic-acid	B	D	B	D	A
glauber's salt	E	A	B	B	A
glucose	A	A	A	A	A
glue (depending on type)	A	A	A	A	A
glycerine-glycerol	A	A	A	A	A
glycols	A	A	A	A	A
green sulphate liquor	A	B	A	A	A
gulfcrown grease	D	A	D	A	A
gulf endurance oils	D	A	D	A	A
gulf FR fluids (emulsion)	D	A	D	A	A
gulf FRG-fluids	A	A	A	A	A
gulf FRp-fluids	A	B	B	B	A
gulf harmony oils	D	A	D	A	A
gulf high temperature grease	D	A	D	A	A
gulf lesion oils	D	A	D	A	A
gulf paraount oils	D	A	D	A	A
gulf security oils	D	A	D	A	A

H

halotane	D	B	D	A	A
halowax oil	D	A	D	A	A
hannifin lube A	B	A	D	A	A
heavy water	A	A	A	E	A
HEF-2 (high energy fuel)	D	B	D	A	A
helium	A	A	A	A	A
N-heptane	D	A	D	A	A
N-hexaldehyde	B	D	B	D	A
hexane	D	A	D	A	A
N-hexane-1	D	A	D	A	A
hexyl alcohol	B	B	C	A	A
high viscosity lubricant U14,	A	B	A	A	A
high viscosity lubricant H2,	A	B	A	A	A
hilo MS #1	C	C	B	D	A
houghto-safe271 (water and glycol base)	B	B	A	B	A
houghto-safe 620 (water/glycol)	B	B	A	B	A
houthto-safe 1010 phosphate ester	C	B	A	A	A
houghto-safe 1055 phosphate ester	C	B	A	A	A
houghto-safe 1120 phosphate ester	C	B	A	A	A
houghto-safe 5040 (water/oil emulsion)	C	B	D	A	A
hydraulic oil (petroleumbase)	C	A	D	A	A
hydrazine	C	E	A	E	A
hydrobromic acid	D	A	A	C	A
hydrobromic acid 40%	D	C	A	A	A
hydrocarbons (saturated)	D	A	D	A	A
hydrochloric acid hot 37%	D	D	C	A	A
hydrochloric acid cold 37%	B	B	A	A	A
hydrochloric acid 3 molar	D	B	A	A	A
hydrochloric acid concentrated	D	C	C	A	A
hydrocyanic acid	C	B	A	A	A
hydro-drive, MIH-50 (petroleum base)	B	A	D	A	A
hydro-drive, MIH-10 (petroleum base)	B	A	D	A	A
hydrofluoric acid, 65% max.cold	D	E	A	A	A
hydrofluoric acid, 65% min.cold	D	D	C	A	A
hydrofluoric acid 65% max.hot	D	D	D	C	A
hydrofluoric acid, 65% min.hot	D	D	D	C	A
hydrofluosilicic acid	D	D	A	A	A
hydrogen gas, cold	C	C	A	A	A
hydrogen gas, hot	C	C	A	A	A
hydrogen peroxide (1)	A	A	A	A	A
hydrogen 90% (1)	B	B	C	B	A
hydrogen sulfide dry, cold	C	C	A	D	A
hydrogen sulfide dry, hot	C	C	A	D	A
hydrogen sulfide wet, cold	C	C	A	D	A
hydrogen sulfide wet, hot	C	C	A	D	A

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	SILICONE	FLUOSIL	BUTYFLOOD	VITOSIL	VENAFLON
hydrolube-water/ethylene glycol	B	B	A	A	A
hydroquinone	E	B	D	D	A
hydyne	D	D	A	D	A
hyjet	E	E	A	D	A
hyjet III	E	E	A	D	A
hyjet S	E	E	A	D	A
hyjet W	E	E	A	D	A
hydrochlorous	E	E	B	A	A
I					
industron FF44	D	A	D	A	A
industron FF48	D	A	D	A	A
industron FF53	D	A	D	A	A
industron FF80	D	A	D	A	A
iodine	E	A	B	A	A
iodine pentafluoride	D	D	D	D	A
iodoform	E	E	A	E	A
isobutyl alcohol	A	B	A	A	A
iso-butyl N-butyrade	E	A	A	A	A
isododecane	E	A	D	A	A
iso-octane	D	A	D	A	A
isophorone (ketone)	D	D	A	D	A
isopropanol	A	B	A	A	A
isopropyl acetate	D	D	B	D	A
isopropyl alcohol	A	B	A	A	A
isopropyl chloride	D	B	D	A	A
isopropyl ether	D	C	D	D	A
J					
JP 3 (MIL-J-5624)	D	A	D	A	A
JP 4 (MIL-J-5624)	D	B	D	A	A
JP 5 (MIL-J-5624)	D	B	D	A	A
JP 6 (MIL-J-25656)	D	B	D	A	A
JP X (MIL-J-25604)	D	D	D	D	A
K					
kel F liquid	A	B	A	B	A
kerosene	D	A	D	A	A
keystone #87HX-grease	D	A	D	A	A
L					
lactams-amino acids	E	D	B	D	A
lactic acid	A	A	A	A	A
lacquers	D	D	D	D	A
lacquer solvents	D	D	D	D	A
lard, animals fats	B	A	D	A	A
lavender oil	D	B	D	A	A
lead acetate	D	D	A	D	A
lead nitrate	B	A	A	E	A
lead sulphamate	B	A	A	A	A
lehifh x 1169	D	A	D	A	A
lehigh x 1170	D	A	D	A	A
light greas	D	A	D	A	A
ligroin (petroleum ether or benzine)	D	A	D	A	A
lime bleach	B	A	A	A	A
lime sulphur	A	A	A	A	A
lindol, hydraulic fluid (phosphate ester type)	C	C	A	B	A
linoleic acid	B	E	D	B	A
linseed oil	A	A	C	A	A
liquid oxygen	D	D	D	D	A
liquid petroleum gas (LPG)	C	C	D	A	A
liquimoly	D	A	D	A	A
lubricating oils, di-ester	D	B	D	A	A
lubricating oils, petroleum base	D	A	D	A	A
lye solutions	B	B	A	B	A
M					
magnesium chloride	A	A	A	A	A
magnesium hydroxyde	E	E	A	A	A
magnesium sulphate	A	A	A	A	A
magnesium sulphite	A	A	A	A	A
magnesium salt	A	A	A	A	A
malathion	D	B	D	A	A
maleic acid	E	E	D	A	A
maleic anhydride	E	E	D	A	A
malicacid	B	A	D	A	A
MCS 312	A	A	D	A	A
MCS 352	C	C	A	D	A
MCS 463	C	C	A	D	A
mercuric chloride	E	E	A	A	A
mercury	E	E	A	A	A
mercury vapor	E	E	A	A	A
mesityl oxide (ketone)	D	D	B	D	A
methane	D	B	D	A	A
methanol	A	A	A	A	A
methyl acetate	D	D	B	D	A
methyl acetoacetate	B	D	B	D	A
methyl acrylate	D	D	B	D	A
methylacrylic acid	D	D	B	C	A
methyl alcohol	A	A	A	D	A
methyl benzoate	D	A	B	A	A
methyl bromide	E	A	D	A	A
methyl butyl ketone	D	D	A	D	A
methyl carbonate	D	B	D	A	A
methyl cellosolve	D	D	B	D	A
methyl cellulose	B	D	B	D	A
methyl chloride	D	B	C	A	A
methyl chloroformate	D	B	D	A	A
methyl D-bromide	D	B	E	A	A
methyl cyclopenthane	D	B	D	A	A
methylene chloride	D	B	D	B	A
methylene dichloride	D	B	D	B	A
methyl ether	A	A	A	A	A
methyl ethyl ketone (MEK)	D	D	A	D	A
methyl ethyl ketone peroxyde	B	D	D	D	A
methyl format	B	E	B	E	A
methyl isobutyl ketone (MIBK)	D	D	C	D	A
methyl isopropyl ketone	D	D	B	D	A
methyl methacrylic	C	D	D	D	A
methyl oleate	E	B	B	A	A
methyl salicylate	E	E	B	E	A
milk	A	A	A	A	A
mineral oils	B	A	D	A	A
mobil 24 DTE	D	A	D	A	A
mobil HF	E	A	D	A	A
mobil delvac 1100, 1110, 1130	D	A	D	A	A
mobil nyvac 20 and 30	A	A	A	A	A
mobil velocite C	D	A	D	A	A
mobilgas wa 200, type A	D	A	D	A	A
automatic trans. fluid mobil oil SAE20	D	A	D	A	A
mobiltherm 600	D	A	D	A	A
mobilux	D	A	D	A	A
mono bromobenzene	D	B	D	A	A
mono chlorobenzene	D	B	D	A	A
mono ethanolamine	B	D	B	D	A
monomerthyl aniline	E	E	E	B	A
monomerthylether	E	E	A	E	A
monomerthyl hydrazine	D	E	A	E	A
monotrotoluene & dinitrotoluene(40-60mix)	D	C	D	C	A
monovinyl acethylene	B	E	A	A	A
mopar brake fluid	C	D	A	D	A
mustard gas	A	E	A	E	A
N					
naptha	D	B	D	A	A
napthalene	D	A	D	A	A
napthenic	D	A	D	A	A
natural gas	A	C	D	A	A
neatsfoot oil	B	A	B	A	A
neon	A	A	A	A	A
neville acid	D	B	B	A	A
nickel acetate	D	D	A	D	A
nickel chloride	A	A	A	A	A
nickel salts	A	A	A	A	A
nickel sulfate	A	A	A	A	A
niter cake	A	A	A	A	A
nitric acid (1) 3 molar	D	C	B	A	A
nitric acid (1) concentrated	D	D	D	A	A
nitric acid dilute	B	B	B	A	A
nitric acid (1) red fuming (RFNA)	D	D	D	C	A
nitric acid (1) inhidited red fuming (IRFNA)	D	D	D	B	A
nitrobenzene	D	D	D	B	A
nitrobenzine	E	A	C	A	A
nitroethane	D	D	B	D	A
nitrogene	A	A	A	A	A
nitrogene (textroxide) (N204) (1)	D	D	D	D	A
nitromethane	D	D	B	D	A
nitropropane	D	D	B	D	A
O					
o-a-548 A	B	B	A	B	A
o-t-634b	D	B	D	A	A
octachlorotoluene	D	B	D	A	A
octadecane	D	A	D	A	A
N-octane	D	B	D	A	A
octyl alcohol	D	B	A	A	A
oleic acid	E	E	B	B	A
oleum (fuming sulfuric acid)	D	E	D	A	A
oleum spirits	D	B	D	A	A
olive oil	D	A	B	A	A
oronite 8200	D	A	D	A	A
oronite 8515	D	A	D	A	A
orthochloroethylbenzene	D	B	D	A	A
ortho-dichlorobenzene	D	B	D	A	A
os45 type III (os45)	D	B	D	A	A
os45 type IV (os45)	D	B	D	A	A
OS70	D	B	D	A	A
oxalic acid	B	A	A	A	A
oxygen, cold	A	A	A	A	A
oxygen, cold 200-400°F	B	D	D	B	A
ozone	A	B	A	A	A
P					
p-s-66 lb	D	A	D	A	A
p-d-680	D	A	D	A	A
paint thinner duco	D	B	D	B	A

Resistance to different products:
A - excellent
B - good
C - insufficient
D - unsatisfactory
E - please, consult

	SILICONE	FLUOSIL	BUTYFLOOD	VITOSIL	VENAFLON
palmitic acid	D	A	B	A	A
para-dichlorobenzene	D	B	D	A	A
par-al-keton	D	D	D	D	A
parker o lube	B	A	D	A	A
peanut oil	A	A	C	A	A
pentane 2 methyl	D	C	D	A	A
pentane, 2-4 dimethyl	D	C	D	A	A
pentane, 3 dimethyl	D	C	D	A	A
N-pentane	D	C	D	A	A
perchloric acid	D	A	B	A	A
perchloroethylene	D	B	D	A	A
petroleum oil, crude	D	A	D	A	A
petroleum oil, below 250°FB	B	D	A	A	
petroleum oil, above 250°F	D	D	D	B	A
phenol	D	B	B	A	A
phenol, 70%/30%H2O	D	B	D	A	A
phenol, 85%/15%H2O	D	B	D	A	A
phenylbenzene	D	B	D	A	A
phenyl ethy ether	D	D	D	D	A
phenyl hydrazine	E	E	D	A	A
phorone	D	D	B	D	A
phosphoric acid 20%	B	B	A	A	A
phosphoric acid 45%	D	B	B	A	A
phosphoric acid 3 molar	B	B	A	A	A
phosphoric acid concent.	C	B	B	A	A
phosphorous trichloride	E	A	A	A	A
pickling solution	D	D	C	B	A
picric acid H2O solution	D	B	B	A	A
picric acid molten	D	B	B	A	A
pinene	D	B	D	A	A
pine oil	D	A	D	A	A
piperidine	D	D	D	D	A
plating solutions, chrome	D	E	A	A	A
plating solutions, other	D	E	A	A	A
pneumatic service	D	D	A	A	A
polyvinyl acetate emulsion	D	E	A	E	A
potassium acetate	D	B	A	D	A
potassium chloride	A	A	A	A	A
potassium cupro cyanide	A	A	A	A	A
potassium cyanide	A	A	A	A	A
potassium dichromate	A	A	A	A	A
potassium hydroxide	C	C	A	B	A
potassium nitrate	A	A	A	A	A
potassium salts	A	A	A	A	A
potassium sulphate	A	A	A	A	A
potassium sulphite	A	A	A	A	A
prestone antifreeze	A	A	A	A	A
PRL-high temp.hydr.oil	B	A	D	A	A
producer gas	B	B	D	A	A
propane	D	B	D	A	A
propane propionitrile	D	C	D	A	A
propyl acetate	D	D	B	D	A
N-propyl acetone	D	D	A	D	A
propyl alcohol	A	A	A	A	A
propyl nitrate	D	D	B	D	A
S					
shell diala	D	A	D	A	A
shell iris 905	D	A	D	A	A
shell iris 3XF mine fluid (fire resist.hydr.)	E	A	D	A	A
shell iris tellus #2 pet.base	D	A	D	A	A
shell iris tellus #33	D	A	D	A	A
shell iris tellus UMF (5%aromatic)	D	A	D	A	A
shell Lo hydrax 27 & 29	D	A	D	A	A
shell macoma 72	D	A	D	A	A
silicate esters	D	A	D	A	A
silicone greases	C	A	A	A	A
silicone oils	C	A	A	A	A
silver nitrate	A	A	A	A	A
sinclair,opaline CX-EPLlube	D	A	D	A	A
skelly, solvent B,C,E	E	A	D	A	A
skydrol 500	C	C	A	D	A
skydrol 7000	C	C	A	B	A
soap solution	A	A	A	A	A
socony mobile type A	D	B	D	A	A
socony vacuum AMV AC781 (grease)	D	B	D	A	A
socony vacuum PD959B	D	A	D	A	A
soda ash	A	A	A	A	A
sodium acetate	D	D	A	D	A
sodium bicarbonate (baking soda)	A	A	A	A	A
sodium bisulfite	A	A	A	A	A
sodium borate	A	A	A	A	A
sodium carbonate (sodium ash)	A	A	A	A	A
sodium chloride	A	A	A	A	A
sodium cyanide	A	A	A	A	A
sodium hydroxide	B	B	A	B	A
sodium hydrochlorite	B	B	B	A	A
sodium metaphospate	E	A	A	A	A
sodium nitrate	D	E	A	E	A
sodium perborate	B	A	A	A	A
sodium peroxide	D	A	A	A	A
sodium phosphate (mono)	D	E	A	A	A
sodium phosphate (dibasic)	D	E	A	A	A
sodium phosphate (tribasic)	A	E	A	A	A
sodium salts	A	A	A	A	A
sodium silicate	E	E	A	A	A
sodium sulphate	A	A	A	A	A
sodium sulphide	A	A	A	A	A
sodium sulphite	A	A	A	A	A
sodium trisultate	A	A	A	A	A
sovasol #1, 2 & 3	D	A	D	A	A
sovalsol # 73 & 74	D	A	D	A	A
soybean oil	A	A	C	A	A
spry	A	A	B	A	A
SR-6 fuel	D	A	D	A	A
SR-10 fuel	D	A	D	A	A
standard oil mobilube GX90-EP lube	D	A	D	A	A
stannic chloride	B	A	B	A	A
stannic chloride 50%	B	A	B	A	A
stannous chloride	B	A	A	A	A
stauffer 7700	D	B	D	A	A
steam, below 350°F	D	D	A	D	A
steam, above 350°F	D	D	C	D	A
stearic acid	B	E	B	E	A
stoddard solvent	D	A	D	A	A
T					
TT-S-735, type II	D	A	D	A	A
TT-S-735, type II	D	A	D	A	A
TT-S-735,type III	D	A	D	A	A
TT-S-735, type IV	C	A	D	A	A
TT-S-735, type V	C	A	D	A	A
TT-S-735, type VI	C	A	D	A	A
TT-T-656b	D	C	A	D	A
tannic acid	B	E	A	A	A
tannic acid 10%	B	A	A	A	A
tar bituminous	B	A	D	A	A
tartaric acid	A	A	B	A	A
terpineol	E	A	C	A	A
tertiary butyl alcohol	B	B	B	A	A
tertiary butyl catechol	E	A	B	A	A
tertiary butyl mercaptan	D	E	D	A	A
tetrabromomethane	D	B	D	A	A
tertabutyl titanate	E	A	A	A	A
tetrachloroethylene	E	B	D	A	A
tetraethyl lead	E	D	D	A	A
"tetraethyl lead" blend	E	B	D	A	A
tetrahydrofuran	E	E	B	D	A
tetralin	D	A	D	A	A
texaco 3450 gear oil	D	A	D	A	A
texaco capella A & AA	D	A	D	A	A
texaco meropa #3	D	A	D	A	A
texaco regal B	D	A	D	A	A
texaco uni-ttemp grease	B	A	D	A	A
texamatic "A" trans.oil"	D	B	D	A	A
texamatic 1581 fluid	D	B	D	A	A
texamatic 3401 fluid	D	B	D	A	A
texamatic 3525 fluid	D	B	D	A	A
texamatic 3528 fluid	D	B	D	A	A
texas 1500 oil	B	A	D	A	A
thiodol TP-90B	E	B	A	A	A
thiodol TP-95	E	B	A	A	A
thionyl chloride	E	E	D	A	A
tidewater oil-beedol	B	A	D	A	A
tidewaater oil multigear 140, EP lube	E	A	D	A	A
titanium tetrachloride	E	B	D	A	A
toluene	E	B	D	A	A
toluene discocyanids	E	D	B	D	A
transformer oil	B	A	D	A	A
transmission fluid type A	B	A	D	A	A
triacetin	E	D	A	D	A
triaryl phosphate	C	B	A	A	A
tributoxyethyl phosphate	E	B	A	A	A
tributyl mercaptan	D	C	D	A	A
tributyl phosphate	E	D	A	D	A
trichlorroacetic acid	E	D	B	C	A
trichloroethane	D	E	D	A	A
trichloroethylene	D	B	D	A	A
tricresyl phosphate	C	B	A	B	A
triethanol amine	E	D	B	D	A
triethyl aluminum	E	E	E	B	A
triethyl borane	E	E	E	A	A
trifluoroethane	D	B	D	A	A
trinitroluene	E	B	D	B	A
trioctyl phosphate	C	B	A	B	A
tripoly phosphate	C	B	A	B	A
tung oil (china wood oil)	D	B	D	A	A
X					
xylene	D	A	D	A	A
sylidepenes-mixed-aromatic amines	D	D	D	D	A
xylol	D	A	D	A	A
xenon	A	A	A	A	A
Z					
zeolites	E	A	A	A	A
zinc acetate	D	D	A	D	A
zinc chloride	E	A	A	A	A
zinc salts	A	A	A	A	A
zinc sulfate	A	A	A	A	A

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