



venAir

FLEXIBLE SILICONE HOSES

FOR THE FOOD, COSMETIC,
PHARMACEUTICAL AND
BIOTECHNOLOGICAL
INDUSTRIES

GOODYEAR
RUBBER PRODUCTS INC.

Call Toll Free: **1-866-711-4673**
WebSales@GoodyearRubberProducts.com

**We Ship
World Wide**



Introduction

For more than 30 years VENAIR has marketed and manufactured flexible silicone hoses for the food, pharmaceutical, biotechnologic, cosmetic and chemical industries. We strive to find answers to the various questions that we are asked through relevant and sometimes innovative solutions.

Whatever the nature of the fluid you convey, its temperature, concentration, working pressure or even the type of cleaning cycles used in your process, VENAIR emerges as the specialist in the transfer of liquid, pasty products or even solids through our flexible solutions.

Our wish is to remain your privileged partner by providing the best formulations of silicone from our Chemists, Engineers and R&D Department.

In order to further strengthen our image, we hold the management certificates ISO 9001, ISO 14001, EMAS and also the product 3A 62-02 & 18-03 standardizations, which further reinforces our pledge to produce connections with a zero retention zone (SZR).

Today, a new era begins with a requirement level which has never been matched in providing hose traceability. The iHose, the intelligent hose by VENAIR, is furnished with an integrated microchip product which will allow you unparalleled ease and comfort in the way that you will manage your preventive maintenance.

Present in every continent directly or through qualified distributors, exporting to more than 60 countries, we want to be responsible in playing a major role in all of your developmental endeavors.

Flexible Silicone Hoses Fitted Hoses

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

Characteristics and applications

Food-grade silicone elastomer hoses for conveying liquid or semiliquid 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 USP Class VI standard.

THE VENAIR PRODUCTS ARE NOT AUTHORISED FOR ANY APPLICATION FOR WHICH IT IS NOT SPECIFICALLY 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 with all common CIP cycles.

Platinum cured

VENAIR Technosil's platinum cured silicone hoses (peroxide free) are recommended for any process within the food industry and specially 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 fittings equipped with the SZR* system (without retention place system). This allows the connection area between the hose and the metal connection to be completely free of any areas of possible contamination, thus facilitating CIP (cleaning in place).

Moreover, some of 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
- USP Class VI
- ISO 10993-6, 10993-10, 10993-11 (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.

LT Silicone for very low temperatures (-100°C / -148°F).

HT Silicone for very high temperatures (+300°C/+572°F).

Length

Depending on the model.

Color

Standard color: translucent

Construction

Elastomer: VMQ Silicone

Internal reinforcement: Polyester

Other options: MIF Polyester, Aramide

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

IMPORTANT:

THE VENAIR PRODUCTS ARE NOT INTENDED FOR USE AS AN IMPLANT MATERIAL

It is the user's responsibility to ensure the suitability and safety of the VENAIR products for all intended uses. All the tests must be conducted in accordance with applicable regulatory requirements in order to determine the safety and effectiveness for use of the hoses in any particular application.

Limited Warranty: For a period of 6 months from the date of sale, VENAIR warrants this product to be free from defects in materials and workmanship. Our only obligation will be to replace any portion proving defective, or at our option, to refund the purchase price thereof. User assumes all other risk, if any, including the risk of injury, loss or damage, direct or consequential, arising out of the use, misuse, or inability to use, this product. THIS WARRANTY IS IN LIEU OF THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. No deviation is authorized. VENAIR assumes no obligations or liability for any advice furnished by it, or for results obtained with respect to those products. All such advice is given and accepted at the buyer's risk.

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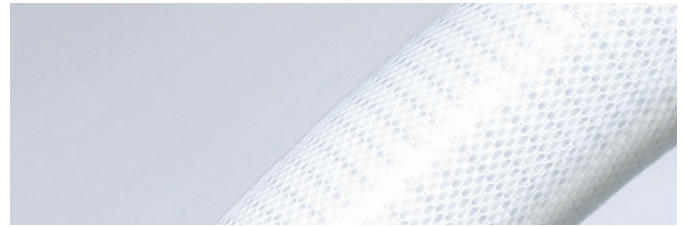


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VENA SIL 650V



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
- USP Class VI standard
- ISO 10993-6, 10993-10, 10993-11
- 3A Sanitary Standard 18-03 Class I (hose)
- 3A Sanitary Standard 62-02 (fitted hoses)

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 +1 -0,5 (mm)	Theoretical Outer Diameter		Bending Radius ISO 1746/2000 (mm)	Working Pressure **		Bursting Pressure **		Vacuum Resistance
(mm)	(inch)		(mm)	(inch)		(bar at 20°C)	(psi at 68°F)	(bar at 20°C)	(psi at 68°F)	
6	1/4	5.5	17,0	0,67	29	26,0	377	77,9	1130	684 Torr (MMHg)
8	5/16		19,0	0,75	31	24,0	348	72,0	1044	
10	3/8		21,0	0,83	34	22,0	318	65,9	955	
13	1/2		24,0	0,94	39	19,9	289	59,7	866	
16	5/8		27,0	1,06	45	18,3	265	54,8	795	
19	3/4		30,0	1,18	54	16,5	240	49,6	719	
22	7/8		33,0	1,30	60	15,8	229	47,3	686	
25	1	6	36,0	1,42	68	14,08	214	44,3	643	9,29 mH2O
32	1 1/4		43,0	1,69	94	12,8	186	38,5	558	
38	1 1/2		49,0	1,93	112	11,5	167	34,5	500	
51	2		62,0	2,44	144	9,2	133	27,5	399	
63	2 1/2	6	74,0	2,91	181	7,5	109	22,6	327	26,93 inHg
76	3		88,0	3,46	232	6,1	88	18,2	263	
102	4		114,0	4,49	367	3,7	54	11,2	163	

* Other diameters can also be manufactured. Please consult.

** Pressure data hold at room temperature. Please reduce pressure values by 20% for each increase of 100°C / 212°F

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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
- 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 vacuum.

Inner Diameter*		Wall thickness +1 -0.5 (mm)	Working Pressure**				Bursting Pressure**			
(mm)	(inch)		ISO 1402/2009 (bar at 20°C)		ISO 1402/2009 (psi at 68°F)		ISO 1402/2009 (bar at 20°C)		ISO 1402/2009 (psi at 68°F)	
			640	640 MIF	640	640 MIF	640	640 MIF	640	640 MIF
6	1/4	4.5	11,7	23,6	169	342	35,0	71	508	1030
8	5/16		10,7	20,5	155	297	32,0	61	464	885
10	3/8		9,7	18,3	140	265	29,0	55	421	798
13	1/2		8,7	16,0	126	232	26,0	48	377	696
16	5/8		8,0	14,5	116	210	24,0	43	348	624
19	3/4		7,7	12,9	111	187	23,0	39	334	566
22	7/8		7,0	12,3	102	178	21,0	37	305	537
25	1		6,7	11,6	97	168	20,0	35	290	508
32	1 1/4		5,7	10,2	82	148	17,0	31	247	450
38	1 1/2		5,0	9,4	73	136	15,0	28	218	406
51	2	4,0	8,1	58	117	12,0	24	174	348	
63	2 1/2	3,3	6,9	48	100	10,0	21	145	305	
76	3	2,7	5,7	39	83	8,0	17	116	247	
102	4	1,7	3,3	24	48	5,0	10	73	145	

* Other diameters can also be manufactured. Please consult.

** Pressure data hold at room 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
- USP Class VI standard
- 3A Sanitary Standard 18-03 Class I (hose)
- 3A Sanitary Standard 62-02 (fitted hoses)

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 most pressure resistant hose of the VENA SIL range.

Designed for use at specific situations 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	Working Pressure **		Bursting Pressure **		Vacuum Resistance
(mm)	(inch)	+1 -0.5 (mm)	(mm)	(inch)	ISO 1746/2000 (mm)	ISO 1402/2009 (bar at 20°C) (psi at 68°F)		ISO 1402/2009 (bar at 20°C) (psi at 68°F)		
19	3/4	5,5	32,0	1,26	68	20,5	297	61,5	892	0,90 atm
22	7/8	5,5	35,0	1,38	72	20,0	290	60,0	870	
25	1	5,5	38,0	1,50	80	18,5	268	55,5	805	9,29 mHg
32	1 1/4	5,5	45,0	1,77	100	16,5	239	49,5	718	
38	1 1/2	6,5	52,0	2,05	121	15,0	218	45,0	653	13,23 psi
51	2	6,5	65,0	2,56	185	12,0	174	36,0	522	
63	2 1/2	6,5	77,0	3,03	273	10,0	145	30,0	435	26,93 inHg
76	3	6,5	90,0	3,54	318	7,1	103	21,3	308	
102	4	6,5	116,0	4,57	423	5,0	73	15,0	218	

* Other diameters can also be manufactured. Please consult.

** Pressure data hold at room 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
- USP Class VI standard
- 3A Sanitary Standard 18-03 Class I (hose)
- 3A Sanitary Standard 62-02 (fitted hoses)

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 (33ft and 66ft)

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.

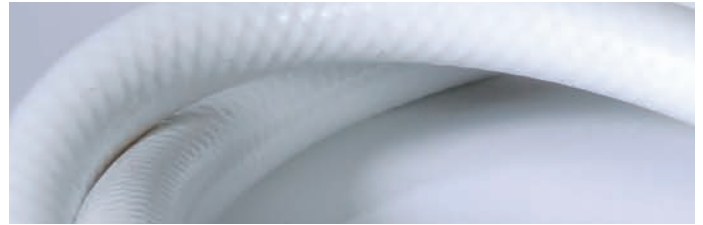
Inner Diameter *		Outer Diameter		Working Pressure **		Bursting Pressure **		Bending Radius
(mm)	(inch)	(mm)	(inch)	ISO 1402/2009		ISO 1402/2009		ISO 1746/2009
				(bar at 20°C)	(psi at 68°F)	(bar at 20°C)	(psi at 68°F)	(mm)
6,35	1/4	13,20	0,52	9,3	135,4	28,0	406	40
7,93	5/16	15,00	0,59	7,7	111,2	23,0	334	45
9,52	3/8	16,60	0,65	7,0	101,5	21,0	305	55
12,70	1/2	20,30	0,80	5,7	82,2	17,0	247	70
15,87	5/8	24,50	0,96	4,3	62,9	13,0	189	85
19,05	3/4	27,90	1,10	3,7	53,2	11,0	160	95
22,22	7/8	31,30	1,23	3,3	48,3	10,0	145	110
25,40	1	34,50	1,36	3,0	43,5	9,0	131	135
31,75	1 1/4	40,80	1,61	2,3	33,8	7,0	102	160

* Other diameters can also be manufactured. Please consult.

** Pressure data hold at room temperature. Please reduce pressure values by 20% for each increase of 100°C / 212°F

VENA TECHNOSIL DB

Double Braiding



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
- USP Class VI standard (inner liner)
- 3A Sanitary Standard 18-03 Class I (hose)
- 3A Sanitary Standard 62-02 (fitted hoses)

Fabric reinforcement: Double polyester braiding.

Stainless steel inside: No

Inner appearance: Translucent and smooth.

Outer appearance: White and smooth.

Standard length of manufacture: 10m (33ft) and 20m (66ft)

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 to 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.

Inner Diameter *		Outer Diameter		Working Pressure **		Bursting Pressure **		Bending Radius
(mm)	(inch)	(mm)	(inch)	(bar at 20°C)	(psi at 68°F)	(bar at 20°C)	(psi at 68°F)	(mm)
5,00	1/5	13,00	0,51	25,2	364,9	75,5	1095	30
6,35	1/4	16,00	0,63	23,7	344,3	71,2	1033	34
7,90	1/3	18,00	0,71	22,8	331,4	68,5	994	37
9,52	3/8	20,00	0,79	22,3	323,5	66,9	971	46
12,70	1/2	23,00	0,91	19,4	281,9	58,3	846	51
15,80	5/8	27,00	1,06	17,0	246,2	50,9	739	65
19,05	3/4	30,50	1,20	15,6	226,0	46,8	678	76
22,00	7/8	33,00	1,30	14,0	202,3	41,9	607	99
25,40	1	37,00	1,46	12,5	181,3	37,5	544	118
28,00	1 1/8	38,00	1,50	11,7	169,2	35,0	508	160
31,75	1 1/4	46,00	1,81	10,1	146,0	30,2	438	181

* Other diameters can also be manufactured. Please consult.

** Pressure data hold at room temperature. Please reduce pressure values by 20% for each increase of 100°C / 212°F

VENA TECHNOEX



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
- USP Class VI standard

Fabric reinforcement: No

Stainless steel inside: No

Inner appearance: Translucent and smooth

Outer appearance: Translucent and smooth

Standard length of manufacture: 50m (164ft)

Temperature scale: -50°C (-58°F) / +200°C (392°F).

Peak at 220°C (428°F)

Typical Physical Properties	ASTM Method	Value
Hardness Shore A, 15 sec	D2240-02	60
Color		Translucent
Tensile Strength	D412-98	1305 (9)
Ultimate elongation (%)	D412-98	>270
Tear resistance lb.-f/in (kN/m)	D1004-94	100 (18)
Specific Gravity	D792-00	1,16
Water Absorption (%)	D570-98	0,06
Compression set constant deflection (% at 70°C during 22 hours)	D395-01 Method B	36
Brittle Temperature (°C)		-50
Maximum recommended operating temperature (°C)	D746-98	200
Sterilization Method		
Autoclavable	Gas	Radiation
Steam 30 minutes at 1 bar (141°C)	Ethylene oxide	Radiation up to 2,5 MRad

Inner Diameter		Outer Diameter		Nominal Diameter
(mm)	(inch)	(mm)	(inch)	(mm)
0,79	1/32	2,38	3/32	1x2
0,79	1/32	3,96	5/32	1x4
1,59	1/16	3,18	1/8	1.5x3
1,59	1/16	4,76	3/16	1.5x5
2,38	3/32	3,96	5/32	2x4
2,38	3/32	5,55	7/32	2x5.5
3,18	1/8	7,90	5/16	3x8
3,18	1/8	4,76	3/16	3x5
3,18	1/8	6,30	1/4	3x6
3,18	1/8	9,52	3/8	3x10
4,76	3/16	7,90	5/16	5x8
4,76	3/16	9,52	3/8	5x10
4,76	3/16	6,30	1/4	4x6
4,76	3/16	11,11	7/16	4x11
6,35	1/4	7,90	5/16	6x8
6,35	1/4	9,52	3/8	6x10
6,35	1/4	11,11	7/16	6x11
6,35	1/4	12,70	1/2	6x13
7,93	5/16	11,11	7/16	8x11
7,93	5/16	12,70	1/2	8x13
7,93	5/16	14,30	9/16	8x14
9,52	3/8	12,70	1/2	10x13
9,52	3/8	14,30	9/16	10x14
9,52	3/8	15,90	5/8	10x16
11,11	7/16	14,30	9/16	11x14
11,11	7/16	15,87	5/8	11x16
12,70	1/2	15,90	5/8	13x16
12,70	1/2	17,50	11/16	13x18
12,70	1/2	19,00	3/4	13x19
15,80	5/8	20,63	13/16	16x21
15,80	5/8	22,20	7/8	16x22
19,05	3/4	25,40	1	19x25
25,40	1	32,00	1 1/4	25x32
32,00	1 1/4	38,00	1 1/2	32x38
38,00	1 1/2	51,00	2	38x51

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) / 0,05 inches (+0,04/-0,002 inches)
- Sleeve with 1 textile reinforcement with a wall thickness of 2,3mm (+1/-0,5mm) / 0,09 inches (+0,04/-0,002 inches)

Maximum manufacturing length: 4m

Possibility of producing other wall thicknesses by request

Silicone material options

- US FDA (Foods and Drugs Administration) Standard 21 CFR 177.2600
- German BfR Standard part XV
- USP Class VI platinum cured

SPECIAL SILICONE SHAPES



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)

VENA VIEW

Sight Flow Indicators

FEP Food Grade translucent wall with aseptic fittings for applications where visual inspection of the transported material is required.

Can be mounted in-line and makes it very easy for the operators to view product flow in any process or system.

An armored housing version is also available per request.

- SZR® System (Without Retention System)
- -60°C (-76°F) to 180°C (356°F) Max Operating Temperature
- Smooth non-stick surface
- Durable: for extended use, compatible with many chemicals and aggressive products
- Suitable for Cleaning with CIP and SIP

Inner diameter	Connection and Length			Working pressure	Bursting pressure	Working pressure with housing	Bursting pressure with housing
	SMS F/F	SMS F/M	SMS M/M				
25 mm 0,98 inch	160 mm (6,30 inch)			8 bar 116 psi	32 bar 464 psi	12 bar 174 psi	48 bar 696 psi
	DIN F/F	DIN F/M	DIN M/M				
	160 mm (6,30 inch)						
	CLAMP / CLAMP						
32 mm 1,26 inch	160 mm (6,30 inch)			7 bar 101 psi	28 bar 406 psi	12 bar 174 psi	48 bar 696 psi
	DIN F/F	DIN F/M	DIN M/M				
	205mm 8,07 inch	200mm 7,87 inch	190mm 7,48 inch				
	CLAMP/CLAMP						
38 mm 1,50 inch	195 mm (7,68 inch)			6 bar 87 psi	25 bar 362 psi	12 bar 174 psi	48 bar 696 psi
	DIN F/F	DIN F/M	DIN M/M				
	210 mm 8,27 inch	205 mm 8,07 inch	200 mm 7,87 inch				
	CLAMP/CLAMP						
51 mm 2,00 inch	220mm (8,66 inch)			5 bar 72 psi	22 bar 319 psi	10 bar 145 psi	47 bar 681 psi
	DIN F/F	DIN F/M	DIN M/M				
	240mm 9,45 inch	235mm 9,25 inch	230mm 9,06 inch				
	CLAMP/CLAMP						
63 mm 2,48 inch	265 mm (10,43 inch)			5 bar 72 psi	22 bar 319 psi	10 bar 145 psi	40 bar 580 psi
	DIN F/F	DIN F/M	DIN M/M				
	295 mm 11,61 inch	290 mm 11,42 inch	285 mm 11,22 inch				
	CLAMP/CLAMP						
76 mm 2,99 inch	285 mm (11,22 inch)			5 bar 72 psi	20 bar 290 psi	9 bar 130 psi	36 bar 522 psi
	DIN F/F	DIN F/M	DIN M/M				
	315 mm 12,40 inch	310 mm 12,20 inch	305 mm 12,01 inch				
	CLAMP/CLAMP						
102 mm 4,02 inch	295 mm (11,61 inch)			4 bar 58 psi	16 bar 232 psi	7 bar 101 psi	14 bar 203 psi
	DIN F/F	DIN F/M	DIN M/M				
	320 mm 12,60 inch	315 mm 12,40 inch	310 mm 12,20 inch				
	CLAMP/CLAMP						



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 are available upon request.

The hoses offer 7 different standard geometrical configurations but we can customly make any piece according to the customer's needs. These products can be vulcanized, sterilized and Cleaned in Place (CIP) with steam or any other common product (caustic soda, 4% diluted acid, etc.)

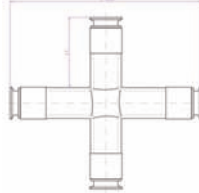
We recommend ADAPTSIL® to:

- Compensate system vibrations as well as to optimize the overall life of the hose or tube connections.
- Solve handling system miss-alignments as well as increased ease in hose or tube installation.
- Offer sound dampening characteristics in your process systems due to its elastic and flexible construction.

*This product is also available with an inner layer of FKM

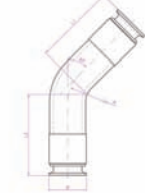


CROSS-SHAPE CL/CL



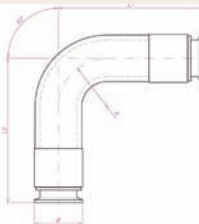
mm	L1	L	
Ø3/8"	10 4 1/2	115 9 7/8	252
Ø1/2"	13 4 1/2	115 10	255
Ø1"	25 4 3/4	120 10 7/8	277
Ø1 1/4"	32 4 3/4	120 11 1/8	284
Ø1 1/2"	38 4 3/4	120 11 3/8	290
Ø2"	51 4 1/2	115 11 1/2	293
Ø2 1/2"	63 4 3/4	120 12 3/8	315
Ø3"	76 4 7/8	125 13 1/4	338
Ø4"	102 4 3/4	120 13 7/8	354

45° ELBOW CL/CL



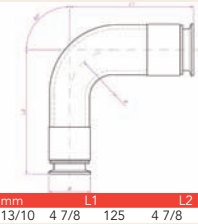
mm	L1	L2	R	
Ø3/8"	10 4 3/8	111 4 3/8	111 5/8	15
Ø1/2"	13 4 1/2	113 4 4/8	113 6/8	20
Ø1"	25 4 7/8	125 4 7/8	125 1 1/2	38
Ø1 1/4"	32 4 7/8	125 4 7/8	125 1 5/8	40
Ø1 1/2"	38 5	127 5	127 1 3/4	45
Ø2"	51 5 1/4	134 5 1/4	134 3	75
Ø2 1/2"	63 5 5/8	144 5 5/8	144 3 1/2	90
Ø3"	76 6 1/8	155 6 1/8	155 4 1/8	105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

90° ELBOW CL/CL



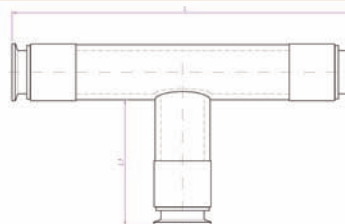
mm	L1	L2	R	
Ø3/8"	10 4 3/4	120 4 3/4	120 5/8	15
Ø1/2"	13 4 7/8	125 4 7/8	125 3/4	20
Ø1"	25 5 7/8	148 5 7/8	148 1 1/2	38
Ø1 1/4"	32 5 7/8	150 5 7/8	150 1 5/8	40
Ø1 1/2"	38 6 1/8	155 6 1/8	155 1 3/4	45
Ø2"	51 7 1/8	180 7 1/8	180 3	75
Ø2 1/2"	63 7 7/8	200 7 7/8	200 3 1/2	90
Ø3"	76 8 5/8	220 8 5/8	220 4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

90° ELBOW REDUCER CL/CL



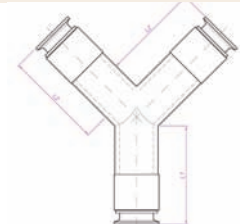
mm	L1	L2	R	
Ø1/2"-3/8"	Ø13/10 4 7/8	125 4 7/8	125 6/8	20
Ø1"-1/2"	Ø25/13 5 3/4	147 5 5/8	142 1 1/2	37
Ø1 1/4"-1"	Ø32/25 6 1/4	160 6 1/4	160 2	50
Ø1 1/2"-1"	Ø38/25 6 1/4	160 6 1/4	160 2	50
Ø1 1/2"-1 1/4"	Ø38/32 6 1/4	160 6 1/4	160 2	50
Ø2"-1"	Ø51/25 7 1/8	180 7 1/4	185 3	75
Ø2"-1 1/2"	Ø51/38 7 1/8	180 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
Ø3"-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

TEE-SHAPE CL/CL



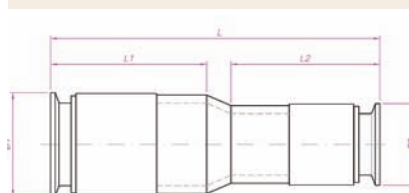
mm	L1	L	
Ø3/8"	10 4 1/2	115 9 7/8	252
Ø1/2"	13 4 1/2	115 10	255
Ø1"	25 4 3/4	120 10 7/8	277
Ø1 1/4"	32 4 3/4	120 11 1/8	284
Ø1 1/2"	38 4 3/4	120 11 3/8	290
Ø2"	51 4 1/2	115 11 1/2	293
Ø2 1/2"	63 4 3/4	120 12 3/8	315
Ø3"	76 4 7/8	125 13 1/4	338
Ø4"	102 4 3/4	120 13 7/8	354

Y-SHAPE CL/CL



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

STRAIGHT REDUCER CL/CL



mm	L1	L2	R	
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
Ø3"-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

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 polyester reinforcements between the silicone layers. To obtain the correct elastic compensation, it is fitted with 3 stainless steel rings, which also prevent volumetric expansion.

This product 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).

*This product is also available with an inner layer of FKM

Nominal Clamp Ø (inch)	Clamp Head Ø (mm)	Inner Ø (mm)	Overall Length (inches)	Overall Length (mm)	Working Pressure (bar)	Working Pressure (psi)
1"	50,5	22,1	4"	102	1,00	14
1 1/2"	50,5	34,7	4"	102	0,90	13
2"	64	47,5	4"	102	0,80	11
2 1/2"	77,5	60	4"	102	0,70	10
3"	91	73	6"	152	0,60	8
4"	119	97,6	6"	152	0,50	7
5"	155	125	7"	178	0,40	5
6"	183	150	7"	178	0,35	5
8"	233,5	200	7"	178	0,20	3
10"	270	250	8"	204	0,10	1

HEATED HOSES



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 fabric

+5°C / 200°C (+41°F / +392°F) - Aramide fabric

Main applications

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

COOLING HOSES



Characteristics: Silicone hose equipped with a cylindrical 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 conduit, and nitrogen for cooling.

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

VITOSIL®



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

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

CONDUCTOR HOSES VENA SIL FDA-X



All our standard hoses (VENA SIL 640, SIL 650V, SIL 655) can be modified externally in order to reduce the Electrical Surface Resistivity. In any case the hose is not designed to convey explosive substances.

- Electrical Surface Resistivity of the exterior ply $< 10^3$ [$\Omega \cdot m$] according to the specification EN 60079-0 Part 26.13.
- 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.

VENAFLO®



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 (13ft o 20ft), depending on the diameter.

Main applications: To conveying aggressive chemical products.

Ø Inner Diameter		Wall Thickness		Working Pressure		Bursting Pressure		Vacuum		Bending Radius	
mm	inch	mm	inch	bar	psi	bar	psi	bar	psi	mm	inch
13	0,51	6,2	0,24	26,0	377	78	1131	0,95	13,78	88	3,46
19	0,75	6,2	0,24	21,7	314	65	942	0,90	13,05	135	5,31
25	0,98	6,2	0,24	17,7	256	53	768	0,90	13,05	182	7,17
32	1,26	6,2	0,24	15,3	221	46	667	0,90	13,05	228	8,98
38	1,50	6,2	0,24	14,0	203	42	609	0,90	13,05	275	10,83
51	2,01	6,2	0,24	10,7	155	32	464	0,85	12,33	318	12,52

VENA TECHNIPUR VAC FDA



New transparent polyurethane hose for the food and pharmaceutical industries. In accordance with FDA standard 21 CFR 177.2600 and generally acceptable* for pneumatic transport of bulk materials and suction of all types of abrasive particles.

For more information please consult the Technical Datasheet.

Possible diameters: from 40mm (1,97inch) to 450mm (17,72inch). **Wall thickness:** 1,2 mm (+0,04/-0,02) / 0,04 inch (+0,001/-0,0007)

Produced with stainless steel wire. Alternatives: Antistatic, with a copper wire parallel to the wire spiral for better electrostatic discharge.

ØInner Diameter		Working Pressure		Vacuum Resistance		Bending Radius		ØInner Diameter		Working Pressure		Vacuum Resistance		Bending Radius	
(mm)	(inch)	(bar)	(psi)	(bar)	(psi)	(mm)	(inch)	(mm)	(inch)	(bar)	(psi)	(bar)	(psi)	(mm)	(inch)
40	1,57	2,60	37,71	0,76	11,02	70	2,76	250	1,57	0,40	5,80	0,12	1,74	385	15,16
45	1,77	2,30	33,36	0,68	9,86	78	3,07	255	1,77	0,39	5,66	0,12	1,74	393	15,47
50	1,97	2,07	30,02	0,61	8,85	85	3,35	260	1,97	0,38	5,51	0,12	1,74	400	15,75
55	2,17	1,87	27,12	0,55	7,98	93	3,66	265	2,17	0,37	5,37	0,11	1,60	408	16,06
60	2,36	1,71	24,80	0,51	7,40	100	3,94	270	2,36	0,37	5,37	0,11	1,60	415	16,34
65	2,56	1,58	22,92	0,47	6,82	108	4,25	275	2,56	0,36	5,22	0,11	1,60	423	16,65
70	2,76	1,46	21,18	0,43	6,24	115	4,53	280	2,76	0,35	5,08	0,11	1,60	430	16,93
75	2,95	1,36	19,73	0,40	5,80	123	4,84	285	2,95	0,35	5,08	0,11	1,60	438	17,24
80	3,15	1,28	18,56	0,38	5,51	130	5,12	290	3,15	0,34	4,93	0,10	1,45	445	17,52
85	3,35	1,20	17,40	0,36	5,22	138	5,43	295	3,35	0,33	4,79	0,10	1,45	453	17,83
90	3,54	1,13	16,39	0,34	4,93	145	5,71	300	3,54	0,33	4,79	0,10	1,45	460	18,11
95	3,74	1,07	15,52	0,32	4,64	153	6,02	305	3,74	0,32	4,64	0,10	1,45	468	18,43
100	3,94	1,01	14,65	0,30	4,35	160	6,30	310	3,94	0,32	4,64	0,10	1,45	475	18,70
105	4,13	0,96	13,92	0,29	4,21	168	6,61	315	4,13	0,31	4,50	0,10	1,45	483	19,02
110	4,33	0,92	13,34	0,27	3,92	175	6,89	320	4,33	0,31	4,50	0,09	1,31	490	19,29
115	4,53	0,88	12,76	0,26	3,77	183	7,20	325	4,53	0,30	4,35	0,09	1,31	498	19,61
120	4,72	0,84	12,18	0,25	3,63	190	7,48	330	4,72	0,30	4,35	0,09	1,31	505	19,88
125	4,92	0,81	11,75	0,24	3,48	198	7,80	335	4,92	0,29	4,21	0,09	1,31	513	20,20
130	5,12	0,77	11,17	0,23	3,34	205	8,07	340	5,12	0,29	4,21	0,09	1,31	520	20,47
135	5,31	0,75	10,88	0,22	3,19	213	8,39	345	5,31	0,28	4,06	0,09	1,31	528	20,79
140	5,51	0,72	10,44	0,22	3,19	220	8,66	350	5,51	0,28	4,06	0,09	1,31	535	21,06
145	5,71	0,69	10,01	0,21	3,05	228	8,98	355	5,71	0,28	4,06	0,08	1,16	543	21,38
150	5,91	0,67	9,72	0,20	2,90	235	9,25	360	5,91	0,27	3,92	0,08	1,16	550	21,65
155	6,10	0,65	9,43	0,19	2,76	243	9,57	365	6,10	0,27	3,92	0,08	1,16	558	21,97
160	6,30	0,63	9,14	0,19	2,76	250	9,84	370	6,30	0,26	3,77	0,08	1,16	565	22,24
165	6,50	0,61	8,85	0,18	2,61	258	10,16	375	6,50	0,26	3,77	0,08	1,16	573	22,56
170	6,69	0,59	8,56	0,18	2,61	265	10,43	380	6,69	0,26	3,77	0,08	1,16	580	22,83
175	6,89	0,57	8,27	0,17	2,47	273	10,75	385	6,89	0,25	3,63	0,08	1,16	588	23,15
180	7,09	0,55	7,98	0,17	2,47	280	11,02	390	7,09	0,25	3,63	0,08	1,16	595	23,43
185	7,28	0,54	7,83	0,16	2,32	288	11,34	395	7,28	0,25	3,63	0,08	1,16	603	23,74
190	7,48	0,52	7,54	0,16	2,32	295	11,61	400	7,48	0,24	3,48	0,07	1,02	610	24,02
195	7,68	0,51	7,40	0,15	2,18	303	11,93	405	7,68	0,24	3,48	0,07	1,02	618	24,33
200	7,87	0,50	7,25	0,15	2,18	310	12,20	410	7,87	0,24	3,48	0,07	1,02	625	24,61
205	8,07	0,49	7,11	0,15	2,18	318	12,52	415	8,07	0,24	3,48	0,07	1,02	633	24,92
210	8,27	0,47	6,82	0,14	2,03	325	12,80	420	8,27	0,23	3,34	0,07	1,02	640	25,20
215	8,46	0,46	6,67	0,14	2,03	333	13,11	425	8,46	0,23	3,34	0,07	1,02	648	25,51
220	8,66	0,45	6,53	0,14	2,03	340	13,39	430	8,66	0,23	3,34	0,07	1,02	655	25,79
225	8,86	0,44	6,38	0,13	1,89	348	13,70	435	8,86	0,22	3,19	0,07	1,02	663	26,10
230	9,06	0,43	6,24	0,13	1,89	355	13,98	440	9,06	0,22	3,19	0,07	1,02	670	26,38
235	9,25	0,42	6,09	0,13	1,89	363	14,29	445	9,25	0,22	3,19	0,07	1,02	678	26,69
240	9,45	0,41	5,95	0,13	1,89	370	14,57	450	9,45	0,22	3,19	0,07	1,02	685	26,97
245	9,65	0,40	5,80	0,12	1,74	378	14,88								

* Please consult your supplier for the risk assessment.

VENA BLUE



Construction

This product is manufactured with inner food grade EPDM and outer blue EPDM rubber cover. Besides, it is equipped with rubber embedded textile reinforcement. These hoses have no spiral reinforcement, which allows to be run over by vehicles.

Applications

Specially recommended for the transport and tank truck unloading of milk, liquor, fruit juice and all types of animal and vegetal origin food products.

Limitations

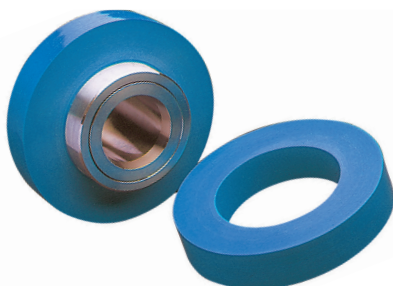
Chemical compatibility of the fluid with food grade EPDM.
Not recommended to work in vacuum.

Hose Properties

- The hose is absolutely odourless, tasteless and completely non-toxic.
- White colour and smooth inner appearance, blue coloured and smooth outer appearance.
- Outer excellent resistance to termal aging, ozone agents, abrasion and, due to its strong and durable construction, it is suitable against floor friction and bad weather conditions.
- This reference is in compliance with FDA 21 CFR 177.2600 and BfR XXI.
- This product can operate with pressure according to the technical specifications attached below.
- Can be equipped with 316L stainless steel fittings on each end with a rugosity value of less than 0,8µm (or 0,5µm under request).
- Operational temperature range from -30°C to +90°C (-22°F to 194°F). It may reach up to 130°C (266°F) for a maximum time of 120 minutes. It can be sterilised at 130°C (266°F).
- Available in a maximum length of 40m (131ft).
- The bending radius is variable depending on the inner pressure.

ID - Inner Diameter		OD - Outer Diameter		Working Pressure Water at 20°C		Bursting Pressure Water at 20°C		Weight
(mm)	(inch)	(mm)	(inch)	(bar)	(psi)	(bar)	(psi)	(kg/m)
19	0,75	30	1,18	10	145,04	30	435,11	0,55
25	0,98	36	1,42	10	145,04	30	435,11	0,75
32	1,26	43	1,69	10	145,04	30	435,11	0,85
38	1,50	49	1,93	10	145,04	30	435,11	1,00
51	2,01	63	2,48	10	145,04	30	435,11	1,30
63	2,48	75	2,95	10	145,04	30	435,11	1,60
76	2,99	89	3,50	10	145,04	30	435,11	2,10
102	4,02	116	4,57	10	145,04	30	435,11	2,80

PROTECTION FOR THE CONNECTIONS



VENAIR 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

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 meters (131ft)

Applications: The Butylfood flexible hose 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 (mm)	Working Pressure		Working Pressure	
(mm)	(inch)	(mm)	(inch)		Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F
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 1/6	130				
76,2	3	92	3 5/8	220				
101,6	4	120	4 3/4	320				

VENA SIL KITCHEN

Elastomer: Extruded silicone produced in accordance with the US FDA Standard 21 CFR 177.2600, the German BfR Standard part XV.

Fabric reinforcement: Polyester braiding. No stainless steel inside.

Inner appearance: Translucent and smooth. **Outer appearance:** Grey with 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", 3/4").

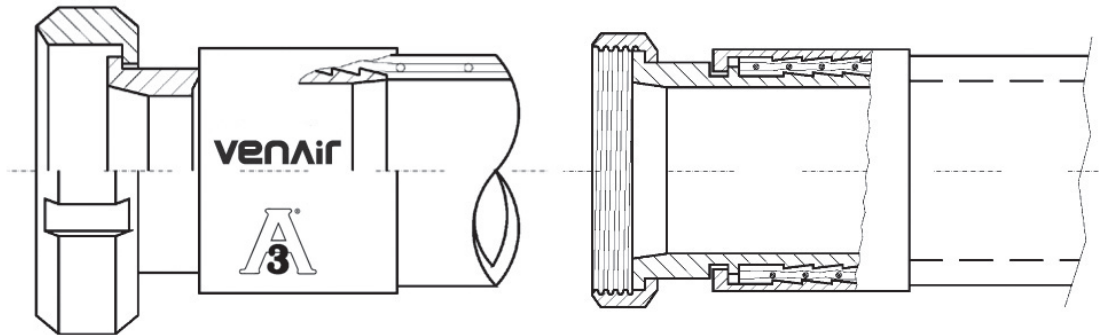
Available lengths: 5, 10, 20, 76m (15', 33', 60', 250')

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 or hardening, staying always flexible.

Sil Kitchen can be supplied with brass fittings suitable for many standard needs.



HOSE ASSEMBLIES



SZR SYSTEM (Without retention zone) and 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.

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.

*SZR is a registered trademark of VENAIR

VENAIR SILICONE ASSEMBLIES IN ACCORDANCE WITH 3-A SSI # 62-02

3-A Sanitary Standards, Inc. (3-A SSI) is an independent, not-for-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries. 3-A SSI represents the interests of three stakeholder groups with a common commitment to promoting food safety and the public health-regulatory sanitarians, equipment fabricators and processors.

3-A Sanitary Standard for Hose Assemblies (Number 62-02) is a standard which covers the sanitary aspects of the hose assemblies consisting of a sanitary couplings permanently attached to one of both ends of multiple-use smooth-bore hoses in a manner such that the resultant hose-to-coupling junction is suitable for cleaning-in-place or 'CIPable'. 3-A SSI formulates sanitary standards and accepted practices for the sanitary design, fabrication, installation and cleanability of dairy and food equipment or systems used to handle, process and package consumable products where a high degree of sanitation is required.

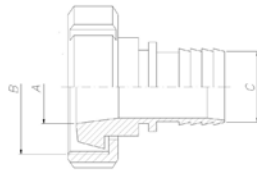
Venair's dedication in providing the highest possible quality, sanitary and hygienic hose assemblies has driven us to obtain and uphold the standards and requirements outlined by the 3-A association and in regards the hose assemblies we manufacture. Just another step towards our management driven objective: Offer our customers the highest quality products in the market.

STAINLESS STEEL FITTINGS 316L

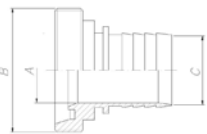
Available in 316L stainless steel, with the exception of the nuts and ferrules which are made of 304 stainless steel. Other fittings can be assembled upon request (RJT, FIL, ISS, MACON, GAS JIC, flanges). Clamps and auxiliary parts for welding can also be manufactured.

DIN 11851

DN	A	B	C
	(mm)	(DIN 405) thread	(mm)
10	10	28 x 1/8"	10
15	16	34 x 1/8"	15
20	20	44 x 1/6"	20
25	26	52 x 1/6"	25
32	32	58 x 1/6"	32
40	38	65 x 1/6"	38
50	50	78 x 1/6"	50
65	66	95 x 1/6"	63
80	81	110 x 1/4"	75
100	100	130 x 1/4"	102
125	125	160 x 1/4"	127
150	150	190 x 1/4"	152



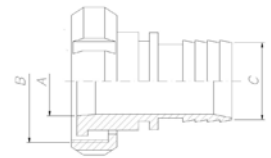
DIN FEMALE



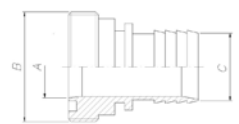
DIN MALE

SMS

DN	A	B	C
	(mm)	thread	(mm)
25	22,5	39,7 x 1/6"	25
38	35,5	59,8 x 1/6"	38
51	48,5	69,8 x 1/6"	50
63	60,5	84,8 x 1/6"	63
76	72,8	97,5 x 1/6"	75
101,6	97,6	132 x 1/6"	102
104	100	124,4 x 1/6"	102



SMS FEMALE

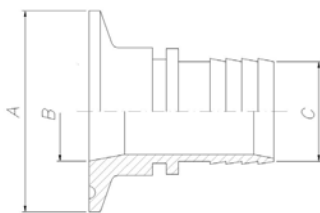


SMS MALE

TRI-CLAMP

a	b	c
(mm)	(mm)	(mm)
25	6,0	6
34	8,0	8
50	8,0	8
25	10,0	10
34	10,0	10
50	10,0	10
25	10,0	13
34	10,0	13
25	13,0	13
34	13,0	13
50	13,0	13
25	16,0	16
34	16,0	16
50	16,0	16
25	16,0	20
50	16,0	20
34	18,0	18
50	18,0	18

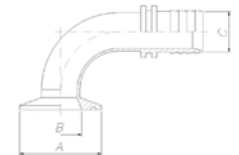
a	b	c
(mm)	(mm)	(mm)
34	20,0	20
50	20,0	20
50	22,5	18
50	22,5	20
50	22,5	25
64	22,5	25
50	29,0	32
64	32,0	32
50	35,5	20
50	35,5	25
50	35,5	38
64	35,5	38
64	38,0	38
64	48,5	50
77	60,3	63
91	72,9	76
119	101,0	102



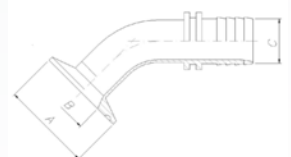
CLAMP

TRI-CLAMP IMPERIAL

DN	A	B	C
(inch)	(mm)	(inch)	(mm)
1/2	25	1	9,5
3/4	25	1	15,8
1/2	25	1	9,5
3/4	25	1	15,8
1/2	25	1	9,5
3/4	25	1	15,8
1/2	25	1	9,5
3/4	25	1	15,8
1	50	2	22,1
1 1/2	50	2	34,8
1	50	2	22,1
1 1/2	50	2	34,8
1	50	2	22,1
1 1/2	50	2	34,8
1	50	2	22,1
1 1/2	50	2	34,8
2	64	2 1/2	47,5
1 1/2	50	2	34,8
2	64	2 1/2	47,5
2	64	2 1/2	47,5
2 1/2	77	3	60,2
2 1/2	77	3	60,2
3	91	3 9/16	72,9
3	91	3 9/16	72,9
4	119	4 11/16	97,4



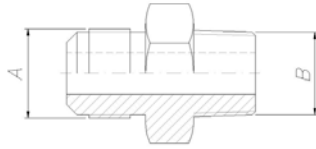
CLAMP 90°



CLAMP 45°

Male JIC x Male NPTF Adaptor

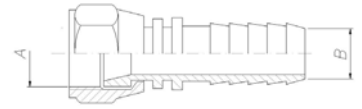
A male JIC	B male NPT
7/16	1/4
1/2	1/4
3/4	3/8
7/8	1/2
11/16	3/4
15/16	1
15/8	11/4
17/8	11/2



MALE JIC x MALE NPTF ADAPTOR

Female JIC Straight Insert

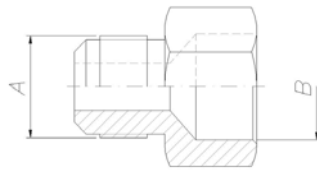
A (inch)	B Ø for hose	
	(inch)	(mm)
7/16	1/4	6,35
1/2	1/4	6,35
3/4	3/8	9,52
7/8	1/2	12,7
11/16	3/4	19,05
15/16	1	25,4
15/8	11/4	31,75
17/8	11/2	38,10



FEMALE JIC STRAIGHT INSERT

Male JIC x Female NPTF Adaptor

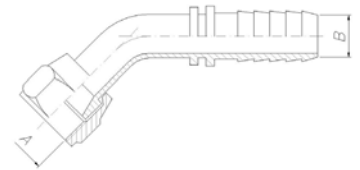
A male JIC	B male NPT
7/16	1/4
1/2	1/4
3/4	3/8
7/8	1/2
11/16	3/4
15/16	1
15/8	11/4
17/8	11/2



MALE JIC x FEMALE NPTF ADAPTOR

Female JIC Elbow 45° Insert

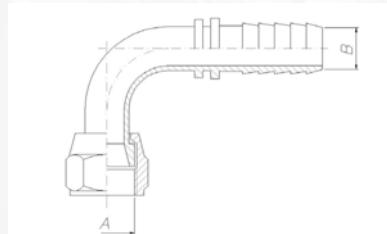
A (inch)	B Ø for hose	
	(inch)	(mm)
7/16	1/4	6,35
1/2	1/4	6,35
3/4	3/8	9,52
7/8	1/2	12,7
11/16	3/4	19,05
15/16	1	25,4
15/8	11/4	31,75
17/8	11/2	38,10



FEMALE JIC ELBOW 45° INSERT

Insert Female JIC Elbow 90°

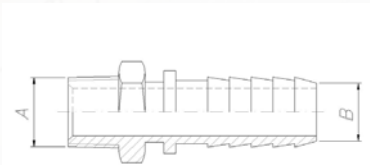
A (inch)	B Ø for hose	
	(inch)	(mm)
7/16	1/4	6,35
1/2	1/4	6,35
3/4	3/8	9,52
7/8	1/2	12,7
11/16	3/4	19,05
15/16	1	25,4
15/8	11/4	31,75
17/8	11/2	38,10



INSERT FEMALE JIC ELBOW 90°

Insert Male NPT

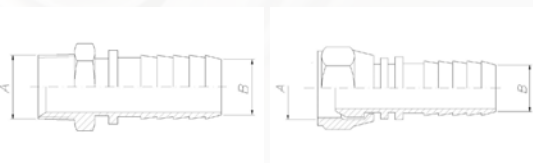
A (inch)	B Ø for hose	
	(inch)	(mm)
7/16	1/4	6,35
1/2	1/4	6,35
3/4	3/8	9,52
7/8	1/2	12,7
11/16	3/4	19,05
15/16	1	25,4
15/8	11/4	31,75
17/8	11/2	38,10



INSERT MALE NPT

Male Gas / Female Gas

A (thread)	B (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



MALE GAS

FEMALE GAS



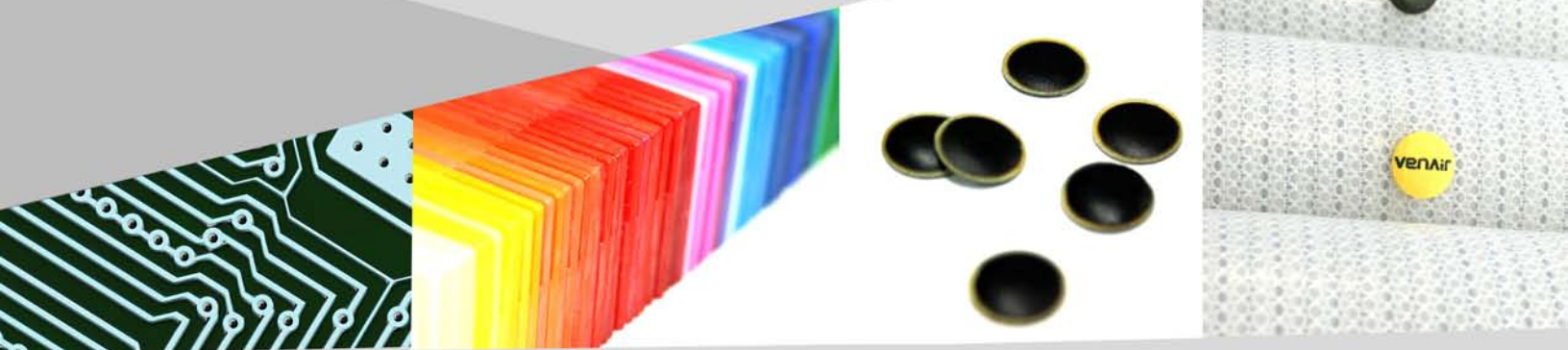
iHOSE

The intelligent hose
by VENAIR

The VenaTrace system allows for the reading of the microchip of the information added to the hose during the manufacturing process.

Each microchip has a unique identifier. This identifier allows obtaining all the information related to the hose during the manufacturing process and implementing: raw materials used, product codes and components, lot number, appropriate certificates, production and sale date, related orders and much more.

VENA® TRACE SYSTEM



BENEFITS

- **Cost saving:** facilitates product installation and improves the preventive and corrective maintenance process.
- **Time saving:** Facilitates validation process during audits.
- Prevents errors and information loss: allows for total digital access to the information.
- Allows to keep records of maintenance and cleaning.
- The RFID system allows a quick and simple reading. Any professional RFID scanner or smartphone with NFC technology and Android is capable of obtaining the information.

IDENTIFICATION BY COLOR

iHOSE the intelligent hose by Venair® allows, in addition, quick identification by use of colors. Each microchip can be wrapped with colored silicone, by which the operator can identify by plain sight each hose or the product they are transferring.

Available colors*:

	BLACK		GREEN
	DARK RED		DARK BLUE
	RED		BLUE
	YELLOW		WHITE

* Other colors available upon request

GOODYEAR
RUBBER PRODUCTS INC.

Call Toll Free: **1-866-711-4673**
WebSales@GoodyearRubberProducts.com

**We Ship
World Wide**

REFERENCES

VENAIR 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
KRONEBOURG

PHARMACEUTICAL

PFIZER
GLAXO-WELLCOME
AVENTIS
MILLIPORE
SCHERING-PLOUGH

COSMETICS

L'OREAL
NIVEA
ROC
LANCASTER

CHEMICAL

SANOFI
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 conventional hoses. Remember that once the hose is installed, it is a and moving element. These hoses 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 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 CRITERIA FOR SELECTION

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

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 Storage life

Storage life 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 (32°F) and 35°C (95°F) wherever possible (optimum temperature 15°C/59°F). 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 ge-

nerated 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, agropharmaceutical 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.

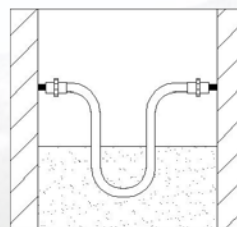
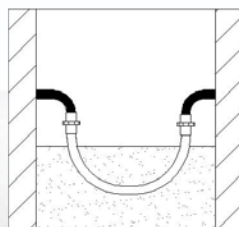
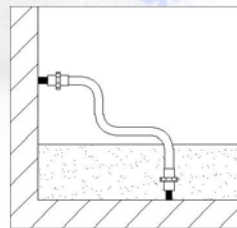
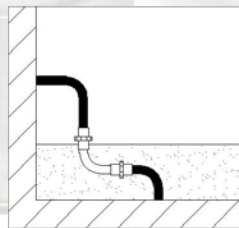
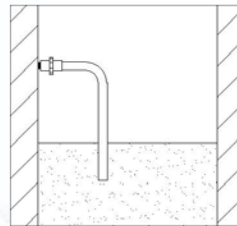
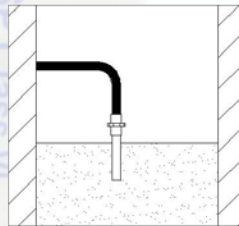
3. INFLAMMABLE PRODUCTS

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.

BENDING RADIUS

RECOMMENDED

NOT RECOMMENDED



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.

	S	F	B	V	P		S	F	B	V	P		S	F	B	V	P																																																																																																																																																																																																																																																																																																																																																																																																
	SILICONE						FLUOSIL						BUTYLFLOOD VENA BLUE						VITOSIL						VENAFLOX																																																																																																																																																																																																																																																																																																																																																																																								
Resistance to different products:																																																																																																																																																																																																																																																																																																																																																																																																																	
A - excellent																																																																																																																																																																																																																																																																																																																																																																																																																	
B - good																																																																																																																																																																																																																																																																																																																																																																																																																	
C - insufficient																																																																																																																																																																																																																																																																																																																																																																																																																	
D - unsatisfactory																																																																																																																																																																																																																																																																																																																																																																																																																	
E - please, consult																																																																																																																																																																																																																																																																																																																																																																																																																	
A																																																																																																																																																																																																																																																																																																																																																																																																																	
acetaldehyde	A	D	A	D	A	ammonium persulfate 10%	E	E	A	E	A	barium salts	A	A	A	A	A	ammonium phosphate	A	E	A	E	A	barium sulfate	A	A	A	A	A	ammonium phosphate, mono-basic	A	E	A	E	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	benzene	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	B	B	D	A	A	brayco 719-R (VV-H-910)	D	B	D	A	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
B																																																																																																																																																																																																																																																																																																																																																																																																																	
bardol B	D	B	E	A	A	barium chloride	A	A	A	A	A	barium hydroxide	A	A	A	A	A																																																																																																																																																																																																																																																																																																																																																																																																

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

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

F

F-60 fluid (dow corning)
 F-61 fluid (dow corning)
 fatty acids
 FC-43 hetacosofluorotri-butylamine
 FC75 fluorocarbon
 ferric chloride
 ferric nitrate
 ferric sulfate
 fish oil
 fluoboric acid
 fluorine (liquid)
 fluorobenzene

	S	F	B	V	P
	SILICONE	FLUOSIL	BUTYFLOOD VENA BLUE	VITOSIL	VENAFLOX
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

fluorocarbon oils
 fluorolube
 fluorinated cyclic ethers
 fluosilicic acid
 formaldehyde
 formic acid
 freon, 11
 freon, 12
 freon, 12 & ASTM-oil #2 (50/50 mixture)
 freon, 12 & SUNISO 4G (50/50 mixture)
 freon, 13
 freon, 13B1
 freon, 14
 freon, 21
 freon, 22
 freon, 22 & ASTM OIL #2D (50/50 mixture)
 freon, 31
 freon, 32
 freon, 112
 freon, 113
 freon, 114
 freon, 114B2
 freon, 115
 freon, 142b
 freon, 152a
 freon, 218
 freon, C316
 freon, C318
 freon, 502
 freon, BF
 freon, MF
 freon, TF
 freon, TA
 freon, TC
 freon, TMC
 freon, T-P35
 freon, T-WD602
 freon, PCA
 fuel oil
 fuel oil acidic
 fuel oil #6
 fumaric acid
 fuming sulphuric acid (20/25% oleum)
 furan (fufuran)
 fufural
 fufuraldehyde
 fufuraly alcohol
 furyl carbinol
 fyrquel A60
 fyrquel 90, 100, 150, 220, 300, 500

G

galic acid
 gasoline
 gelatin
 grilling brake fluid
 glacial acetic-acid
 glauber's salt
 glucose
 glue (depending on type)
 glycerine-glycerol
 glycols
 green sulphate liquor
 gulfcrown grease
 gulf endurance oils

	S	F	B	V	P
fluorocarbon oils	E	E	A	E	A
fluorolube	A	B	A	B	A
fluorinated cyclic ethers	E	E	A	E	A
fluosilicic 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	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

gulf FR fluids (emulsion)
 gulf FRG-fluids
 gulf FRp-fluids
 gulf harmony oils
 gulf high temperature grease
 gulf lesion oils
 gulf paraout oils
 gulf security oils

H

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

	S	F	B	V	P
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 paraout oils	D	A	D	A	A
gulf security oils	D	A	D	A	A
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	C	B	A	A	A
phosphate ester	C	B	A	A	A
houghto-safe 1055	C	B	A	A	A
phosphate ester	C	B	A	A	A
houghto-safe 1120	C	B	A	A	A
phosphate ester	C	B	D	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 concentrated	D	B	A	A	A
hydrocyanic acid	D	C	C	A	A
hydro-drive, MIH-50 (petroleum base)	C	B	A	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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Resistance to different products:
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B - good
C - insufficient
D - unsatisfactory
E - please, consult

hydrolube-water/ethylene glycol
 hydroquinone
 hydyne
 hyjet
 hyjet III
 hyjet S
 hyjet W
 hydrochlorous

I

industron FF44
 industron FF48
 industron FF53
 industron FF80
 iodine
 iodine pentafluoride
 iodoform
 isobutyl alcohol
 iso-butyl N-butyrade
 isododecane
 iso-octane
 isophorone (ketone)
 isopropanol
 isopropyl acetate
 isopropyl alcohol
 isopropyl chloride
 isopropyl ether

J

JP 3 (MIL-J-5624)
 JP 4 (MIL-J-5624)
 JP 5 (MIL-J-5624)
 JP 6 (MIL-J-25656)
 JP X (MIL-J-25604)

K

kel F liquid
 kerosene
 keystone #87HX-grease

L

lactams-amino acids
 lactic acid
 lacquers
 lacquer solvents
 lard, animals fats
 lavender oil
 lead acetate
 lead nitrate
 lead sulphamate
 lehifh x 1169
 lehigh x 1170
 light greas
 ligroin (petroleum ether or benzene)
 lime bleach
 lime sulphur

	S	F	B	V	P
	SILICONE				
	FLUOSIL				
	BUTYFLOOD VENA BLUE				
	VITOSIL				
	VENAFLO				
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
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
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
kel F liquid	A	B	A	B	A
kerosene	D	A	D	A	A
keystone #87HX-grease	D	A	D	A	A
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 benzene)	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)
 linoleic acid
 linseed oil
 liquid oxygen
 liquid petroleum gas (LPG)
 liquimoly
 lubricating oils, di-ester
 lubricating oils, petroleum base
 lye solutions

M

magnesium chloride
 magnesium hydroxyde
 magnesium sulphate
 magnesium sulphite
 magnesium salt
 malathion
 maleic acid
 maleic anhydride
 malicacid
 MCS 312
 MCS 352
 MCS 463
 mercuric chloride
 mercury
 mercury vapor
 mesityl oxide (ketone)
 methane
 methanol
 methyl acetate
 methyl acetoacetate
 methyl acrylate
 methylacrylic acid
 methyl alcohol
 methyl benzoate
 methyl bromide
 methyl butyl ketone
 methyl carbonate
 methyl cellosolve
 methyl cellulose
 methyl chloride
 methyl chloroformate
 methyl D-bromide
 methyl cyclopentane
 methylene chloride
 methylene dichloride
 methyl ether
 methyl ethyl ketone (MEK)
 methyl ethyl ketone peroxyde
 methyl format
 methyl isobutyl ketone (MIBK)
 methyl isopropyl ketone
 methyl methacrylic
 methyl oleate
 methyl salicylate
 milk
 mineral oils
 mobil 24 DTE
 mobil HF
 mobil delvac 1100, 1110, 1130
 mobil nyvac 20 and 30
 mobil velocite C
 mobilgas wa 200, type A
 automatic trans. fluid
 mobil oil SAE20

	S	F	B	V	P
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
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 cyclopentane	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	D	A	D	A	A
mobil oil SAE20	D	A	D	A	A

mobilterm 600
 mobilux
 mono bromobenzene
 mono chlorobenzene
 mono ethanolamine
 monomerthyl aniline
 monomerthylether
 monomerthyl hydrazine
 monotrotoluene & dinitrotoluene(40-60mix)
 monovinyl acethylene
 mopar brake fluid
 mustard gas

N

naptha
 napthalene
 napthenic
 natural gas
 neatsfoot oil
 neon
 neville acid
 nickel acetate
 nickel chloride
 nickel salts
 nickel sulfate
 niter cake
 nitric acid (1) 3 molar
 nitric acid (1) concentrated
 nitric acid dilute
 nitric acid (1) red fuming (RFNA)
 nitric acid (1) inhibited red fuming (IRFNA)
 nitrobenzene
 nitrobenzine
 nitroethane
 nitrogene
 nitrogene (textroxide) (N2O4) (1)
 nitromethane
 nitropropane

O

o-a-548 A
 o-t-634b
 octachlorotoluene
 octadecane
 N-octane
 octyl alcohol
 oleic acid
 oleum (fuming sulfuric acid)
 oleum spirits
 olive oil
 oronite 8200
 oronite 8515
 orthochloroethylbenzene
 ortho-dichlorobenzene
 os45 type III (os45)
 os45 type IV (os45)
 OS70
 oxalic acid
 oxygen, cold
 oxygen, cold 200-400°F
 ozone

P

p-s-66 lb
 p-d-680
 paint thinner duco

	S	F	B	V	P
mobilterm 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
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) inhibited 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) (N2O4) (1)	D	D	D	D	A
nitromethane	D	D	B	D	A
nitropropane	D	D	B	D	A
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-s-66 lb	D	A	D	A	A
p-d-680	D	A	D	A	A
paint thinner duco	D	B	D	B	A

