Biopharm

venair

Flexible tubing & hoses and disposable solutions for pharma and bio processing industries

Fluid solutions. Solid performance.

At **Venair**, we design and create fluid transfer solutions that help top leading companies run all their operations with precision and reliability.

Today, we present more than 35 years of experience manufacturing custom high-quality product and delivering direct assistance to the most demanding industries across the world.

Together, we will achieve the maximum operability for your critical applications.

EMAS

TÜVRheinland CERTIFICADO

Sistema de Gestión
ISO 9001:2015
ISO 14001:2015

www.tuv.com
ID 0910078058

HEADQUARTERS (SPAIN)

+35 years of meaningful innovation

We're involved in each part of the creation, design and engineering of the solution.

Material research and product development

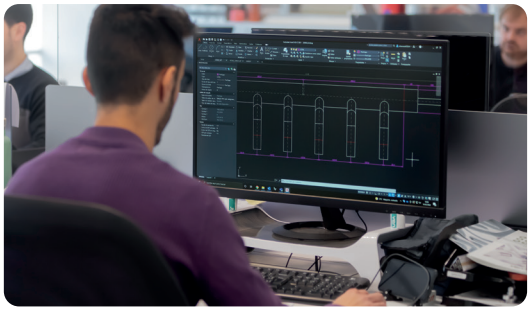
Research of new materials

Development of new products or improvement of existing ones

Design and engineering support

Design advice

Specialized in the design of customized parts



Quality assurance

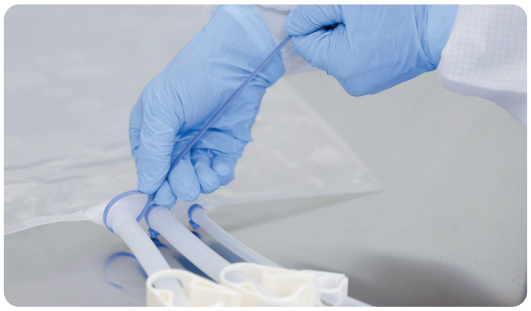
Tailor-made testing for each application

Product certifications required for each market or customer

Custom manufacturing

Custom pieces

Process automation for series production



Biopharm






Content

1. Biotechnology

Venair is a manufacturer of high purity tubing, sampling and storing bags as well as an integrator of high complexity and open architecture single use systems.

With ISO7 cleanrooms distributed in multiple locations, our products reach labs, institutions, CDMOs and big-pharma companies in more than 70 countries in every corner of the globe.

Services

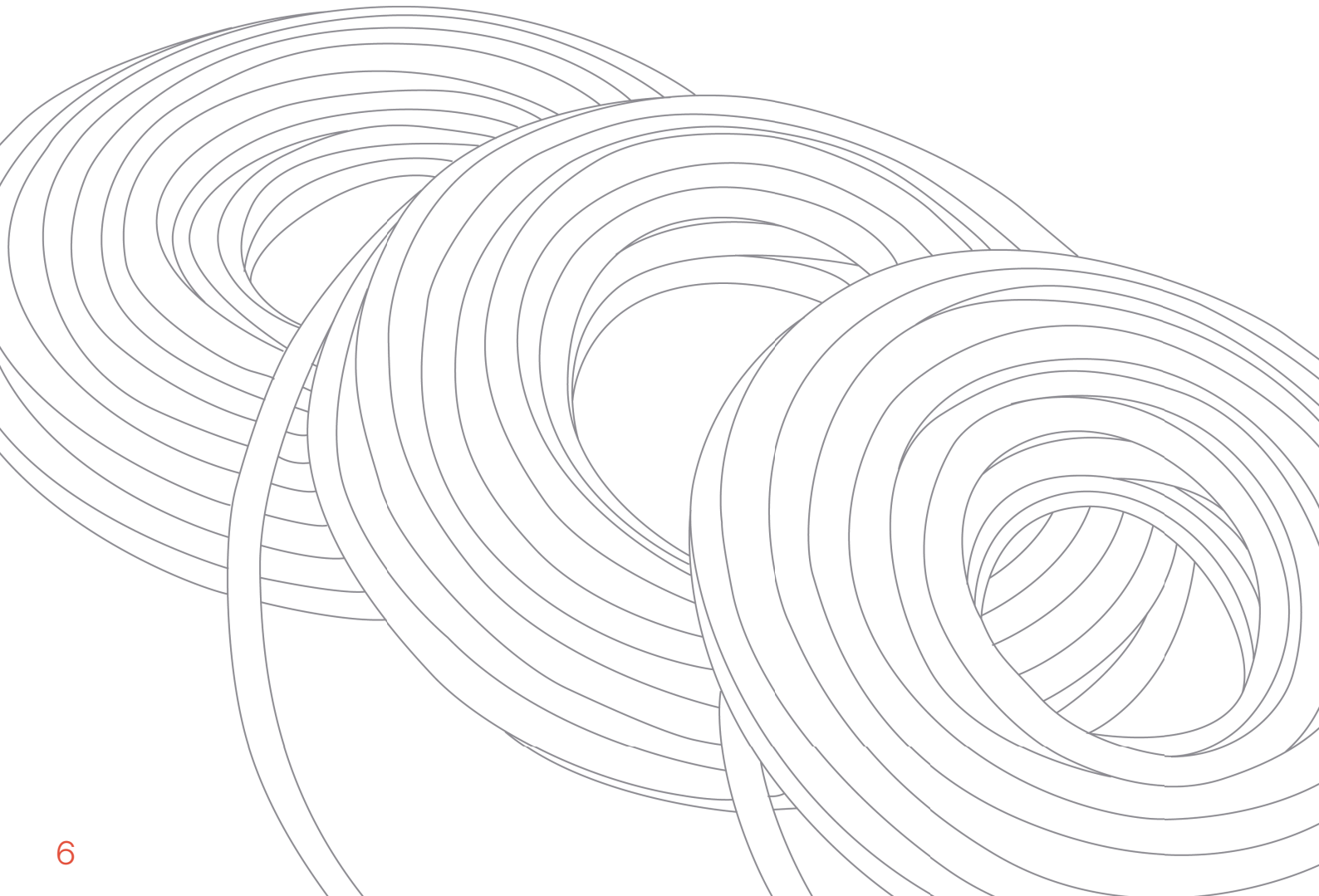
ISO7 clean room manufacturing
Single Use User Requirement implementation
Change notification process
Active business continuity policies
Certificate of Analysis per batch
Certificate of compliance per product
Biocompatibility studies
Extractables and leachables studies
Gamma and X-Ray irradiation
Sterile claim
Integrity testing
Endotoxin and particulate batch release

Biotechnology

Introducing VENABIO®, the biotech range of products.

Products

- Silicone Tubing
- Thermoplastic tubing
- Fluoropolymer tubing
- Silicone overmolding
- 50mL to 500mL sampling bags
- 1L to 50L bioprocessing bags
- Pre-designed SU systems
- Open architecture and customized design SU systems



1.1. Tubing guide

VENABIO® Tubing range comprises all key materials in a broad selection of sizes. To select the right product for your application, check the following guides:

01 Application Guide

02 Regulatory Guide

03 Size Guide

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01 Application Guide

	Flow Pumpgrade	Flow Multipurpose	Braided Plus	Double Braided	Weld	Pump	PTFE	FEP
Material type	Silicone	Silicone	Silicone	Silicone	TPE	TPV	Fluoropolymer	Fluoropolymer
Hardness	50shA	60shA	60shA	60shA	58 ± 5shA	68 ± 5shA	56shD	56shD
Flexibility	+++	+++	+++	+++	+++	+++	+	+
Appearance	Transparent	Transparent	Transparent	Transparent	Transparent	Opaque	Translucid	Transparent
Aseptic Sealing and welding	NO	NO	NO	NO	YES	YES	NO	NO
Peristaltic pump life	++	+	NR	NR	++	+++	NR	NR
Extraction profile	YES	YES	YES	YES	YES	YES	NO	NO
Pressure resistant	NO	NO	YES	YES	NO	NO	YES	YES
Autoclave Sterilization	YES	YES	YES	YES	YES*	YES*	YES	YES
Gamma Sterilization	YES	YES	YES	YES	YES	YES	NO	YES
Molded assemblies	YES	YES	YES	YES	NO	NO	NO	NO
Max Temp [°C]	220	220	180	180	135	135	260	260
Min Temp [°C]	-60	-60	-60	-60	-45	-45	-200	-200
Chemical compatibility	See chart or consult to your sales representative.							

02 Regulatory Guide

Compliance and biocompatibility							
Property Test Cool		After Gamma				Before Gamma	
		FLOW	BRAIDED	PUMP	WELD	FEP	PTFE
Animal derived component Free	General Statement	X	X	X	X	X	X
Phthalates Free	General Statement	X	X	X	X	X	X
PFAS Free	General Statement	X	X	X	X		
Melamine Free	General Statement	X	X	X	X	X	X
Bisphenol Free	General Statement	X	X	X	X	X	X
BSE/ TSE free	General Statement	X	X	X	X	X	X
BfR recommendation XV	General Statement	X	X	X	X		
Reach (EC 1907/2006)	General Statement	X	X	X	X	X	X
Plastics in contact with food safety	EU 10/2011	X	X	X	X		
Materials in contact with food safety	EU 1935/ 2004	X	X	X	X		
Silicone Elastomer for Closures and Tubing	EP 3.1.9.	X	X				
Rubber articles intended for repeated use in contact with food	FDA 21CFR177.2600	X	X	X	X		
Perfluorocarbon resins in repeated contact with food	FDA 21CFR177.1550					X	X
Biological reactivity, in vivo, Class VI	USP 88	X	X	X	X	X	X
Bacterial endotoxins	USP 85	X	X	X	X		
Biological reactivity, in vitro	USP 87	X	X	X	X		
Hemolysis	ISO 10993-4	X	X	X	X		
Cytotoxicity	ISO 10993-5	X	X	X	X		
Local effects after implantation	ISO 10993-6	X	X	X	X		
Irritation and delayed type hypersensitivity	ISO 10993-10	X	X	X	X		
Systemic toxicity	ISO 10993-11	X	X	X	X		
Particulate matter in injections	USP 788	X	X	X	X		
Extractables study	USP 665	X	X	X	X		

03 Size Guide

Standard Size Guide, non reiforced tubing

METRIC (mm)			IMPERIAL (inches)			PUMP SIZE	FLOW	WELD	PUMP
ID	OD	WALL	ID	OD	WALL				
0.8	2.4	0.8	1/32	3/32	1/32		x		
1.6	3.2	0.8	1/16	1/8	1/32		x		
1.6	4.8	1.6	1/16	3/16	1/16	14	x	x	x
1.6	6.4	2.4	1/16	1/4	3/32		x		
2.4	4.0	0.8	3/32	5/32	1/32		x		
2.4	5.6	1.6	3/32	7/32	1/16		x		
3.2	4.8	0.8	1/8	3/16	1/32		x		
3.2	6.4	1.6	1/8	1/4	1/16	16	x	x	x
3.2	7.9	2.4	1/8	5/16	3/32		x		
3.2	9.5	3.2	1/8	1/8	1/8		x		
4.0	5.6	0.8	5/32	7/32	1/32		x		
4.0	7.1	1.6	5/32	9/32	1/16		x		
4.0	8.7	2.4	5/32	11/32	3/32		x		
4.8	6.4	0.8	3/16	1/4	1/32		x		
4.8	7.9	1.6	3/16	5/16	1/16	25	x	x	x
4.8	9.5	2.4	3/16	3/8	3/32	15	x		
4.8	11.1	3.2	3/16	7/16	1/8	123	x		
6.4	7.9	0.8	1/4	5/16	1/32		x		
6.4	9.5	1.6	1/4	3/8	1/16	17	x	x	x
6.4	11.1	2.4	1/4	7/16	3/32	24	x	x	x
6.4	12.7	3.2	1/4	1/2	1/8	26	x	x	x
7.9	11.1	1.6	5/16	7/16	1/16	18	x	x	x
7.9	12.7	2.4	5/16	1/2	3/32	35	x	x	x
7.9	14.3	3.2	5/16	9/16	1/8		x		
9.5	12.7	1.6	3/8	1/2	1/16		x		
9.5	14.3	2.4	3/8	9/16	3/32	36	x	x	x
9.5	15.9	3.2	3/8	5/8	1/8	70	x	x	x
11.1	14.3	1.6	7/16	9/16	1/16		x		
12.7	15.9	1.6	1/2	5/8	1/16		x		
12.7	17.5	2.4	1/2	11/16	3/32		x		
12.7	19.1	3.2	1/2	3/4	1/8	80	x	x	x
12.7	22.2	4.8	1/2	7/8	3/16		x		
15.9	22.2	3.2	5/8	7/8	1/8	89	x		
15.9	25.4	4.8	5/8	3/16	3/16				
19.1	25.4	3.2	3/4	1	1/8		x	x	x
19.1	28.6	4.8	3/4	1 1/8	3/16		x		
22.2	31.8	4.8	7/8	1 1/4	3/16				
25.4	31.8	3.2	1	1 1/4	1/8		x		
25.4	34.9	4.8	1	1 3/8	3/16		x		
25.4	38.1	6.4	1	1 1/2	1/4		x		

03 Size Guide

Size Guide Braided Plus

METRIC (mm)			IMPERIAL (inches)		
ID	OD	WALL	ID	OD	WALL
4.80	11.10	3.20	3/16	4/9	1/8
6.40	12.70	3.20	1/4	1/2	1/8
9.50	15.90	3.20	3/8	5/8	1/8
12.70	22.20	4.80	1/2	7/8	3/16
15.90	25.40	4.80	5/8	1	3/16
19.10	28.60	4.80	3/4	1 1/8	3/16
22.20	31.80	4.80	7/8	1 1/4	3/16
25.40	34.90	4.80	1	1 3/8	3/16

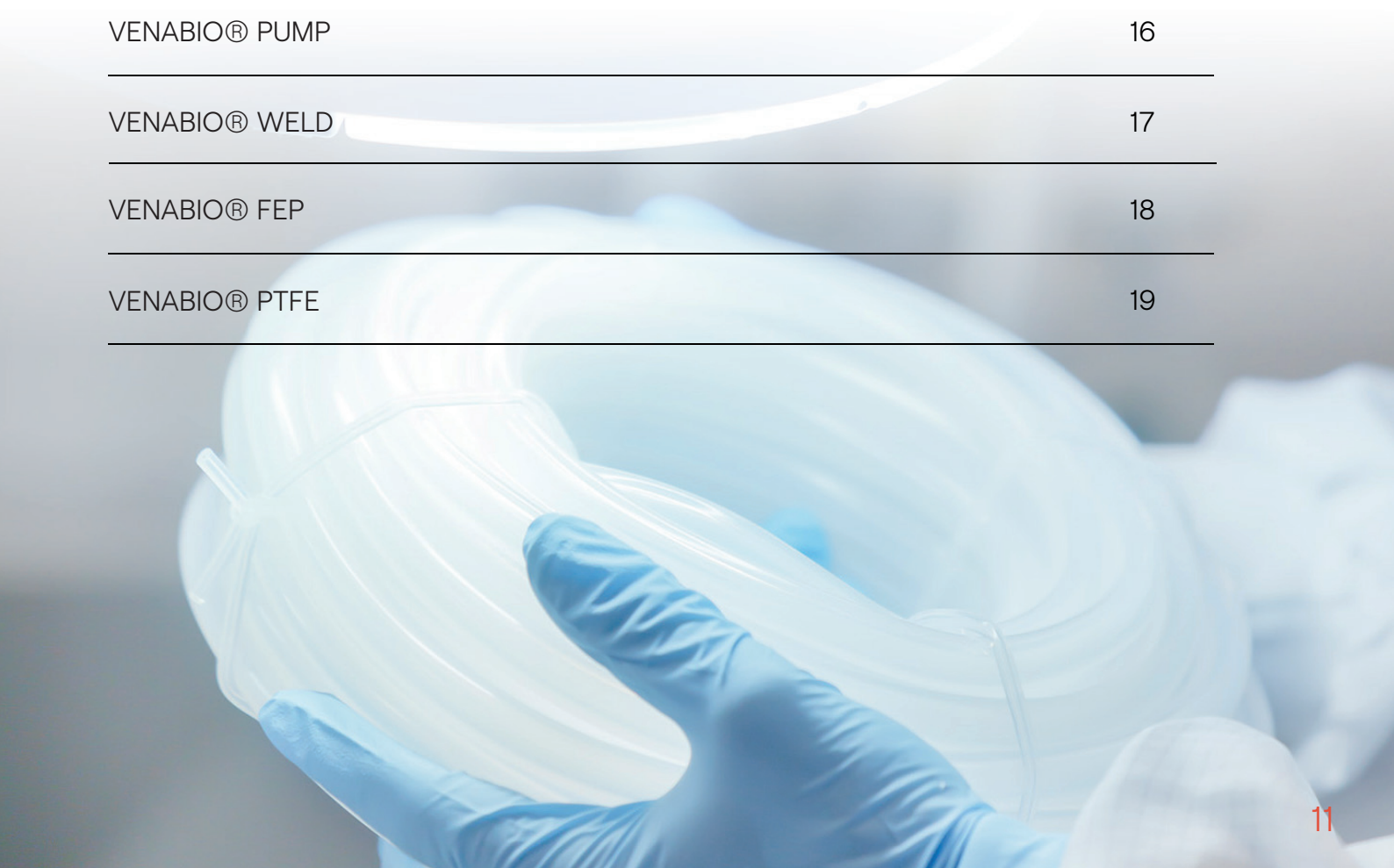
Size Guide Double Braided

METRIC (mm)			IMPERIAL (inches)		
ID	OD	WALL	ID	OD	WALL
5.10	13.10	4.00	1/5	-	-
6.40	16.10	4.85	1/4	-	-
7.90	18.00	5.05	5/16	-	-
9.50	20.00	5.25	3/8	-	-
12.70	22.70	5.00	1/2	-	-
15.90	27.10	5.60	5/8	-	-
19.10	30.60	5.75	3/4	-	-
22.20	33.20	5.50	7/8	-	-
25.40	37.00	5.80	1	-	-
28.00	41.60	6.80	1 1/8	-	-
31.80	46.10	7.15	1 1/4	-	-

1.2. Tubing

Platinum cured silicone, braided and double braided hoses, thermoplastic elastomers and fluoropolymers make our tubing portfolio for the high value drug substance transfer applications.

Products



FLOW RANGE

APPLICATIONS

Silicone tubing is the basic material upon any single use process is built. Its great overall performance and resistance to temperature, moist, ozone and steam and high biocompatibility makes it the product of choice for all stages of bioprocessing, from drug formulation, upstream processing and all downstream's critical steps from separation to final fill.

MATERIAL

Platinum cured silicone. Postcured to completely eliminate volatiles.

ROLL LENGTH

Available in 25ft and 50ft. Other lengths under demand

LASER ETCHED

Traceable with reference, lot number and ID/OD

CLEAN ROOM

Manufactured in ISO14644-1 Class 7

DOUBLE BAG

Double bagged ISO14644-1 Class 7

TEMPERATURE

-60°C/+220°C (-76°F/ +428°F)

ANIMAL FREE

Animal derived component free.

SMOOTHNESS

Reduces protein binding and biofilm formation

RADIOSTABLE

Gamma/eBeam sterilization available

VENABIO® Pumpgrade

CODE: 9200851*
HARDNESS: 50ShA

For the applications where low flow variations and long pumplife are of the utmost importance, lower hardness is recommended.

VENABIO® Multipurpose

CODE: 9200852*
HARDNESS: 60ShA

This product is the workhorse for the majoritiy of fluid management applications happening in manufacturing and filling plants. It is used upstream from the media prep to the harvest stage and downstream all the way from the first filtration stages to the final filling. This hardness provides a compromise in pumping performance and the little pressures generated by filter incorporation to the fluid path.

BRAIDED RANGE

APPLICATIONS

Silicone tubing is the basic material upon any single use process is built. Its great overall performance and resistance to temperature, moist, ozone and steam and high biocompatibility makes it the product of choice for all stages of bioprocessing, from drug formulation, upstream processing and all downstream's critical steps from separation to final fill.

MATERIAL

Platinum cured silicone. Postcured to completely eliminate volatiles. Reinforced with a polyester.

ROLL LENGTH

Available in 25ft, 50ft. Other lengths under demand

LASER ETCHED

Traceable with reference, lot number and ID/OD

CLEAN ROOM

Manufactured in ISO14644-1 Class 7

TEMPERATURE

-60°C/+180°C (-76°F/+356°F)

DOUBLE BAG

Double bagged ISO14644-1 Class 7

HARDNESS

60ShA

ANIMAL FREE

Animal derived component free.

SMOOTHNESS

Reduces protein binding and biofilm formation.

RADIOSTABLE

Gamma/eBeam sterilization available.

VENABIO® Braided plus

CODE: 92008542*

BRAIDING: Single & High-performance polyester

This product is braided using a high-performance polyester yarn. This provides increased pressure resistance and a maximum temperature of 180°C. The ID/OD dimensions of this product have been harmonized to the standard imperial sizing.

VENABIO® Double braided

CODE: 9200855*

BRAIDING: Two separated polyester layers

This product is braided twice using a polyester yarn and a silicone layer between them. This provides the highest pressure resistance and a maximum temperature of 180°C.

VENABIO® PUMP

APPLICATIONS

This product is specially designed to work in long lasting pump cycles, where silicone would need to be replaced mid-batch. The average pump life when proper maintenance is followed is in the thousand-hour range. It is important to mention that a thermoplastic is heat sensitive, so dry heat, SIP and autoclave sterilization cycles should be avoided.

MATERIAL

Thermoplastic vulcanizated
CODE: 92008810*

ROLL LENGTH

Available in 25ft, 50ft. Other lengths under demand

LASER ETCHED

Traceable with reference lot number and ID/OD

CLEAN ROOM

Manufactured in ISO14644-1 Class 7

WELDING

Heat sealable and weldable biopharmaceutical tubing

PUMPLIFE

Longest pumplife available

TEMPERATURE

-45°C/+135°C(-49°F/+275°F)

DOUBLE BAG

Double bagged ISO14644-1 Class 7

HARDNESS

68 ±5 ShA

ANIMAL FREE

Animal derived component free

RADIOSTABLE

Gamma/eBeam sterilization available

VENABIO® WELD

APPLICATIONS

This product satisfies the need for a heat sealable and weldable biopharmaceutical tubing. It provides disconnection and reconnection capabilities through a cuttable seal and aseptic welding. It is important to mention that a thermoplastic is heat sensitive, so dry heat, SIP and autoclave sterilization cycles should be avoided.

MATERIAL

Thermoplastic elastomer
CODE: 92008910*

ROLL LENGTH

Available in 25ft, 50ft. Other lengths under demand

LASER ETCHED

Traceable with reference lot number and ID/OD

CLEAN ROOM

Manufactured in ISO14644-1 Class 7

WELDING

Heat sealable and weldable biopharmaceutical tubing

TEMPERATURE

45°C/+135°C (-49°F/+275°F)

DOUBLE BAG

Double bagged ISO14644-1 Class 7

HARDNESS

58 ± 5ShA

ANIMAL FREE

Animal derived component free

RADIOSTABLE

Gamma/eBeam sterilization available

VENABIO® FEP

APPLICATIONS

This is a fluoropolymer tubing especially recommended for the most aggressive chemicals, pressurized gas transfer and abrasive particles in the pharmaceutical and biopharm processes. It is highly transparent and semi-flexible. This product is gamma stable.

MATERIAL

Fluorinated ethylene propylene
CODE: 92201100*

ROLL LENGTH

Available in 25ft

TEMPERATURE

-200°C/+205°C(-328°F/+421°F)

HARDNESS

56ShD

UNIVERSAL

Universal chemical compatibility

LOW PERMEABILITY

Pressurized gas transfer

ANIMAL FREE

Animal derived component free

RADIOSTABLE

Gamma/eBeam sterilization available.

VENABIO® PTFE

APPLICATIONS

This is a fluoropolymer tubing especially recommended for the most aggressive chemicals, pressurized gas transfer and abrasive particles in the pharmaceutical and biopharm processes. It is highly translucid and semi-flexible.

MATERIAL

Politetrafluoroethylene
CODE: 92201200*

ROLL LENGTH

Available in 25ft

TEMPERATURE

-200°C/+205°C (-328°F/ +421°F)

HARDNESS

56 ShD

UNIVERSAL

Universal chemical compatibility.

LOW PERMEABILITY

Pressurized gas transfer

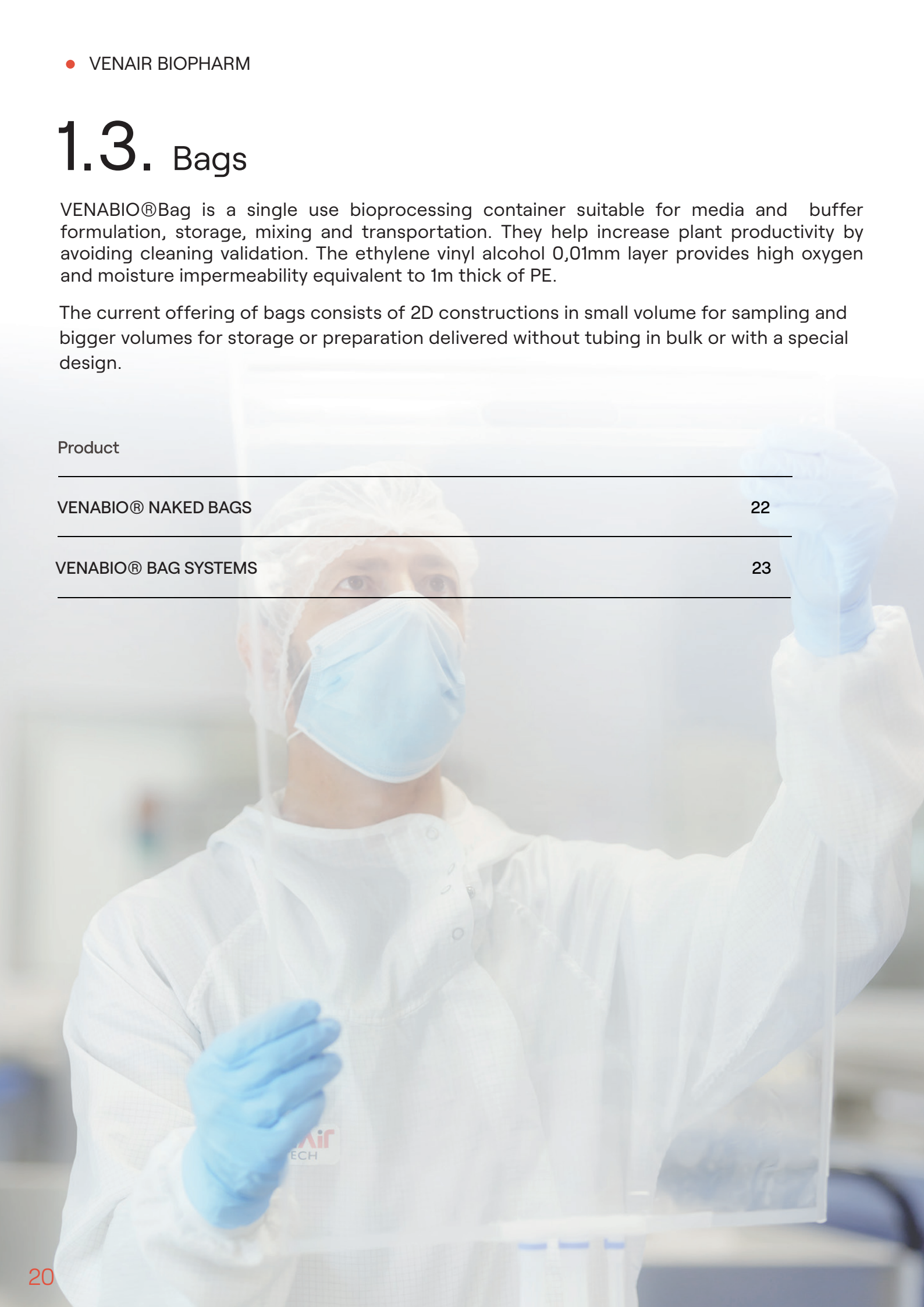
ANIMAL FREE

Animal derived component free.

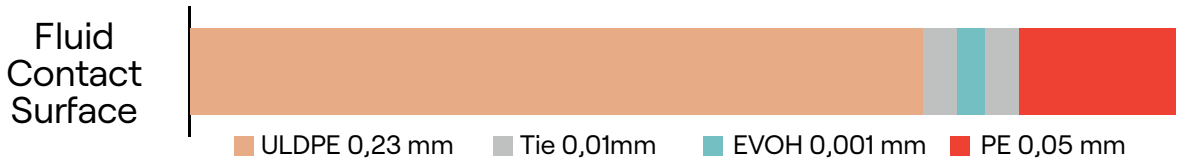
1.3. Bags

VENABIO®Bag is a single use bioprocessing container suitable for media and buffer formulation, storage, mixing and transportation. They help increase plant productivity by avoiding cleaning validation. The ethylene vinyl alcohol 0,01mm layer provides high oxygen and moisture impermeability equivalent to 1m thick of PE.

The current offering of bags consists of 2D constructions in small volume for sampling and bigger volumes for storage or preparation delivered without tubing in bulk or with a special design.



Film Material



Film Specifications

PROPERTY	TEST PROTOCOL	VALUE
Mechanical propeerties after 25kGy gamma dose		
Film thickness	-	0,325 mm
Haze	ASTM D-1003	7%
Clarity	ASTM D-1003	97%
Transmittance	ASTM D-1003	93%
Tensile strength at break	ASTM D-882	13 Mpa
Elongation at break	ASTM D-882	360%
Elastic modulus	ASTM D-882	300 MPa
Break at cold temperature	ISO 8570	below - 45°C
Density	ASTM D-792	0,9 g/cm3
Water vapour transmision rate at 23°C 100% RH	ASTM F-1249	0,32 g/(m2.day)
Oxygen permeability at 23°C 0% RH	ASTM D-3985	0,05 cm3 /(m2.day.bar)
Carbon dioxide permeability at 23°C 0% RH	ASTM F-2476	0,02 cm3 /(m2.day.bar)
Compliance and biocompatibility after 25kGy gamma dose		
Animal derived component free	ADCF	Pass
Bacterial endotoxins	USP <85>	<0,005 EU/mL
Biological reactivity tests, in vitro, Class VI	USP <87>	Pass
Buffer capacity	USP <661>	0,10 mL
Nonvolatile residue	USP <661>	0,0 mg
Heavy metals	USP <661>	Pass
Residue on ignition	USP <661>	Pass
Hemolysis	ISO 10993-4	0,0%
Cytotoxicity	ISO 10993-5	Pass
Local effects after implantation	ISO 10993-6	Pass
Irritation and delayed type hypersensitivity	ISO 10993-10	Pass
Sensitization	ISO 10993-10	Pass
Acute systemic toxicity	ISO 10993-11	Pass
Appearance	EP <3.1.5>	Pass
Acidity	EP <3.1.5>	<1,5 mL NaOH
Alkalinity	EP <3.1.5>	<1,0 mL HCl
Absorbance	EP <3.1.5>	<0,2 abs
Reducing substances	EP <3.1.5>	< 3,0 mL $KMnO_4$

VENABIO® NAKED BAGS

We manufacture our line of Sampling (50mL, 150mL, 250mL and 500mL) and Bioprocessing (1L, 2L, 5L, 10L, 20L and 50L) in one of our ISO7 cleanrooms in Barcelona, Spain.

LINE	VOLUME	PORTS	QUANTITY	FILM	DESCRIPTION
Sampling	50mL	Injected PE boat weld with 2 ports of 3,2mm	1pc 10/pk 50/pk	Multilayer PE with oxygen barrier	Wide center hole with hard plastic support
	150mL				
	250mL				
	500mL				
Bioprocessing	1L	Injected PE boat weld with 3 ports of 1x 3,2mm 2x 6,4mm	1pc 10/pk 50/pk	Multilayer PE with oxygen barrier	Pair of self-supporting circular holes
	2L				
	5L				
Bioprocessing	10L	Injected PE boat weld with 3 ports of 1x 3,2mm 2x 9,5mm	1pc 10/pk 50/pk	Multilayer PE with oxygen barrier	Pair of self-supporting circular holes
	20L				
	50L				

TUBING AVAILABLE IN:

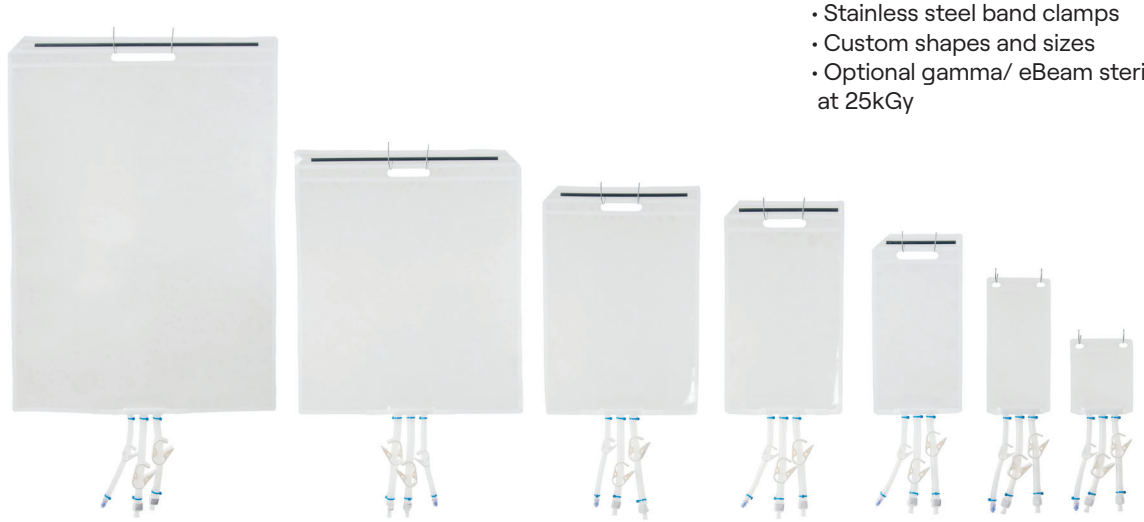
- VENABIO® FLOW
- VENABIO® PUMP
- VENABIO® WELD

CONNECTORS AVAILABLE IN:

- Polypropylene
- Polycarbonate
- PVDF

UNDER DEMAND:

- Different combination of inlet/outlet
- Other port lengths and diameters
- Sanitary fitting triclamp 25mm
- Stainless steel band clamps
- Custom shapes and sizes
- Optional gamma/ eBeam sterilization at 25kGy



VENABIO® BAG SYSTEM

VOLUME	PORT	SIZE	LENGTH	CONNECTIONS	DESCRIPTION
50mL 150mL 250mL 500mL	Sampling Inlet	ID 3,20mm x OD 6,40mm ID 3,20mm x OD 6,40mm	0,3m	LUER	Needlefree swabable valve female luer lock, Polycarbonate Male luer lock, Polycarbonate, cap included Female luer lock, Polycarbonate, cap included
50mL 150mL 250mL 500mL	Sampling Inlet	ID 3,20mm x OD 6,40mm ID 3,20mm x OD 6,40mm	0,3m	QUICK CONNECT	Needlefree swabable valve female luer lock, Polycarbonate RQC male quick connector, MPC compatible, Polypropylene, cap included RQC female quick connector, MPC compatible, Polypropylene, cap included
1L 2L 5L	Sampling Inlet Outlet	ID 3,20mm x OD 6,40mm ID 6,40mm x OD 9,50mm ID 6,40mm x OD 9,50mm	0,3m	QUICK CONNECT	Needlefree swabable valve female luer lock, Polycarbonate RQC male quick connector, MPC compatible, Polypropylene, cap included RQC female quick connector, MPC compatible, Polypropylene, cap included
1L 2L 5L	Sampling Inlet Outlet	ID 3,20mm x OD 6,40mm ID 6,40mm x OD 9,50mm ID 6,40mm x OD 9,50mm	0,3m	TRICLAMP	Needlefree swabable valve female luer lock, Polycarbonate Sanitary fitting triclamp 50mm, Polypropylene Sanitary fitting triclamp 50mm, Polypropylene
10L 20L 50L	Sampling Inlet Outlet	ID 3,20mm x OD 6,40mm ID 9,50mm x OD 15,90mm ID 9,50mm x OD 15,90mm	0,3m	QUICK CONNECT	Needlefree swabable valve female luer lock, Polycarbonate RQC male quick connector, MPC compatible, Polypropylene, cap included RQC female quick connector, MPC compatible, Polypropylene, cap included
10L 20L 50L	Sampling Inlet Outlet	ID 3,20mm x OD 6,40mm ID 9,50mm x OD 15,90mm ID 9,50mm x OD 15,90mm	0,3m	TRICLAMP	Needlefree swabable valve female luer lock, Polycarbonate Sanitary fitting triclamp 50mm, Polypropylene Sanitary fitting triclamp 50mm, Polypropylene

1.4 GMP-grade Single Use Systems

We understand the importance of optimizing your biomanufacturing processes to save time, space, and resources, while increasing flexibility, product quality, and scalability. That's why we offer both common and customized designs that are tailored to meet your unique facility needs and process parameters.

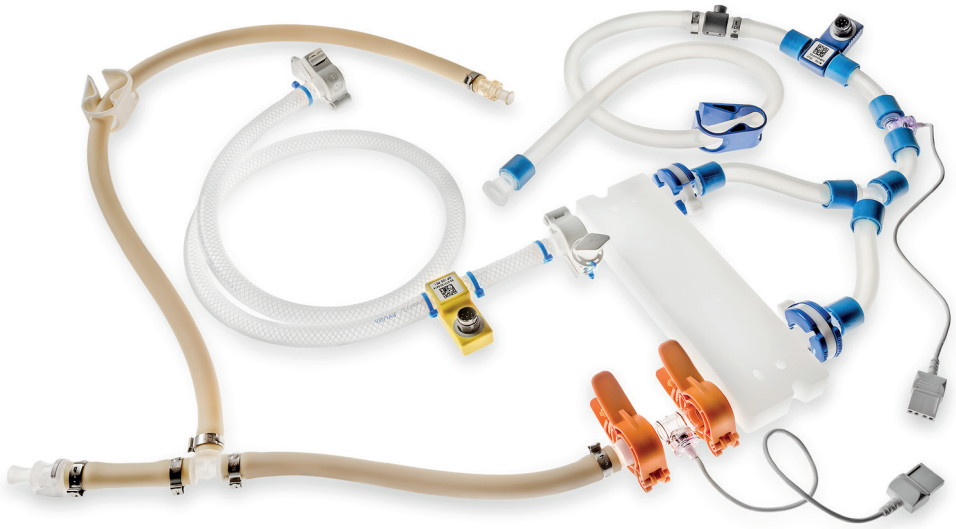
Our team of experts has years of experience designing and developing Single Use Systems that can be used in multiple unit operations with manual or automated filling. We provide flexible designs that enable you to choose the number and type of single-use bags/film technology, standard tubing, standard connectors, and equipment integration that best suits your needs.

- Tranfer lines
- Y pump kits
- Sampling bottle manifolds
- Sampling bag assemblies
- Bottle seed train
- Storing bags up to 50L
- Filter and TFF kits
- Sensorized PUPSIT architecture with drain bags
- Filling lines with SS316L or PEEK needles
- Whole “tank-to-vial” filling assembly with RTP Beta bags

We understand that each facility has unique challenges, and we’re here to help you overcome them. Our customizable Single Use Systems are designed to help you achieve the highest level of process optimization, so you can focus on what you do best: biomanufacturing.

Customized open architecture

Our commitment to your success means that we offer direct access to experienced engineers who can help you with any questions or concerns you may have. We pride ourselves on providing quick prototyping and short lead times so that you can get your system up and running as soon as possible.



With our systems, you can transition seamlessly from bench to commercial scale, reducing time, space, and resources while increasing flexibility and scalability. For this reason we offer our integration services in a wide range of regulatory profiles for every stage of your development:

APPLICATION	LEVEL	GAMMA 25kGy	SHELF LIFE	STERILE CLAIM	USP 85	USP 788	INTEGRITY
Prototypes	0	-	-	-	-	-	-
Bioburden reduced	1	Yes	-	-	-	-	-
GMP grade	2	Yes	2 years*	Yes	-	-	-
GMP grade	3	Yes	2 years*	Yes	Lot release	Lot release	-
GMP grade	4	Yes	2 years*	Yes	Lot release	Lot release	Leak tested**
Customized	9	Any custom combination of services					

*Although VENAIR strives to offer a 2 year shelf life, there are instances when certain components may not have 2 years shelf life prior to manufacture of an assembly and the expiration date of the whole assembly is adjusted based on the component with the shortest shelf life. Regarding shelf life for sterility, there is currently a risk assessment that supports a 2 year period. Data from accelerated and real time aged sterile barrier system properties is currently being generated to back this claim.

** Pressure decay leak testing is performed partially or not performed at all when prohibited by the design.

Component library

Tubing

- VENABIO® Precision
- VENABIO® Flow 50
- VENABIO® Flow 60
- VENABIO® Braided Plus
- VENABIO® Weld
- VENABIO® Pump
- Other brands available

PE/EVOH Bags

- 2 ports 3,2/3,2mm; 50mL to 500mL
- 3 ports 3,2/6,4/6,4mm; 1L to 5L
- 3 ports 3,2/9,5/9,5mm; 10L to 50L
- Customized ports and shapes
- Multiple brands available

Aseptic connectors and disconnectors

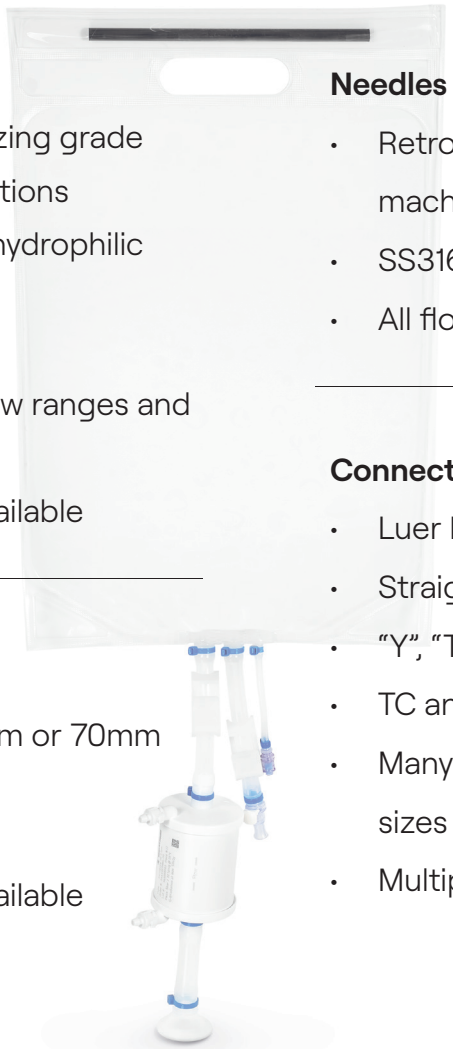
- Genderless and high temperature options
- TC and HB connections
- Big range of dimemsions

Sensors

- Pressure, Flow, Conductivity,
- PH, Turbidity and Air detection
- Multiple brands available

Single Use Pump-Heads

- Pulsation-free fast transfer
- No protein aggregation
- Low particle release
- Ultra-low shear technology



Filters

- Venting and Sterilizing grade
- TC and HB connections
- Hydrophobic and hydrophilic options
- Gamma stable
- Many materials, flow ranges and pores sizes
- Multiple brands available

Bottles

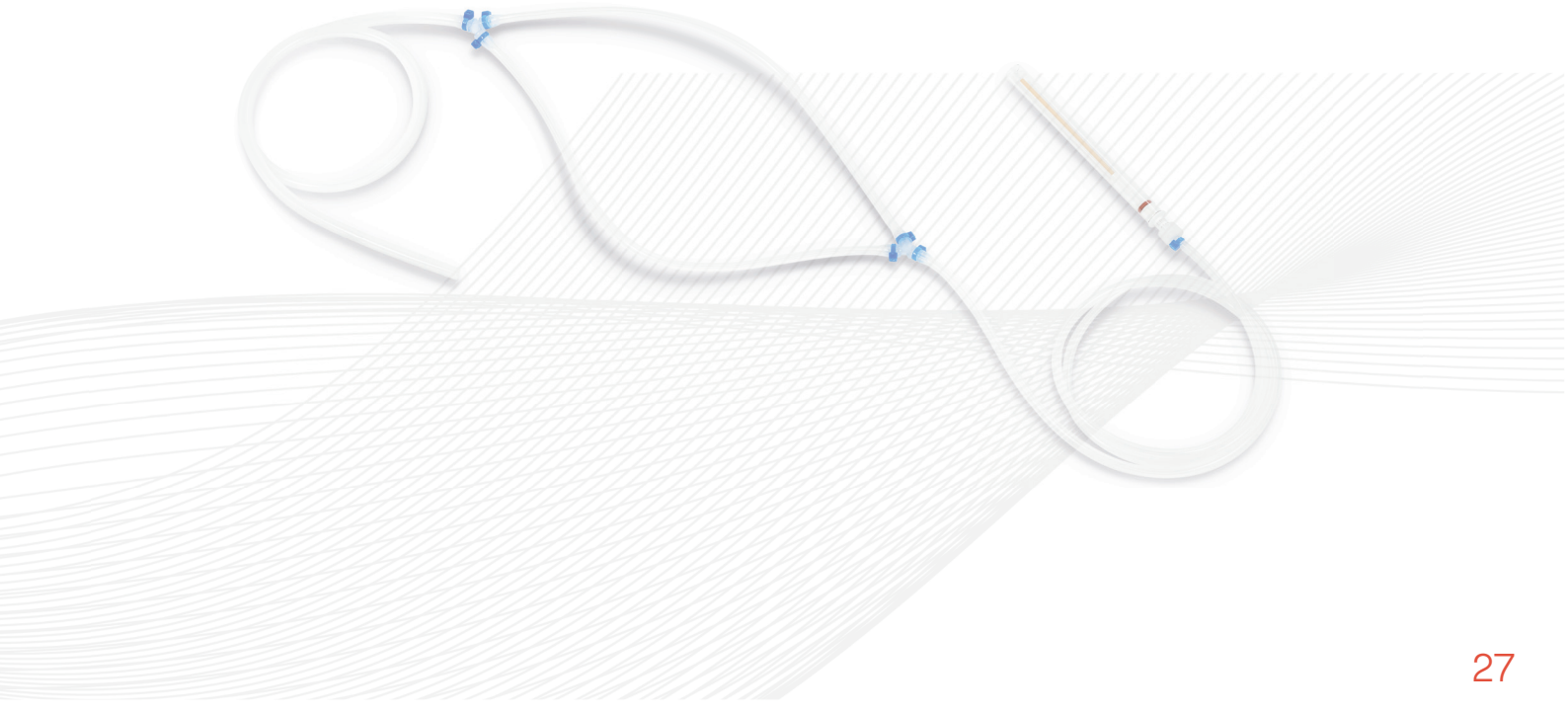
- PC and PET
- PP Caps with 48mm or 70mm
- 2, 3 and 4 ports
- 50mL to 20L
- Multiple brands available

Needles

- Retro compatible with all filling machines
- SS316L or PEEK
- All flow ranges and sizes

Connections

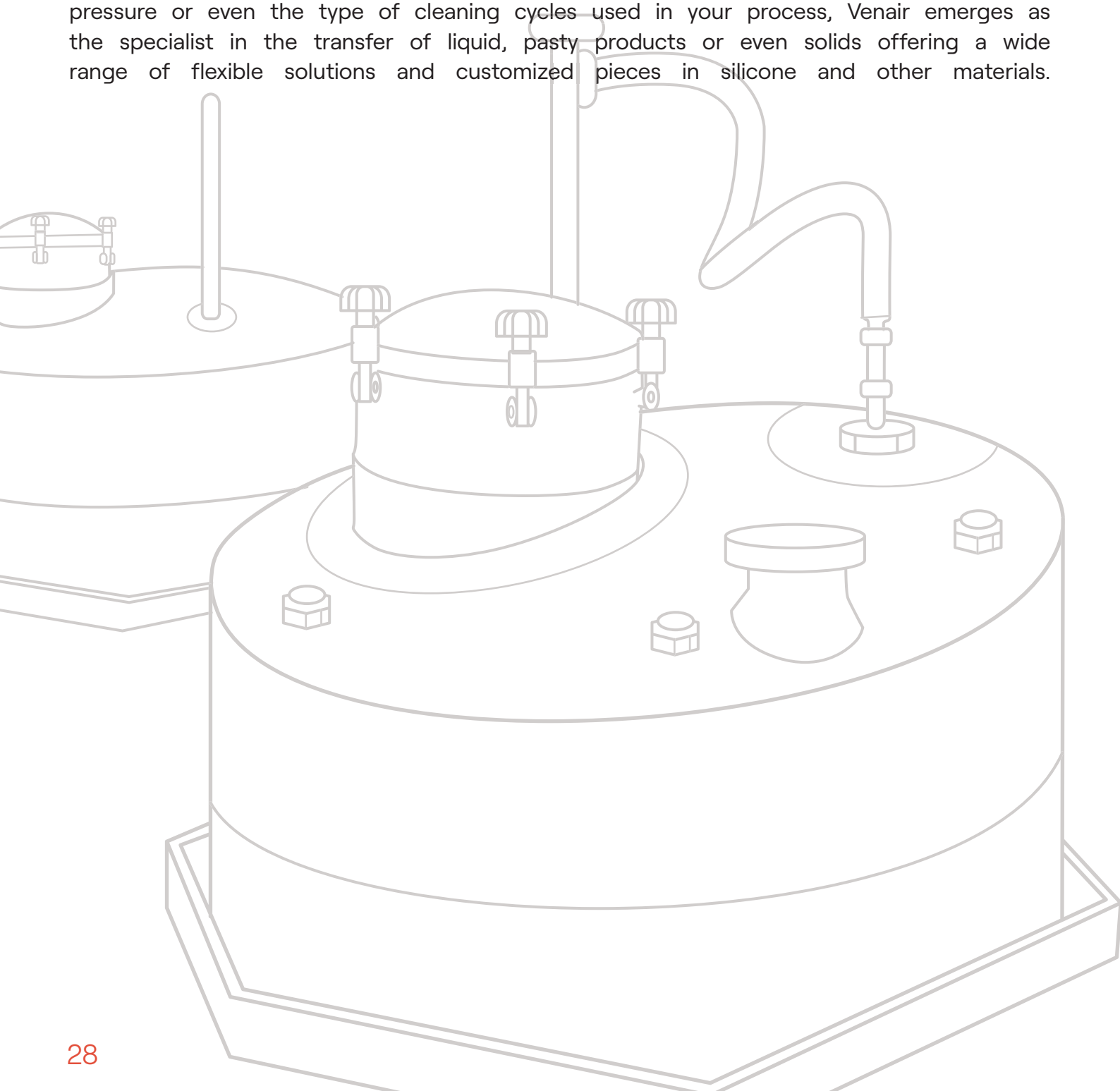
- Luer Lock and Quick Connects
- Straight adapters and reducers
- “Y”, “T” and “+”
- TC and HB connections
- Many materials, flow ranges and sizes
- Multiple brands available



2. Pharmaceuticals

We have years of experience in the manufacture of hoses for the pharmaceutical sector. We customize solutions based on high purity flexible hoses for the most critical applications in the pharmaceutical processing. Our hoses have a great mechanical properties, chemical stability and long durability within an extended range of temperatures and for critical applications with any chemical product. We help our partners to optimize the process by improving the preventive maintenance and reducing the machine shutdowns.

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 offering a wide range of flexible solutions and customized pieces in silicone and other materials.



2.1. Products

Liquid filling machines

Chemicals & Fats

Solid products processing

Thermal management solutions

Validation Package

All Venair's pharma silicone range of products is made with a fully validated silicone. From the simplest pharma application to the most technical bioprocess, Venair provides its products with the same and completely validated silicone, avoiding any cross contamination.

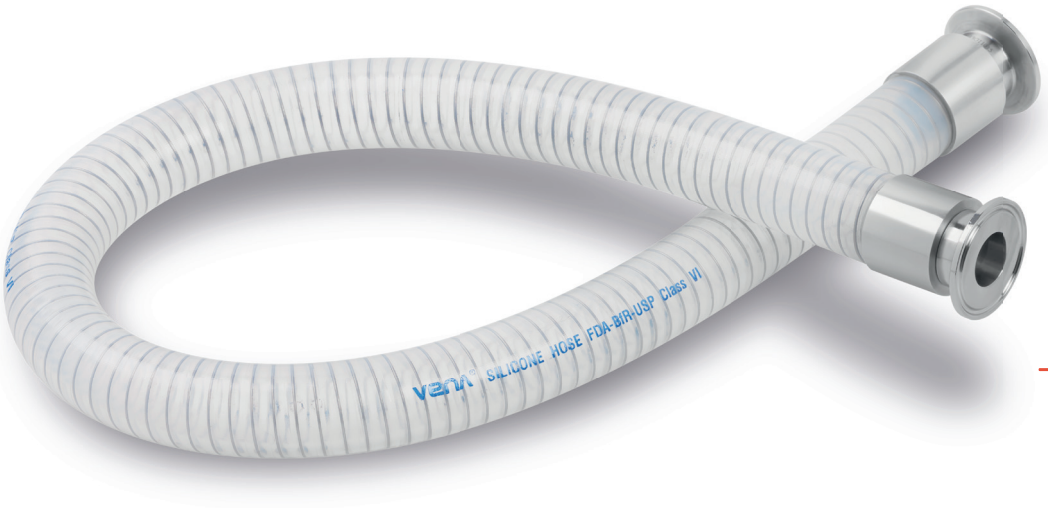
Under request, we can deliver our extensive leachables and extractables study.

Advantages:

- Animal derived component free (ADCF).
- Platinum cured and post cured to reduce extractables levels.
- Gamma stable and autoclavable.
- Low water absorption and low gas permeability rating.
- Minimal extractables help maintain fluid integrity.
- Documented biocompatibility for sensitive applications.

All our silicone products comply with the following regulations:

REFERENCE	TITLE
(EU) No 10/2011 (EU) No 1935/2004	Plastic materials and articles intended to come into contact with food. Simulant B (3% Acetic acid aqueous solution) and Simulant D1 (50% ethanol)
FDA 21 CFR 177.2600	Rubber articles intended for repeated use, FDA ITEM 177.2600 (e)
BfR recommendation XV	Recommendations on the health assessment of plastics and other high polymers
United States Pharmacopoeia <88>	Biological reactivity tests, IN VIVO Class VI - 121°C
ISO 10993-4	Biological evaluation of medical devices - Part 4: Selection of tests for interactions with blood
ISO 10993-5 & USP <87>	Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity
ISO 10993-6	Biological evaluation of medical devices - Part 6: Tests for local effects after implantation
ISO 10993-10	Biological evaluation of medical devices - Part 10: Tests for irritation and skin sensitization
3A 18-03	Sanitary standard procedure N° 18-03 Class I
European Pharmacopoeia 3.1.9.	Silicone elastomer for closures and tubing
Extractables and Leachables study available for 70ShA silicone	Extraction experiment in organic solvent
	Extraction experiment in polar organic-aqueous solvent system
	Extraction experiment in aqueous solvent, alkaline conditions
	Extraction experiment in aqueous solvent, acidic conditions



Vaccum Pressure
0,80 bar (11,6 psi)

Material
Transparent platinum cured silicone
+ Stainless steel spring wire

Temperature
-55°C / +200°C
(-67°F / +392°F)

Transparent wire reinforced silicone hose

VENA® SIL 630

APPLICATIONS

For transport by suction or discharge of liquid, semi-liquid or solid products in the food, cosmetic, pharma, and biotech industries. Suitable for filling machines and any fluid transfer process where the vision of the liquid is required.

CERTIFICATIONS

→ Complete Validation Package.

→ 3A Sanitary Standard 62-02 (fitted hoses).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3)

FABRIC REINFORCEMENT

No.

STAINLESS STEEL INSIDE

Stainless steel wire spring encased inside the hose wall.

INNER APPEARANCE

Transparent and completely smooth.

OUTER APPEARANCE

Transparent and completely smooth

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8") under request

Technical Table
See on page: 62

Material
Transparent platinum cured silicone
+ Polyester fabric

Temperature
-55°C / +180°C
(-67°F / +356°F)

Fabric reinforced silicone hose

VENA® SIL 640

APPLICATIONS

Suitable for the transport by the impulsion of liquid, semi-liquid or solid products in the food, cosmetic pharm, and biotech industries. Recommended for metal detector systems or applications where not any bending is required.

CERTIFICATIONS

→ Complete Validation Package.

→ 3A Sanitary Standard 62-02 (fitted hoses).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Polyester fabric reinforcement.

STAINLESS STEEL INSIDE

No.

INNER APPEARANCE

Translucent and smooth.

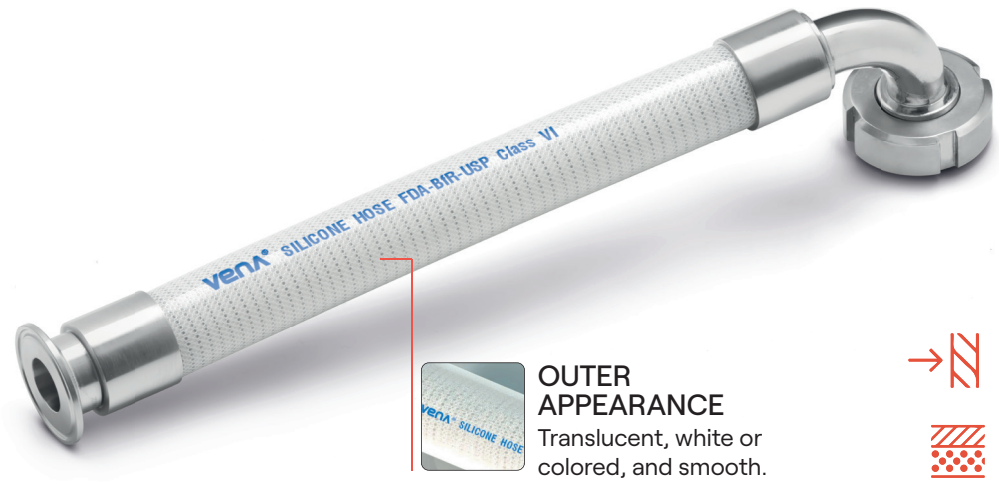
OUTER APPEARANCE

Translucent and smooth

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8") under request

Technical Table
See on page: 62



OUTER APPEARANCE
Translucent, white or colored, and smooth.

Vaccum Pressure
0,91 bar (13,23 psi)

Material
Transparent platinum cured silicone
+ Polyester fabric
+ Stainless steel spring wire

Temperature
-55°C / +180°C
(-67°F / +356°F)

Fabric and wire reinforced silicone hose

VENA® SIL 650V

APPLICATIONS

For the transport by suction or impulsion of liquid, semi-liquid or solid products in the food, cosmetic, pharm and biotech industries. High flexibility and tight bending radius make it suitable for repetitive movements in dosing and filling machines. Specially designed to absorb vibrations and to compensate level differences.

CERTIFICATIONS

→ Complete Validation Package.

→ 3A Sanitary Standard 62-02 (fitted hoses).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3)

FABRIC REINFORCEMENT

Polyester fabric reinforcements.

Technical Table
See on page: 63

STAINLESS STEEL INSIDE

Stainless steel wire spring encased inside the hose wall.

INNER APPEARANCE

Translucent and smooth.

OUTER APPEARANCE

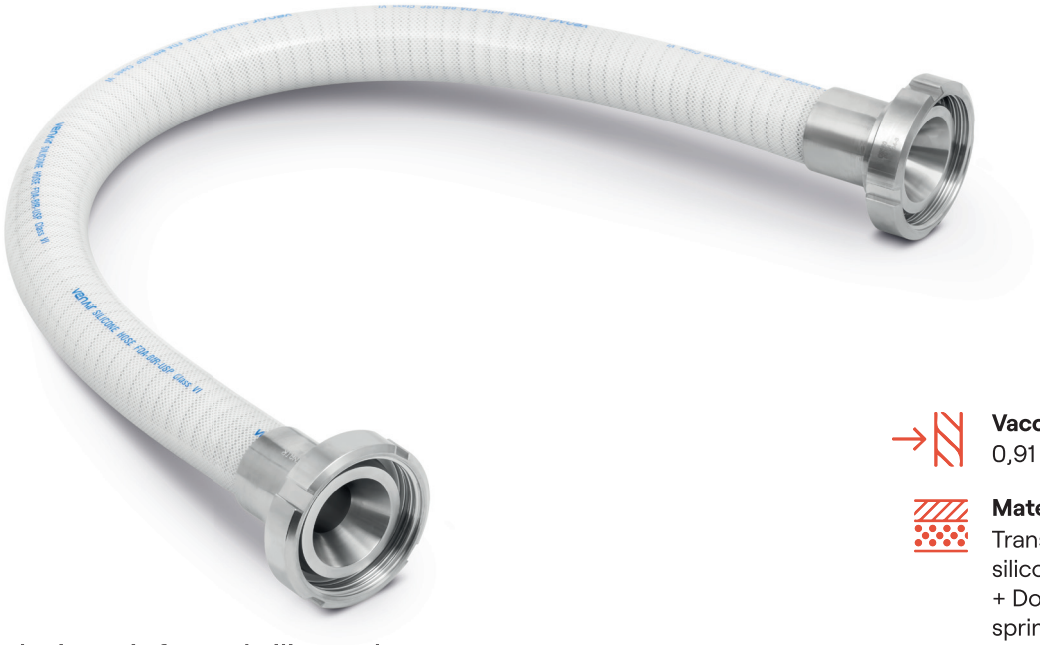
Translucent, white or colored, and smooth.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8") under request

CONFIGURATIONS

X: With food grade black conductive silicone.
PL: Plastic steel wire.
Lastic: with improved elastic properties silicone.



Vaccum Pressure
0,91 bar (13,23 psi)

Material
Transparent platinum cured silicone + Polyester fabric + Double stainless steel spring wire

Temperature
-55°C / +180°C
(-67°F / +356°F)

Fabric and wire reinforced silicone hose

VENA® SIL 655

APPLICATIONS

For dosing and filling machines in food, cosmetic and pharma industries, specially for use at specific situations where there may be sudden high pressure surges (hammering).

CERTIFICATIONS

→ Complete Validation Package.

→ 3A Sanitary Standard 62-02 (fitted hoses).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Polyester fabric reinforcement.

STAINLESS STEEL INSIDE

Double stainless steel wire spring encased inside the hose wall at different levels.

INNER APPEARANCE

Translucent and smooth.

OUTER APPEARANCE

Translucent, white or colored, and smooth.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8") under request

Technical Table
See on page: 64

Material
Platinum cured silicone
+ Braided polyester fabric

Temperature
-55°C/+180°C
(-67°F/+356°F)

Polyester braided silicone tubing

VENA® TECHNOSIL

APPLICATIONS

Recommended for repetitive movements in dosing and filling machines where no tight bending radius is needed. Available in long lengths applications. Is it resistant to UV, radiation, and ozone. It is gamma stable and autoclavable.

CERTIFICATIONS

→ Complete Validation Package.

→ 3A Sanitary Standard 62-02 (fitted hoses).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3)

FABRIC REINFORCEMENT

Polyester braiding.

STAINLESS STEEL INSIDE

No.

INNER APPEARANCE

Translucent and smooth.

OUTER APPEARANCE

Translucent and smooth.

STANDARD MANUFACTURING LENGTH

10m and 20m (33ft and 66ft).

CONFIGURATIONS

VENA TECHNOSIL DB: For higher Pressure and vacuum resistance

Technical Table
See on page: 65

Transparent silicone tubing

VENABIO® FLOW MULTIPURPOSE

Material
Platinum cured silicone tubing

Temperature
-60°C / +220°C
(-76°F / +428°F)

APPLICATIONS

Recommended for transfer fluids at very low pressure in filling processes of liquidss and semi-liquids. Typical applications are media and buffer preparation, downstream processing, formulation, filling drug delivery and peristaltic pumps.

CERTIFICATIONS

→ Complete Validation Package.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

No.

HARDNESS

60 ShA.

STAINLESS STEEL INSIDE

No.

INNER APPEARANCE

Translucent and smooth.

OUTER APPEARANCE

Translucent and smooth. Laser marking.

STANDARD MANUFACTURING LENGTH

50ft (15,24m) and 100ft (30,48m).

FEATURES

Manufactured and double bagged in clean room ISO7 according ISO 14644-1.

Technical Table
See on page: 66

Antimicrobial silicone tubing

VENA® ASEPTISIL

Material
Antimicrobial silicone that avoids contamination from the growth of bacteria, mold and fungi.

Temperature
-60°C (-76 F) to +200°C (392 F)

APPLICATIONS

Specially recommended for food contact applications in the transport of liquid or semi-liquid fluids in the food and beverage industries. It offers an extremely broad field of applications, specially effective where there is intermittent use of water or other fluids in warm conditions without the possibility of drying between uses.

CERTIFICATIONS

→ US FDA Standard 21 CFR 177.2600.

→ ResAp 2004 (5), according to Reg 1935/2004/EEC, and Reg 10/2011/EEC.

→ Tested in accordance with ISO 22196:2011 on E.coli and MRSA

→Active substance in accordance with the Biocidal Product Regulation (EU) 528/2012

→ Material used is in accordance with EU Directive 2015/863 for restriction of the use of hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

No.

Technical Table
See on page: 67

STAINLESS STEEL INSIDE

No.

INNER APPEARANCE

White and smooth.

OUTER APPEARANCE

White and smooth.

STANDARD MANUFACTURING LENGTH

50ft (15,24m) and 100ft (30,48m).

Material
Customized.

Temperature
-55°C/+180°C
(-67°F/+356°F)

Special silicone shapes

ADAPTSIL

APPLICATIONS

Any configuration can be customized according to the costumer needs.

→ Recommended 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.

CERTIFICATIONS

Completed Validation Package.

FABRIC REINFORCEMENT

Customized.

STAINLESS STEEL INSIDE

Customized.

INNER APPEARANCE

Customized.

OUTER APPEARANCE

Customized.

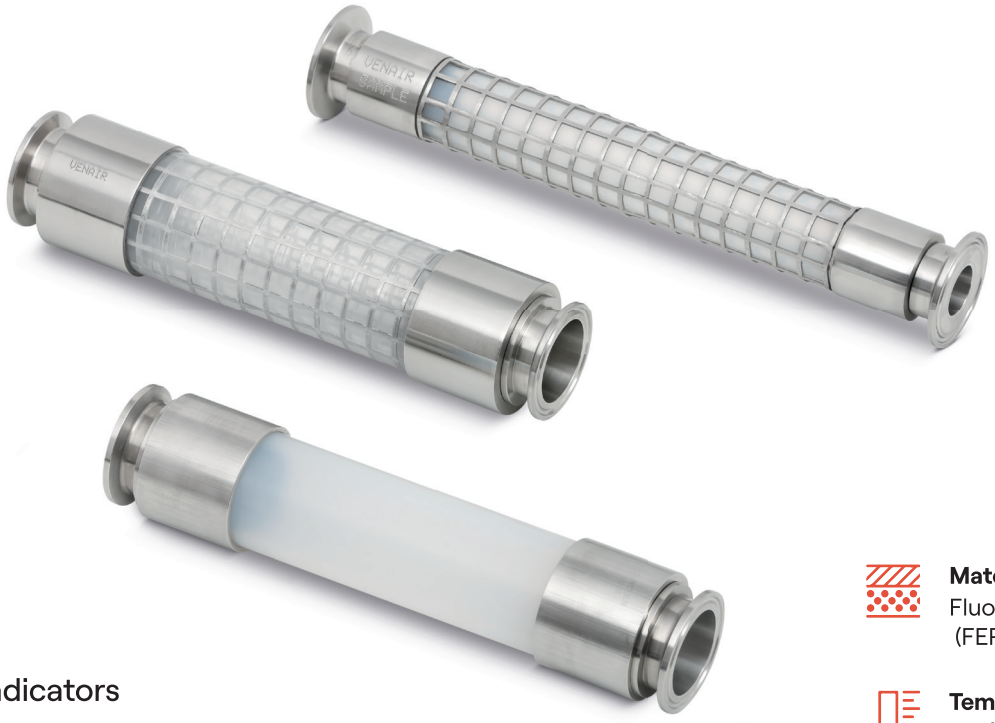
STANDARD MANUFACTURING LENGTH

Customized.

CUSTOM MADE SHAPES

Venair offers technical advice and manufacturing of all types of silicone shapes including reducers, elbows upon demand.

Technical Table
See on page: 67



Sight flow indicators

VENA® VIEW

Material
Fluoropolymer hose (FEP).

Temperature
-55°C / +180°C
(-67°F / +356°F)

APPLICATIONS

Compatible with many chemical and aggresive products, which makes this product a very resistant and durable option. Where visual inspection of the conveyed material is required.

CERTIFICATIONS

→ US FDA Standard 21 CFR 177.1550.

→ USP Class VI, <88> in vivo test.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3)

→ ResAp 2004 (5), according to Reg 1935/2004/EEC, and Reg 10/2011/EEC.

STAINLESS STEEL INSIDE

No.

INNER APPEARANCE

Translucent and completely smooth.

OUTER APPEARANCE

Translucent and smooth.

STANDARD MANUFACTURING LENGHT

Under demand (3m/10ft maximum).

ALTERNATIVES

This hose can be manufactured with metal grid protection.

Technical Table
See on page: 68

Highly flexible hybrid hose

VENA® FLEXIP

Material
Fluoroelastomers with PTFE particles, polyester fabric, SS spring wire, and white FDA silicone cover.

Temperature
-20°C/+175°C
(-4°F/+347°F)

APPLICATIONS

It has good resistance specially in fatty products or oily foods and glycols, as well as alcoholic beverages. Specially recommended for vegetal and animal oils in food and cosmetic applications.

CERTIFICATIONS

→ US FDA Standard 21 CFR 177.2600.

→ USP Class VI <88> in vivo test, 121°C.

→ ResAp 2004 (5), according to Reg 1935/2004/EEC, and Reg10/2011/ EEC with simulants A (10% of ethanol) and simulant D2 (olive oil).

STAINLESS STEEL INSIDE

Yes.

CONFIGURATIONS

X: Conductive material.

Technical Table
See on page: 68

INNER APPEARANCE

White and smooth.

OUTER APPEARANCE

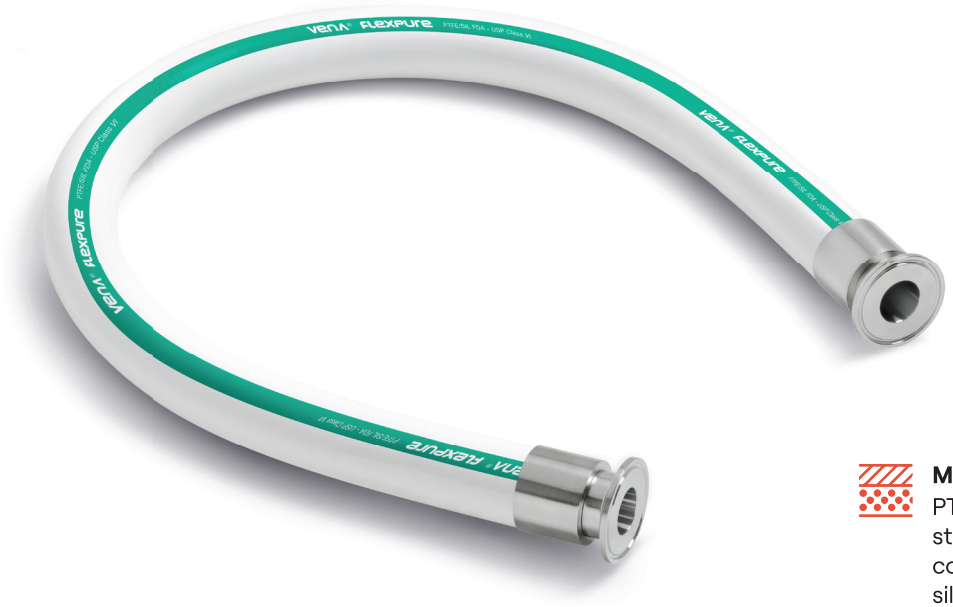
White and smooth FDA Silicone.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

CLEANING COMPATIBILITY

Media	Concentration	Temperature
Hot water	-	Up to 95°C
Steam	-	Up to 130°C, max 30 min.
Caustic Soda	1%	Up to 80°C
	3%	Up to 25°C
Nitric Acid	0,5%	Up to 80°C
	2%	Up to 65°C
Peracetic Acid	3%	Up to 80°C



Material
PTFE+ braided stainless steel, covered with white FDA silicone.

Temperature
-50°C/+200°C
(-76°F/+500°F)

Highly flexible PTFE hose

VENA® FLEXPURE

APPLICATIONS

Ideal for powder, liquid and semiliquid processing in applications with aggressive chemicals where a high hygienic design and is flexibility required.

CERTIFICATIONS

→ US FDA Standard 21 CFR 177.550

→ USP Class VI <88> in vivo test, 120°C

→ European Regulation (EU) 10/2011.

This hose is in accordance with the RoHS Directive 2002/95/EC and its subsequent amendments including the RoHS Directive 2011/65/EU and RoHS 3 Directive 2015/863.

INNER APPEARANCE

White and smooth.

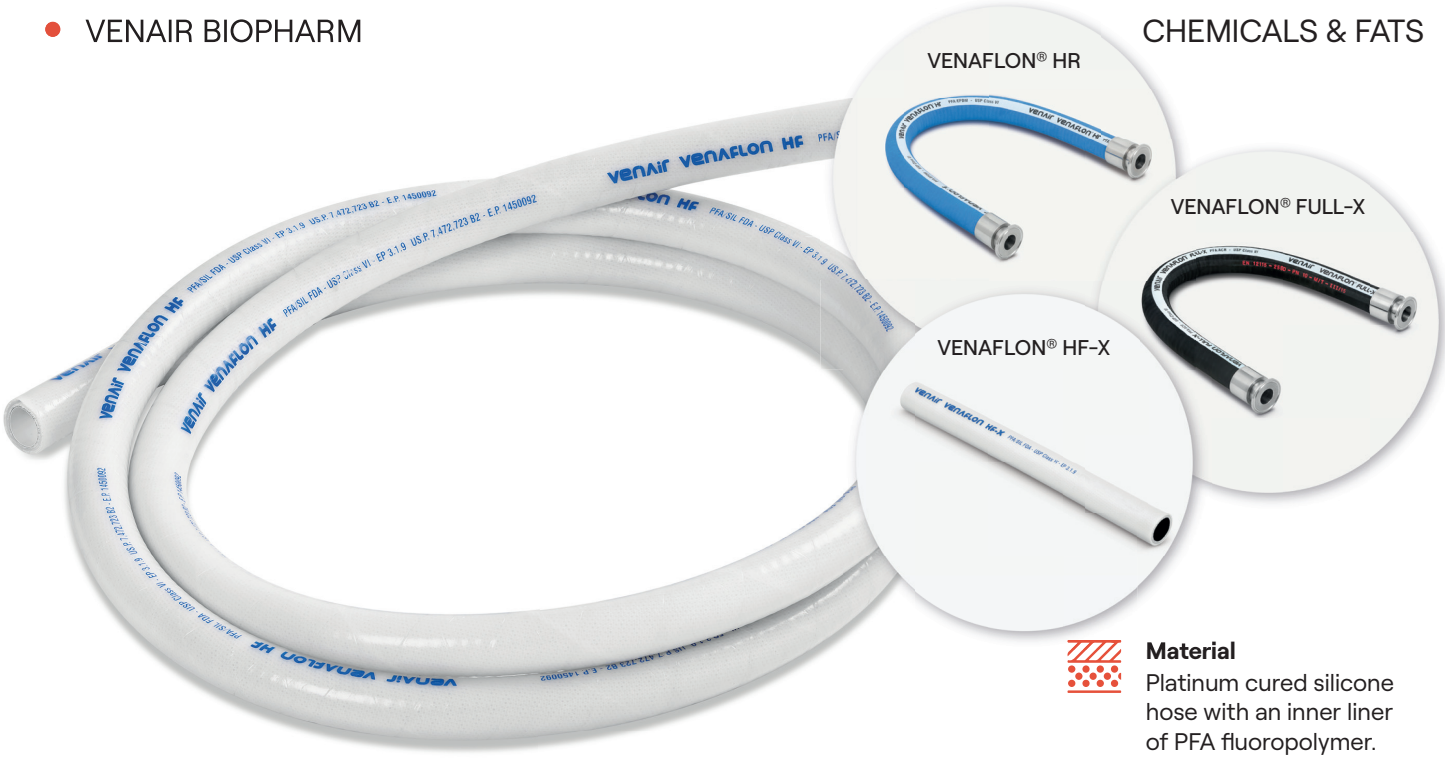
OUTER APPEARANCE

White and smooth.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

Technical Table
See on page: 68



PFA Silicone Hose

VENAFLON® HF

Material
Platinum cured silicone hose with an inner liner of PFA fluoropolymer.

Temperature
-30°C/+150°C
(-22°F/+302°F)

APPLICATIONS

Very resistant to liquids and semi-liquids and aggressive chemical products. The construction of this hose allows the conveying of products at high temperatures by suction or discharge.

CERTIFICATIONS

→ US FDA Standard 21 CFR 177.1550

→ USP Class VI <88> in vivo tests.

→ USP Class VI <87> in vitro tests.

→ ISO 10993-5, 10 y 11

→ Reg 1935/2004/EEC, and Reg 10/2011/EEC.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Yes.

Technical Table
See on page: 69

STAINLESS STEEL INSIDE

Stainless steel wire spring encased inside the hose wall.

INNER APPEARANCE

White and smooth.

OUTER APPEARANCE

White and smooth.

STANDARD MANUFACTURING LENGTH

20m (65,62ft)

CONFIGURATIONS

X: Black conductive PFA (R<10^6 Ω)

HR: EPDM cover for external abrasion resistance

Full-X: full conductive construction (R<10^9 Ω)

FKM Silicone hose

VITOSIL®

Material
White FDA FKM inner layer and platinum cured silicone.

Temperature
-30°C/+180°C
(-75°F/+356°F)

APPLICATIONS

Recommended to convey aggressive fluids that are not compatible with silicone. Able to transport liquid or semi-liquid foodstuffs at high temperatures by impulsion or suction, since their design can resist pressure or vacuum.

CERTIFICATIONS

→ US FDA Standard 21 CFR 177.2600.

→ Regulation 10/2011/EC and Reg 1935/2004/EC.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Yes.

STAINLESS STEEL INSIDE

Stainless steel wire spring encased inside the hose wall.

INNER APPEARANCE

White and smooth.

OUTER APPEARANCE

White and smooth.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

Technical Table
See on page: 73

Material
food grade polyurethane

Temperature
-20°C / +80°C
(-4°F / +176°F)

High flexible polyurethane hose

VENA® TECHNIPUR VAC

APPLICATIONS

Recommended for the transport of bulk or powder materials in food and pharma industries.

CERTIFICATIONS

→ US FDA (Foods and Drugs Administration) Standard 21 CFR 177.1680 and CFR 177.2600.

→ 1935/2004/EC Regulation and and 10/2011/EC (Migration Test).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

No.

STEEL WIRE INSIDE

Yes.

INNER APPEARANCE

Translucent and corrugated.

OUTER APPEARANCE

Translucent and corrugated.

STANDARD MANUFACTURING LENGTH

10 m (33 ft).

CONFIGURATIONS

X: Conductive polyurethane (R<10^9 Ω)

Technical Table
See on page: 70

Material
Food grade polyurethane.

Temperature
-20°C / +80°C
(-4°F / +176°F)

Smooth mandrel-made polyurethane hose

VENA® TECHNIPUR® S100

APPLICATIONS

Pneumatic transport of bulk materials in food and pharma industries.

CERTIFICATIONS

→ US FDA (Foods and Drugs Administration) Standard 21 CFR 177.1680 and CFR 177.2600.

→ 1935/2004/EC Regulation and European Council Resolution AP 2004 (5) – silicones and 10/2011/ EC (Migration Test).

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3) hazardous substances (RoHS 3).

INNER APPEARANCE

Translucent and smooth.

OUTER APPEARANCE

Translucent and corrugated.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

CONFIGURATIONS

S-200: Translucent and smooth outside.
X: Conductive material (R<10^9 Ω)

Technical Table
See on page: 71

Highly abrasion resistant silicone hose

VENA® ABRASIL

Material
Hybrid polymer with polyester fabric reinforcement and a metal wire spiral.

Temperature
-20°C / +90°C
(-4°F/+194°F)
it may reach up to 120°C (248°F) during short period of time

APPLICATIONS

Recommended for suction and transport in food and pharmaceutical industries. Generally acceptable for pneumatic transport of non-flammable bulk materials and suction of all types of abrasive particles.

CERTIFICATIONS

→ FDA 21 CFR 177.2600. Rubber articles intended for repeated use, FDA ITEM 177.2600(e)

→ USP (88) Biological reactivity tests, IN VIVO class V.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3) hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Yes.

Technical Table
See on page: 72

STAINLESS STEEL INSIDE

Yes.

INNER APPEARANCE

White and smooth.

OUTER APPEARANCE

White and smooth.

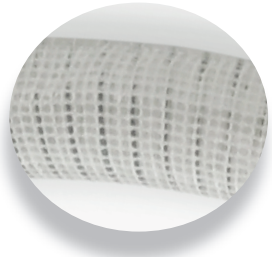
MAXIMUM LENGTH OF MANUFACTURE

4m (13') / 6m (19' 8").

CONFIGURATIONS

X: Conductive material

Clear: Translucent material.



Sleeve with or without textil reinforcement

SILICONE SLEEVES

Material
Platinum cured silicone.

Temperature
-55°C / +180°C
(-67°F / +356°F)

APPLICATIONS

Silicone sleeves are suitable to convey liquids, semi liquids and powder at low pressure (gravity discharge) or protecting against contamination outer-inner or inner-outer in areas of product handling.

CERTIFICATIONS

→ Complete Validation Package.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Under request.

STAINLESS STEEL INSIDE

No.

INNER APPEARANCE

Translucent and completely smooth.

OUTER APPEARANCE

Translucent and smooth.

MAXIMUM LENGTH OF MANUFACTURE

4m (13') / 6m (19' 8").

CONFIGURATIONS

Customized construction under request.

Material
Platinum cured silicone.

Temperature
-55°C/+180°C
(-67°F/+356°F)

Silicone compensator

VENA® PHARMALOADER

APPLICATIONS

An elastic and smooth compensator for the pharmaceutical and food industries. It is the ideal solution for all tank, hopper, pump and weighing tank outlets to compensate vibrations and level differences. Autoclavable and sterilizable.

CERTIFICATIONS

→ Complete Validation Package.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3)

FABRIC REINFORCEMENT

Yes.

STAINLESS STEEL INSIDE

External steel rings.

INNER APPEARANCE

Translucent and smooth.

OUTER APPEARANCE

Customized.

MAXIMUM LENGTH OF MANUFACTURE

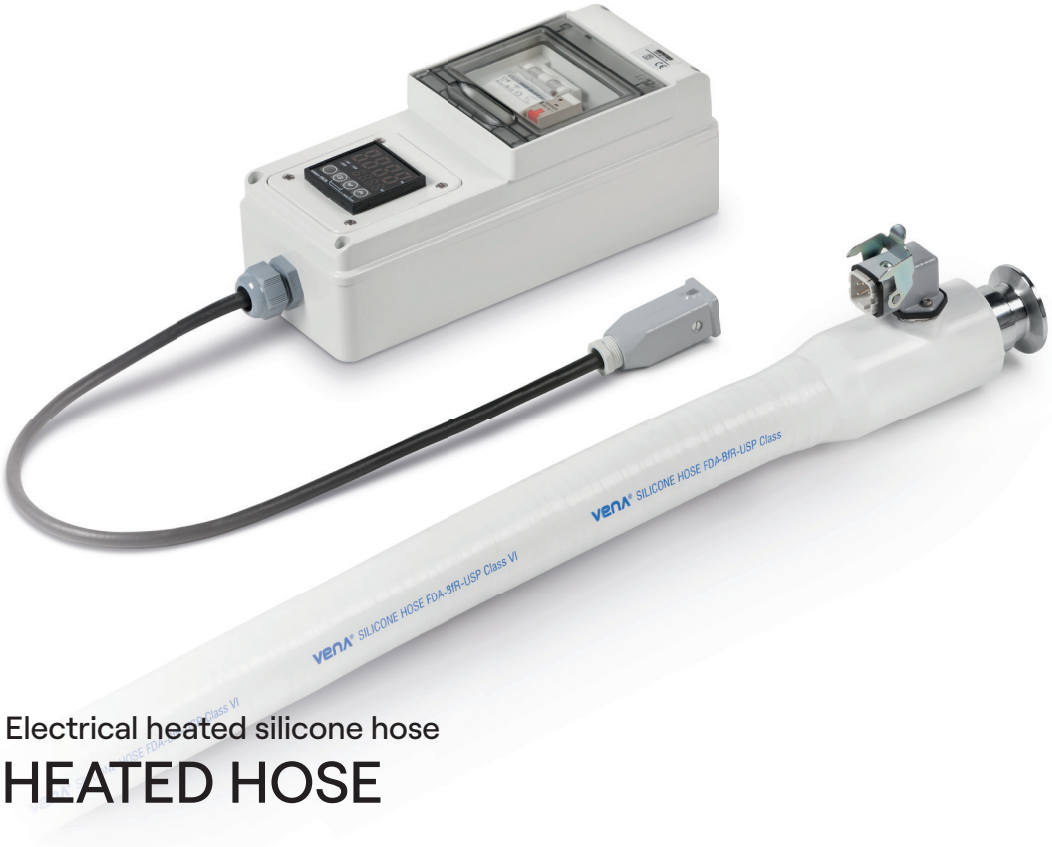
Customized.

CONFIGURATIONS

Pharmaloader HP: Special construction for high pressure resistance.

FKM: for transport of chemicals.

Technical Table
See on page: 66



Electrical heated silicone hose

HEATED HOSE

Material
Platinum Silicone hose with an integrated electrical resistance.

Temperature
• Operational temperature:
-55°C (-67°F)
+180°C (356°F)
Peaks up to +200°C (392°F)
• Set temperature:
0°C (32°F)
+200°C (392°F)

APPLICATIONS

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

CERTIFICATIONS

→ Complete Validation Package.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3).

FABRIC REINFORCEMENT

Yes.

STAINLESS STEEL INSIDE

Yes.

INNER APPEARANCE

Translucent and completely smooth.

OUTER APPEARANCE

White and smooth.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

CONFIGURATIONS

Specific construction according to application.

Fluoropolymer inner layer for better chemical resistance

Voltage depending on user needs
220V/110V/24V

STANDARD CONSTRUCTIONS

Silicone hose equipped with an electrical resistance encased inside the wall in order to provide a regular temperature to the hose for an optimum flow 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.

Spiral tubing rolled along the silicone hose

COOLING HOSE

Material
Platinum cured silicone hose with an integrated secondary tubing.

Temperature
-55°C (-67°F)
+180°C (356°F)

APPLICATIONS

For conveying products that require a stable temperature.
This system provides a regular temperature of the conveyed product by cold water or nitrogen for cooling and by hot water or steam for heating.

CERTIFICATIONS

→ Complete Validation Package.

→ Material used is in accordance with EU Directive 2015/863 for Restriction of the use hazardous substances (RoHS 3)

FABRIC REINFORCEMENT

Yes.

STAINLESS STEEL INSIDE

Stainless steel wire spring encased inside the hose wall.

INNER APPEARANCE

White and completely smooth.

OUTER APPEARANCE

Customized.

STANDARD MANUFACTUIRNG LENGTH

4m (13') / 6m (19' 8").

ADDITIONAL INFORMATION

Custom made.

Insulation & anticondensation material for silicone hoses

TELCRA®

Material
Insulation material.

Temperature
-30°C / +180°C
(-22°F / +356°F)

APPLICATIONS

It is suitable for very cold or frozen liquids and semi liquids in the food, pharmaceutical and biotech industries for insulation and anticondensation.

CERTIFICATIONS

Complete Validation Package.

INNER APPEARANCE

Translucent and completely smooth.

OUTER APPEARANCE

Customized.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

CONFIGURATIONS

→ LT: for anticondensation and insulation.

→ HT: for insulation.

ADVANTAGES

→ ULTRALIGHT: Lightweight material with a density of 500 kg/m3.

→ EASY INSTALLATION: Super flexible material. Contours easily to complex forms.

→ ADHESION TO SILICONE: Telcra® presents an adhesivefree chemical adhesion with silicone materials.

→ ENVIRONMENTALLY SAFE: Odorless, tasteless and completely non-toxic.

Material
Hybrid polymer

Temperature
-40°C (-40°F) to
+150°C (302°F)

Highly resistant to satured steam in continuous flow

VENA® STEAMFLOW

APPLICATIONS

The perfect product for saturated steam in continuous flow in the food and pharma industries.
Its robust but flexible design makes this hose perfect for those applications where flexibility and good mechanical performance are needed. Abrasion resistant outer layer in Vena® Steamflow guarantees good performance in most demanding applications.

CERTIFICATIONS

- US FDA Standard 21 CFR 177.2600

This hose is in accordance with the RoHS Directive 2002/95/EC and its subsequent amendments including the RoHS2 Directive 2011/65/EU and RoHS3 Directive 2015/863

FABRIC REINFORCEMENT

Two plies of synthetic fabric reinforcements.

STAINLESS STEEL INSIDE

Yes. Metal braiding.

INNER APPEARANCE

Cream-color food quality rubber.

OUTER APPEARANCE

Black colored and smooth.

STANDARD MANUFACTURING LENGTH

4m (13') / 6m (19' 8").

CONFIGURATIONS

Customized shape under request.

Technical Table
See on page: 73

2.2. Sterilization & Cleaning

ALL FLEXIBLE HOSES MUST BE STERILIZED BEFORE USE AND MUST ONLY BE USED FOR THE INTENDED PURPOSE FOR WHICH THEY WERE DESIGNED.

During hose selection, it is vitally important to consider the cleaning and sterilization process since this will affect to a greater or lesser extent, the mechanical properties and the behaviour of the materials used. It can also determine the useful life of the hose due to the aging effect.

Sterilization and cleaning are important and necessary processes that must be applied in order to eliminate contamination due to transport, storage, handling, or usage of the product. So, it is highly recommended to do it prior to each use to prevent microorganisms growth or harmful contamination that can affect the inner layer of the hose which is in contact with the flow.

Sterilization

The hoses exposed to steam or hot-air sterilization have different and unpredicted behaviour depending on the connections, on the frequency of the cleaning and sterilization processes, and on the specific product application.

- **Non aggressive liquid transfer (Silicone):**
  Our entire range of silicone hoses can be sterilized by steam cycles of 30 minutes at a maximum temperature of 135°C.

- **Chemicals & Fats:**
  The products **Vena® Flexip and Vena® Flexpure** can be sterilized by steam cycles of 30 minutes at a maximum temperature of 130°C.

  The product range **Vena® Vitosil and Venaflon** can be sterilized by steam cycles of 30 minutes at a maximum temperature of 121°C.

- **Solid products transfer:**
  The product range **Vena® Abrasil** can be sterilized by steam cycles of 30 minutes at a maximum temperature of 121°C.

  The product range Vena Technipur cannot be sterilized by steam.

- **Thermal management solutions:**
  Sterilization conditions depends on the product material (see previous information)

For all hoses, a minimum time of 1 hour must be left between steam cycles for material stabilization.

It is recommended an accurate inspection of the hose after 150 hours of sterilization.

Hose replacement criteria based on visual inspection includes among others, displacement of layers, displacement of wire helix from their normal pitch, signs of displacement of fittings or leakage in the ends, reinforcement fabric exposed, wire corrosion, dents, kinks, or abrasion marks in both internally and externally.

CIP (Cleaning in place)

As per the sterilization process, the cleaning process can determine the useful life or the behavior of the hose material due to mechanical and chemical stress that occurs during the cleaning procedure. Therefore, there are some aspects that need to be considered when choosing one process over another (such as temperature, concentration, time...). Also is important to regularly monitor the physical conditions of the hoses in order to detect any possible alteration which could be a sign of a material degradation.

In the CIP process the following media are used in different concentrations:

- Basic solutions (such as caustic soda) used to remove fat and protein part
- Acid solutions (for example phosphoric acid) to eliminate mineral deposits
- Oxidizing acids or other oxidizing products (nitric acid, peracetic acid, hydrogen peroxide) to remove bacterial load

Except the Polyurethane product families (Vena Technipur), all Venair products can be cleaned by the typical CIP processes (see table).

Sterilization & CIP Compatibility

	SILICONE	FLEXIP	FLEXPURE	VENAFLON	ABRASIL
HOT WATER	Up to 95°C Up to 200°F	Up to 95°C Up to 200°F	Up to 95°C Up to 200°F	Up to 95°C Up to 200°F	Up to 95°C Up to 200°F
STEAM	135°C - 30min 275°F - 30min	130°C - 30min 265°F - 30min	130°C - 30min 265°F - 30min	121°C - 30min 250°F - 30min	130°C - 30min 265°F - 30min
CAUSTIC SODA	1% - 80°C 1% - 175°F	1% - 80°C 3% - 25°C 1% - 175°F 3% - 75°C	3% - 80°C 3% - 175°F	3% - 80°C 3% - 175°F	1% - 80°C 1% - 175°F
NITRIC ACID / PHOSPHORIC ACID	0,5% - 80°C 1% - 25°C 0,5% - 175°F 1% - 75°F	0,5% - 80°C 2% - 65°C 0,5% - 175°F 2% - 150°F	3% - 80°C 3% - 175°F	3% - 80°C 3% - 175°F	1% - 25°C 1% - 75°F
PARACETIC ACID	1% - 25°C 1% - 75°F	3% - 80°C 3% - 175°F	3% - 80°C 3% - 175°F	3% - 80°C 3% - 175°F	1% - 25°C 1% - 75°F

*This information is based on tests and generally available sources, and it should be used only as a guide since it does not take into consideration other variables that may affect the hose.

2.3. Traceability solutions

Hose marking

Venair offers several traceability solutions in order to improve the data reading. Various solutions make it possible to obtain all information related to the hose during the manufacturing process, e.g. raw materials, product codes and components, batch number, appropriate certificates, production and sale date and related orders.

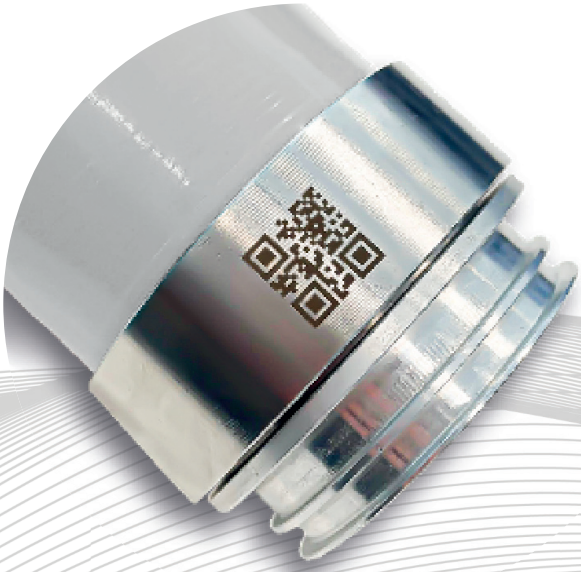
Our hoses can be marked by laser. Apart of the product batch number, any customized marking like customer name and reference can be added to any specific silicone hose.

Connection marking

All crimped hoses count with the batch number marked by laser in the connections which makes it as the simplest and fully reliable system to ensure the traceability of the assembly.

QR marking

The QR code can be marked by laser on the metal connection, assuring the full traceability of the hose while allowing the access to any information related to the product at any time along the life of the hose. QR code is an alternative to the chip that is commonly used in the market to assure hoses traceability. Data content in the code are completely customizable. It does not need any additional software. QR code can be read with all kind of mobile device which has downloaded an app to read codes. Applications to read QR codes are completely free for any device.



Identification by labels

Color silicone labels can be placed over any Venair hose in order to mark specific information required by the client. The label offers clear identification, cleanliness and permanence in the silicone hose. Venair silicone labels can be customized to meet your specific needs such as part number, manufacturing date, replacement date, or any specific product or process information required by the customer.

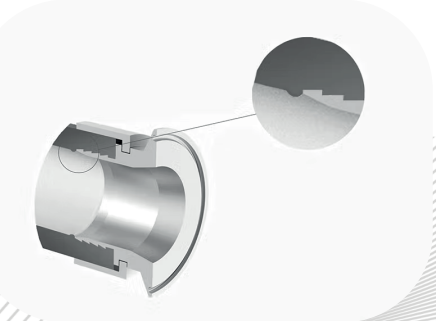
Features:

- It is not in contact with the inner liquid
- It is made of permanent vulcanized silicone
- Handles clean-in-place (CIP) and steam-in-place (SIP) processes
- Autoclavable
- Several colors available
-

2.4. Stainless steel Connections

SZR crimping system

Venair offers its range of sanitary tubes with any type of 316L stainless steel connections crimped at the ends.
The connection by means of a pressing system (SZR system) is the most recommended for any flexible hose, as it guarantees the correct pressure resistance of the final assembly, avoiding the retention area that usually appears in any sanitary connection. Most of our flexible hoses with connections can be certified according to Sanitary Regulation 3A 62-02 for assemblies.



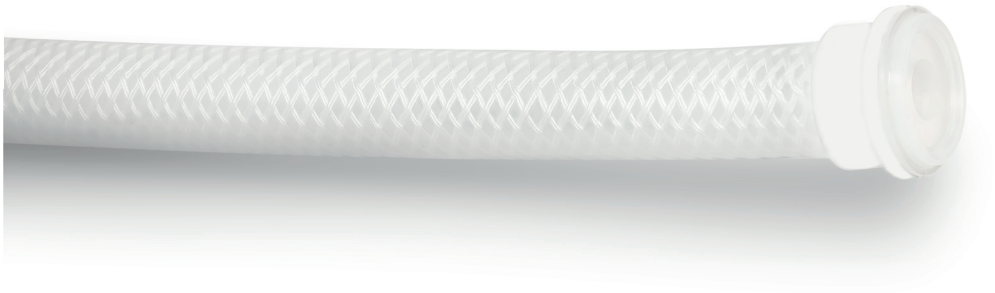
Finishing quality

The maximum standard roughness of the inner surface of our SZR* fittings is 0.8µm and can be improved to 0.375µm electropolished under demand.
The manufacturing batch number is indicated on each assembly, ensuring the total traceability of the product. It is also possible to mark a laser QR code on the ferrule, which allows immediate access to any information related to the product (technical data sheet, certificates, instructions for use, etc.).
All the straight fittings are manufactured in a single block, without welds, and the connections at 45° or 90° are made by orbital welding.

Molded Clamps

VENAIR® molded silicone clamps are well-suited for critical applications in high purity industries. These assemblies are manufactured with the same raw material than this is used to manufacture hoses and tubing. They reduce installation time (no gaskets), improve cleanliness (no retention zone) and maintain the benefits of the silicone.

VENAIR® molded silicone clamps are available in mini and standard Tri-Clamp fitting styles and are supplied with integrated gaskets molded directly to the face of the clamps.
Protective backup cups (thermoplastic or stainless steel) provide a stable clamping surface and safeguard the clamps during installation and use.



Features:

- Platinum-cured silicone
- Completely smooth transition from the tubing or the hose through the clamp
- Constant diameter. No internal reductions
- Autoclavable and sterilizable (CIP and SIP)
- Meets USP Class VI, FDA and BfR standards*
- Easy installation. Reduces assembly time
- Temperature resistance: -55°C to 180°C (-67°F to +356°F)
- No product contact with metallic materials
- Molded clamps can be supplied on any Venair silicone

*Under request, molded assemblies can meet all the certifications set out in the Validation Package.

Available fittings

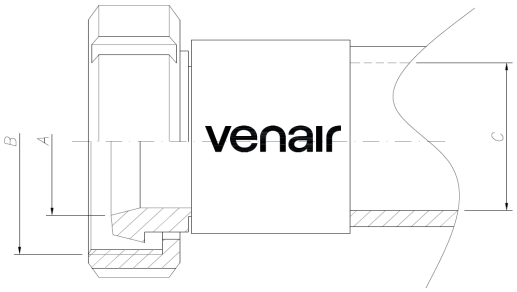
Any connection, however special it may be, can be crimped to our product:
DIN-11851, SMS, Tri-Clamp, DIN-11864, Gas, RJT, Camlock, Flanges ...

We have the most standard connections and dimensions in stock for immediate assembly.

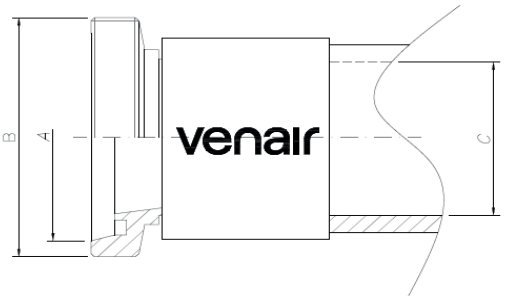
DIN 11851

DN	A	B (DIN 405)	C
	mm	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''	51
65	66	95 x 1/6''	63
80	81	110 x 1/4''	75
100	100	130 x 1/4''	102
125	125	160 x 1/4''	127
150	150	190 x 1/4''	152

DIN Female



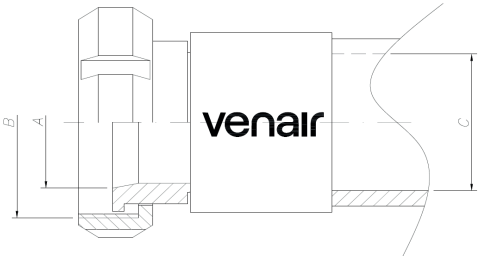
DIN Male



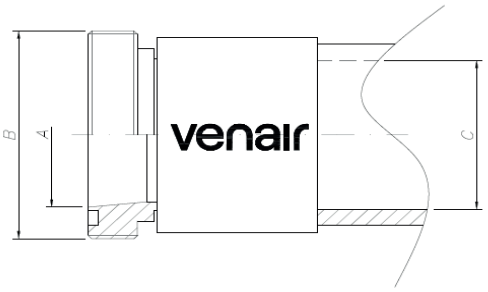
SMS

DN	A	B (DIN 405)	C
	mm	thread	mm
25	22,5	39,7x 1/6''	25
38	35,5	59,8 x 1/6''	38
51	48,5	69,8 x 1/6''	51
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

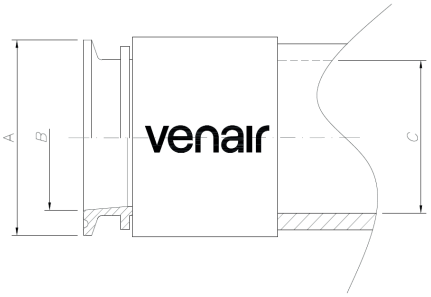
SMS Female



SMS Male



Tri-Clamp



TRI-CLAMP SMS 3008		
Head	Cone	Hose
A	B	C
(mm)	(mm)	(mm)
25	9,7	13
25	16,0	19
50,5	16,0	19
50,5	22,5	19
50,5	22,5	25
50,5	35,5	19
50,5	35,5	25
50,5	35,5	38
64	48.5	50
77	60,3	63
91	72,9	76
119	97,6	102

TRI-CLAMP ASME BPE (DIN 32676-C) / Imperial				
DN	Head	Cone	Hose	
	A	B	C	C
(inch)	(mm)	(mm)	(mm)	(inch)
1/2	25	9,4	6,35	1/4
3/4	25	15,8	6,35	1/4
1/2	25	9,4	9,52	3/8
3/4	25	15,8	9,52	3/8
1/2	25	9,4	12,7	1/2
3/4	25	15,8	12,7	1/2
1/2	25	9,4	19,05	3/4
3/4	25	15,8	19,05	3/4
1	50,5	22,1	6,35	1/4
1 1/2	50,5	34,8	6,35	1/4
1	50,5	22,1	9,52	3/8
1 1/2	50,5	34,8	9,52	3/8
1	50,5	22,1	12,7	1/2
1 1/2	50,5	34,8	12,7	1/2
1	50,5	22,1	19,05	3/4
1 1/2	50,5	34,8	19,05	3/4
1	50,5	22,1	25,4	1
1 1/2	50,5	34,8	25,4	1
2	64	47,5	25,4	1
1 1/2	50,5	34,8	38,1	1 1/2
2	64	47,5	38,1	1 1/2
2	64	47,5	50,8	2
2 1/2	77	60,2	50,8	2
2 1/2	77	60,2	63,5	2 1/2
3	91	72,9	63,5	2
3	91	72,9	76,2	3
4	119	97,4	101,6	4

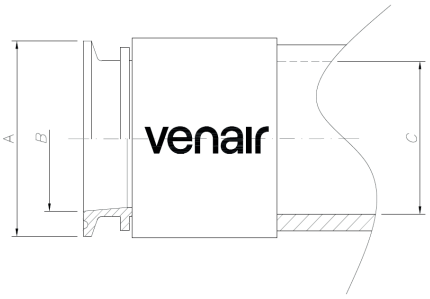
TRI-CLAMP DIN (DIN 32676-A)

DN	Head	Cone	Hose
	A	B	C
(mm)	(mm)	(mm)	(mm)
10	34	10	10
15	34	16	16
20	34	20	19
25	50,5	26	25
32	50,5	32	32
40	50,5	38	38
50	64	50	51
65	91	66	63
80	106	81	76
100	119	100	102

TRI-CLAMP (Others)

Head	Cone	Hose
A	B	C
(mm)	(mm)	(mm)
25	6,0	6
34	8,0	8
50	8,0	8
25	10,0	10
50	10,0	10
25	13,0	13
34	10,0	13
34	13,0	13
50	13,0	13
25	16,0	16
34	16,0	16
50	16,0	16
50	20,0	19
64	22,5	25
50	29,7	32
64	32,0	32
64	35,5	38
64	38,0	38

Tri-Clamp



2.5. Specification Charts

VENA® SIL 630

Ø INT		WALL THICKNESS		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS	
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1	
mm	inch	+1/-0.5mm	+0.04/-0.02''	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	ft
10	25/64	5,7	0,22	9,86	143,00	29,58	429,02	16,03	0,053
13	1/2	5,7	0,22	8,40	121,83	25,20	365,49	25,04	0,083
19	3/4	5,7	0,22	6,66	95,75	19,99	289,33	43,07	0,15
25	1	5,7	0,22	5,63	81,65	16,90	245,11	61,10	0,21
32	1 1/4	5,7	0,22	4,84	70,19	14,53	210,73	82,13	0,27
38	1 1/2	5,7	0,22	4,36	63,23	13,08	189,70	112,00	0,54
51	2	5,7	0,22	3,64	52,79	10,92	158,38	139,22	0,37

* At the indicated working pressure, the hose may experience an elongation up to 20%.
Other diameters can also be manufactured. Please consult.

VENA® SIL 640

Ø INT		WALL THICKNESS		WORKING PRESSURE*		BURSTING PRESSURE	
				ISO 1402/2009		ISO 1402/2009	
mm	inch	+1/-0.5mm	+0.04/-0.02''	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F
6	1/4	4,5	0,18	11,7	169	35	508
10	3/8	4,5	0,18	9,7	140	29	421
13	1/2	4,5	0,18	8,7	126	26	377
19	3/4	4,5	0,18	7,7	111	23	334
25	1	4,5	0,18	6,7	97	20	290
32	11/4	4,5	0,18	5,7	82	17	247
38	11/2	4,5	0,18	5	73	15	218
51	2	4,5	0,18	4	58	12	174
63	2 1/2	4,5	0,18	3,3	48	10	145
76	3	4,5	0,18	2,7	39	8	116
102	4	4,5	0,18	1,7	24	5	73

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

VENA® SIL 650V

Ø INT		WALL THICKNESS		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS		VACUUM RESISTANCE
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1		
mm	inch	+1/-0.5mm	+0.04/-0.02''	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch	
6	1/4	5,5	0,22	26	377	77,9	1130	29	1,14	684 Torr (mmHg) 0,91 bar 13,23 psi 26,93 inHg 9,29 m H_2O
10	3/8	5,5	0,22	22	318	65,9	955	34	1,34	
13	1/2	5,5	0,22	19,9	289	59,7	866	39	1,54	
19	3/4	5,5	0,22	16,5	240	49,6	719	54	2,13	
25	1	5,5	0,22	14,8	214	44,3	643	68	2,68	
32	1 1/4	5,5	0,22	12,8	186	38,5	558	94	3,7	
38	1 1/2	5,5	0,22	11,5	167	34,5	500	112	4,41	
51	2	5,5	0,22	9,2	133	27,5	399	144	5,67	
63	2 1/2	5,5	0,22	7,5	109	22,6	327	181	7,13	
76	3	6	0,24	6,1	88	18,2	263	232	9,13	
102	4	6	0,24	3,7	54	11,2	163	367	14,45	

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

VENA® SIL 650V LASTIC

Ø INT		WALL THICKNESS		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS	
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1	
mm	inch	+1/-0.5 mm	+0.04/ -0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
6	1/4	5.5	0.22	23.5	340.7	70.5	1022.1	15	0.6
8	5/16	5.5	0.22	21.4	310.3	64.2	931.0	15	0.6
10	3/8	5.5	0.22	19.8	286.8	59.3	860.3	15	0.6
13	1/2	5.5	0.22	17.9	259.1	53.6	777.2	15	0.6
16	5/8	5.5	0.22	16.3	237.1	49.0	711.4	15	0.6
19	3/4	5.5	0.22	15.1	219.0	45.3	657.0	15	0.6
22	7/8	5.5	0.22	14.0	203.5	42.1	610.5	15	0.6
25	1	5.5	0.22	13.1	190.0	39.3	570.0	25	1.0
32	1 1/4	5.5	0.22	11.3	163.9	33.9	491.8	49	1.9
38	1 1/2	5.5	0.22	10.1	145.8	30.2	437.4	69	2.7
51	2	5.5	0.22	7.9	114.7	23.7	344.1	114	4.5
63	2 1/2	5.5	0.22	6.4	92.4	19.1	277.2	155	6.1
76	3	6.0	0.24	5.0	72.6	15.0	217.8	200	7.9
102	4	6.0	0.24	2.9	41.5	8.6	124.6	290	11.4

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

VENA® SIL 650V PLASTIC

Ø INT		WALL THICKNESS		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS	
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1	
mm	inch	+1/-0.5 mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
6	1/4	6	0.24	26.0	376.5	77.9	1129.5	29	1.14
8	5/16	6	0.24	24.0	348.1	72.0	1044.3	31	1.22
10	3/8	6	0.24	22.0	318.4	65.9	955.3	34	1.34
13	1/2	6	0.24	19.9	288.6	59.7	865.8	45	1.77
16	5/8	6	0.24	18.3	265.0	54.8	794.9	55	2.15
19	3/4	6	0.24	16.5	239.6	49.6	718.8	68	2.69
22	7/8	6	0.24	15.8	228.8	47.3	686.3	82	3.24
25	1	6	0.24	14.8	214.2	44.3	642.7	105	4.13
32	1 1/4	6	0.24	12.8	186.2	38.5	558.5	131	5.15
38	1 1/2	6	0.24	11.5	166.6	34.5	499.9	166	6.52
51	2	6	0.24	9.2	133.2	27.5	399.5	231	9.08
63	2 1/2	6	0.24	7.5	109.1	22.6	327.4	299	11.77
76	3	6.5	0.26	6.1	87.8	18.2	263.4	378	14.88
102	4	6.5	0.26	3.7	54.3	11.2	163.0	550	21.67

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

VENA® SIL 655

Ø INT		WALL THICKNESS		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS		VACUUM RESISTANCE
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1		
mm	inch	+1/-0.5mm	+0.04/-0.02''	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch	
6	1/4	5,5	0,26	31,5	456	94,5	1370	43	1,69	684 Torr (mmHg) 0,91 bar 13,23 psi 26,93 inHg 9,29 m H_2O
10	3/8	5,5	0,26	27	392	81.0	1174	49	1,93	
13	1/2	5,5	0,26	24,5	355	73,5	1066	54	2,13	
19	3/4	5,5	0,26	20,5	297	61,5	892	68	2,68	
25	1	5,5	0,26	18,5	268	55,5	805	80	3,15	
32	11/4	5,5	0,26	16,5	239	49,5	718	100	3,94	
38	11/2	6,5	0,28	15.0	218	45.0	653	121	4,76	
51	2	6,5	0,28	12.0	174	36.0	522	185	7,28	
63	21/2	6,5	0,28	10.0	145	30.0	435	273	10,75	
76	3	6,5	0,28	7.1	103	21.3	308	318	12,52	
102	4	6,5	0,28	5.0	73	15.0	218	423	16,65	

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

VENA® TECHNOSIL

Ø INT		OUTER DIAMETER		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS	
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1	
mm	inch	mm	inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
6,35	1/4	13.2	0.52	9.3	135	28	406	40	1.57
7,93	5/16	15.0	0.59	7.7	111	23	334	45	1.77
9,52	3/8	16.6	0.65	7.0	102	21	305	55	2.21
12,7	1/2	20.3	0.80	5.7	82	17	247	70	2.76
15,88	5/8	24.5	0.96	4.3	63	13	189	85	3.35
19,05	3/4	27.9	1.10	3.7	53	11	160	95	3.74
22,22	7/8	31.3	1.23	3.3	48	10	145	110	4.33
25,4	1	34.5	1.36	3.0	44	9	131	135	5.32
31,75	1 1/4	40.8	1.61	2.3	34	7	102	160	6.30

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

VENA® TECHNOSIL DB

Ø INT		OU TER DIAMETER		WORKING PRESSURE*		BURSTING PRESSURE		BENDING RADIUS		VACUMM PRESSURE	
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1			
mm	inch	mm	inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch	Bar	Psi
6,35	1/4	16	0,63	23,7	344	71,2	1033	34	1,36	1	14,5
7,93	5/16	18	0,71	22,8	331	68,5	994	37	1,48	1	14,5
9,52	3/8	20	0,79	22,3	324	66,9	971	46	1,84	0,95	13,78
12,7	1/2	23	0,91	19,4	282	58,3	846	51	2,04	0,95	13,78
15,88	5/8	27	1,06	17	246	50,9	739	65	2,6	0,9	13,05
19,05	3/4	30,5	1,2	15,6	226	46,8	678	76	3,04	0,8	11,6
22,22	7/8	33	1,3	14	202	41,9	607	99	3,96	0,5	7,25
25,4	1	37	1,46	12,5	181	37,5	544	118	4,72	0,4	5,8
28,00	1 7/64	38	1,50	11,67	169	35,00	507	160,00	6,40	0,15	2,18
31,75	1 1/4	46	1,81	10,07	146	30,20	438	181,00	7,24	0,15	2,18

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

VENABIO® FLOW MULTIPURPOSE

INNER DIAMETER		OUTER DIAMETER	
mm	inch	mm	inch
1,6	1/16	4,8	3/16
2,4	3/32	5,6	7/32
3,2	1/8	6,4	1/4
3,2	1/8	7,9	5/16
3,2	1/8	9,5	3/8
4,8	3/16	7,9	5/16
4,8	3/16	9,5	3/8
4,8	3/16	11,1	7/16
6,4	1/4	9,5	3/8
6,4	1/4	12,7	1/2
7,9	5/16	12,7	1/2
9,6	3/8	14,3	9/16
9,5	3/8	15,9	3/8
11,1	7/16	14,3	9/16
12,7	1/2	19.1	3/4
15,9	5/8	22,2	7/8
19.1	3/4	25,4	1

Other sizes available under demand.

PHARMALOADER®

NOMINAL CLAMP Ø	CLAMP HEAD Ø	INNER Ø	OVERALL LENGHT		WORKING PRESSURE	
inch	mm	mm	inch	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
6	167	147	7	178	0,35	5
8	233,5	200	7	178	0,20	3
8	218	198	7	178	0,20	3
10	270	250	8	204	0,10	1

PHARMALOADER HP®

NOMINAL CLAMP Ø	CLAMP HEAD Ø	INNER Ø	OVERALL LENGHT	WORKING PRESSURE	BURSTING PRESSURE
inch	mm	mm	mm(inches)	Bar	Bar
1 1/2"	50.5	34.7	4" (102)	5.7	17
2"	64.0	47.5	4" (102)	4.0	12
3"	91.0	73.0	6"(152)	2.6	7.9

VENA® ASEPTISIL

INNER DIAMETER			TOLERANCE		OUTER DIAMETER			TOLERANCE		THICKNESS		TOLERANCE	
mm	inch		mm	inch	mm	inch		mm	inch	mm	inch	mm	inch
1,59	0,06	1/16	0,25	0,0098	4,76	0,19	3/16	0,75	0,0295	1,585	0,062	0,25	0,0098
2,38	0,09	3/32	0,25	0,0098	5,56	0,22	7/32	0,75	0,0295	1,59	0,063	0,25	0,0098
3,18	0,13	1/8	0,25	0,0098	6,35	0,25	1/4	0,75	0,0295	1,585	0,062	0,25	0,0098
3,18	0,13	1/8	0,25	0,0098	7,94	0,31	5/16	0,85	0,0335	2,38	0,094	0,30	0,0118
3,18	0,13	1/8	0,25	0,0098	9,52	0,37	3/8	0,85	0,0335	3,17	0,125	0,30	0,0118
4,76	0,19	3/16	0,30	0,0118	7,94	0,31	5/16	0,80	0,0315	1,59	0,063	0,25	0,0098
4,76	0,19	3/16	0,30	0,0118	9,52	0,37	3/8	0,90	0,0354	2,38	0,094	0,30	0,0118
4,76	0,19	3/16	0,30	0,0118	11,11	0,44	7/16	0,90	0,0354	3,17	0,125	0,30	0,0118
6,35	0,25	1/4	0,30	0,0118	9,52	0,37	3/8	0,80	0,0315	1,585	0,062	0,25	0,0098
6,35	0,25	1/4	0,30	0,0118	12,70	0,50	1/2	0,90	0,0354	3,17	0,125	0,30	0,0118
7,94	0,31	5/16	0,30	0,0118	12,70	0,50	1/2	0,90	0,0354	2,38	0,094	0,30	0,0118
9,52	0,37	3/8	0,35	0,0138	14,29	0,56	9/16	0,95	0,0374	2,38	0,094	0,30	0,0118
9,52	0,37	3/8	0,35	0,0138	15,88	0,63	5/8	0,95	0,0374	3,18	0,125	0,30	0,0118
11,11	0,44	7/16	0,35	0,0138	14,29	0,56	9/16	0,85	0,0335	1,59	0,063	0,25	0,0098
12,70	0,50	1/2	0,35	0,0138	19,05	0,75	3/4	0,95	0,0374	3,17	0,125	0,30	0,0118
15,88	0,62	5/8	0,35	0,0138	22,22	0,87	7/8	0,95	0,0374	3,17	0,125	0,30	0,0118
19,05	0,75	3/4	0,40	0,0157	25,40	1,00	1	1	0,0394	3,17	0,125	0,30	0,0118

ADAPTSIL®

Ø INT		WALL THICKNESS		WORKING PRESSURE		BURSTING PRESSURE	
				ISO 1402/2009		ISO 1402/2009	
mm	inch	+1/-0.5mm	+0.04/-0.02''	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F
13	1/2	5,8	0,23	16,1	234	48,3	701
19	3/4	5,8	0,23	14	204	42,1	611
25	1	5,8	0,23	13,4	194	40,1	582
38	1 1/2	5,8	0,23	10,4	151	31,2	453
51	2	5,8	0,23	8,3	120	24,8	360
63	2 1/2	5,8	0,23	6,1	89	18,4	267
76	3	5,8	0,23	4,9	72	14,8	215

VENA® VIEW

INNER DIAMETER		WORKING PRESSURE ISO 1402/2009		BURSTING PRESSURE ISO 1402/2009		WORKING PRESSURE WITH HOUSING		BURSTING PRESSURE WITH HOUSING	
mm	inch	Bar	Psi	Bar	Psi	Bar	Psi	Bar	Psi
25	0,98	8	116	32	464	12	174	48	696
51	2	5	72	22	319	10	145	47	681
63	2,48	5	72	22	319	10	145	40	580
76	2,99	5	72	20	290	9	130	36	522
102	4,02	4	58	16	232	7	101	14	203

VENA® FLEXIP

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE ISO 1402/2009		BURSTING PRESSURE ISO 1402/2009		BENDING RADIUS ISO 17	
mm	inch	+1/ -0.5 mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
6	1/4	5,50	0,22	32,70	474,40	98,10	1423,20	29	1,14
8	5/16	5,50	0,22	31,20	452,00	93,50	1356,00	31	1,22
10	3/8	5,50	0,22	29,70	430,30	89,00	1290,80	34	1,34
13	1/2	5,50	0,22	27,50	398,90	28,50	1196,70	39	1,54
16	5/8	5,50	0,22	25,40	369,00	76,30	1107,10	45	1,77
19	3/4	5,50	0,22	23,50	340,60	70,50	1021,80	54	2,13
22	7/8	5,50	0,22	21,60	313,70	64,90	941,00	60	2,36
25	1	5,50	0,22	19,90	288,20	59,60	864,50	68	2,68
32	1 1/4	5,50	0,22	16,20	234,50	48,50	703,40	94	3,70
38	1 1/2	5,50	0,22	13,40	194,80	40,30	584,40	112	4,41
51	2	5,50	0,22	8,90	129,10	26,70	387,20	144	5,67
63	2 1/2	5,50	0,22	6,40	92,90	19,20	278,80	181	7,13
76	3	6,00	0,24	5,50	80,40	16,60	241,10	232	9,13

VENA® FLEXPURE

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE		BURSTING PRESSURE		BENDING RADIUS	
mm	inch	+1/ -0.5 mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
19,10	3/4	3,80	0,150	10	145	30	435	65	2,56
21,00	7/8	4,10	0,161	10	145	30	435	80	3,15
25,50	1	4,20	0,165	10	145	30	435	90	3,54
31,80	1 1/4	4,65	0,183	10	145	30	435	125	4,92
38,10	1 1/2	5,00	0,197	10	145	30	435	155	6.10

VENAFLON® HF

INNER DIAMETER		WALL THICKNESS ISO 1307		WORKING PRESSURE ISO 1402		BENDING RADIUS ISO 10619-1	
mm	inch	+- 0.8 mm	+- 0.03 inch	Bar at 20°C	Psi at 68°F	mm	inch
10	3/8	6,0	0,24	10	145,04	40	1,58
13	1/2	6,0	0,24	10	145,04	45	1,77
16	5/8	6,0	0,24	10	145,04	55	2,17
19	3/4	6,0	0,24	10	145,04	65	2,56
25	1	6,0	0,24	10	145,04	85	3,35
32	1 1/4	6,0	0,24	10	145,04	120	4,72
38	1 1/2	6,5	0,26	10	145,04	140	5,51
51	2	8,0	0,31	10	145,04	180	7,09
63,5	2 1/2	8,0	0,31	5	72,52	320	12,60
76	3	8,0	0,31	5	72,52	380	14,96
100	4	9,0	0,35	3	43,51	500	19,69

VENAFLON® HF-X

INNER DIAMETER		WALL THICKNESS ISO 1307		WORKING PRESSURE ISO 1402		BENDING RADIUS ISO 10619-1	
mm	inch	+0,8/ -0,8 mm	+-0,03 inch	Bar a 20°C	Psi at 68°F	mm	inch
13	1/2	6.0	0,24	10	145,04	120	4,72
19	3/4	6.0	0,24	10	145,04	120	4,72
25	1	6.0	0,24	10	145,04	150	5,91
32	1 1/4	6.0	0,24	10	145,05	200	7,87
38	1 1/2	6.5	0,26	10	145,05	250	9,84
51	2	8.0	0,31	10	145,05	300	11,81
63,5	2 1/2	8.0	0,31	5	72,52	380	14,96
76	3	8.0	0,31	5	72,52	460	18,11

VENAFLON® HR

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE ISO 1402		BENDING RADIUS	
mm	inch	+1/ -0.5 mm	+0.04/-0.02 inch	ISO 1402/2009 Bar at 20°C	ISO 1402/2009 Psi at 68°F	ISO 1746/1998 mm	ISO 1746/1998 inch
13	1/2	6	0,24	10	145	45	1.77
19	3/4	6	0,24	10	145	65	2.55
25	1	6	0,24	10	145	85	3.34
32	1 1/4	6.5	0,26	10	145	120	4.72
38	1 1/2	6.5	0,26	10	145	140	5.51
51	2	7.25	0,28	10	145	180	7.08
63.5	2.5	8	0,31	10	145	250	9.84
76	3.00	8	0,31	10	145	350	13.77

VENAFLON® FULL-X

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE ISO 1402/2009		BENDING RADIUS ISO 10619-1	
mm	inch	+1/-0.5 mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	mm	inch
13	1/2	6.0	0,24	10	145,04	135	5,31
19	3/4	6.0	0,24	10	145,04	188	7,40
25	1	6.0	0,24	10	145,04	225	8,85
32	1 1/4	6.5	0,26	10	145,04	262	10,31
38	1 1/2	6.5	0,26	10	145,04	338	13,30
51	2	7.25	0,28	10	145,04	412	16,22
63,5	2 1/2	8.0	0,31	10	145,04	450	17,71
76	3	8.0	0,31	10	145,04	525	20,66
100	4	8.50	0,33	10	145,04	700	27,56

VENA® TECHNIPUR® VAC FDA

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE		BURSTING PRESSURE		VACUUM RESISTANCE		BENDING RADIUS	
				ISO 1402/2009		ISO 1402/2009		ISO 7233/2006		ISO 10619-1	
mm	inch	+0.04/ -0.02 mm	$+1.57x10^{-3}$/ $-7.87x10^{-4}$ inch	Bar a 20°C	Psi a 68F	Bar a 20°C	Psi a 68F	Bar a 20°C	Psi a 68F	mm	inch
50	1.97	1,20	0,05	2,07	30,02	6,21	90,05	0,61	8,85	85	0,28
55	2.17	1,20	0,05	1,87	27,12	5,61	81,35	0,55	7,98	93	0,31
60	2.36	1,20	0,05	1,71	24,80	5,13	74,39	0,51	7,40	100	0,33
65	2.56	1,20	0,05	1,58	22,91	4,74	68,73	0,47	6,82	108	0,35
70	2.76	1,20	0,05	1,46	21,17	4,38	63,51	0,43	6,24	115	0,38
75	2.95	1,20	0,05	1,36	19,72	4,08	59,16	0,4	5,80	123	0,40
80	3.15	1,20	0,05	1,28	18,56	3,84	55,68	0,38	5,51	130	0,43
85	3.35	1,20	0,05	1,2	17,40	3,60	52,20	0,36	5,22	138	0,45
90	3.54	1,20	0,05	1,13	16,39	3,39	49,16	0,34	4,93	145	0,48
95	3.74	1,20	0,05	1,07	15,52	3,21	46,55	0,32	4,64	153	0,50
100	3.94	1,20	0,05	1,01	14,65	3,03	43,94	0,3	4,35	160	0,52
105	4.13	1,20	0,05	0,96	13,92	2,88	41,76	0,29	4,21	168	0,55
110	4.33	1,20	0,05	0,92	13,34	2,76	40,02	0,27	3,92	175	0,57
115	4.53	1,20	0,05	0,88	12,76	2,64	38,28	0,26	3,77	183	0,60
120	4.72	1,20	0,05	0,84	12,18	2,52	36,54	0,25	3,63	190	0,62
125	4.92	1,20	0,05	0,81	11,75	2,43	35,24	0,24	3,48	198	0,65
130	5.12	1,20	0,05	0,77	11,17	2,31	33,50	0,23	3,34	205	0,67
135	5.31	1,20	0,05	0,75	10,88	2,25	32,63	0,22	3,19	213	0,70
140	5.51	1,20	0,05	0,72	10,44	2,16	31,32	0,22	3,19	220	0,72
145	5.71	1,20	0,05	0,69	10,01	2,07	30,02	0,21	3,05	228	0,75
150	5.91	1,20	0,05	0,67	9,72	2,01	29,15	0,2	2,90	235	0,77
155	6.10	1,20	0,05	0,65	9,43	1,95	28,28	0,19	2,76	243	0,80
160	6.30	1,20	0,05	0,63	9,14	1,89	27,41	0,19	2,76	250	0,82
165	6.50	1,20	0,05	0,61	8,85	1,83	26,54	0,18	2,61	258	0,85

VENA® TECHNIPUR® S100

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE ISO 1402/2009		BURSTING PRESSURE ISO 1402/2009	
mm	inch	+1/-0.5 mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F
20	0.79	3.6	0.14	10.44	151.35	31.31	454.06
25	0.98	3.6	0.14	9.40	136.27	28.19	408.80
30	1.18	3.6	0.14	8.46	122.68	25.38	368.05
32	1.26	3.6	0.14	8.11	117.64	24.34	352.92
35	1.38	3.6	0.14	7.62	110.46	22.85	331.37
38	105	3.6	0.14	7.15	103.71	21.46	311.14
40	1.57	3.6	0.14	6.86	99.45	20.58	298.34
45	1.77	3.6	0.14	6.17	89.53	18.52	268.60
51	2.01	3.6	0.14	5.44	78.93	16.33	236.80
60	2.36	3.6	0.14	4.51	65.34	13.52	196.02
63,5	2.5	3.6	0.14	4.19	60.71	12.56	182.13
70	2.76	3.6	0.14	3.65	52.96	10.96	158.89
76	2.99	3.6	0.14	3.22	46.69	9.66	140.08
82	3.23	3.6	0.14	2.84	41.17	8.52	123.50
90	3.54	3.6	0.14	2.40	34.80	7.20	104.40
102	4.02	3.6	0.14	1.87	27.05	5.60	81.14
114	4.49	3.6	0.14	1.45	21.02	4.35	63.07
127	5.00	3.6	0.14	1.10	16.00	3.31	48.00
203	7.99	3.6	0.14	0.65	9.47	1.96	28.40

VENA® TECHNIPUR® S200

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE		BURSTING PRESSURE	
mm	inch	+1/-0.5 mm	+0.04/-0.02 inch	ISO 1402/2009 Bar at 20°C	ISO 1402/2009 Psi at 68°F	ISO 1402/2009 Bar at 20°C	ISO 1402/2009 Psi at 68°F
13	0,51	4,50	0,18	12,17	176,47	36,50	529,25
16	0,63	4,50	0,18	11,54	167,33	34,61	501,84
20	0,79	4,50	0,18	10,73	155,51	32,18	466,54
25	0,98	4,50	0,18	9,75	141,43	29,26	424,29
30	1,18	4,50	0,18	8,83	128,02	26,49	384,06
32	1,26	4,50	0,18	8,47	122,85	25,42	368,54
35	1,38	4,50	0,18	7,95	115,29	23,85	345,87
38	1,5	4,50	0,18	7,45	107,98	22,34	323,93

VENA® ABRASIL

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE		BURSTING PRESSURE		BENDING RADIUS	
				ISO 1402/2009		ISO 1402/2009		ISO 10619-1	
mm	inch	+1/ -0.5 mm	+0.04/ -0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
6	1/4	5.0	0.20	14.5	210.3	43.5	630.9	28.6	1.13
10	3/8	5.0	0.20	13.7	199.3	41.2	598.0	34.4	1.35
13	1/2	5.0	0.20	13.2	191.3	39.6	574.0	39.1	1.54
16	5/8	5.0	0.20	12.7	183.5	38.0	550.6	44.3	1.74
19	3/4	5.0	0.20	12.1	175.9	36.4	527.7	49.7	1.96
22	7/8	5.0	0.20	11.6	168.5	34.8	505.4	55.6	2.19
25	1	5.0	0.20	11.1	161.2	33.3	483.7	61.8	2.43
32	1 1/4	5.0	0.20	10.0	145.1	30.0	435.2	77.7	3.06
38	1 1/2	5.0	0.20	9.1	132.0	27.3	396.0	92.9	3.66
51	2	5.0	0.20	7.3	106.3	22.0	318.9	130.8	5.15
63	2 1/2	5.0	0.20	5.9	85.7	17.7	257.2	171.8	6.76
76	3	5.5	0.22	4.6	66.8	13.8	200.4	222.8	8.77
102	4	5.5	0.22	2.7	39.6	8.2	118.7	345.2	13.59

VENA® ABRASIL PL

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE		BURSTING PRESSURE		BENDING RADIUS ISO 10619-1	
				ISO 1402/2009		ISO 1402/2009			
mm	inch	+1/-0.5mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
6	1/4	5.0	0.20	10.5	152.5	31.6	457.6	24.6	0.97
8	5/16	5.0	0.20	9.5	138.0	28.5	413.9	25.2	0.99
10	3/8	5.0	0.20	8.7	126.6	26.2	379.9	25.9	1.02
13	1/2	5.0	0.20	7.8	113.3	23.4	340.0	27.1	1.07
16	5/8	5.0	0.20	7.1	102.8	21.3	308.4	28.4	1.12
19	3/4	5.0	0.20	6.5	94.1	19.5	282.3	29.9	1.18
22	7/8	5.0	0.20	6.0	86.7	17.9	260.0	31.5	1.24
25	1	5.0	0.20	5.5	80.2	16.6	240.6	33.3	1.31
32	1 1/4	5.0	0.20	4.7	67.7	14.0	203.0	38.1	1.50
38	1 1/2	5.0	0.20	4.1	59.0	12.2	176.9	42.9	1.69
51	2	5.5	0.20	3.0	44.1	9.1	132.2	55.5	2.18
63	2 1/2	5.0	0.20	2.3	33.3	6.9	100.0	115.4	4.54
76	3	5.5	0.22	1.6	23.8	4.9	71.5	194.8	7.67
102	4	5.5	0.22	0.6	8.9	1.8	26.7	425.9	16.77

VITOSIL®

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE ISO 1402/2009		BURSTING PRESSURE ISO 1402/2009		BENDING RADIUS ISO 10619-1	
mm	inch	+1/ -0.5 mm	+0.04/ -0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
25	1	6,5	0,26	13,3	192,9	40,0	580,2	111	4,37
38	1 ½	6,5	0,26	10,3	149,4	31,0	449,6	159	6,26
51	2	6,5	0,26	8,3	120,4	25,0	362,6	209	8,23
63	2 ½	6,5	0,26	6,7	97,2	20,0	290,1	237	9,33
76	3	6,5	0,26	5,3	76,9	16,0	232,1	346	16,62
102	4	7,2	0,28	3,7	53,7	11,0	159,5	412	16,22

VENA® STEAMFLOW

INNER DIAMETER		WALL THICKNESS		WORKING PRESSURE ISO 1402/2009		BURSTING PRESSURE ISO 1402/2009		BENDING RADIUS ISO 10619-1	
mm	inch	+1/ -0.5 mm	+0.04/-0.02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F	mm	inch
10	3/8	6,5	0,26	21,3	308,9	63,9	926,8	123,8	4,9
13	1/2	6,5	0,26	19,4	281,4	58,2	844,1	135,3	5,3
16	5/8	6,5	0,26	17,1	247,5	51,2	742,6	148,2	5,8
19	3/4	6,5	0,26	15,3	221,4	45,8	664,3	162,4	6,4
25	1	6,5	0,26	11,4	165,3	34,2	496,0	194,7	7,7
32	1 1/4	6,5	0,26	9,9	143,1	29,6	429,3	239,1	9,4
38	1 1/2	6,5	0,26	9,6	139,7	28,9	419,2	283	11,1
50	2	6,5	0,26	8,6	124,7	25,8	374,2	396	15,6

3. Chemical Compatibility

Resistance to different products:
A - excellent **B - good** **C - insufficient** **D - unsatisfactory**

A	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
acetaldehyde	A	A	A	C	D	A
acetamide	B	A	B	A	B	A
acetic acid 5%	A	A	A	-	A	A
acetic acid 30%	A	C	A	-	B	A
acetic acid, hot high press	C	-	-	-	D	A
acetic acid, glacial	B	A	C	D	D	A
acetic anhydride	C	A	B	D	D	A
acetone	B	A	C	B	D	A
acetophenone	D	B	-	D	D	A
acetyl acetone	D	A	-	-	D	A
acetyl chloride	C	D	A	D	A	A
acetylene	B	A	A	D	A	A
acetylene tetrabromide	-	D	-	-	A	A
acrylonitrile	D	D	D	A	D	A
adipic acid	-	B	C	A	-	A
aero lubriplate	B	C	-	-	A	A
aero safe 2300	C	B	-	-	D	A
aero safe 2300 w	C	B	-	-	D	A
aero shell IAC	B	D	-	-	A	A
aero shell 7 A grease	B	D	-	-	A	A
aero shell 17 grease	B	D	-	-	A	A
aero shell 750	D	D	-	-	A	A
air-below 300° F	A	D	A	-	A	A
air-above 300° F	A	D	A	-	A	A
alkazene	D	D	-	-	B	A
alum NH3 CR-K	A	A	-	-	D	A
aluminum acetate	D	A	-	-	D	A
aluminum bromide	A	B	-	-	A	A
aluminum chloride	B	A	A	B	A	A
aluminum fluoride	B	A	-	A	A	A
aluminum nitrate	B	A	-	A	A	A
aluminum phosphate	A	A	-	-	A	A
aluminum salts	A	A	A	A	A	A
aluminum sulfate	A	A	A	A	A	A
ambrex 33 mobile	D	-	-	-	A	A
amines, mixed	B	A	A	C	D	A
ammonia anhydrous(liquid)	C	A	A	B	D	A
ammonia gas, cold	A	A	A	-	D	A
ammonia gas, hot	A	-	A	-	D	A
ammonia & lichium metali solution	D	-	-	-	D	A
ammonium carbonate	-	A	A	B	-	A
ammonium chloride	-	A	A	A	A	A
ammonium hydroxide (concentrated)	A	A	A	A	B	A
ammonium nitrate	-	A	A	A	-	A
ammonium nitrite	B	A	-	-	-	A
ammonium persulfate solution	-	A	-	A	-	A
ammonium persultate 10%	-	-	-	-	-	A
ammonium phosphate	A	A	A	-	-	A
ammonium phosphate, mono-basic	A	A	-	A	-	A
ammonium phosphate, dibasic	A	A	-	A	-	A
ammonium phosphate, tribasic	A	A	-	C	-	A
ammonium salts	A	A	A	A	C	A
ammonium sulfate	A	A	A	A	A	A
ammonium sulfide	-	A	-	-	D	A
amyl acetate	D	D	D	C	D	A
amyl alcohol	D	A	D	B	B	A
amyl borate	-	B	-	-	-	A
amyl chloride	D	D	D	D	A	A
amyl chloronaphthalene	D	C	-	-	A	A
amyl naphthalene	D	D	-	-	A	A
anderol L 774 (di-ester)	D	-	-	-	A	A
anderol L 826 (di-ester)	D	D	-	-	A	A
anderol L 829 (di-ester)	D	D	-	-	A	A
ang-25 (glycerol ester)	B	-	-	-	A	A
ang-25 (di-ester base)	B	D	-	-	A	A
anhydrous ammonia	B	A	-	-	D	A
anhydrous hydrazine	-	-	-	-	D	A
anhydrous hydrogen fluo	-	C	-	-	D	A
aniline	D	A	D	C	C	A
aniline dyes	C	A	-	-	B	A
aniline hydrochloride	D	A	D	D	B	A
aniline oils	D	C	-	-	C	A
animal fats	B	B	-	-	A	A
animal oil (lard oil)	B	B	-	-	A	A
AN-03 grade M	B	B	-	-	A	A
AN-0-6	D	-	-	-	A	A
AN-0-366	D	-	-	-	A	A
AN-V V-0-366 b hydrofluid	D	D	-	-	A	A
ansul ether	D	D	-	-	D	A
aqua regia	D	C	B	B	B	A
argon	B	A	-	-	A	A
aroclor 1248	B	D	-	-	A	A
aroclor 1254	C	D	-	-	A	A
aroclor 1260	A	D	-	-	A	A
aromatic fuel 50%	D	C	-	C	A	A
arsenic acid	A	A	C	B	A	A
arsenic trichloride	-	B	-	-	-	A
askatel	D	D	-	-	A	A
asphalt	D	C	-	A	A	A
ASTM oit #1	A	C	D	-	A	A
ASTM oil #2	D	D	D	-	A	A
ASTM oil #3	C	D	D	-	A	A
ASTM oil #4	D	D	-	-	A	A
ASTM reference fuel A	D	C	-	-	A	A
ASTM reference fuel B	D	C	-	-	A	A
ASTM reference fuel C	D	C	-	-	A	A
ATL-857	D	-	-	-	A	A
atlantic dominion F	D	C	-	-	A	A
aurex 903R mobil	D	-	-	-	A	A
automatic transmission fluid	D	D	-	-	A	A
automotive brake fluid	C	-	-	-	D	A

B	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
bardol B	D	D	-	-	A	A
barium chloride	A	A	-	A	A	A
barium hydroxide	A	A	A	B	A	A
barium salts	A	-	A	-	A	A
barium sulfate	A	A	-	B	A	A
barium sulfide	A	A	-	B	A	A
bayol D	D	D	-	-	A	A
beer	A	A	A	A	A	A
beet sugar liquors	A	A	-	A	A	A
benzaldehyde	D	B	D	A	D	A
benzene	D	D	D	C	A	A
benzene sulfonic acid	D	A	A	A	A	A
benzine	D	D	-	-	A	A
benzochloride	-	-	-	-	A	A
benzoic acid	B	A	D	A	A	A
benzophenone	-	-	-	-	A	A
benzyl alcohol	-	C	B	D	A	A
benzyl benzoate	-	C	-	-	A	A
benzyl chloride	D	C	-	-	A	A
black point 77	C	-	-	-	A	A
black sulphate liquors	B	-	-	-	A	A
blast furnace gas	A	A	-	-	A	A
bleach solution	B	B	-	-	A	A
borax	B	A	A	A	A	A
bordeaux mixture	B	A	-	-	A	A
boric acid	A	A	A	A	A	A
boron fluids (HEF)	D	D	-	-	A	A
brake fluid (non petroleum)	C	A	-	-	D	A
bray GG-130	D	-	-	-	A	A
brayco 719-R (VV-H-910)	B	-	-	-	D	A
brayco 885 MILL-L-6085 A	D	-	-	-	A	A
brayco 910	D	-	-	-	D	A
bret 710	D	-	-	-	D	A
brine	-	A	-	-	-	A
brom-113	D	-	-	-	-	A
brom-114	D	-	-	-	B	A
bromine	D	C	A	D	A	A
bromine anhydrous	C	C	-	-	A	A
bromine pentafluoride	D	D	-	-	D	A
bromine trifluoride	D	C	-	-	D	A
bromine water	D	B	-	-	A	A
bromobenzene	D	D	-	-	A	A
bromochloro trifluoroethane	D	D	-	-	A	A
bunker oil	B	B	-	-	A	A
butadiene	D	D	-	D	B	A
butane	D	D	D	C	A	A
butane 2.2-dimethyl	D	-	-	-	A	A
butane 2.3-dimethyl	D	-	-	-	A	A
butanol (butyl alcohol)	B	A	B	B	A	A
1-butane.2-ethyl	D	-	-	-	A	A
butter	B	B	-	-	A	A
butyl acetate	D	D	D	C	D	A
butyl acetyl ricinoleate	-	B	-	-	A	A
butyl acrylate	-	D	-	-	D	A
butyl alcohol	B	A	-	-	A	A
butyl amine	B	A	-	C	D	A
butyl benzoate	-	C	-	-	A	A
butyl butyrate	-	C	-	-	A	A
butyl carbitol	D	C	-	-	C	A
butyl cellosolve	-	A	-	-	D	A
butyl cellosolve adipate	B	-	-	-	B	A
butyl ether	D	B	-	-	D	A
butyl oleate	-	B	-	-	A	A
butyl stearate	-	B	-	-	A	A
butylene	D	C	-	B	A	A
butyraldehyde	D	A	-	-	D	A
butyric acid	-	A	A	D	B	A

C	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
calcine liquors	-	-	-	-	A	A
calcium acetate	D	A	-	-	D	A
calcium bisulfite	A	D	D	A	A	A
calcium carbonate	A	A	-	B	A	A
calcium chloride	A	A	-	B	A	A
calcium cyanide	A	-	-	-	-	A
calcium hydroxide	A	A	-	A	A	A
calcium hypochloride	-	A	-	-	A	A
calcium hypochlorite	B	B	-	A	A	A

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
calcium nitrate	B	A	-	A	A	A
calcium phosphate	A	-	-	-	A	A
calcium salts	B	A	A	-	A	A
calcium silicate	-	-	-	-	A	A
calcium sulfide	B	A	-	-	A	A
calcium sulfite	A	A	-	-	A	A
calcium thiosulfate	A	A	-	-	A	A
caliche liquors	B	-	-	-	A	A
cane sugar liquors	A	A	-	-	A	A
caproic aldehyde	B	-	-	-	D	A
carbanate	-	A	-	-	A	A
carbitol	B	A	-	-	B	A
carbolic acid	D	A	-	-	A	A
carbon bisulfide	-	D	D	-	A	A
carbon dioxide, dry	B	-	A	A	B	A
carbon dioxide, wet	B	-	A	A	B	A
carbon disulfide	-	D	D	C	A	A
carbon monoxide	A	A	A	A	A	A
carbon tetrachloride	D	D	B	D	A	A
carbonic acid	A	A	A	B	A	A
castor oil	A	B	C	-	A	A
cellosolve	D	C	D	B	D	A
cellosolve acetate	D	A	D	-	D	A
cellosolve butyl	D	C	-	-	D	A
celluguard	A	B	-	-	A	A
cellulube A60 (now fyrquel)	-	-	-	-	B	A
cellulube 90,100,150,220,300 and 500	A	-	-	-	A	A
cellutherm 2505A	-	D	-	-	A	A
cetate (hexadecane)	D	D	-	-	A	A
china wood oil (tunf oil)	D	B	-	-	A	A
chloroacetic acid	-	D	B	D	D	A
chlorodane	D	B	-	-	A	A
chlorextol	D	-	-	-	A	A
chlorinated salt brine	D	-	-	-	A	A
chlorinated solvents, dry	D	-	-	-	A	A
chlorinated solvents, wet	D	-	-	-	A	A
chlorine, dry	D	C	A	D	A	A
chlorine, wet	-	C	A	-	A	A
chlorine dioxide	-	D	-	-	A	A
chlorine dioxide (8%Cl as NAC102 in solution)	-	-	-	-	A	A
chlorine trifluoride	D	D	-	-	D	A
chloroacetone	D	B	-	-	D	A
chloroacetic acid	-	D	A	D	-	A
chlorobenzene	D	D	D	D	A	A
chlorobenzene (mono)	D	C	D	C	A	A
chlorobromo methane	D	D	D	A	B	A
chlorobutadiene	D	C	-	-	A	A
chrorododecane	D	D	-	-	A	A
chloroform	D	D	D	C	A	A
0-chloroaphtanene	D	D	-	-	A	A
I-chloro-I-nitro ethane	D	C	-	-	C	A
chlorosulfonic acid	D	B	A	D	C	A
chlorotoluene	D	C	-	-	A	A
chlorox	-	B	-	-	A	A
0-chlorphenol	D	C	-	-	A	A
chrome alum	A	-	-	-	A	A
chrome plating solution	B	A	-	-	A	A
chromic acid	C	B	A	D	A	A
chromic oxide 88 Wt, % aqueous solution	B	-	-	-	A	A
circo light process oil	D	-	-	-	A	A
citric acid	A	A	-	D	A	A
city service koolmotor-AP gear oil 140 E,P,Lube	D	-	-	-	A	A
city service pacemaker #2	D	-	-	-	A	A
city service #65,#120,#250	D	-	-	-	A	A
cobalt chloride	B	A	-	-	A	A
cobalt chloride, 2N	A	-	-	-	A	A
cocoanut oil	A	B	C	-	A	A
cod liver oil	B	C	-	-	A	A
coffe	A	A	-	-	A	A
coke oven gas	B	C	-	-	A	A
coliche liquors	-	B	-	-	-	A
convelex 10	D	D	-	-	-	A
coolanol (monsanto)	D	D	-	-	A	A
coolanol 45 (monsanto) +A269	D	D	-	-	A	A
copper acetate	D	A	-	-	D	A
copper chloride	A	C	-	-	A	A
copper cyanide	A	C	-	B	A	A
copper salts	A	-	A	-	A	A
copper sulfate	A	C	-	A	A	A
copper sulfate 10%	A	-	-	-	A	A
copper sulfate 50%	A	-	-	-	A	A
corn oil	A	B	-	-	A	A
cottonseed oil	A	B	C	-	A	A
creosol	D	C	D	D	A	A
creosote	D	B	-	-	A	A
creosote, coal tard	D	D	-	-	A	A
creosote, wood	D	D	-	-	A	A
creosvlic acid	D	B	-	-	A	A
crude oil	D	C	-	-	A	A
cumene	D	C	-	-	A	A
cutting oil	D	C	-	-	A	A
cyclohexane	D	D	D	B	A	A
cyclohexanol	D	B	-	-	A	A
cyclohexanone	D	B	D	D	D	A
P-cymene	D	D	-	-	A	A

D

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
decalin	D	D	-	C	A	A
decane	B	B	-	-	A	A
delco brake fluid	C	-	-	-	D	A
denatured alcohol	A	B	-	-	A	A
detergent solutions	A	B	-	D	A	A
developing fluids (photo)	A	A	-	A	A	A
dextrin	D	A	-	-	A	A
diacetone	D	C	-	-	D	A
diacetone alcohol	D	A	A	-	D	A
diazinon	D	D	-	-	B	A
dibenzyl ether	-	C	-	-	D	A
dibenzyl sebacate	C	C	-	-	B	A
dibromoethyl benzene	D	C	-	-	A	A
dibutylamine	C	B	-	-	D	A
dibutyl ether	D	B	-	-	C	A
dibutyl phthalate	B	B	C	-	B	A
dibutyl sebacate	B	B	-	-	B	A
0-dichlorobenzene	D	D	-	-	A	A
P-dichlorobenzene	D	D	-	-	-	A
dichloro-butane	D	-	-	-	A	A
dichloro-isopropyl ether	D	D	-	-	C	A
dicyclohexylamine	-	B	-	-	D	A
diesel oil	D	C	D	C	A	A
di-ester lubricant MIL-L-7808	D	D	-	-	A	A
di-ester synthetic lubricants	D	D	-	-	A	A
diethylamine	B	A	A	D	D	A
diethyl benzene	D	C	-	-	A	A
diethyl ether	D	B	-	-	D	A
diethyl sebacate	B	B	-	-	B	A
diethylene glycol	B	A	A	B	A	A
difluorodibromomethane	D	B	-	-	-	A
diisobutylene	D	C	-	-	A	A
diisooctyl sebacate	C	B	-	-	B	A
diisopropyl benzene	-	C	-	-	A	A
diisopropyl ketone	D	C	-	-	D	A
dimethyl aniline	-	B	-	-	D	A
dimethyl formamide	B	A	A	A	D	A
dimethyl phthalate	-	B	-	-	B	A
dinitro toluene	D	B	-	-	D	A
dioctyl phthalate	C	B	-	-	B	A
dioctyl sebacate	C	C	-	-	B	A
dioxane	D	B	D	C	D	A
dioxolane	D	C	-	-	D	A
dipentene	A	C	-	-	A	A
diphenyl	D	C	-	-	A	A
diphenyl oxides	C	C	-	-	A	A
dow chemical 50-4	-	-	-	-	D	A
dow chemical ET378	D	-	-	-	-	A
dow chemical ET588	-	-	-	-	D	A
dow corning-3	C	-	-	-	A	A
dow corning-4	C	-	-	-	A	A
dow corning-5	C	-	-	-	A	A
dow corning-11	C	-	-	-	A	A
dow corning-33	C	-	-	-	A	A
dow corning-44	C	-	-	-	A	A
dow corning-55	C	-	-	-	A	A
dow corning-200	C	-	-	-	A	A
dow corning-220	C	-	-	-	A	A
dow corning-510	C	-	-	-	A	A
dow corning-550	C	-	-	-	A	A
dow corning-704	-	-	-	-	A	A
dow corning-705	-	-	-	-	A	A
dow corning-710	C	-	-	-	A	A
dow corning-1208	C	-	-	-	A	A
dow corning-4050	C	-	-	-	A	A
dow corning-6620	C	-	-	-	A	A
dow corning-F60	C	-	-	-	A	A
dow corning-F61	B	-	-	-	A	A
dow corning-XF60	C	-	-	-	A	A
dow guard	A	-	-	-	A	A
dowtherm oil	B	D	-	-	A	A
dowtherm A or E	D	D	-	-	A	A
dowtherm 209.50%solution	C	-	-	-	D	A
driking water	A	-	-	-	A	A
dry cleaning fluids	D	D	-	-	A	A
DTE light oil	D	D	-	-	A	A

E

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
elco 28-EP lubricant	B	-	-	-	A	A
epichlorohydrin	D	B	-	-	D	A
epoxy resins	-	-	-	-	D	A
esam-6 fluid	-	B	-	-	D	A
esso fuel 208	B	-	-	-	A	A
esso golden gasoline	D	-	-	-	A	A
esso motor oil	D	-	-	-	A	A
esso transmission fluid (typeA)	D	-	-	-	A	A
esso WS3812 (MIL-L-7808 A)	D	-	-	-	A	A
esso SP90-EP lubricant	D	-	-	-	A	A
esstic 42,43	B	D	-	-	A	A
ethane	D	C	-	-	A	A
ethanol	A	A	B	B	A	A

Resistance to different products:
A - excellent
B - good
C - insufficient
D - unsatisfactory

Resistance to different products:
A – excellent **B – good** **C – insufficient** **D – unsatisfactory**

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
ethanol amine	B	A	-	-	D	A
ethers	D	B	D	-	C	A
ethyl acetate-organic ester	B	A	D	-	D	A
ethyl acetoacetate	B	A	-	-	D	A
ethyl acrylate	B	A	-	-	D	A
ethyl acrylic acid	D	C	-	-	-	A
ethyl alcohol	B	A	-	B	A	A
ethyl benzene	D	D	-	D	A	A
ethyl benzoate	D	C	D	C	A	A
ethyl bromide	-	C	A	-	A	A
ethyl cellosolve	D	B	-	-	D	A
ethyl cellulose	C	A	-	-	D	A
ethyl chloride	D	C	A	C	A	A
ethyl chlorocarbonate	D	A	-	-	A	A
ethyl chloroformate	D	C	-	-	A	A
ethyl cyclopentane	D	-	-	-	A	A
ethyl ether	D	B	D	D	D	A
ethyl formate	-	A	-	-	A	A
ethyl hexanol	B	-	-	-	A	A
ethyl mercaptan	C	C	-	-	B	A
ethyl oxalate	D	A	-	-	A	A
ethyl pentachlorobenzene	D	D	-	-	A	A
ethyl silicate	-	A	-	-	A	A
ethylene	-	C	-	-	A	A
ethylene chloride	D	D	-	D	B	A
ethylene chlorohydrin	C	A	A	D	A	A
ethylene diamine	A	A	-	A	D	A
ethylene dibromide	D	C	-	-	A	A
ethylene dichloride	D	C	A	D	A	A
ethylene glycol	A	A	B	A	A	A
ethylene oxide	D	A	A	A	D	A
ethylene trichloride	D	-	-	-	A	A
ethylmorpholene stannous octoate (50/50)mixture	-	-	-	-	D	A

F

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
F-60 fluid (dow corning)	D	-	-	-	A	A
F-61 fluid (dow corning)	D	-	-	-	A	A
fatty acids	C	B	B	D	A	A
FC-43 hetacosofluorotri-butylamine	A	-	-	-	A	A
FC75 fluorocarbon	A	-	-	-	B	A
ferric chloride	B	A	A	A	A	A
ferric nitrate	C	A	A	A	A	A
ferric sulfate	B	A	A	A	A	A
fish oil	A	B	-	-	A	A
fluoboric acid	-	A	A	A	-	A
fluorine (liquid)	D	-	-	-	B	A
fluorobenzene	D	C	-	-	A	A
fluorocarbon oils	-	D	-	-	-	A
fluorolube	A	-	-	-	B	A
fluorinated cyclic ethers	-	D	-	-	-	A
fluosilicie acid	-	A	A	-	-	A
formaldehyde	B	A	A	-	D	A
formic acid	B	A	A	D	C	A
freon,11	D	D	B	C	A	A
freon,12	D	D	B	A	B	A
freon, 12&ASTM-oil#2 (50/50 mixture)	D	-	-	-	A	A
freon, 12&SUNISO 4G (50/50 mixture)	D	-	-	-	A	A
freon,13	D	-	-	-	A	A
freon, 13B1	D	-	-	-	A	A
freon,14	D	-	-	-	A	A
freon,21	D	D	-	-	D	A
freon,22	D	D	B	-	D	A

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
freon,22&ASTM OIL#2D (50/50 mixture)	B	-	-	-	A	A
freon,31	-	-	-	-	D	A
freon,32	-	-	-	-	D	A
freon,112	D	-	-	-	A	A
freon, 113	D	D	-	-	B	A
freon,114	D	D	-	-	B	A
freon,114B2	D	-	-	-	B	A
freon,115	D	D	-	-	B	A
feron,142b	-	-	-	-	D	A
freon,152a	-	-	-	-	D	A
freon, 218	-	-	-	-	A	A
freon, C316	-	-	-	-	-	A
freon, C318	-	-	-	-	A	A
freon, 502	-	-	-	-	B	A
freon, BF	D	-	-	-	A	A
freon, MF	D	-	-	-	B	A
freon, TF	D	D	-	B	B	A
freon, TA	A	-	-	-	C	A
freon, TC	D	-	-	-	A	A
freon, TMC	C	-	-	-	A	A
freon, t-P35	A	-	-	-	A	A
freon, T-WD602	D	-	-	-	A	A
freon, PCA	D	-	-	-	B	A
fuel oil	D	D	D	B	A	A
fuel oil acidic	A	-	-	-	A	A
fuel oil #6	A	-	-	-	A	A
fumaric acid	B	A	-	-	A	A
fuming sulphuric acid (20/25% oleum)	D	-	-	-	A	A
furan	-	A	-	D	-	A
furfural	D	A	D	D	D	A
furfuraldehyde	D	-	-	-	D	A
furfuraly alcohol	D	C	-	-	-	A
furyl carbinol	D	-	-	-	-	A
fyrquel A60	C	-	-	-	D	A
fyrquel 90, 100, 150, 220, 300 500	A	-	-	-	A	A

G

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
gallic acid	-	B	D	A	A	A
gasoline	D	D	D	-	A	A
gelatin	A	A	A	A	A	A
grilling brake fluid	-	-	-	-	D	A
glacial acetic-acid	B	-	-	-	D	A
glauber's salt	-	-	-	-	B	A
glucose	A	A	A	A	A	A
glue (depending on type)	A	A	A	A	A	A
glycerine-glycerol	A	A	B	A	A	A
glycols	A	A	-	-	A	A
green sulphate liquor	A	A	-	-	A	A
gulfcrown grease	D	-	-	-	A	A
gulf endurance oils	D	-	-	-	A	A
gulf FR fluids (emulsion)	D	-	-	-	A	A
gulf FRG-fluids	A	-	-	-	A	A
gulf FRp-fluids	A	-	-	-	B	A
gulf harmony oils	D	-	-	-	A	A
gulf high temperature grease	D	-	-	-	A	A
gulf lesion oils	D	-	-	-	A	A
gulf paraount oils	D	-	-	-	A	A
gulf security oils	D	-	-	-	A	A

H

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
halotane	D	-	-	-	A	A
halowax oil	D	D	-	-	A	A
hannifin lube A	B	D	-	-	A	A
heavy water	A	B	-	-	-	A
HEF-2 (high energy fuel)	D	D	-	-	A	A
helium	A	A	-	-	A	A
N-heptane	D	C	D	B	A	A
N-hexaldehyde	B	C	-	-	D	A
hexane	D	D	-	D	A	A
N-hexane-1	D	C	-	-	A	A
hexyl alcohol	B	B	-	-	A	A
high viscosity lubricant U14	A	-	-	-	A	A
high viscosity lubricant H2	A	-	-	-	A	A
hilo MS #1	C	-	-	-	D	A
houghto-safe271 (water and glycol base)	B	A	-	-	B	A
houghto-safe 620(water/ glycol)	B	A	-	-	B	A
houthto-safe 1010 phospha-te ester	C	A	-	-	A	A
houghto-safe 1055 phos-phate ester	C	A	-	-	A	A
houghto-safe 1120 phos-phate ester	C	A	-	-	A	A
houghto-safe 5040 (water/ oil emulsion)	C	D	-	-	A	A
hydraulic oil (petroleumbase)	C	D	-	C	A	A
hydrazine	C	A	D	D	-	A
hydrobromic acid	D	B	A	B	C	A
hydrobromic acid 40%	D	-	A	-	A	A
hydrocarbons (saturated)	D	-	-	-	A	A
hydrochloric acid hot 37%	D	B	A	-	A	A
hydrochloric acid cold 37%	B	B	A	-	A	A
hydrochloric acid 3 M	D	-	-	-	A	A
hydrochloric acid concen-trated	D	-	-	-	A	A
hydrocyanic acid	C	B	B	A	A	A
hydro-drive, MIH-50 (petro-leum base)	B	-	-	-	A	A
hydro-drive, MIH-10 (petro-leum base)	B	-	-	-	A	A
hydrofluoric acid, 65% max.cold	D	-	-	-	A	A
hydrofluoric acid, 65% min.cold	D	-	-	-	A	A
hydrofluoric acid, 65% max.hot	D	-	-	-	C	A
hydrofluoric acid, 65% min.hot	D	-	-	-	C	A
hydrofluosilicic acid	D	B	-	B	A	A
hydrogen gas	C	A	A	A	A	A
hydrogen peroxide	A	A	A	-	A	A
hydrogen 90%	B	-	D	-	B	A
hydrogen sulfide, dry	C	A	A	A	D	A
hydrogen sulfide, wet	C	A	A	A	D	A
hydrolube-water/ethylene glycol	B	A	-	-	A	A
hydroquinone	-	A	B	A	D	A
hydyne	D	D	-	-	D	A
hyjet	-	-	-	-	D	A
hyjet III	-	-	-	-	D	A
hyjet S	-	-	-	-	D	A
hyjet W	-	-	-	-	D	A
hypochlorous acid	-	-	-	-	A	A

I

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
industron FF44	D	-	-	-	A	A
industron FF48	D	-	-	-	A	A
industron FF53	D	-	-	-	A	A
industron FF80	D	-	-	-	A	A

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
iodine	-	A	C	A	A	A
iodine pentafluoride	D	D	C	-	D	A
iodoform	-	B	-	-	-	A
isobutyl alcohol	A	A	C	A	A	A
iso-butyl N-butyrade	-	-	-	-	A	A
isododecane	-	-	-	-	A	A
iso-octane	D	D	D	-	A	A
isophorone (ketone)	D	B	-	-	D	A
isopropanol	A	B	-	A	A	A
isopropyl acetate	D	B	D	B	D	A
isopropyl alcohol	A	A	C	A	A	A
isopropyl chloride	D	C	-	-	A	A
isopropyl ether	D	C	D	B	D	A

J

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

K

kel F liquid	A	-	-	-	B	A
kerosene	D	D	D	C	A	A
keystone #87HX-grease	D	-	-	-	A	A

L

lactams-amino acids	-	-	-	-	D	A
lactic acid	A	A	B	A	A	A
lacquers	D	C	-	A	D	A
lacquer solvents	D	D	D	-	D	A
lard, animals fats	B	B	C	-	A	A
lavender oil	D	C	-	-	A	A
lead acetate	D	A	A	A	D	A
lead nitrate	B	A	-	A	-	A
lead sulfamate	B	A	-	A	A	A
lehigh x 1169	D	-	-	-	A	A
lehigh x 1170	D	-	-	-	A	A
light greas	D	-	-	-	A	A
ligroin (petroleum ether or benzine)	D	B	-	A	A	A
lime bleach	B	A	-	A	A	A
lime sulphur	A	B	-	-	A	A
lindol, hydraulic fluid (phosphate ester type)	C	A	-	-	B	A
linoleic acid	B	C	C	A	B	A
linseed oil	A	C	D	-	A	A
liquid oxygen	D	-	-	-	D	A
liquid petroleum gas (LPG)	C	D	-	-	A	A
liquimoly	D	-	-	-	A	A
lubricating oils, di-ester	D	D	-	D	A	A
lubricating oils, petroleum base	D	D	D	D	A	A
lye solutions	B	B	-	D	B	A

M

magnesium chloride	A	A	A	A	A	A
magnesium hydroxyde	-	A	A	-	A	A
magnesium sulfate	A	A	A	A	A	A
magnesium sulfite	A	A	-	-	A	A
magnesium salt	A	A	-	-	A	A
malathion	D	-	-	-	A	A
maleic acid	-	A	A	B	A	A
maleic anhydride	-	A	-	D	A	A
malicacid	B	A	A	-	A	A

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
MCS312	A	-	-	-	A	A
MCS352	C	-	-	-	D	A
MCS463	C	-	-	-	D	A
mercuric chloride	-	A	A	A	A	A
mercury	-	A	A	A	A	A
mercury vapor	-	A	-	-	A	A
mesityl oxide (ketone)	D	C	-	-	D	A
methane	D	C	D	-	A	A
methanol	A	A	-	A	A	A
methyl acetate	D	A	D	D	D	A
methyl acetoacetate	B	A	-	-	D	A
methyl acrylate	D	D	-	-	D	A
methylacrylic acid	D	A	-	-	C	A
methyl alcochol	A	A	A	-	D	A
methyl benzoate	D	-	-	-	A	A
methyl bromide	-	C	D	C	A	A
methyl butyl ketone	D	C	-	-	D	A
methyl carbonate	D	D	-	-	A	A
methyl cellosolve	D	A	-	-	D	A
methyl cellulose	B	-	-	-	D	A
methyl chloride	D	B	A	C	A	A
methyl chloroformate	D	-	-	-	A	A
methyl D-bromide	D	-	-	-	A	A
methyl cyclopenthane	D	C	-	-	A	A
methylene chloride	D	C	-	D	B	A
methylene dichloride	D	-	-	-	B	A
methyl ether	A	-	-	-	A	A
methyl ethyl ketone (MEK)	D	D	-	D	D	A
methyl ethyl ketone peroxyde	B	-	-	-	D	A
methyl format	B	B	-	-	-	A
methyl isobutyl ketone (MIBK)	D	C	D	C	D	A
methyl isopropyl ketone	D	C	-	D	D	A
methyl methacrylic	C	B	-	-	D	A
methyl oleate	-	C	-	-	A	A
methyl salicylate	-	B	-	-	-	A
milk	A	A	A	A	A	A
mineral oils	B	D	B	-	A	A
mobil 24 DTE	D	-	-	-	A	A
mobil HF	-	-	-	-	A	A
mobil delvac 1100,1110,1130	D	-	-	-	A	A
mobil nyvac 20 and 30	A	-	-	-	A	A
mobil velocite C	D	-	-	-	A	A
mobilgas wa 200, type A automatic trans. Fluid	D	-	-	-	A	A
mobil oil SAE20	D	-	-	-	A	A
mobiltherm 600	D	-	-	-	A	A
mobilux	D	-	-	-	A	A
mono bromobenzene	D	-	-	-	A	A
mono chlorobenzene	D	D	-	-	A	A
monoethanolamine	B	A	B	C	D	A
monomerthyl aniline	-	B	-	-	B	A
monomerthylether	-	C	-	-	-	A
monomerthyl hydrazine	D	-	-	-	-	A
monotrotoluene & dinitrotoluene(40-60mix)	D	-	-	-	C	A
monovinyl acethylene	B	-	-	-	A	A
mopar brake fluid	C	-	-	-	D	A
mustard gas	A	A	-	-	-	A

N

naphtha	D	C	D	A	A	A
naphthalene	D	C	D	C	A	A
napthenic	D	B	-	-	A	A
natural gas	A	B	D	A	A	A

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
neatsfoot oil	B	B	-	-	A	A
neon	A	A	-	-	A	A
neville acid	D	A	-	-	A	A
nickel acetate	D	A	-	-	D	A
nickel chloride	A	A	A	A	A	A
nickel salts	A	A	A	-	A	A
nickel sulfate	A	A	A	A	A	A
niter cake	A	A	-	-	A	A
nitric acid 3 M	D	-	-	-	A	A
nitric acid concentrated	D	C	-	C	A	A
nitric acid dilute	B	-	A	C	A	A
nitric acid red fuming (RFNA)	D	D	-	-	C	A
nitric acid inhidited red fuming (IRFNA)	D	D	-	-	B	A
nitrobenzene	D	D	D	C	B	A
nitrobenzine	-	-	-	-	A	A
nitroethane	D	A	-	-	D	A
nitrogene	A	A	-	-	A	A
nitrogene (textroxide) (N204)	D	D	-	-	D	A
nitromethane	D	A	D	A	D	A
nitropropane	D	B	-	-	D	A

O

o-a-548 A	B	-	-	-	B	A
o-t-634b	D	-	-	-	A	A
octachlorotoluene	D	-	-	-	A	A
octadecane	D	B	-	-	A	A
N-octane	D	D	-	-	A	A
octyl alcohol	D	B	-	-	A	A
oleic acid	-	C	B	C	B	A
oleum (fuming sulfuric acid)	D	D	-	-	A	A
oleum spirits	D	D	-	-	A	A
olive oil	D	B	-	A	A	A
oronite 8200	D	-	-	-	A	A
oronite 8515	D	-	-	-	A	A
orthochloroethylbenzene	D	-	-	-	A	A
ortho-dichlorobenzene	D	D	-	-	A	A
os45 type III (os54)	D	-	-	-	A	A
os45 type IV (os45)	D	-	-	-	A	A
OS70	D	-	-	-	A	A
oxalic acid	B	A	A	A	A	A
oxygen, cold	A	-	A	-	A	A
oxygen, cold 200-400°F	B	-	-	-	B	A
ozone	A	A	A	C	A	A

P

p-s-66 lb	D	-	-	-	A	A
p-d-680	D	-	-	-	A	A
paint thinner duco	D	C	-	-	B	A
palmitic acid	D	B	-	-	A	A
para-dichlorobenzene	D	C	-	-	A	A
par-al-keton	D	-	-	-	D	A
parker o lube	B	-	-	-	A	A
peanut oil	A	B	-	-	A	A
pentane 2 methyl	D	-	-	-	A	A
pentane, 2-4 dimethyl	D	-	-	-	A	A
pentane, 3 dimethyl	D	-	-	-	A	A
N-pentane	D	-	-	D	A	A
perchloric acid	D	A	A	B	A	A
perchloroethylene	D	D	B	D	A	A
petroleum oil, crude	D	C	-	C	A	A
petroleum oil, below 250°FB	B	-	-	-	A	-
petroleum oil, above 250°F	D	-	-	-	B	A
phenol	D	C	D	D	A	A

Resistance to different products:
A - excellent
B - good
C - insufficient
D - unsatisfactory

Resistance to different products:
A - excellent **B - good** **C - insufficient** **D - unsatisfactory**

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
phenol, 70%/30%H20	D	-	D	-	A	A
phenol, 85%/15%H20	D	-	D	-	A	A
phenylbenzene	D	C	-	-	A	A
phenyl ethy ether	D	-	-	-	D	A
phenyl hydrazine	-	B	-	-	A	A
phorone	D	B	-	-	D	A
phosphoric acid 20%	B	A	A	A	A	A
phosphoric acid 45%	D	C	A	B	A	A
phosphoric acid 3 M	B	-	-	-	A	A
phosphoric acid concen-trated	C	-	-	-	A	A
phosphorus trichloride	-	B	B	B	A	A
pickling solution	D	A	-	-	B	A
picric acid H2O solution	D	A	-	A	A	A
picric acid molten	D	B	-	D	A	A
pinene	D	D	-	-	A	A
pine oil	D	D	-	D	A	A
piperidine	D	B	-	-	D	A
plating solutions, chrome	D	A	B	-	A	A
plating solutions, other	D	A	B	-	A	A
pneumatic service	D	-	-	-	A	A
polyvinyl acetate emulsion	D	A	-	-	-	A
potassium acetate	D	A	-	-	D	A
potassium chloride	A	A	-	A	A	A
potassium cupro cyanide	A	A	-	-	A	A
potassium cyanide	A	A	A	A	A	A
potassium dichromate	A	A	-	A	A	A
potassium hydroxide	C	A	A	A	B	A
potassium nitrate	A	A	-	A	A	A
potassium salts	A	-	A	-	A	A
potassium sulfate	A	A	-	A	A	A
potassium sulfite	A	-	-	-	A	A
prestone antifreeze	A	A	-	-	A	A
PRL-high temp.hydr.oil	B	-	-	-	A	A
producer gas	B	D	-	-	A	A
propane	D	D	A	C	A	A
propane propionitrile	D	-	-	-	A	A
propyl acetate	D	B	-	-	D	A
N-propyl acetone	D	-	-	-	D	A
propyl alcohol	A	A	C	-	A	A
propyl nitrate	D	B	-	-	D	A

S

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
shell diala	D	-	-	-	A	A
shell iris 905	D	-	-	-	A	A
shell iris 3XF mine fluid (fire resist.hydr.)	-	-	-	-	A	A
shell iris tellus #2 pet.base	D	-	-	-	A	A
shell iris tellus #33	D	-	-	-	A	A
shell iris tellus UMF (5% aromatic)	D	-	-	-	A	A
shell Lo hydrax 27 & 29	D	-	-	-	A	A
shell macoma 72	D	-	-	-	A	A
silicate esters	D	A	-	-	A	A
silicone greases	C	B	-	-	A	A
silicone oils	C	C	B	B	A	A
silver nitrate	A	A	A	A	A	A
sinclair,opaline CX-EPLlube	D	-	-	-	A	A
skelly,solvent B,C,E	-	-	-	-	A	A
skydrol 500	C	-	-	C	D	A
skydrol 7000	C	B	-	-	B	A
soap solution	A	A	A	D	A	A
socony mobile type A	D	-	-	-	A	A
socony vacuum AMV AC781 (grease)	D	-	-	-	A	A
socony vacuum PD959B	D	-	-	-	A	A
soda ash	A	A	-	-	A	A
sodium acetate	D	A	-	A	D	A
sodium bicarbonate (baking soda)	A	A	A	A	A	A
sodium bisulfite	A	A	B	A	A	A
sodium borate	A	A	B	A	A	A
sodium carbonate (sodium ash)	A	A	A	A	A	A
sodium chloride	A	A	A	A	A	A
sodium cyanide	A	A	A	A	A	A
sodium hydroxide	B	A	C	-	B	A
sodium hydrochlorite	B	B	-	-	A	A
sodium metaphospate	-	-	-	-	A	A
sodium nitrate	D	A	A	A	-	A
sodium perborate	B	A	-	A	A	A
sodium peroxide	D	A	-	A	A	A
sodium phosphate (mono)	D	A	-	A	A	A
sodium phosphate (dibasic)	D	A	-	A	A	A
sodium phosphat (tribasic)	A	A	-	A	A	A
sodium salts	A	-	A	-	A	A
sodium silicate	-	A	A	A	A	A
sodium sulphate	A	A	-	-	A	A
sodium sulphide	A	A	A	-	A	A
sodium sulphite	A	A	A	-	A	A
sodium trisultate	A	-	-	-	A	A
sovasol #1, 2 & 3	D	-	-	-	A	A
sovalsol # 73 & 74	D	-	-	-	A	A
soybean oil	A	B	-	-	A	A
spry	A	-	-	-	A	A
SR-6 fuel	D	-	-	-	A	A
SR-10 fuel	D	-	-	-	A	A
standard oil mobilube GX90-EP lube	D	-	-	-	A	A
stannic chloride	B	A	-	A	A	A
stannic chloride 50%	B	-	-	-	A	A
stannous chloride	B	A	-	B	A	A
stauffer 7700	D	-	-	-	A	A
steam, below 350°F	D	-	-	-	D	A
steam, above 350°F	D	-	-	-	D	A
stearic acid	B	A	A	B	-	A
stoddard solvent	D	D	-	C	A	A

T

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
TT-S-735,type II	D	-	-	-	A	A
TT-S-735,type III	D	-	-	-	A	A
TT-S-735,type IV	C	-	-	-	A	A
TT-S-735,type V	C	-	-	-	A	A
TT-S-735,type VI	C	-	-	-	A	A
TT-T-656b	D	-	-	-	D	A
tannic acid	B	A	A	B	A	A
tannic acid 10%	B	-	-	-	A	A
tar bituminous	B	D	-	-	A	A
tartaric acid	A	A	A	A	A	A
terpineol	-	B	-	-	A	A
tertiary butyl alcohol	B	A	-	-	A	A
tertiary butyl catechol	-	B	-	-	A	A
tertiary butyl mercaptan	D	B	-	-	A	A
tetrabromomethane	D	D	-	-	A	A
tertabutyl titanate	-	B	-	-	A	A
tetrachloroethylene	-	D	-	B	A	A
tetraethyl lead	-	C	-	-	A	A
"tetraethyl lead" blend	-	-	-	-	A	A
tetrahydrofuran	-	C	-	C	D	A
tetralin	D	C	-	-	A	A
texaco 3450 gear oil	D	-	-	-	A	A
texaco capella A & AA	D	-	-	-	A	A
texaco meropa #3	D	-	-	-	A	A
texaco regal B	D	-	-	-	A	A
texaco uni-ttemp grease	B	-	-	-	A	A
texamatic "A" trans.oil	D	-	-	-	A	A
texamatic 1581 fluid	D	-	-	-	A	A
texamatic 3401 fluid	D	-	-	-	A	A
texamatic 3525 fluid	D	-	-	-	A	A
texamatic 3528 fluid	D	-	-	-	A	A
texas 1500 oil	B	-	-	-	A	A
thiodol TP-90B	-	-	-	-	A	A
thiodol TP-95	-	-	-	-	A	A
thionyl chloride	-	-	-	D	A	A
tidewater oil-beedol	B	-	-	-	A	A
tidewaater oil multigear 140, EP lube	-	-	-	-	A	A
titanium tetrachloride	-	B	-	-	A	A
toluene	-	D	D	C	A	A
toluene discocyanids	-	B	-	-	D	A
transformer oil	B	D	-	-	A	A
transmission fluid type A	B	C	-	-	A	A
triacetin	-	A	-	-	D	A
triaryl phosphate	C	B	-	-	A	A
tributoxyethyl phosphate	-	B	-	-	A	A
tributyl mercaptan	D	B	-	-	A	A
tributyl phosphate	-	A	-	-	D	A
trichlorroacetic acid	-	B	A	-	C	A
trichloroethane	D	B	D	-	A	A
trichloroethylene	D	B	D	D	A	A
tricresyl phosphate	C	A	B	-	B	A
triethanol amine	-	A	D	-	D	A
triethyl aluminium	-	B	-	-	B	A
triethyl borane	-	B	-	-	A	A
trifluoroethane	D	-	-	-	A	A
trinitroluene	-	A	-	-	B	A
trioctyl phosphate	C	B	-	-	B	A
tripoly phosphate	C	-	-	-	B	A
tung oil (china wood oil)	D	B	-	D	A	A

X

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
xylene	D	D	D	B	A	A
sylidepenes-mixed-aromatic amines	D	-	-	-	D	A
xylol	D	-	-	-	A	A
xenon	A	A	-	-	A	A

Z

	SILICONE	TPV	TPE	ULDPE	FKM VITOSIL	FEP/PFA/PTFE
zeolites	-	A	-	-	A	A
zinc aceate	D	A	-	-	D	A
zinc chloride	-	A	A	A	A	A
zinc salts	A	A	A	-	A	A
zinc sulfate	A	A	-	A	A	A

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