











# 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 freeof 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 (- $100^{\circ}$ C / - $148^{\circ}$ F). HT Silicone for very high temperatures (+ $300^{\circ}$ C/+ $572^{\circ}$ F).

### Lenath

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.







# 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:  $-60^{\circ}$  C /  $+180^{\circ}$  C ( $-76^{\circ}$  F /  $+356^{\circ}$  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 Di	ameter*	Wall thickness	Theoretic Diam		Bending Radius	Working P	ressure **	Bursting P	ressure **	Vacuum Resistance
					ISO 1746/2000	ISO 140	02/2009	ISO 140	02/2009	
(mm)	(inch)	+1 -0,5 (mm)	(mm)	(inch)	(mm)	(bar at 20°C)	(psi at 68°F)	(bar at 20°C)	(psi at 68°F)	
6	1/4	1	17,0	0,67	29	26,0	377	77,9	1130	
8	5/16		19,0	0,75	31	24,0	348	72,0	1044	684 Torr (MMhG)
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	0,91 bar
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	0,90 atm
22	7/8	5.5	33,0	1,30	60	15,8	229	47,3	686	
25	1		36,0	1,42	68	14,08	214	44,3	643	9,29 mH20
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	13,23 psi
51	2		62,0	2,44	144	9,2	133	27,5	399	
63	2 1/2		74,0	2,91	181	7,5	109	22,6	327	26,93 inHg
76	3	6	88,0	3,46	232	6,1	88	18,2	263	
102	4	6	114,0	4,49	367	3,7	54	11,2	163	

<sup>\*</sup> Other diameters can also be manufactured. Please consult.

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





# 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 (12)

(13').

Upon request, 6m length hoses (19' 8") can be manufactured. **Temperature scale:**  $-60^{\circ}$  C /  $+180^{\circ}$  C ( $-76^{\circ}$  F /  $+356^{\circ}$  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 Di	ameter*	Wall thick- ness		Working F	ressure**		Bursting Pressure**				
			ISO 1402/20	09 (bar at 20°C)	ISO 1402/20	09 (psi at 68°F)	ISO 1402/20	09 (bar at 20°C)	ISO 1402/20	09 (psi at 68°F)	
(mm)	(inch)	+1 -0.5 (mm)	640	640 MIF	640	640 MIF	640	640 MIF	640	640 MIF	
6	1/4		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	4.5	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	

<sup>\*</sup> Other diameters can also be manufactured. Please consult.

<sup>\*\*</sup> 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 in-

side 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.



In	Inner Diameter*		Wall thickness	Theoretical Outer Diameter		Bending Radius	Working Pressure **		Bursting Pressure **		Vacuum Resistance
						ISO 1746/2000	ISO 1402/2009		ISO 1402/2009		
(m	nm)	(inch)	+1 -0.5 (mm)	(mm)	(inch)	(mm)	(bar at 20°C)	(psi at 68°F)	(bar at 20°C)	(psi at 68°F)	
1	19	3/4	6,5	32,0	1,26	68	20,5	297	61,5	892	0,90 atm
2	22	7/8	6,5	35,0	1,38	72	20,0	290	60,0	870	
2	25	1	6,5	38,0	1,50	80	18,5	268	55,5	805	9,29 mH20
3	32	1 1/4	6,5	45,0	1,77	100	16,5	239	49,5	718	
3	38	1 1/2	7	52,0	2,05	121	15,0	218	45,0	653	13,23 psi
5	51	2	7	65,0	2,56	185	12,0	174	36,0	522	
6	53	2 1/2	7	77,0	3,03	273	10,0	145	30,0	435	26,93 inHg
7	76	3	7	90,0	3,54	318	7,1	103	21,3	308	
1	02	4	7	116,0	4,57	423	5,0	73	15,0	218	

<sup>\*</sup> Other diameters can also be manufactured. Please consult.

<sup>\*\*</sup> 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. Temperature scale:  $-60^{\circ}$  C /  $+180^{\circ}$  C ( $-76^{\circ}$  F /  $356^{\circ}$  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 Dia	Inner Diameter *		Outer Diameter		ressure **	Bursting P	Bending Radius		
				ISO 140	ISO 1402/2009		ISO 1402/2009		
(mm)	(inch)	(mm)	(inch)	(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	

<sup>\*</sup> Other diameters can also be manufactured. Please consult.

<sup>\*\*</sup> 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:  $-60^{\circ}$  C /  $+180^{\circ}$  C ( $-76^{\circ}$  F /  $356^{\circ}$  F)

Pressure Resistance: 3 times higher than the standard Vena Te-

chnosil (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 Di	ameter *	Outer Diameter		Working F	ressure **	Bursting P	Bending Radius	
				ISO 140	02/2009	ISO 140	ISO 1402/2009	
(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

<sup>\*</sup> Other diameters can also be manufactured. Please consult.

<sup>\*\*</sup> 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

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 lbf/in (kN/m)	D1004-94	100 (18)
Specific Gravity	D792-00	1,16
Water Absorption (%)	D570-98	0,06
Compression set constant deflection	D395-01	36
(% at 70°C during 22 hours)	Method B	
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 D	iameter	Outer D	iameter	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	10×14		
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)
- FEP FDA 21.CFR 177 1552
- USP CLASS VI
- -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	Conr	nection and L	enght	Working pressure	Bursting pressure	Working pressure with housing	Bursting pressure with housing	
	SMS F/F	SMS F/M	SMS M/M					
	160	0 mm (6,30 ir	nch)					
25 mm	DIN F/F	DIN F/M	DIN M/M	8 bar	32 bar	12 bar	48 bar	
0,98 inch	160	0 mm (6,30 ir	nch)	116 psi	464 psi	174 psi	696 psi	
	C	LAMP / CLAI	MP					
		0 mm (6,30 ir						
32 mm	DIN F/F	DIN F/M	DIN M/M	7 bar	28 bar	12 bar	48 bar	
1,26 inch	205mm 8,07 inch	200mm 7,87 inch	190mm 7,48 inch	101 psi	406 psi	174 psi	696 psi	
	SMS F/F	SMS F/M	SMS M/M					
	210 mm	205 mm	200 mm					
	8,27 inch	8,07 inch	7,87 inch					
38 mm	DIN F/F	DIN F/M	DIN M/M	6 bar	25 bar	12 bar	48 bar	
1,50 inch	210 mm	205 mm	200 mm	87 psi	362 psi	174 psi	696 psi	
	8,27 inch	8,07 inch	7,87 inch	_				
		LAMP/CLAN						
	SMS F/F	5 mm (7,68 ir SMS F/M	SMS M/M					
	240 mm	235 mm	230 mm					
	9,45 inch	9,25 inch	9,06 inch					
51 mm	DIN F/F	DIN F/M	DIN M/M	5 bar	22 bar	10 bar	47 bar	
2,00 inch	240mm 9,45 inch	235mm 9,25 inch	230mm 9,06 inch	72 psi	319 psi	145 psi	681 psi	
		CLAMP/CLAM	1P					
	22	0mm (8,66 ir	nch)					
	SMS F/F	SMS F/M	SMS M/M					
	295 mm	290 mm	285 mm					
	11,61 inch DIN F/F	11,42 inch DIN F/M	11,22 inch DIN M/M					
63 mm 2,48 inch	295 mm	290 mm	285 mm	5 bar	22 bar	10 bar 145 psi	40 bar	
2,40 INCH	11,61 inch	11,42 inch	11,22 inch	72 psi	319 psi	145 psi	580 psi	
		CLAMP/CLAN	1P					
	265	mm (10,43 i	nch)					
	SMS F/F	SMS F/M	SMS M/M					
	315 mm	310 mm	305 mm					
	12,40 inch	12,20 inch	12,01 inch					
76 mm	DIN F/F	DIN F/M	DIN M/M	5 bar	20 bar	9 bar	36 bar	
2,99 inch	315 mm	310 mm 12,20 inch	305 mm	72 psi	290 psi	130 psi	522 psi	
	12,40 inch	CLAMP/CLAN	12,01 inch					
		mm (11,22 i						
	SMS F/F							
	320 mm	315 mm	310 mm					
	12,60 inch	12,40 inch	12,20 inch					
102 mm	DIN F/F	DIN F/M	DIN M/M	4 bar	16 bar	7 bar	14 bar	
4,02 inch	320 mm	315 mm	340 mm	58 psi	232 psi	101 psi	203 psi	
	12,60 inch	12,40 inch	13,39 inch					
		LAMP/CLAN	-					
	295	mm (11,61 i	nch)					





# **ADAPTSIL**

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.)

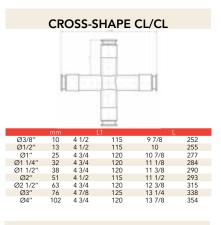
We recommend ADAPTSIL® to:

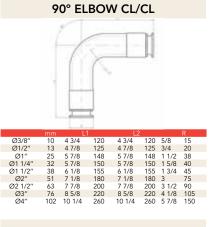
- Compensate system vibrations as well as to optimize the overall life of the hose or tube connections.
- Solve handling system miss-alignments as well as increased ease in hose or tube installation.
- Offer sound dampening characteristics in your process systems due to its elastic and flexible construction.

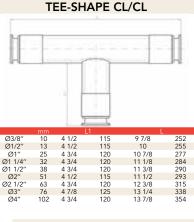
\*This product is also available with an inner layer of FKM

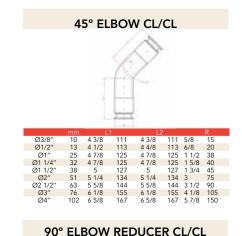


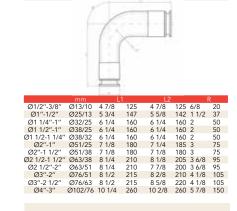
The first line of flexible adaptors in silicone designed for the Food, Pharm and Biotech industries.

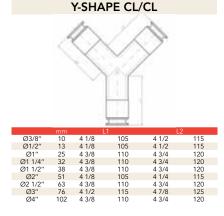


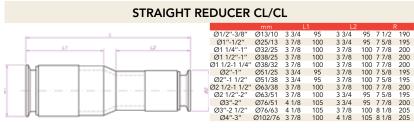














# **PHARMALOADER**



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	Clamp Head Ø	Inner Ø	Ove Len		Working Pressure		
(inch)	(mm)	(mm)	(inches)	(mm)	(bar)	(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	



### 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 product conveyed 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.

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

Main applications: To conveying agressive chemical products.

	nner neter		all kness	Wor Pres			sting ssure	Vacuum		Ber Ra	nding dius
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.

	Ølnner Diameter		Working Pressure		Vacuum Resistance		Bending Radius		Ølnner Diameter		Pressure	e 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
165 170	6,50	0,61	8,85	0,18	2,61	258 265	10,16	375 380	6,50	0,26	3,77	0,08	1,16	573 580	22,56
170	6,69 6,89	0,59 0,57	8,56 8,27	0,18 0,17	2,61	273	10,43 10,75	380	6,69 6,89	0,26 0,25	3,77 3,63	0,08	1,16	588	22,83 23,15
180	7,09	0,55	7,98	0,17	2,47 2,47	280	11,02	390	7,09	0,25	3,63	0,08 0,08	1,16 1,16	595	23,43
185	7,07	0,53	7,83	0,17	2,32	288	11,34	395	7,07	0,25	3,63	0,08	1,16	603	23,43
190	7,28	0,52	7,54	0,16	2,32	295	11,61	400	7,28	0,23	3,48	0,08	1,10	610	24,02
195	7,48	0,52	7,40	0,15	2,18	303	11,93	405	7,48	0,24	3,48	0,07	1,02	618	24,02
200	7,87	0,50	7,40	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	7,23	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	0,13	2,03	325	12,80	420	8,27	0,24	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		,		- ,	.,	,		.,

<sup>\*</sup> Please consult your supplier for the risk assessment.



# **VENA BLUE**



### Construction

This product is manufactured with inner food rubber 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 thermal 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	ID - Inner Diameter		r Diameter		Pressure at 20°C	Bursting Water	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 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 Di	iameter	Outer [	Diameter	Bending Radius	Workir	ng Pressure	Workin	g Pressure
(mm)	(inch)	(mm)	(inch)	(mm)	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, 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 or hardening, staying always flexible.

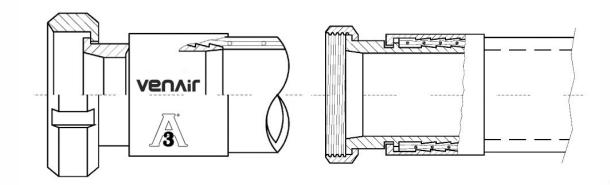
Sil Kitchen can be supplied with brass fittings suitable for many standard needs.





# 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.



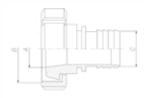


# **STAINLESS STEEL** FITTINGS 316L

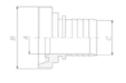
Available in 316L stainless steel, with the exception of the nuts and ferrules which are made of 304 stainless steel. Other fittings can be assembled upon request (RJT, FIL, ISS, MACON, GAS JIC, flanges). Clamps and auxiliary parts for welding can also be manufactured.

# **DIN 11851**

DN	Α	B (DIN 405)	С
		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



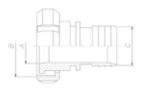
DIN FEMALE



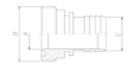
DIN MALE

# **SMS**

DN	Α	В	С
	(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

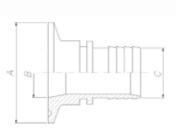


SMS MALE

# **TRI-CLAMP**

а	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

а	b	С
(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

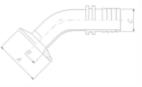


CLAMP

# TRI-CLAMP IMPERIAL

DN	Α		В	(	:
(inch)	(mm)	(inch)	(mm)	(mm)	(inch)
1/2	25	1	9,5	6,35	1/4
3/4	25	1	15,8	6,35	1/4
1/2	25	1	9,5	9,52	3/8
3/4	25	1	15,8	9,52	3/8
1/2	25	1	9,5	12,7 12,7	1/2
3/4	25	1	15,8	12,7	1/2
1/2	25	1	9,5	19,05	3/4
3/4	25	1	15,8	19,05	3/4
1	50	2	22,1	6,35	1/4
1 1/2	50	2 2 2	34,8	6,35	1/4
1	50	2	22,1	9,52	3/8
1 1/2	50	2	34,8	9,52	3/8
1 1/2	50	2	22,1	12,7	1/2
1 1/2	50	2	34,8	12,7	1/2
1	50	2	22,1	19,05	3/4
1 1/2	50	2	34,8	19,05	3/4
1	50	2 2 2 2 2 1/2	22,1	19,05 25,4	1
1 1/2	50	2	34,8	25,4	1
2	64	2 1/2	47,5	25,4	1
1 1/2	50	2 2 1/2 2 1/2	34,8	38,1	1 1/2
2	64	2 1/2	47,5	38,1	1 1/2
2	64	2 1/2	47,5	50,8	2
2 2 1/2	77	3	60,2	50,8	2
2 1/2	77	3	60,2	63,5	2 1/2
3	91	3 9/16	72,9	63,5	2
3 3 4	91	3 9/16	72,9	76,2	2 3 4
4	119	4 11/16	97,4	101,6	4



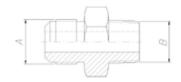


CLAMP 45°



# 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

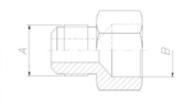
Α	B Ø for hose	
(inch)	(inch)	(mm)
7/16	1/4	6,35
1/2	1/4	6,35
3/4	3/8	9,52
7/8	1/2	12,7
11/16	3/4	19,05
15/16	1	25,4
15/8	11/4	31,75
17/8	11/2	38,10



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



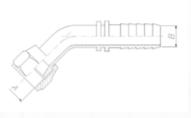
MALE JIC x FEMALE NPTF ADAPTOR

# Female JIC Elbow 45° Insert

Α	B Ø for	hose
(inch)	(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** 

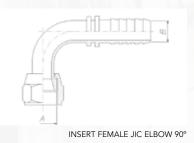
B Ø for hose



FEMALE JIC ELBOW 45° INSERT

# Insert Female JIC Elbow 90°

Α	B Ø for l	nose
(inch)	(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



 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

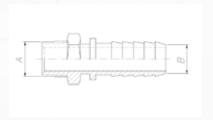
 15/16
 1
 25,4

 15/8
 11/4
 31,75

11/2

38,10

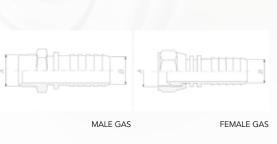
17/8



INSERT MALE NPT

# Male Gas / Female Gas

Α	В
(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
11/2"	38



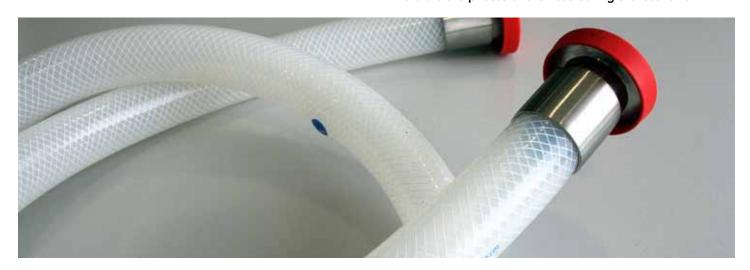






# iHOSE The intelligent hose by VENAIR

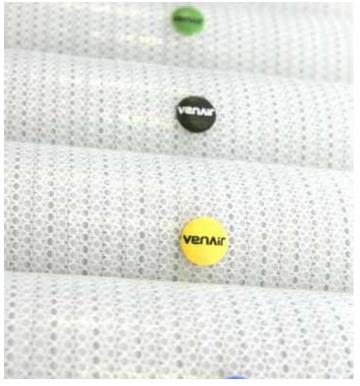
What was the installation date?
When was the last sterilization completed?
Who last checked the hose, and when?
What does last report state?
What kind of cleaning process (CIP, SIP) and how often?
When shall we do next inspection?
Where are the photos of the hose during the last review?



RFID uses radiofrequency waves to identify an object in the distance, which contains a RFID tag. This RFID tag contains an antenna and a small electronic device, which allows the device to work with the energy received through the antenna, and use the same energy to broadcast the information stored in the electronic device (chip). The traceability aims to give the sales order number, production order, FDA and USP certifications, 3A 62-02 certification, ISO9001 and ISO14001, operator reference, manufacture date, product description and lot numbers for hoses and fittings.

- VenaTrack for iHose Mobile (implemented)
   Basic identification system and traceability for Venair hoses

   From smart phone with NFC and Android Identifies the hose, and allows the info to be sent to the user by email
- VenaTrack for iHose Online (implemented)
   Allow the companies to access the information online (through a web page) of the hoses they have purchased, datasheets, quality certificates, etc.
   Grouping by orders, delivery dates...



### **ADVANTAGES**

- 1. We make the hose intelligent
- 2. Time savings
- 3. Inmediate access to the information, at the same place
- 4. Easy reading
- 5. Easy maintenance
- 6. Advanced technology

- Certificates travel along with the product during the entire service life
- 8. Total traceability
- 9. No more paper!
- 10. Very detailed and complete information





# **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:

FOODPHARMACEUTICALCOSMETICSCHEMICALDANONEPFIZERL'OREALSANOFI

NESTLE GLAXO-WELLCOME NIVEA BAYER SCHWEPPES AVENTIS ROC HENKEL

COCA COLA MILLIPORE LANCASTER

KRONEBOURG SCHERING-PLOUGH

# 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  $+250^{\circ}$  C ( $+482^{\circ}$  F) or steam sterilized at  $+135^{\circ}$  C ( $+275^{\circ}$  F) and a pressure of with 3.5 bars. Recommended maximum time: 1.5 hours  $+135^{\circ}$  C ( $+275^{\circ}$  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 than 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

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  $0^{\circ}$ 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-

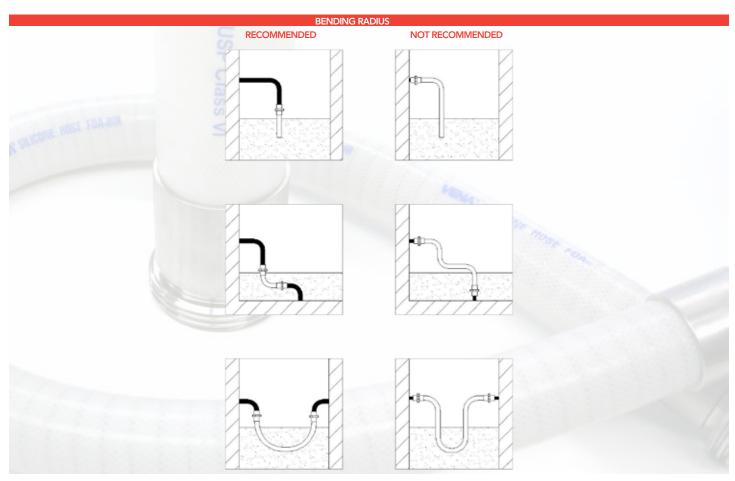
nerated by rubbing the friction of transported particles against the wall of the hoses. With regard to connections, it should be ensured that exterior connections are not subjected to abrasion. However, connections included in the hoses avoid the formation of turbulence that, as already mentioned, can 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 pecified 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.

	S	F	В	٧	P		s	F	В	٧	P		5	F	В	٧	p
Resistance			BUTYFLOOD VENA BLUE			and a page of the two experiences.			101	357			100	200		300	1
to different			8			ammonium persultate 10%	E		A	E	A	barium salts	A	A	A	A	
products:			5		100	ammonium phosphate	A	E	A	E	A	barium sulfate	A	A	A	A	
A - excellent	ш		Æ		Z	ammonium phosphate,	A	E	A	E	A	barium sulfide	A	A	A	A	
B-good	z	-	0	-	VENAFLON	mono-basic						bayol D	D	A	D	A	
	NOU	FLUOSIL	8	VITOSIL	LL	ammonium phosphate,	A	E	A	E	A	beer	A	A	A	A	
C - insufficient	U	0	H	0	×	dibasic						beet sugar liquors	A	A	A	A	
D - unsatisfactory	SILI	2	7	F	2	ammonium phosphate,	A	E	A	E	A	benzaldehyde	D	D	A	D	
E - please, consult	S	H	BC	5	>	tribasic						benzene	D	A	D	A	
	200					ammonium salts	A	C	A	C	A	benzene sulfonic acid	D	В	D	A	A
						ammonium sulfate	A	A	A	A	A	benzine	D	A	D	A	A
						ammonium sulfide	E	E	A	D	A	benzochloride	E	A	A	A	4
A						amyl acetate	D	D	A	D	A	benzoic acid	В	B	D	A	A
acetaldehyde	A	D	A	0	A	amyl alcohol	D	A	A	B	A	benzophenone	E	A	B	A	A
acetamide	В	A	A	B	A	amyl borate	E	E	D	E	A	benzyl alcohol	E	B	B	A	1
acetic acid 5%	A	В	A	A	A	amyl chloride	D	В	D	A	A	benzyl benzoate	E	A	В	A	
acetic acid 30%	A	В	A	B	A	amyl chloronaphthalene	D	B	D	A	A	benzyl chloride	D	A	D	A	A
acetic acid, hot high press	C	D	C	D	A	amyl naphthalene	D	A	D	A	A	black point 77	C	C	A	A	
acetic acid, glacial	В	D	В	D	A		D	В	D	A	A	black sulphate liquors	В	В	В	A	
acetic anhydride	C	D	В	D	A	anderol L 826 (di-ester)	D	В	D	A	A	blast furnace gas	A	B	D	A	
acetone	В	D	A	D	A		D	В	D	A	A	bleach solution	B	В	A	A	
acetophenone	D	D	A	D	A	ang-25 (glycerol ester)	В	В	A	A	A	borax	В	В	A	A	
acetyl acetone	D	D	A	D	A	ang-25 (di-ester base)	В	В	D	A	A	bordeaux mixture	В	В	A	A	
acetyl chloride	C	A	D	A	A	anhydrous ammonia	B	D	A	D	A	boric acid	A	A	A	A	
acetylene	В	E	A	A	A		E	D	B	D	A	boron fluids (HEF)	D	B	D	A	
acetylene tetrabromide	E	E	A	A	A	anhydrous hydrazine anhydrous hydrogen fluo	E	D	A	D	A	brake fluid (non petroleum)	1000	D	A	D	- 10
acetylene tetradronnide acrylonitrile	D	D	D	D	A		D		B		A			B	100.0	A	
-7.10 M. T 10.10 T.		TO S	E		St. 1.5	aniline	100	C		C	72/34	bray GG-130	D		D	1000	100
adipic acid	EB	A		EA	A	aniline dyes	C	В	B	B	A	brayco 719-R (VV-H-910)	B	В	A	D	
aero lubriplate	0	A	D		A	aniline hydrochloride	D	В	C	B	A	brayco 885 MIL-L-6085 A	D	B	D	A	
aero safe 2300	C	C	A	D	A	aniline oils	D	C	В	C	A	brayco 910	D	D	A	D	
aero safe 2300 w	C	C	A	D	A	animal fats	В	A	B	A	A	bret 710	D	D	A	D	
aero shell IAC	В	A	D	A	A	animal oil (lard oil)	В	A	B	A	A	brine	E	E	A	E	
aero shell 7 A grease	В	A	D	A	A	AN-0-3 grade M	В	A	D	A	A	brom-113	D	E	D	E	
aero shell 17 grease	В	A	D	A	A	AN-0-6	D	A	D	A	A	brom-114	D	E	D	В	
aero shell 750	D	B	D	A	A	AN-0-366	D	A	D	A	A	bromine	D	8	D	A	
aerozene 50	D	D	A	D	A	AN-V V-0-366 b hydrofluid	D	A	D	A	A	bromine anhydrous	C	В	E	A	100
(50% hydrazine 50% UDMH)	20	201	19	37	130	ansul ether	D	C	C	Đ	A	bromine pentafluoride	D	D	D	Đ	
air-below 300° F	A	A	В	A	A	aqua regia	D	C	C	В	A	bromine trifluoride	D	D	D	D	
air-above 300° F	A	B	D	A	A	argon	В	B	A	A	A	bromine water	D	В	D	A	A
alkazene	D	В	D	В	A	aroclor 1248	В	В	B	A	A	bromobenzene	D	A	D	A	
alum NH3 Cr-K	A	E	A	D	A	aroclor 1254	C	B	B	A	A	bromochloro trifluoroethan	eD	В	D	A	1
aluminum acetate	D	D	A	D	A	aroclor 1260	A	A	E	A	A	bunker oil	В	A	D	A	A
aluminum bromide	A	A	A	A	A	aromatic fuel 50%	D	B	D	A	A	butadiene	D	В	D	B	A
aluminum chloride	B	A	A	A	A	arsenic acid	A	A	A	A	A	butane	D	A	D	A	A
aluminum fluoride	B	A	A	A	A	arsenic trichloride	E	E	E	E	A	butane 2.2-dimethyl	D	A	D	A	A
aluminum nitrate	В	E	A	A	A	askatel	D	8	D	A	A	butane 2.3-dimethyl	D	A	D	A	A
aluminum phosphate	A	E	A	A	A	asphalt	D	В	D	A	A	butanol (butyl alcohol)	В	A	B	A	
aluminum salts	A	A	A	A	A	ASTM oil #1	A	A	D	A	A	1-butane.2-ethyl	D	C	D	A	
aluminum sulfate	A	A	A	A	A	ASTM pil #2	D	A	D	A	A	butter	В	Ā	В	A	
ambrex 33 mobile	D	C	D	A	A	ASTM oil #3	C	A	D	A	A	butyl acetate	D	D	В	D	
amines, mixed	В	D	В	D	A	ASTM oil #4	Ď	B	D	A	A	butyl acetyl ricinoleate	E	В	A	A	
그러지 않는 아이들이 친하는 아이들이 하는 얼마를 가는 것이 되었다.	C	D	A	D	A	ASTM reference fuel A	D	A	D	A	A	butyl acrylate	E	D	D	D	
ammonia gas, cold	A	A	A	D	A	ASTM reference fuel B	D	A	D	A	A	butyl alcohol	B	A	В	A	
ammonia gas, tota	A	D	В	D	A	ASTM reference fuel C	D	B	D	A	A	butyl anconor butyl amine	В	D	D	D	
ammonia & lichium	D	D	В	D	A	ATL-857	D	В	D	A	A	butyl benzoate	E	A	B	A	
metali solution	-	1	3	0	-	100 To 10	D			A							
ammonium carbonate	Ė	E	K	-	^	atlantic dominion F	-7	A	D		A	butyl butyrate	E	A	A	A	
	E		A	E	A	aurex 903R mobil	D	D	D	A	A	butyl carbitol	D	D	A	C	
ammonium chloride	E	E	A	AB	A	automatic transmission fluid		E	D	A	A	butyl cellosolve	E	D	A	D	
ammonium hydroxide	A	В	A	6	A	automotive brake fluid	C	D	A	D	A	butyl cellosolve adipate	В	B	B	B	
(concentrated)		-										butyl ether	D	0	C	D	
ammonium nitrate	E	E	A	E	A	В	4	y v	10	100	yo	butyl oleate	E	В	В	A	
ammonium nitrite	B	E	A	E		bardol B	D	В	E	A	A	butyl stearate	E	8	В	A	
		-	A	E	A	barium chloride	A	A	A	Δ	A	butylene	D	B	D	A	1
ammonium persulfate solution	E	E	~	-	-		AA	A	A	AA	A	butyraldehyde	D	D	В	D	



	S	F	В	٧	P		S	F	В	٧	Р		S	F	В	٧	P
esistance						chl orobenzene (mono)	D	В	D	Α	A	dibutyl ether	D	С	С	С	1
different			<b>BUTYFLOOD VENA BLUE</b>			chlorobromo methane	D	В	В	В	A	dibutyl phthalate	В	Č	C	В	1
roducts:			AE			chlorobutadiene	D	В	D	A	Α	dibutyl sebacate	В	В	В	В	1
\ - excellent			E		z	chrorododecane	D	A	D	A	A	0-dichlorobenzene	D	В	D	A	A
	ш	١.	>		0	chloroform	D	В	D	A	A	P-dichlorobenzene	D	E	D	E	A
3 - good	Z	FLUOSIL	8	=		O-chloroaphtanene	D	В	D	A	A	dichloro-butane	D	В	D	A	A
- insufficient	0	S	ŏ	VITOSIL	NAFL	I-chloro- I-nitro ethane	D	D	D	ĉ	A	dichloro-isopropyl ether	D	C	C	c	A
) - unsatisfactory	SILIC	0	Ē	0	7		D	D	D	C	A			D	D	D	
- please, consult	_	2	Ē	$\vdash$	E	chlorosulfonic acid						dicyclohexylamine	E				A
picase, consuit	S	I	B	5	>	chlorotoluene	D	В	D	Α	A	diesel oil	D	A	D	A	A
						chlorox	E	Α	В	Α	Α	di-ester lubricant MIL-L-780		В	D	Α	А
						O-chlorphenol	D	В	D	Α	Α	di-ester synthetic lubricants	s D	В	D	Α	А
b.min naid	_	_	D	D	۸	chrome alum	A	E	Α	A	A	diethylamine	В	D	В	D	A
outyric acid	Ε	Е	В	В	Α	chrome plating solution	В	В	D	Α	Α	diethyl benzene	D	C	D	Α	Α
						chromic acid	C	C	C	A	A	diethyl ether	D	C	D	D	A
;						chromic oxide 88 Wt, %	В	В	В	A	A	diethyl sebacate	В	В	В	В	A
alcine liquors	E	Α	Α	Α	Α		Ь	Ь	Ь	~	~		В	В	A	A	A
calcium acetate	D	D	Α	D	A	aqueous solution	_		_			diethylene glycol					
alcium bisulfite	A	A	D	A	A	circo light process oil	D	Α	D	Α	A	difluorodibromomethane	D	E	В	E	A
alcium carbonate	A	A	A	A	A	citric acid	Α	Α	Α	Α	Α	diisobutylene	D	C	D	Α	A
alcium chloride	Â	A	Â	A	A	city service koolmotor-AP	D	Α	D	Α	Α	diisooctyl sebacate	C	C	C	В	А
						gear oil 140 E, P, Lube						diisopropyl benzene	E	В	D	Α	Α
alcium cyanide	A	E	A	E	A	city service pacemaker #2	D	Α	D	Α	Α	diisopropyl ketone	D	D	A	D	A
alcium hydroxide	A	Α	Α	Α	Α	city service #65, #120, #250	D	A	D	A	A	dimethyl aniline	E	D	В	D	A
alcium hypochloride	Е	Α	Α	Α	Α	cobalt chloride	В	A	A	A	A	,	В	D	В	D	A
alcium hypochlorite	В	В	Α	Α	A							dimethyl formamide					
alcium nitrate	В	Α	Α	Α	A	cobalt chloride, 2N	A	A	A	Α	A	dimethyl phthalate	E	В	В	В	A
alcium phosphate	A	E	A	A	A	cocoanut oil	Α	Α	C	Α	Α	dinitro toluene	D	D	D	D	A
alcium salts	B	Ā	A	A	A	cod liver oil	В	Α	Α	Α	Α	dioctyl phthalate	C	В	В	В	А
alcium saits alcium silicate	E	E	A	A	A	coffee	Α	Α	Α	Α	Α	dioctyl sebacate	C	C	В	В	Α
			-			coke oven gas	В	В	D	Α	Α	dioxane	D	D	В	D	Α
alcium sulfide	В	А	Α	Α	Α	coliche liquors	E	E	В	E	Α	dioxolane	D	D	В	D	A
alcium sulfite	Α	Α	Α	Α	Α	convelex 10	D	Ē	E	Ē	A	dipentene	A	D	D	A	A
alcium thiosulfate	A	Α	A	A	A												
aliche liquors	В	Α	Α	Α	A	coolanol (monsanto)	D	В	D	Α	A	diphenyl	D	В	D	Α	A
ane sugar liquors	Α	Α	Α	Α	A	coolanol 45 (monsanto)	D	В	D	Α	Α	diphenyl oxides	C	В	D	Α	А
aproic aldehyde	В	D	В	D	A	+A269						dow chemical 50-4	E	D	Α	D	Α
						copper acetate	D	D	Α	D	A	dow chemical ET378	D	E	E	E	A
arbanate	E	A	В	A	A	copper chloride	A	Α	A	A	A	dow chemical ET588	E	D	В	D	А
arbitol	В	В	В	В	Α	copper cyanide	A	A	A	A	A	dow corning-3	C	A	A	A	A
arbolic acid	D	Α	В	Α	Α		A	A	Â	Â	A		C		Â	A	A
arbon bisulfide	E	A	D	A	A	copper salts	-					dow corning-4		A	-		
carbon dioxide, dry	В	В	В	В	Α	copper sulfate	Α	Α	В	Α	Α	dow corning-5	C	Α	Α	Α	Α
arbon dioxide, wet	В	В	В	В	A	copper sulfate 10%	Α	Α	В	Α	Α	dow corning-11	C	Α	Α	Α	Α
arbon disulfide	E	A	D	A	A	copper sulfate 50%	Α	Α	В	Α	Α	dow corning-33	C	Α	Α	Α	Α
			_			corn oil	Α	A	C	Α	A	dow corning-44	C	A	A	Α	Α
arbon monoxide	A	В	A	Α	A	cottonseed oil	Α	Α	C		A	dow corning-55	C	Α	A	A	Α
arbon tetrachloride	D	А	D	Α	Α	creosols	D	В	D	Α	A	dow corning-200	C	Α	A	A	Α
arbonic acid	Α	Α	Α	Α	Α		D	C	D	A	A	-	C	A	A	A	A
astor oil	A	A	В	A	A	creosote	-					dow corning-220					
ellosolve	D	D	В	D	A	creosote, coal tar	D	A	D	A	A	dow corning-510	C	A	A	A	A
cellosolve acetate	D	D	В	D	A	creosote, wood	D	Α	D	Α	Α	dow corning-550	C	А	Α	Α	A
cellosolve butyl	D	D	В	D	A	creosylic acid	D	В	D	Α	Α	dow corning-704	E	Е	Α	Α	Α
						crude oil	D	В	D		Α	dow corning-705	E	Ε	Α	Α	Α
elluguard	A	A	A	A	A	cumene	D	В	D	Α	Α	dow corning-710	C	Α	A	A	А
ellulube A60 (now fyrquel)		C	Α	В	Α	cutting oil	D	A	D	A	A	dow corning-1208	C	A	A	A	A
ellulube 90,100,150,220,	Α	В	Α	Α	Α	cyclohexane	D	A	D	A	A	dow corning-1200 dow corning-4050	C	A	Â	A	A
00 and 500																	
ellutherm 2505A	Ε	В	D	Α	Α	cyclohexanol	D	A	D		A	dow corning-6620	C	A	A	A	A
etate (hexadecane)	D	C	D	Α	A	cyclohexanone	D	D	В		Α	dow corning-F60	C	Α	Α	A	A
hina wood oil (tung oil)	D	В	C	A	Â	P-cymene	D	В	D	Α	Α	dow corning-F61	В	Α	Α	Α	А
												dow corning-XF60	C	Α	A	Α	А
hloracetic acid	E	D	В	D	A	D						dow guard	A	Α	A	A	А
hlorodane	D	В	D	Α	Α	decalin	D	Α	D	Α	Α	dowtherm oil	В	A	D	A	A
hlorextol	D	В	D	Α	Α								D			-	
nlorinated salt brine	D	Α	D	Α	A	decane	В	A	D	A	A	dowtherm A or E	_	В	D	A	A
hlorinated solvents, dry	D	A	D	A	A	delco brake fluid	C	D	Α	D	Α	dowtherm 209.50%solution	C	Е	Α	D	A
nlorinated solvents, wet	D	A	D	A	A	denatured alcohol	Α	Α	Α	Α	Α	driking water	Α	Α	Α	Α	А
			-			detergent solutions	Α	Α	Α	Α	Α	dry cleaning fluids	D	В	D	Α	А
hlorine, dry	D	A	D	Α	A	developing fluids (photo)	A	Α	В	A	A	DTE light oil	D	A	D	A	A
hlorine, wet	Е	В	C	Α	Α	dextron	D	В	D	A	A	Jie ngilt on				.,	
chlorine dioxide	Ε	В	C	Α	Α												
chlorine dioxide (8%Cl as	Ε	В	D	Α	A	diacetone	D	D	A	D	A	E			_		
IAC102 in solution						diacetone alcohol	D	D	Α	D	Α	elco 28-EP lubricant	В	Α	D	Α	Α
hlorine trifluoride	D	В	D	D	Α	diazinon	D	В	D	В	Α	epichlorohydrin	D	D	В	D	Α
	D	D	A	D		dibenzyl ether	Е	Е	В	D	Α	epoxy resins	E	Е	Α	D	Α
chloroacetone					A	dibenzyl sebacate	C	C	В		Α	esam-6 fluid	E	D	A	D	А
chloroacetic acid	E	E	В	E	A	dibromoethyl benzene	D	В	D		A	esso fuel 208	В	A	D	A	A
chlorobenzene	D	В	D	Α	Α	dibutylamine	C	D	D		A	esso golden gasoline	D	A	D	A	A
						uluutylalliille	L	U	U	U	M	esso doineil dazoille	U	M	U	M	M





	S	F	В	٧	Р		S	F	В	٧	Р		S	F	В	٧	Р
Resistance			ш			fluorocarbon oils	Е	Е	Α	С	Α	sulf EB fluide (amulaian)	D	Α	D	А	Α
to different			<b>BUTYFLOOD VENA BLUE</b>			fluorocarbon ons	A	В	A	E B	A	gulf FR fluids (emulsion) gulf FRG-fluids	A	A	A	A	A
products:			AE			fluorinated cyclic ethers	Ë	E	A	E	A	gulf FRp-fluids	A	В	В	В	A
A - excellent			E		z	fluosilicie acid	E	Ē	Ē	E	A	gulf harmony oils	D	A	D	A	A
B - good	N	_	2	_	ENAFLON	formaldehyde	В	D	Ā	D	A	gulf high temperature	D	A	D	A	A
C - insufficient	2 0	FLUOSIL	ō	VITOSIL	H	formic acid	В	C	A	C	A	grease				-	
D - unsatisfactory	SILIC	0	Ξ	0	A	freon, 11	D	В	D	Α	A	gulf lesion oils	D	Α	D	Α	A.
E - please, consult	$\equiv$	$\supset$	Ξ	Ĕ	Z	freon, 12	D	D	В	В	Α	gulf paraount oils	D	A	D	Α	A.
	S	교	8	5	>	freon, 12 & ASTM-oil #2	D	В	D	Α	Α	gulf security oils	D	Α	D	Α	A.
						(50/50 mixture)											
						freon, 12 & SUNISO 4G	D	В	D	Α	Α	Н					
esso motor oil	D	Α	D	Α	Α	(50/50 mixture)	_					halotane	D	В	D	A	A
esso transmission fluid	D	Α	D	Α	Α	freon, 13	D	D	A	A	A	halowax oil	D B	A	D	A	A A
(typeA)	_		_			freon, 13B1 freon, 14	D D	B E	A	A	A	hannifin lube A heavy water	A	A	A	E	A
esso WS3812 (MIL-L-7808 A)	D	A	D	Α	A	freon, 21	D	E	D	D	A	HEF-2 (high energy fuel)	D	В	D	A	A
esso SP90-EP lubricant	D	Α	D	А	А	freon, 22	D	D	A	D	A	helium	A	A	A	A	A
esstic 42, 43	В	A	D	A	A	freon, 22 & ASTM OIL #2D	В	D	В	A		N-heptane	D	A	D	A	A
ethane	D	В	D	A	A	(50/50 mixture)						N-hexaldehyde	В	D	В	D	A
ethanol	A	C	A	A	A	freon, 31	Ε	Ε	Α	D	Α	hexane	D	A	D	A	A
ethanol amine	В	D	В	D	A	freon, 32	Ε	Ε	Α	D	Α	N-hexane-1	D	Α	D	Α	A.
ethers	D	C	C	C	Α	freon, 112	D	Е	D	Α	Α	hexyl alcohol	В	В	C	Α	A.
ethyl acetate-organic ester	В	D	В	D	Α	freon, 113	D	D	D	В	Α	high viscosity lubricant U14		В	Α	Α	A.
ethyl acetoacetate	В	D	В	D	Α	freon, 114	D	В	Α	В	Α	high viscosity lubricant H2,		В	Α	Α	A
ethyl acrylate	В	D	В	D	А	freon, 114B2	D	E	D	В	Α	hilo MS #1	C	C	В	D	A
ethyl acrylic acid	D	D	В	E	Α	freon, 115	D	E	A	В	A	houghto-safe271	В	В	Α	В	A.
ethyl alcohol	В	Α	A	Α	Α	freon, 142b	E	E	A	D	A	(water and glycol base)	_	_		_	
ethyl benzene	D	Α	D	Α	A	freon, 152a	E	E	A	D	A	houghto-safe 620	В	В	Α	В	A.
ethyl benzoate	D	A	D	A	A	freon, 218 freon, C316	E	E	A	A E	A	(water/glycol) houthto-safe 1010	С	В	А	А	A
ethyl bromide	E	A	D	A	A	freon, C318	E	E	A	A	A	phosphate ester	L	В	A	А	Α.
ethyl cellosolve ethyl cellulose	D	D D	B B	D D	A	freon, 502	E	E	A	B	A	houghto-safe 1055	С	В	Α	А	A
ethyl chloride	D	A	A	A	A	freon, BF	D	Ē	D	A	A	phosphate ester	~	-		^	^
ethyl chlorocarbonate	D	В	D	A	A	freon, MF	D	E	D	В	A	houghto-safe 1120	C	В	Α	Α	A
ethyl chloroformate	D	В	D	A	A	freon, TF	D	E	D	В	A	phosphate ester					-
ethyl cyclopentane	D	Ā	D	A	A	freon, TA	Α	Е	Α	C	A	houghto-safe 5040	C	В	D	Α	A.
ethyl ether	D	С	C	D	A	freon, TC	D	Е	В	Α	Α	(water/oil emulsion)					
ethyl formate	Е	Α	В	Α	Α	freon, TMC	C	Е	В	Α	Α	hydraulic oil					
ethyl hexanol	В	Α	Α	Α	Α	freon, T-P35	Α	Е	Α	Α	Α	(petroleumbase)	C	Α	D	Α	A.
ethyl mercaptan	С	Е	D	В	Α	freon, T-WD602	D	E	В	A	Α	hydrazine	C	E	A	E	A
ethyl oxalate	D	В	D	Α	Α	freon, PCA	D	E	D	В	A	hydrobromic acid	D	A	A	C	A
	D	В	D	A	A	fuel oil fuel oil acidic	D	A	D D	A	A	hydrobromic acid 40% hydrocarbons (saturated)	D	CA	A D	A	A A
ethyl silicate	E	A	A	A	A	fuel oil #6	A	A	D	A	A	hydrochloric acid hot 37%	D	D	C	A	A
ethylene ethylene ehleride	E D	A C	E D	A B	A	fumaric acid	B	A	E	A	A	hydrochloric acid cold 37%		В	A	A	A
ethylene chloride ethylene chlorohydrin	C	В	В	A	A	fuming sulphuric acid	D	E	D	Â	A	hydrochloric acid 3 molar	D	В	A	A	A
ethylene diamine	A	D	A	D	A	(20/25% oleum)	-	-		^	A	hydrochloric acid	D	C	C		A
ethylene dibromide	D	C	Ĉ	A	A	furan (fufuran)	Ε	Е	С	Ε	A	concentrated			_	-	
ethylene dichloride	D	C	C	A	A	fufural	D	Е	В	D	Α	hydrocyanic acid	C	В	Α	Α	A.
ethylene glycol	A	A	D	Α	A	fufuraldehyde	D	Е	В	D	Α	hydro-drive, MIH-50	В	Α	D	Α	A.
ethylene oxide	D	D	C	D	А	fufuraly alcohol	D	D	В	Ε	Α	(petroleum base)					
ethylene trichloride	D	С	C	Α	Α	furyl carbinol	D	D	В	Е	Α	hydro-drive, MIH-10	В	Α	D	Α	A.
ethylmorpholene stannous	Е	Е	В	D	А	fyrquel A60	C	D	В	D	Α	(petroleum base)		_			
octoate (50/50 mixture)						fyrquel 90, 100, 150,	Α	В	Α	Α	A	hydrofluoric acid, 65%	D	Ε	Α	Α	A
_						220, 300, 500						max.cold	_	_	_		
F	_					C						hydrofluoric acid, 65% min.cold	D	D	С	Α	A.
F-60 fluid (dow corning)	D D	A	A	A	A	G galic acid	Ε	Α	В	Α	Α	hydrofluoric acid 65%	D	D	D	С	A
F-61 fluid (dow corning) fatty acids	C	E	D	A	A	gasoline	D	A	D	A	A	max.hot	U	U	U	·	^
FC-43 hetacosofluorotri-	A	A	A	A	A	gelatin	A	A	A	A	A	hydrofluoric acid, 65%	D	D	D	С	Α
butylamine	^	^	~	^	^	grilling brake fluid	E	D	A	D	A	min.hot				-	-
FC75 fluorocarbon	Α	В	А	В	Α	glacial acetic-acid	В	D	В	D	Α	hydrofluosilicic acid	D	D	Α	Α	A
ferric chloride	В	A	A	A	A	glauber's salt	E	A	В	В	Α	hydrogen gas, cold	C	C	A	A	A
ferric nitrate	C	A	A	A	A	glucose	Α	А	Α	Α	Α	hydrogen gas, hot	C	C	Α	Α	A
ferric sulfate	В	Α	Α	Α	Α	glue (depending on type)	Α	А	Α	Α	Α	hydrogen peroxide (1)	Α	Α	Α	Α	A.
fish oil	Α	Α	Α	Α	Α	glycerine-glycerol	Α	А	Α	Α	А	hydrogen 90% (1)	В	В	C	В	A
fluoboric acid	Ε	Е	А	Е	А	glycols	Α	A	Α	Α	Α	hydrogen sulfide dry, cold	C	C	A	D	A
fluorine (liquid)	D	E	C	В	A	green sulphate liquor	A	В	A	A	A	hydrogen sulfide dry, hot	C	C	A	D	A
fluorobenzene	D	В	D	А	A	gulfcrown grease	D D	A	D D	A	A	, ,	C	C	A	D D	
						gulf endurance oils	U	Α	U	A	A	hydrogen sulfide wet, hot	C	C	A	U	A



	S	F	В	٧	P		S	F	В	٧	Р		S	F	В	٧
Resistance			BUTYFLOOD VENA BLUE			lindol, hydraulic fluid	С	С	Α	В	Α	mobiltherm 600	D	A	D D	A
o different			BL			(phosphate ester type) linoleic acid	В	Е	D	В	А	mobilux mono bromobenzene	D	A B	D	A
roducts:			ž		z		A	A	C	A	A	mono chlorobenzene	D	В	D	A
- excellent	ш		¥		0		D	D	D	D	A	mono ethanolamine	В	D	В	D
- good	Z	FLUOSIL	9	=	ENAFLO		C	C	D	A	Α	monomerthyl aniline	E	E	E	В
- insufficient	0	S	2	VITOSIL	AF	liquimoly	D	Α	D	Α	A	monomerthylether	Е	Ε	A	Е
- unsatisfactory	SILIC	5	¥	2	z	lubricating oils, di-ester	D	В	D	Α	Α	monomerthyl hydrazine	D	Ε	Α	Е
- please, consult	=	_	5	Ξ	V E	lubricating oils, petroleum	D	Α	D	Α	Α	monotrotoluene &	D	C	D	C
	v,	-	ш			base						dinitrotoluene(40-60mix)		_		
						lye solutions	В	В	Α	В	Α	monovinyl acethylene	В	E	A	A
ydrolube-water/ethylene	В	В	А	Α	Α	м						mopar brake fluid	C	D E	A	D
glycol ydroquinone	Е	В	D	D	Α	***	Α	Α	Α	Α	Α	mustard gas	A	E	A	Е
dyne	D	D	A	D			E	Ë	A	Â	A	N				
rjet	E	E	Â	D		magnesium sulphate	Ā	Ā	A	Â	A	naptha	D	В	D	А
rjet III	Ē	Ē	A	D			A	A	A	A	A	napthalene	D	A	D	A
vjet S	E	E	Α	D		magnesium salt	Α	Α	Α	Α	Α	napthenic	D	Α	D	A
yjet W	Е	Е	Α	D	Α	malathion	D	В	D	Α	A	natural gas	Α	C	D	Α
drochlorous	Е	Ε	В	Α	Α	maleic acid	Ε	Ε	D	Α	Α	neatsfoot oil	В	Α	В	A
						maleic anhydride	E	Е	D	Α	Α	neon	A	A	A	A
						malicacid	В	Α	D	A	A	neville acid	D	В	В	A
dustron FF44	D	Α	D	Α		MCS 312	A	A	D	A	A	nickel acetate	D	D	A	[
dustron FF48	D	A	D	A		MCS 352	C	C	A	D	A	nickel chloride	A	A	A	4
dustron FF53	D	A	D	A		MCS 463	C	C	A	D	A	nickel salts	A	A	A	4
dustron FF80	D E	A	D B	A		mercuric chloride	E	E	A A	A	A	nickel sulfate niter cake	A	A	A	A
odine odine pentafluoride	D	D	D	D	A	mercury mercury vapor	E	E	A	A	A	nitric acid (1) 3 molar	D	C	В	A
doform	E	E	A	E			D	D	В	D	A	nitric acid (1) concentrated	D	D	D	A
obutyl alcohol	Ā	В	A	Ā	A	methane	D	В	D	A	A	nitric acid dilute	В	В	В	A
o-butyl N-butyrade		A	A	A			A	A	A	A	A	nitric acid (1) red fuming	D		D	C
ododecane	E	Α	D	A	Α		D	D	В	D	A	(RFNA)				
so-octane	D	Α	D	Α	Α	methyl acetoacetate	В	D	В	D	Α	nitric acid (1) inhidited	D	D	D	Е
sophorone (ketone)	D	D	Α	D	Α	methyl acrylate	D	D	В	D	Α	red fuming (IRFNA)				
sopropanol	Α	В	Α	Α	Α	methylacrylic acid	D	D	В	C	Α	nitrobenzene	D	D	D	В
sopropyl acetate	D	D	В	D		methyl alcohol	A	Α	A	D	Α	nitrobenzine	E	A	C	A
sopropyl alcohol	A	В	A	A		methyl benzoate	D	A	В	A	A	nitroethane	D	D	В	
sopropyl chloride	D D	В	D D	A D		methyl bromide	E	A D	D A	A D	A	nitrogene	A	A D	A D	A
sopropyl ether	U	С	U	υ	А	, ,	D	В	D	A	A	nitrogene (textroxide) (N204) (1)	U	U	U	L
l	+						D	D	В	Ď	A	nitromethane	D	D	В	D
P 3 (MIL-J-5624)	D	А	D	Α	Α	methyl cellulose	В	D	В	D	A	nitropropane	D	D	В	D
P 4 (MIL-J-5624)	D	В	D	A		methyl chloride	D	В	C	A	A	пиоргоропо	_	_	_	-
P 5 (MIL-J-5624)	D	В	D	Α	Α	methyl chloroformate	D	В	D	Α	Α	0				
P 6 (MIL-J-25656)	D	В	D		Α	methyl D-bromide	D	В	Е	Α	Α	o-a-548 A	В	В	Α	В
P X (MIL-J-25604)	D	D	D	D	А	, , , , , , , , , , , , , , , , , , , ,	D	В	D	Α	Α	o-t-634b	D	В	D	Α
							D	В	D	В	Α	octachlorotoluene	D	В	D	A
							D	В	D	В	A	octadecane	D	A	D	A
el F liquid	A	В	A	В		methyl ether	A	A	A	A	A	N-octane	D	В	D	A
erosene	D D	A	D D	A	A		D B	D D	A D	D D	A	octyl alcohol	D	B E	A B	A
eystone #87HX-grease	U	A	U	А	А	methyl ethyl ketone peroxyde	D	U	U	U	Α	oleic acid oleum (fuming sulfuric acid	-		D	A
	-					methyl format	В	Ε	В	Ε	А	oleum spirits	D	В	D	A
		D	В	D	Α	methyl isobutyl ketone	D	D	C	D	A	olive oil	D	A	В	A
	E			A		(MIBK)				-	^	oronite 8200	D	A	D	A
actams-amino acids	Ε		Δ	-		methyl isopropyl ketone	D	D	В	D	А	oronite 8515	D	A	D	A
actic acid	Α	Α	A	D			C	D	D	D	Α	orthochloroethylbenzene	D	В	D	A
ctic acid cquers	A D	A D	D	D D	Α	methyl methacrylic			В	Α	Α			В	D	A
ctic acid cquers cquer solvents	Α	Α		D D A		methyl methacrylic methyl oleate	E	В				ortho-dichlorobenzene	D		D	A
ctic acid cquers cquer solvents rd, animals fats	A D D	A D D	D D	D	Α		E	E	В	Е	Α	ortno-dichlorobenzene os45 type III (os45)	D	В		
ctic acid cquers cquer solvents rd, animals fats evender oil	A D D B	A D D A	D D D	D A A D	AAA	methyl oleate		E A	B A	Α	A		_	В	D	
actic acid acquers acquer solvents ard, animals fats avender oil aad acetate	A D D B D D B	ADDABDA	DDDDAA	DAADE	AAAA	methyl oleate methyl salicylate milk mineral oils	E A B	E A A	B A D	A		os45 type III (os45)	D D D	B B	D	A
actams-amino acids actic acid acquers acquer solvents ard, animals fats avender oil aad acetate aad nitrate aad sulphamate	A D D B D D B B	ADDABDAA	DDDDAAA	DAADEA	AAAAA	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE	E A B D	E A A	B A D D	AAA	AAA	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid	D D D B	B B A	D A	A
actams-amino acids actic acid acquers acquer solvents ard, animals fats avender oil ead acetate ead nitrate ead sulphamate ehifh x 1169	A D D B D D B B D	ADDABDAAA	DDDDAAAD	DAADEAA	AAAAAA	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE mobil HF	E A B D E	EAAAA	B A D D D	AAAA	AAAA	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid oxygen, cold	D D D B A	B A A	D A A	A
actams-amino acids actic acid acquers acquer solvents ard, animals fats avender oil ad acetate ad nitrate ead sulphamate ehifh x 1169 ehigh x 1170	A D D B D D B B D D	ADDABDAAAA	DDDDAAADD	DAADEAAA	AAAAAAA	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE	E A B D E	E A A	B A D D	AAA	AAA	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid oxygen, cold oxygen, cold 200-400°F	D D D B A B	BBAAD	D A A D	AAB
actams-amino acids actic acid acquers acquer solvents acquer solvents ard, animals fats avender oil aed acetate aed nitrate aed sulphamate ahifh x 1169 ght greas	A D D B D D B B D D D	ADDABDAAAA	DDDDAAADDD	DAADEAAAA	AAAAAAA	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE mobil HF mobil delvac 1100, 1110, 113	EABDEO	EAAAAD	BADDDA	AAAAD	A A A A	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid oxygen, cold	D D D B A	B A A	D A A	AAB
actams-amino acids actic acid acquers acquer solvents ard, animals fats avender oil aed acetate aed nitrate aed sulphamate shifh x 1169 ght greas groin (petroleum ether	A D D B D D B B D D	ADDABDAAAA	DDDDAAADD	DAADEAAA	AAAAAAA	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE mobil HF mobil delvac 1100, 1110, 113	EABDED A	EAAAAD A	BADDDA A	AAAAD A	A A A A A	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid oxygen, cold oxygen, cold 200-400°F ozone	D D D B A B	BBAAD	D A A D	AAB
actams-amino acids actic acid acquers acquer solvents ard, animals fats avender oil aed acetate aed nitrate aed sulphamate ahifh x 1169 ahigh x 1170 ght greas groin (petroleum ether or benzine)	A D D B D D D D D D	ADDABDAAAAA	DDDDAAADDDD	DAADEAAAA	AAAAAAAA	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE mobil HF mobil delvac 1100, 1110, 113 mobil nyvac 20 and 30 mobil velocite C	EABDED AD	EAAAAD AA	BADDDA AD	AAAAD AA	44444	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid oxygen, cold oxygen, cold 200-400°F ozone	DDDBABA	B A A D B	D A A D A	AABA
actams-amino acids actic acid acquers acquer solvents ard, animals fats avender oil ad acetate and sulphamate shifh x 1169 ght greas groin (petroleum ether	A D D B D D B B D D D	ADDABDAAAA		DAADEAAAA A	AAAAAAAA A	methyl oleate methyl salicylate milk mineral oils mobil 24 DTE mobil HF mobil delvac 1100, 1110, 113 mobil nyvac 20 and 30 mobil velocite C	EABDED A	EAAAAD AA	BADDDA A	AAAAD A	44444	os45 type III (os45) os45 type IV (os45) OS70 oxalic acid oxygen, cold oxygen, cold 200-400°F ozone	D D D B A B	B A A D B	D A A D	AAABA





	S	F	В	٧	Р
Resistance			J.		
to different			B		
products:			¥		
A - excellent	ш		Æ		VENAFLON
B - good	ILICONE	$\exists$	0	_	7
C - insufficient	0	S	8	S	4
D - unsatisfactory	2	0	币	0	A
E - please, consult	_	$\exists$	5	Ξ	Ш
	S	4	B	>	>
palmitic acid	D	Α	В	Α	А
para-dichlorobenzene	D	В	D	Α	A
par-al-keton	D	D	D	D	A
parker o lube	B A	A	D	A	A
peanut oil pentane 2 methyl	D	C	D	A	A
pentane, 2-4 dimethyl	D	C	D	A	A
pentane, 3 dimethyl	D	C	D	Â	A
N-pentane	D	Č	D	A	A
perchloric acid	D	A	В	A	A
perchloroethylene	D	В	D	Α	A
petroleum oil, crude	D	Α	D	Α	Α
petroleum oil, below 250°FB	В	D	Α	Α	
petroleum oil, above 250°F	D	D	D	В	A
phenol	D	В	В	Α	A
phenol, 70%/30%H20	D	В	D	A	A
phenol, 85%/15%H2O	D	В	D	A	A
phenylbenzene	D D	B D	D D	A	A
phenyl ethy ether phenyl hydrazine	E	E	D	D A	A
phorone	D	D	В	D	A
phosphoric acid 20%	В	В	A	A	A
phosphoric acid 45%	D	В	В	A	A
phosphoric acid 3 molar	В	В	A	Α	A
phosphoric acid concent.	C	В	В	A	A
phosphorous trichloride	Ε	Α	Α	Α	Α
pickling solution	D	D	C	В	Α
picric acid H2O solution	D	В	В	Α	A
picric acid molten	D	В	В	Α	A
pinene	D	В	D	A	A
pine oil	D	A	D	A	A
piperidine	D D	D	D	D	A
plating solutions, chrome	D	E	A	A	A
plating solutions, other pneumatic service	D	D	A	A	A
polyvinyl acetate emulsion	D	E	A	E	A
potassium acetate	D	В	Â	D	A
potassium chloride	A	A	A	A	A
potassium cupro cyanide	Α	Α	Α	Α	A
potassium cyanide	Α	Α	Α	A	A
potassium dichromate	Α	Α	Α	Α	Α
potassium hydroxide	C	C	Α	В	Α
potassium nitrate	Α	Α	Α	Α	Α
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	В	A	D	A	A
producer gas	В	В	D	A	A
propane propane propionitrile	D	B	D	A	A
propane propionitrile	D D	D	D B	A D	A
propyl acetate N-propyl acetone	D	D	A	D	A
propyl alcohol	A	A	A	A	A
propyl nitrate	D	D	В	D	A
S					
shell diala	D	Α	D	A	A

	S	F	В	٧	Р
shell iris 905 shell iris 3XF mine fluid	D E	A A	D D	A	A
(fire resist.hydr.)					
shell iris tellus #2 pet.base	D	Α	D	Α	Α
shell iris tellus #33	D	Α	D	Α	Α
shell iris tellus UMF	D	Α	D	А	Α
(5%aromatic)	D		D		
shell Lo hydrax 27 & 29 shell macoma 72	D	A	D	A	A
silicate esters	D	A	D	A	A
silicone greases	C	Α	A	A	A
silicone oils	C	Α	Α	Α	Α
silver nitrate	Α	Α	Α	A	Α
sinclair,opaline CX-EPLlube		A	D	A	A
skelly, solvent B,C,E	E	A	D	A	A
skydrol 500 skydrol 7000	C	C	A	D B	A
soap solution	A	A	A	A	A
socony mobile type A	D	В	D	A	A
socony vacuum AMV	D	В	D	Α	Α
AC781 (grease)					
socony vacuum PD959B	D	A	D	A	A
soda ash	A D	A	A	A	A
sodium acetate sodium bicarbonate	A	D A	A	DA	A
(baking soda)	^	^	^	~	~
sodium bisulfite	Α	А	Α	А	А
sodium borate	Α	Α	A	A	Α
sodium carbonate	Α	Α	Α	Α	Α
(sodium ash)					
sodium chloride	A	A	A	A	A
sodium cyanide	A B	A B	A	A B	A
sodium hydroxide sodium hydrochlorite	В	В	В	A	A
sodium metaphospate	E	A	A	A	A
sodium nitrate	D	Е	Α	Е	Α
sodium perborate	В	Α	Α	Α	Α
sodium peroxide	D	A	Α	Α	Α
sodium phosphate (mono)	D	E	A	A	A
sodium phosphate (dibasic) sodium phosphate (tribasic)		E	A	A	A
sodium phosphate (tribasic) sodium salts	A	A	A	A	A
sodium silicate	E	E	A	A	A
sodium sulphate	Ā	A	A	A	A
sodium sulphide	Α	Α	Α	А	Α
sodium sulphite	Α	Α	Α	Α	Α
sodium trisultate	A	A	A	A	A
sovasol #1, 2 & 3	D	A	D	A	A
sovalsol # 73 & 74 sovbean oil	DA	A	C	A	A
spry	A	A	В	A	A
SR-6 fuel	D	Α	D	Α	Α
SR-10 fuel	D	Α	D	Α	Α
standard oil mobilube	D	Α	D	Α	Α
GX90-EP lube	_		_		
stannic chloride stannic chloride 50%	B	A	B	A	A
stannic chloride 50% stannous chloride	В	A	A	A	A
stauffer 7700	D	В	D	A	A
steam, below 350°F	D	D	A	D	A
steam, above 350°F	D	D	C	D	Α
stearic acid	В	Ε	В	Ε	Α
stoddard solvent	D	Α	D	A	Α
т					
TT-S-735, type II	D	Α	D	Α	Α
TT-S-735, type II	D	A	D	A	A
TT-S-735,type III	D	Α	D	Α	Α
TT-S-735, type IV	C	Α	D	Α	Α
TT-S-735, type V	C	Α	D	Α	Α

	S	F	В	٧	Р
TT-S-735, type VI	С	Α	D	Α	А
TT-T-656b	D	C	Α	D	Α
tannic acid	В	E	A	A	A
tannic acid 10% tar bituminous	В	A	A	A	A
tar oituminous tartaric acid	B	A	D B	A	A
terpineol	E	A	C	A	A
tertiary butyl alcohol	В	В	В	A	A
tertiary butyl catechol	E	A	В	A	A
tertiary butyl mercaptan	D	E	D	A	A
tetrabromomethane	D	В	D	Α	Α
tertabutyl titanate	Ε	Α	Α	A	A
tetrachloroethylene	E	В	D	A	A
tetraethyl lead	E	D	D	A	A
"tetraethyl lead" blend	E	В	D	A	A
tetrahydrofuran tetralin	D	E	B	DA	A
texaco 3450 gear oil	D	A	D	A	A
texaco capella A & AA	D	Â	D	A	A
texaco meropa #3	D	A	D	A	A
texaco regal B	D	A	D	A	A
texaco uni-ttemp grease	В	Α	D	A	A
texamatic "A" trans.oil"	D	В	D	Α	Α
texamatic 1581 fluid	D	В	D	Α	Α
texamatic 3401 fluid	D	В	D	Α	Α
texamatic 3525 fluid	D	В	D	A	A
texamatic 3528 fluid	D	В	D	A	A
texas 1500 oil	В	A	D	A	A
thiodol TP-90B thiodol TP-95	E	B	A	A	A
thionyl chloride	E	E	D	A	A
tidewater oil-beedol	В	A	D	A	A
tidewaater oil multigear	E	A	D	A	A
140, EP lube					
titanium tetrachloride	Ε	В	D	Α	A
toluene	Ε	В	D	Α	Α
toluene discocyanids	Ε	D	В	D	Α
transformer oil	В	Α	D	Α	Α
transmission fluid type A	В	Α	D	A	A
triacetin	E	D	A	D	A
triaryl phosphate	C	В	A	A	A
tributoxyethyl phosphate tributyl mercaptan	E	B	A D	A	A
tributyl phosphate	E	D	A	D	A
trichlorroacetic acid	E	D	В	C	A
trichloroethane	D	E	D	A	A
trichloroethylene	D	В	D	A	A
tricresyl phosphate	C	В	Α	В	Α
triethanol amine	Ε	D	В	D	Α
triethyl aluminum	E	Е	Ε	В	Α
triethyl borane	E	E	E	A	A
trifluoroethane	D	В	D	A	A
trinitroluene	E	В	D	В	A
trioctyl phosphate	C	В	A	В	A
tripoly phosphate	D	B	A	B	A
tung oil (china wood oil)	U	В	υ	A	А
x					
xylene	D	Α	D	Α	Α
sylidepenes-mixed-	D	D	D	D	A
aromatic amines					
xylol	D	Α	D	Α	Α
xenon	Α	Α	Α	Α	Α
Z zeolites	Ε	Α	А	A	А
zeolites zinc acetate	D	D	A	D	A
zinc acetate zinc chloride	E	A	A	A	A
STORY WITHWITH WITH			A		
zinc salts	A	Α	A	Α	Α





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