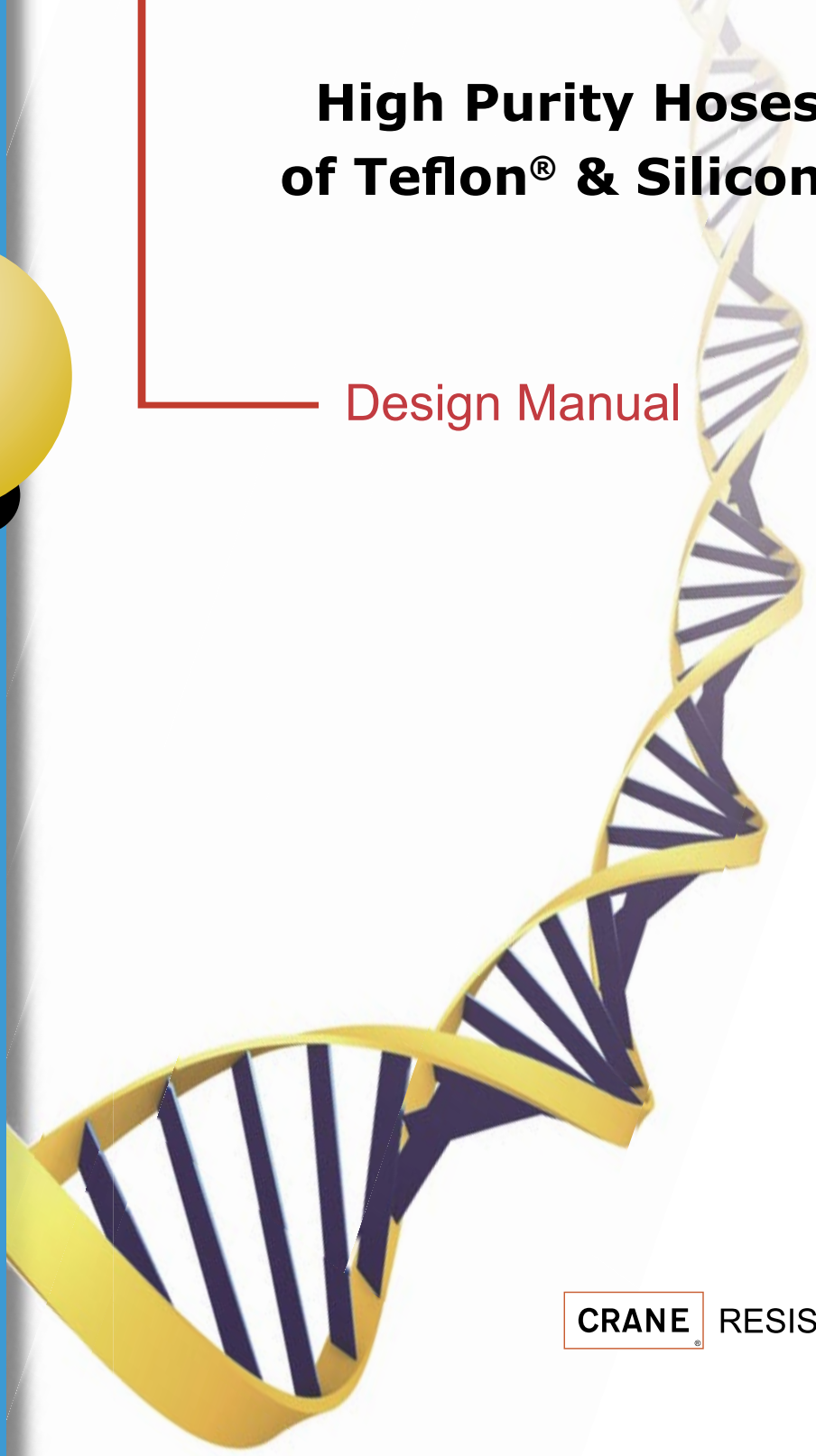
ResistoPure™

High Purity Hoses of Teflon® & Silicone

Design Manual



CRANE RESISTOFLEX®

RHDM-03-2007

CRANE RESISTOFLEX®

ResistoPure™

ResistoPure™ is a brand of products offered by Resistoflex for the Biotech, Pharmaceutical, Food & Beverage, and Cosmetics industries. The ResistoPure™ brand differs from traditional Resistoflex fluid handling components in that products and processes are designed to meet the critical needs of the sanitary and aseptic markets.

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Cirrus™ HP Hose

Inner core: Smooth *Teflon*® FEP
Reinforcement: EPDM rubber

Construction

White smooth bore *Teflon*® FEP liner bonded to a reinforced gray EPDM rubber cover. Cover is shiny and cleanable. A helical wound wire embedded in the carcass provides crush, kink and vacuum resistance.

Benefits

- *Teflon*® FEP liner acceptable per FDA CFR 177.1550 and USP 28, NSF 23, 2005 for Class VI plastics
- USP Class VI approval
- Will Not Absorb Media
- Low Minimum Bend Radius and Force-to-Bend
- Designed Not to Elongate Under Working Pressure
- Long Service Life
- Meets or Exceeds Common Working Conditions in BioPharm Industries
  - > Steam Cleaning
  - > CIP
  - > Autoclaving
  - > SIP
- Vacuum-Rated
- Documented Lot Traceable
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Fittings

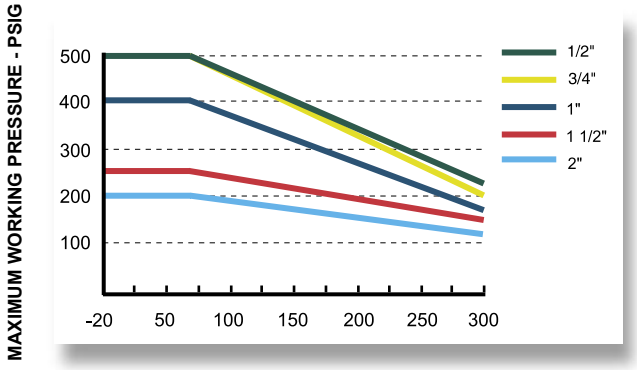
Fitting Material Availability

316 S.S.
Teflon® Encapsulated

External Protective Accessories

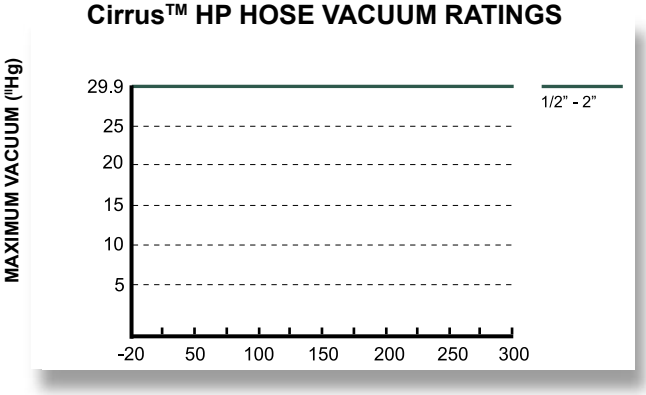
Spiral guards, kink guards, and shrink sleeves available.

Cirrus™ HP HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

Cirrus™ HP HOSE VACUUM RATINGS



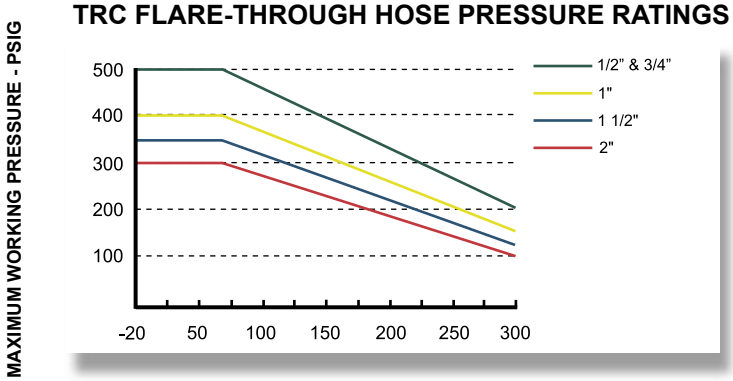
Note: Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

Size		Hose O.D.		O.D. Tolerance		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Approximate Weight		Bend Radius		Natural Part Number
INCH	DN	INCH	MM	INCH	MM	PSIG	BAR	PSIG	BAR	LBS./FT.	KG/M	INCH	MM	
1/2	15	0.97	24.6	+/- 0.032	+/- 0.8	500	34.5	2000	138	.30	.50	1.5	38	08-TRC-LITE-HP
3/4	20	1.27	32.3	+/- 0.032	+/- 0.8	500	34.5	2000	138	.44	.60	2.5	63	12-TRC-LITE-HP
1	25	1.48	37.6	+/- 0.038	+/- 1.0	400	27.6	1600	110.4	.59	.90	3	76	16-TRC-LITE-HP
1-1/2	40	2.04	51.8	+/- 0.038	+/- 1.0	250	17.2	1000	69	.92	.40	4.5	114	24-TRC-LITE-HP
2	50	2.54	64.5	+/- 0.045	+/- 1.1	200	13.8	800	55.2	.25	1.90	7	178	32-TRC-LITE-HP

TRC Flared-Through Hose

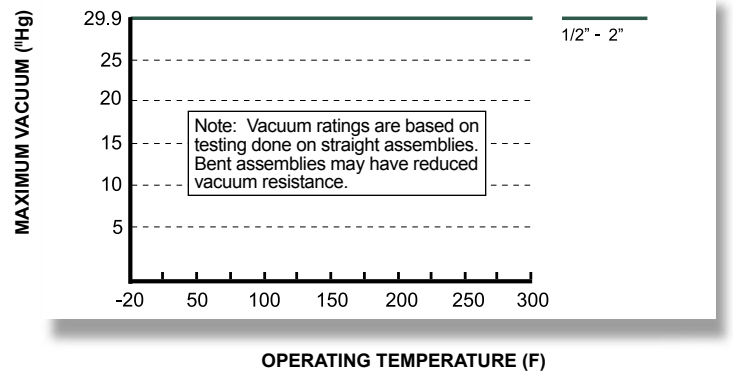
ResistoPure™

TRC FLARE-THROUGH HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

TRC FLARE-THROUGH HOSE VACUUM RATINGS



Inner core: Smooth *Teflon*® PTFE
Reinforcement: EPDM rubber

Construction

Extra-thick, natural or conductive smooth bore *Teflon*® PTFE liner bonded to a reinforced EPDM rubber cover. A carbon steel wire helically wound through the carcass provides crush, kink and vacuum resistance. Liner is flared out over the face of the fitting.

Benefits

- *Teflon*® PTFE liner acceptable per FDA CFR 177.1550 and USP 28, NSF 23, 2005 for Class VI plastics
- USP Class VI approval
- Patented Flare-Through Design
- Patented Thermalok™ Process Results in Interference Fit Liner
- No Entrapment Issues
- True Sanitary I.D. Dimensions
- Wide Variety of Fittings Available
- Full Vacuum-Rated
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Fittings

Fitting Materials

316 S.S.
Teflon® Encapsulated

External Protective Accessories

Spiral guards, kink guards, and shrink sleeves available.

Custom colors available upon request.
Minimum order quantity applies.

Size		Hose I.D.		Hose O.D.		Min Bend Radius		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Natural Liner Part Number	Conductive Liner Part Number
Inch	DN	Inch	MM	Inch	MM	Inch	MM	PSIG	BAR	PSIG	BAR		
1/2	15	0.750	19.05	1.30	33	3	76.2	500	34.5	2000	137.8	08-TRCF-W	08-TRCF-8
3/4	20	0.750	19.05	1.30	33	3	76.2	500	34.5	2000	137.8	12-TRCF-W	12-TRCF-8
1	25	1.000	25	1.56	39.6	4	101.6	400	27.6	1600	110.3	16-TRCF-W	16-TRCF-8
1-1/2	40	1.500	38.1	2.05	52	12	304.8	350	24.1	1400	96.5	24-TRCF-W	24-TRCF-8
2	50	2.000	51	2.56	65	12	304.8	300	20.7	1200	82.8	32-TRCF-W	32-TRCF-8

SuperFlex SFT-Si Hose

Inner core: Smooth *Teflon*® PTFE
Reinforcement: Fiberglass braid, 300-series stainless steel braid, and a silicone cover.

Construction

Natural smooth bore *Teflon*® PTFE liner. Liner is covered with a fiberglass braid externally bonded to the liner in a patented process. This is followed by a stainless steel braid and silicone cover.

Benefits

- Ultra Flexible
- True I.D. Sizes
- Very high pressure capability
- No Entrapment Issues
- Wide Variety of Fittings Available
- Documented Lot Traceable
- Meets or Exceeds 3A Standards
- Vacuum-Rated
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Approvals

- FDA (reference 21 CFR 177.1550)
- USDA (21 CFR 177.1550)
- USP Class VI

Fittings

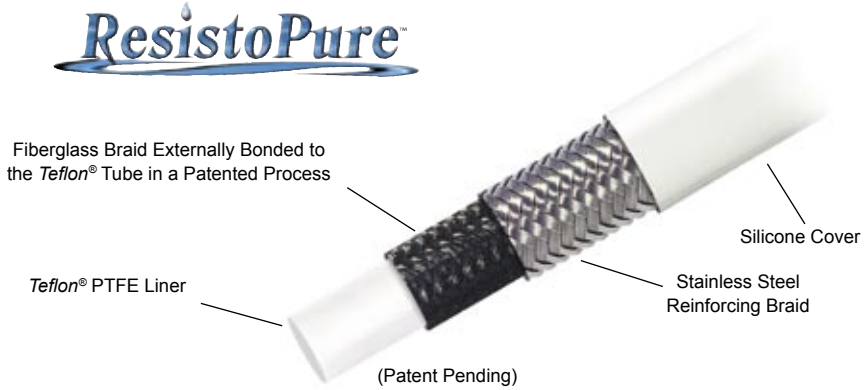
Fitting Material Availability

316 S.S.
Teflon® Encapsulated

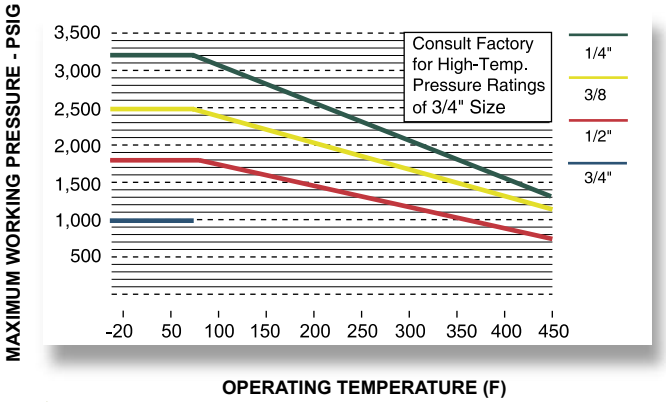
External Protective Accessories:

Spiral guards, kink

ResistoPure

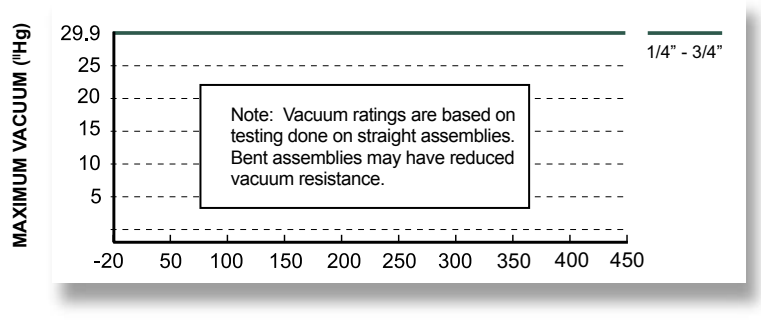


SuperFlex HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

SuperFlex HOSE VACUUM RATINGS



Nominal Size		Hose I.D.		Hose O.D.		Min. Bend Radius		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Approximate Weight		Natural Liner Part Number
Inch	DN	Inch	MM	Inch	MM	Inch	MM	PSIG	BAR	PSIG	BAR	LBS./FT.	KG/M	
1/4	8	0.250	6.3	0.445	11.3	2.00	50.8	3,200	220.8	14,000	966	.16	.24	04-SFT-W
3/8	10	0.375	9.5	0.710	18	2.50	63.5	2,500	172.5	10,000	690	.19	.28	06-SFT-W
1/2	15	0.500	12.7	0.890	22.6	3.00	76.2	1,800	124.2	7,200	496.8	.25	.37	08-SFT-W
3/4	20	0.750	19	1.120	28.4	5.00	127	1,000	69	6,000	414	.50	.75	12-SFT-W

Si-B Braid-Reinforced Silicone Hose

ResistoPure™ By AMESIL

- Platinum-Cured Silicone
- Polyester Braid
- Extremely Flexible
- Hose produced in a Certified Class 100 Clean Room

Benefits

- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Sterilizable/Autoclavable
- 65A Shore Hardness
- Documented lot traceable
- Available in custom lengths and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Approvals

- USP Class VI

Meets or Exceeds:

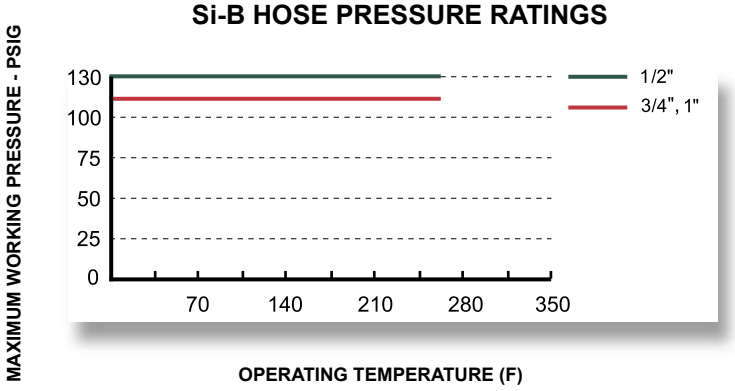
- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

Fittings

Fitting Material Availability

316 S.S.
Teflon® Encapsulated

Si-B HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

Nominal I.D.		Wall Thickness		Hose O.D.		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Approximate Weight		Product Number
Inch	DN	Inch	MM	Inch	MM	PSIG	BAR	PSIG	BAR	LBS./FT.	KG/M	
1/2	15	.150	3.8	.80	20.3	130	8.9	520	35.8	.16	.24	08-Si-B
3/4	20	.175	4.5	1.10	27.9	110	7.5	440	30.3	.26	.39	12-Si-B
1	25	.180	4.6	1.36	34.5	110	7.5	440	30.3	.35	.52	16-Si-B

NOTE: Bulk tubing available in 25 ft., 50 ft., or 100 ft. coils.
1/8", 1/4", 3/8", and 1 1/4" sizes available - Consult factory

Si-B HD Braid-Reinforced Silicone Hose

- Platinum-Cured Silicone
- Polyester Braid
- High Pressure
- Extremely Flexible
- Hose produced in a Certified Class 100 Clean Room

Benefits

- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Sterilizable/Autoclavable
- 65A Shore Hardness
- Documented lot traceable
- Available in custom lengths and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Approvals

- USP Class VI

Meets or Exceeds:

- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

Fittings

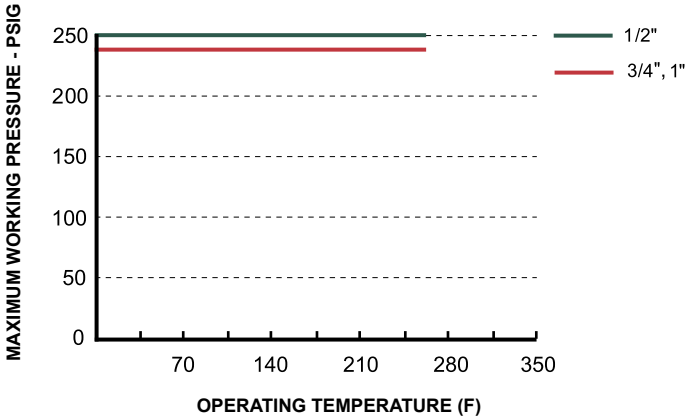
Sanitary | Industrial | Flanged | Cam & Groove | Special

Fitting Material Availability

316 S.S.
Teflon® Encapsulated

ResistoPure™ By AMESIL

Si-B HD HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

Nominal I.D.		Wall Thickness		Hose O.D.		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Approximate Weight		Product Number
Inch	DN	Inch	MM	Inch	MM	PSIG	BAR	PSIG	BAR	LBS./FT.	KG/M	
1/2	15	.220	5.6	.940	23.9	250	17.2	1000	68.9	.19	.28	08-Si-B-HD
3/4	20	.250	6.4	1.250	31.8	250	17.2	1000	68.9	.41	.61	12-Si-B-HD
1	25	.230	5.8	1.470	37.3	240	16.5	960	66.2	.88	1.31	16-Si-B-HD

NOTE: Bulk tubing available in 25 ft., 50 ft., or 100 ft. coils.

Si-W Fabric-Reinforced Silicone Hose

ResistoPure™ By AMESIL

- Low Volatile Grade Platinum-Cured Silicone
- Multi-Ply Polyester Fabric Reinforcement
- High Pressure
- Hose Produced in a Certified Class 100 Clean Room

Benefits

- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Sterilizable/Autoclavable
- 50A Shore Hardness
- Documented lot traceable
- Available in custom lengths (up to 24 feet) and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Approvals

- USP Class VI

Meets or Exceeds:

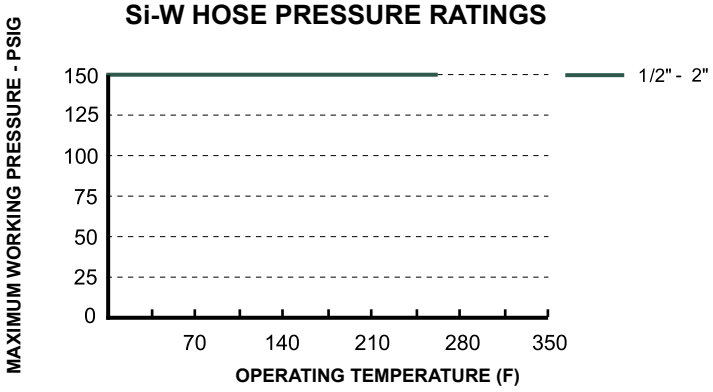
- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

Fittings

Fitting Material Availability

316 S.S.
Teflon® Encapsulated

Si-W HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

Nominal I.D.		Wall Thickness		Hose O.D.		Min. Bend Radius		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Approximate Weight		Product Number
Inch	DN	Inch	MM	Inch	MM	Inch	MM	PSIG	BAR	PSIG	BAR	LBS./FT.	KG/M	
1/2	15	.180	4.6	0.834	21.2	2.50	63.5	150	10.3	600	41.3	.30	.45	08-Si-W
3/4	20	.200	5.1	1.16	29.4	4.50	114.3	150	10.3	600	41.3	.39	.58	12-Si-W
1	25	.200	5.1	1.39	35.3	9.00	228.6	150	10.3	600	41.3	.43	.60	16-Si-W
1-1/2	40	.200	5.1	1.90	48.8	12.00	304.8	150	10.3	600	41.3	.72	1.07	24-Si-W
2	50	.200	5.1	2.38	60.5	CALL FACTORY		150	10.3	600	41.3	1.08	1.61	32-Si-W

Si-V Silicone Suction Hose

- Low Volatile Grade Platinum-Cured Silicone
- 4-Ply Polyester Braid, SS Wire Reinforced.
- Rated for Full Vacuum
- Hose Produced in a Certified Class 100 Clean Room

Benefits

- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Rated for full vacuum to 300°F
- Sterilizable/Autoclavable
- 50A Shore Hardness
- Documented lot traceable
- Available in custom lengths (up to 24 feet) and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Approvals

- USP Class VI

Meets or Exceeds:

- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

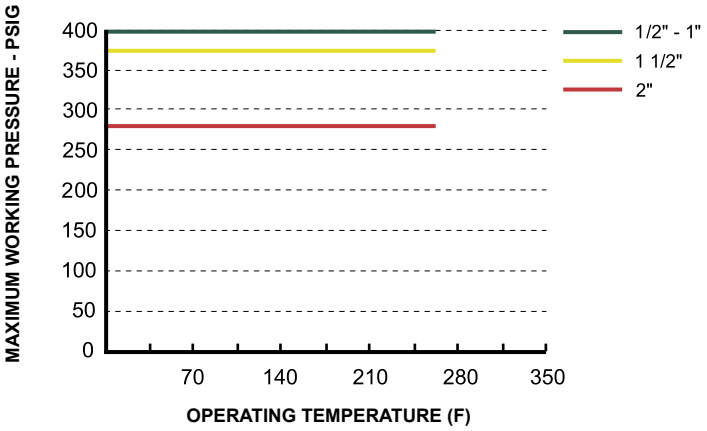
Fittings

Fitting Material Availability

316 S.S.
Teflon® Encapsulated

ResistoPure™ By AMESIL

Si-V HOSE PRESSURE RATINGS



NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.

Nominal I.D.		Wall Thickness		Hose O.D.		Min. Bend Radius		Max. Working Pressure at 70°F (21°C)		Burst Pressure at 70°F (21°C)		Vacuum Rating at 300°F (149°C)		Approximate Weight		Product Number
Inch	MM	Inch	MM	Inch	MM	Inch	MM	PSIG	Bar	PSIG	Bar	Inches Hg	Bar (a)	LBS./FT.	KG/M	
1/2	15	.180	4.6	0.890	22.6	2.00	50.8	400	27.6	1600	110.3	29.9	0	.30	.45	08-Si-V
3/4	20	.200	5.1	1.19	30.3	2.50	63.5	400	27.6	1600	110.3	29.9	0	.39	.58	12-Si-V
1	25	.200	5.1	1.39	35.3	3.50	88.9	400	27.6	1600	110.3	29.9	0	.43	.60	16-Si-V
1-1/2	40	.200	5.1	1.89	48	4.00	101.6	375	25.8	1500	103.4	29.9	0	.72	1.07	24-Si-V
2	50	.200	5.1	2.39	60.7	6.00	152.4	275	18.9	1100	75.8	29.9	0	1.08	1.61	32-Si-V

NOTE: 1 1/4", 2 1/2", 3", and 4" sizes available - Consult factory

Sanitary Fittings


Tri-Clamp®


90° Elbow


Mini Sanitary
(elbows available)


Female I-Line®


Male I-Line®


Female Bevel Seat


Male Bevel Seat

Shank Size	Fitting Style / Size Availability and Code				
	Tri-Clamp®	Mini Sanitary	Male I-Line®	Female I-Line®	Bevel Seat (Male or Female)
1/4"	N/A	04X04 04X08 04X12	N/A	N/A	N/A
3/8"	N/A	06X06 06X12	N/A	N/A	N/A
1/2"	08X08 08X12 08X16 **08X24**	**08X08** **08X12**	N/A	N/A	N/A
3/4"	12X12 12X16 **12X24**	**12X12**	N/A	N/A	N/A
1"	**16X16** **16X24** 16X32	N/A	16	16	16
1 1/2"	**24X24** 24X32	N/A	24	24	24
2"	**32X32**	N/A	32	32	32
3"	48X48	N/A	48	48	48
4"	64X64	N/A	64	64	N/A
Part Number Example	SAN-08X08-SS	MSAN-06X12-SS	MIL-16-SS	FIL-24-SS	Male: MBS-32-SS Female: FBS-16-SS

Color Code for Assembly Lead Times With These Fittings:

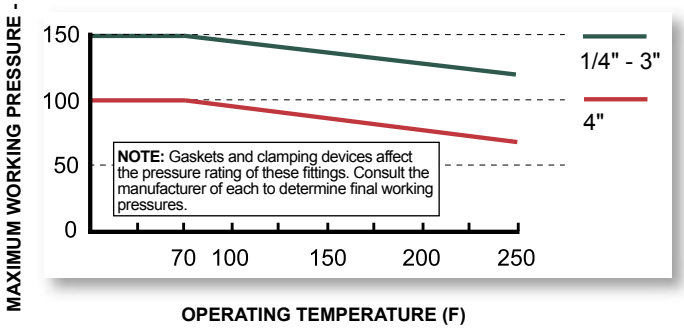
- 1-2 working days (w/d) for SS or electropolished (EP)
- 1-2 w/d for SS; 7 w/d for EP
- 12 w/d for SS; 15 w/d for EP

For 1 1/4, 2 1/2" in all fittings, and other sizes of MSAN, consult factory.

Surface Finish

SS = 25 Ra
EP = 15 Ra
Surface finishes meet or exceed FDA, USDA, and 3A standards.
Custom finishes and electropolishing available for most fittings.

SANITARY FITTING PRESSURE RATINGS



Adaptors and Accessories

Sanitary Adapters

PTFE and PFA-Lined

- Straight or reducing
- Tri-Clamp, I-Line, Bevel Seat x Flange, Cam-Lock and other connections

PTFE-Lined Female I-Line x Male I-Line Reducer

Flange Adapters

PTFE and PFA-Lined

- Available in stainless steel and other alloys
- ANSI, DIN, JIS, and other drillings x sanitary, camlock and other connections.

PFA-Lined Flange x Male Cam Lock

PTFE-Lined Flange x Tri-Clamp

Tagging/Marking Options

- PaperTag
- SS Tag Wired on Hose
- Encapsulated Label for Silicone Hoses (pictured)
- Pin Stamp on Collar

Features Comparison

Hose	Description	Features								
		Clean Packaging of Assemblies	Fitting Lot Traceability (Contact Surface)	Hose Liner Lot Traceability	Charted Hydrostatic Test	USP Class VI Certification	Meets or Exceeds FDA CFR:	USDA AND 3A Accepted	Meets or Exceeds ISO 10993	Meets or Exceeds European Pharmacopoeia 3.1.9
Si-B	Braid Reinforced Silicone Hose	Max. 100 Ft.	✓	✓	Max. 100 Ft.	✓	177.2600	✓	✓	✓
Si-B HD	Braid Reinforced Silicone Hose	Max. 100 Ft.	✓	✓	Max. 100 Ft.	✓	177.2600	✓	✓	✓
Si-W	High Pressure Silicone Hose	Max. 24 Ft.	✓	✓	Max. 24 Ft.	✓	177.2600	✓	✓	✓
Si-V	Silicone Suction Hose	Max. 24 Ft.	✓	✓	Max. 24 Ft.	✓	177.2600	✓	✓	✓
Cirrus HP	Smooth Teflon® FEP-Lined EPDM Rubber Covered Hose	Max. 75 Ft.	✓	✓	Max. 24 Ft.	✓	177.1550	✓	✓	✓
SuperFlex SFT-Si	Smooth Teflon® PTFE-Lined Fiberglass/SS Double Braid Silicone Cover	Max. 100 Ft.	✓	✓	Max. 100 Ft.	✓	177.1550	✓	✓	✓
TRC Flared Through	Smooth Teflon® PTFE-Lined EPDM Rubber Covered Hose	Max. 20 Ft.	Consult Factory	✓	Max. 20 Ft.	✓	177.1550	✓	✓	✓

Quality Assurance

ResistoPure hoses are qualified to an extremely rigorous quality assurance program. The following tests are performed on 100% of our hose designs, ensuring that every unit meets performance specifications.

Resistoflex Qualification Testing

1.0 Test Method

1.1 *Qualification Tests:* Hose designs shall pass qualification tests designed to demonstrate the hose's ability to withstand severe operating conditions. Once a hose design has passed qualification testing, re-testing is not required. If the manufacturer changes the hose design, however, the new design must be re-tested. The hose manufacturer shall make hose qualification test reports available upon request. Qualification testing is as follows:

1.1.1 *Burst Testing:* Subject hose to destructive burst test to determine allowable operating pressure and proof test pressure.

1.) Install hose on test stand, Introduce hydraulic fluid into hose, purge all air.
2.) Pressurize at an approximate rate of 100 psi/sec. until hose fails.
3.) Record burst pressure.
4.) Allowable operating pressure is defined as 25% of burst pressure for a 4:1 safety factor.

Note: Allowable operating pressure is also known as "rated working pressure" and "working pressure."

1.1.2 *Steam-Cold Water Cycling:* Subject representative *Teflon*®-lined hose samples to steam-cold water cycling to determine the ability of the lined hoses to withstand rapid temperature changes. Procedure is as follows:

1.) Install hose on closed-loop test stand and circulate saturated steam at 125±5 psig (50 psig for TRC hose) until the skin temperature varies no more than ±2.5°F for 10 minutes. Temperature shall be measured by a thermocouple attached to the crimp collar.
2.) Close off the steam and immediately circulate water at a maximum temperature of 77°F until the skin temperature reaches 122°F.
3.) Vent and introduce air to purge the test hose for a minimum of one minute to completely drain hose of water.
4.) Repeat steps 1-3 for a total of 100 cycles.
5.) During testing, leakage is cause for rejection.

1.1.4 *Vacuum Testing:* Subject representative hose assemblies to vacuum conditions to determine rated vacuum for hose at a given temperature.

1.) Reach the desired vacuum/temperature level and hold for 48 hrs.
2.) Turn off the oven and allow the hose to cool to ambient temperature while still under the same vacuum level.
3.) Remove the hose and inspect for buckling or collapse of the liner. Any buckling or collapse of the liner shall be cause for rejection.
4.) If no collapse or buckling has occurred, the vacuum and temperature shall be considered acceptable.

1.2 *Proof Testing for Customer Orders:* 100% of finished hose assemblies shall be proof tested.

1.2.1 Factory-made assemblies shall be proof tested hydrostatically at 1.5 times rated working pressure with high-purity deionized water
1.2.2 Hose assemblies made at an Authorized Fabricating Distributor location shall be hydrostatically proof tested.

2.0 Quality Documentation

2.1 Manufacturer's design, engineering, manufacturing, sales, and service shall be certified to ISO 9001.
2.2 Wetted surface traceability documentation provided with all silicone hoses, Cirrus HP, and SuperFlex assemblies.

Teflon® Provides Unsurpassed Purity

Teflon® in High Purity Applications

Only *Teflon*® PTFE used in ResistoPure hoses offers true protection against all sources of contamination. We've been making our PTFE hose liner for more than 50 years!

ResisPure PTFE liners contain no plasticizers, fillers, or antioxidants that leach out and react with process fluids.

Properly designed sanitary fittings are a given. However, the surface area exposure of fittings is minimal compared to the hose liner.

ResistoPure hoses feature DuPont *Teflon*® PTFE resin which meets every major high-purity classification:

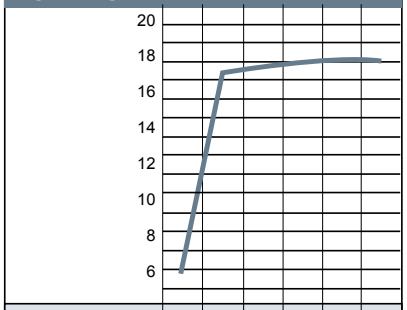
- Meets 3A Sanitary Standards
- Meets FDA 21 CFR 177.1550
- USDA Accepted

This is where we begin. Following are the results of where we end with a product of unequaled purity. We challenge the competition to meet our standards.

In the effort to produce water of the highest purity for the semiconductor, pharmaceutical, and biotech industries, engineers are designing fluid handling systems that do more than just last for a short period of time. These fluid handling systems must be designed to prove that they contribute less than parts per billion of extractables to the process water.

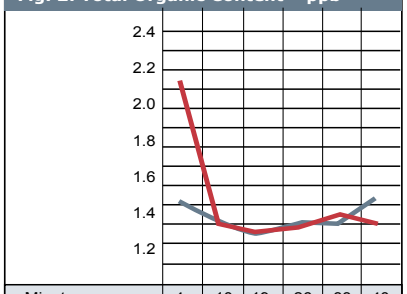
Particulate, ionic, organic, or microbial contaminates in process fluids reduce product yields dramatically -- requiring purity levels which are orders of magnitude greater than yesterday's needs. One of the harshest and most widely publicized agents used for wet processing is deionized 18 megohm-cm water. To determine the effect 18 megohm-cm water has on Resistoflex PTFE lined hoses, an extractable analysis was conducted by AT&T Analytical Services. AT&T's analysis consisted of "dynamic rinsing" of ResistoPure PTFE lined hose samples and subsequent ionic characterization.

Fig. 1: Megohms – cm



Minutes	4	10	19	26	33	40
Filtrate, megohms – cm	7.0	17.6	17.8	17.9	18.0	18.1

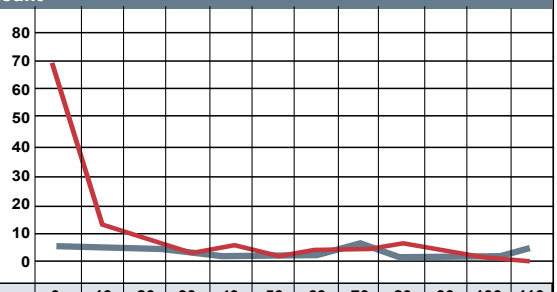
Fig. 2: Total Organic Content – ppb



Minutes	4	10	19	26	33	40
Filtrate, ppb	2.17	1.41	1.38	1.39	1.46	1.41
Background, ppb	1.52	1.45	1.43	1.47	1.46	1.56

As can be seen in Fig. 1, rinse to background occurrwed within 5 minutes. Organicis were determined by total organic carbon (TOC) analysis, which also can be seen in Fig. 2. TOCs were below background levels within 10 minutes.

Fig. 3: Particulate Count



Minutes	0	10	20	30	40	50	60	70	80	90	100	110
Filtrate, (.05µ)	68.8	13.3	9.6	4.4	6.2	2.7	3.4	3.4	5.8	4.3	1.7	1.4
Background (.05µ)	5.3	4.9	4.9	3.7	3.6	3.7	4.1	4.5	2.1	3.3	2.9	4.1

Particulate dynamic rinse data is shown if Fig. 3. Particle count rinsed to background levels within 50 minutes, proving that ResistoPuer PTFE liner has a very smooth, contamination-free surface that will not support microbe growth.

Finally, Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) data for 68 metals and anion analysis samples were taken at 24 hours of dynamic rinse exposure with 18 megohm water. In all cases, extractables were below detectable limits for ResistoPure PTFE hoses.

The use of ozone in ultrapure water processing has proven to be a quick and reliable method of microbial control. Ozonization of ultrapure water is considered a "clean" process and does not produce any undesirable chemical byproducts. Unlike traditional chemical disinfectants, ozone dissipates from the treated water due to its own natural decay properties. Because of this, ozone is gaining increasing popularity in electronics, pharmaceuticals, and other ultrapure water-dependent industries. However, the same aggressive nature that gives ozone the ability to attack and kill microorganisms also makes it especially tough on the materials with which it comes in contact. As opposed to silicone hoses, ResistoPure PTFE hoses are chemically inert and non-reactive with ozone.

Please contact us for AT&T's detailed report.

Related Definitions

Rated Working Pressure: Maximum operating pressure at which the hose may operate through the stated bending range.

Proof Test Pressure: Not to exceed 1-1/2 times rated working pressure.

Burst Pressure: The average pressure at which the hose can be expected to fail at 70°F.

Minimum Bend Radius: The bend radius to which a hose may be bent when no further motion is to be imposed.

Dynamic Bend Radius: The bend radius used in calculations involving applications where the hose is moving. This bend radius has a direct relation to cycle life. Bending the hose in a smaller radius than rated will adversely affect the life of the hose.

Live Length: The length of hose that will bend, or the length of hose between the braid collars (LL).

Overall Length: The total face-to-face length of a straight hose (OAL).

Length Tolerances:	Min.-18" assemblies	+/- .250"
	19"-36" assemblies	+/- .500"
	37"-50" assemblies	+/- .750"
	51"-Max. assemblies	+/- 1.5"

Installation and Motion Considerations

Axial Motion: Motion that occurs when a hose is compressed along its longitudinal axis. Axial motion is only applicable in very short lengths of annular hose only. Hoses should not be subjected to axial motion.

Lateral Offset Motion: (Fig. 1) Motion that occurs when one end of the hose is deflected in a plane perpendicular to its longitudinal axis with the ends remaining parallel. In offset applications where motion is repeated, the offset should never exceed 25% of the minimum bend radius.

OAL = LL + Fitting Length A + Fitting Length B

Note: Where offset motion "Y" occurs on both sides of hose centerline, the hose live length should be based on total travel or 2Y.

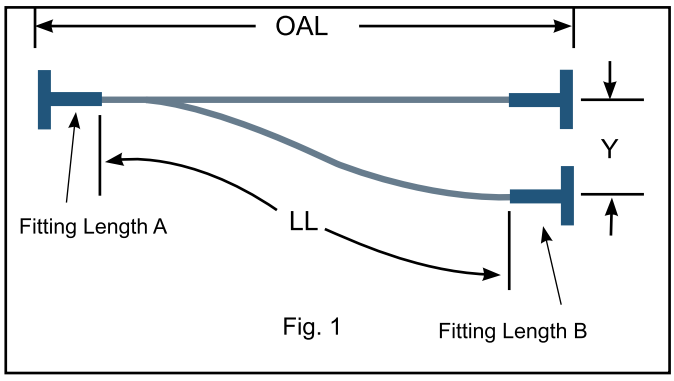


Fig. 1

Angular Offset Motion: Angular movement is defined as the bending of the hose so that the ends are no longer parallel. Amount of movement is measured in degrees from centerline of the hose.

Radial Motion: This type of movement occurs when the hoses are bent in a 180 degree arc such as in vertical or horizontal loops. In this configuration, two types of movement are possible. One is where the bend radius remains constant and one end of the hose moves parallel to the other end. The other is where the ends move perpendicular to each other so as to enlarge or decrease the width of the loop.

For more consideration on best practices for hose installation and determining the proper length of a hose assembly, please refer to the NAHAD website at www.nahad.org.

Resistoflex Industrial Hose Products

Chlorine Hose (CTH)

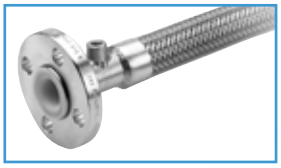
Specifically designed for making, moving, and packing chlorine and bromine

Truck & Rail (TR)

50 years later, still the toughest loading / unloading hose on the planet

TMH

A smooth Teflon® liner inside a corrogated metal hose with a protective braid



The Twister™ (CRC)

A Convoluted Teflon® PTFE liner in a tough EPDM carcass. Virtually Kink-proof, lightweight, and flexible

The CB Family

Convoluted Teflon® liner inside braided cover - of your choosing - from PP to Hastelloy®

The TRC Family

Smoothbore Teflon® liner in a tough EPDM carcass

Wide Fittings Assortment

Flange

Buttweld

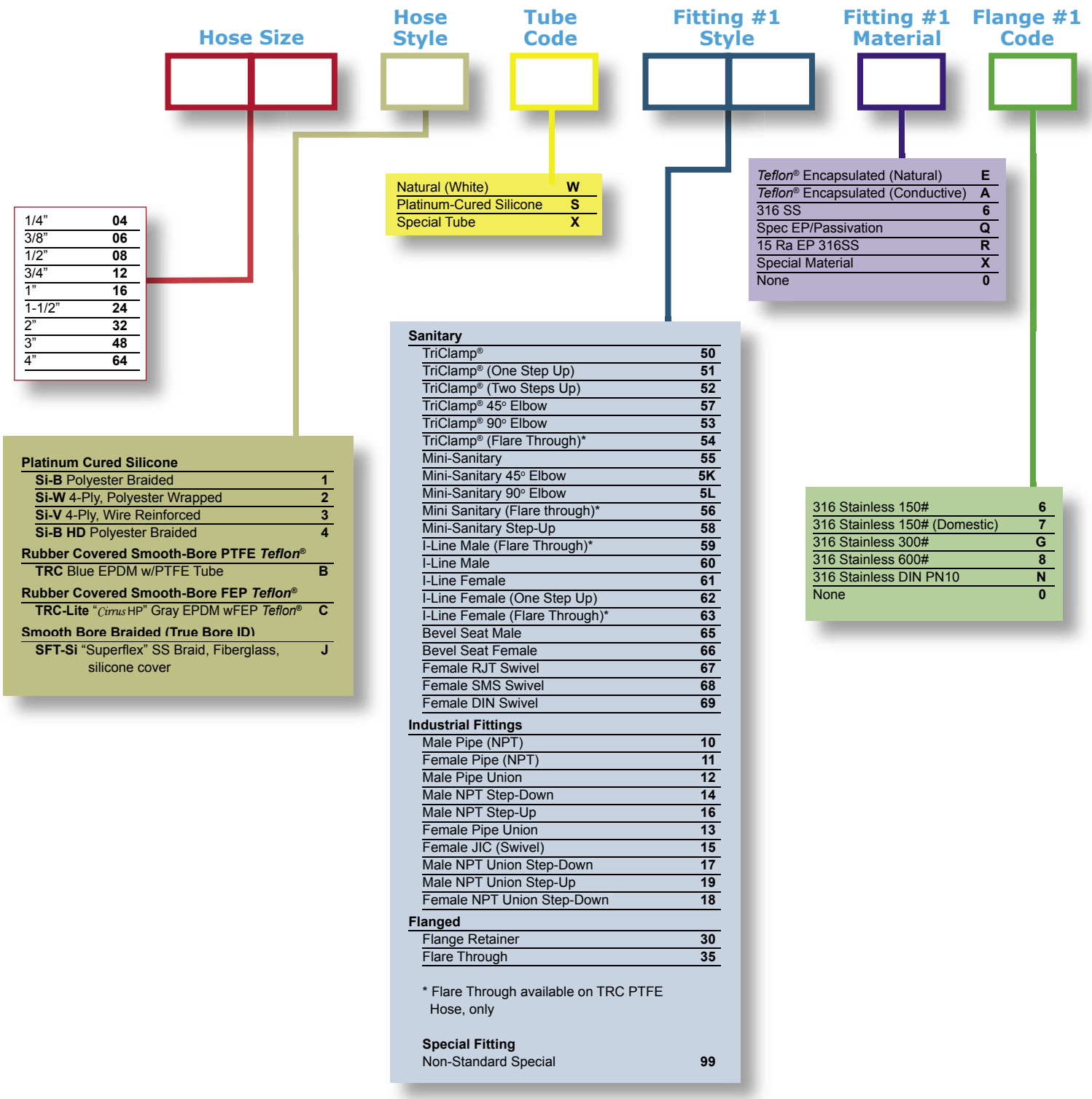
Cam-Lock

Encapsulated Cam-Lock

Pipe Thread

Special Materials (PVDF, Hastelloy®, etc.)

Assembly Part Numbers



Hose Size	
1/4"	04
3/8"	06
1/2"	08
3/4"	12
1"	16
1-1/2"	24
2"	32
3"	48
4"	64

Hose Style	
Platinum Cured Silicone	
Si-B Polyester Braided	1
Si-W 4-Ply, Polyester Wrapped	2
Si-V 4-Ply, Wire Reinforced	3
Si-B HD Polyester Braided	4
Rubber Covered Smooth-Bore PTFE *Teflon*®	
TRC Blue EPDM w/PTFE Tube	B
Rubber Covered Smooth-Bore FEP *Teflon*®	
TRC-Lite "*Cirrus* HP" Gray EPDM wFEP *Teflon*®	C
Smooth Bore Braided (True Bore ID)	
SFT-Si "Superflex" SS Braid, Fiberglass, silicone cover	J

Tube Code	
Natural (White)	W
Platinum-Cured Silicone	S
Special Tube	X

Fitting #1 Style	
Sanitary	
TriClamp®	50
TriClamp® (One Step Up)	51
TriClamp® (Two Steps Up)	52
TriClamp® 45° Elbow	57
TriClamp® 90° Elbow	53
TriClamp® (Flare Through)*	54
Mini-Sanitary	55
Mini-Sanitary 45° Elbow	5K
Mini-Sanitary 90° Elbow	5L
Mini Sanitary (Flare through)*	56
Mini-Sanitary Step-Up	58
I-Line Male (Flare Through)*	59
I-Line Male	60
I-Line Female	61
I-Line Female (One Step Up)	62
I-Line Female (Flare Through)*	63
Bevel Seat Male	65
Bevel Seat Female	66
Female RJT Swivel	67
Female SMS Swivel	68
Female DIN Swivel	69
Industrial Fittings	
Male Pipe (NPT)	10
Female Pipe (NPT)	11
Male Pipe Union	12
Male NPT Step-Down	14
Male NPT Step-Up	16
Female Pipe Union	13
Female JIC (Swivel)	15
Male NPT Union Step-Down	17
Male NPT Union Step-Up	19
Female NPT Union Step-Down	18
Flanged	
Flange Retainer	30
Flare Through	35
Special Fitting	
Non-Standard Special	99

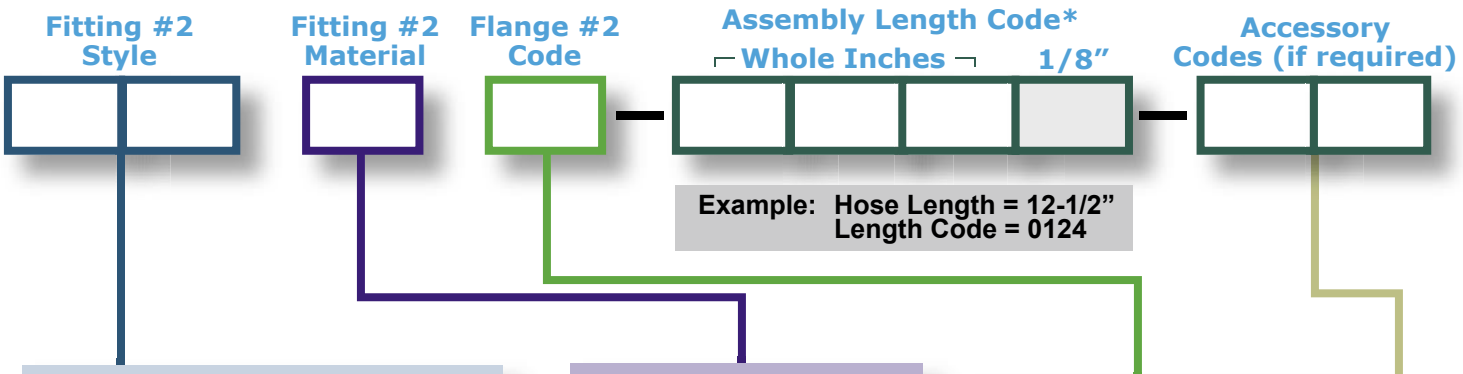
* Flare Through available on TRC PTFE Hose, only

Fitting #1 Material	
Teflon® Encapsulated (Natural)	E
Teflon® Encapsulated (Conductive)	A
316 SS	6
Spec EP/Passivation	Q
15 Ra EP 316SS	R
Special Material	X
None	0

Flange #1 Code	
316 Stainless 150#	6
316 Stainless 150# (Domestic)	7
316 Stainless 300#	G
316 Stainless 600#	8
316 Stainless DIN PN10	N
None	0

Note: Some configurations are not feasible.

Assembly Part Numbers



Example: Hose Length = 12-1/2”
Length Code = 0124

Sanitary	
TriClamp®	50
TriClamp® (One Step Up)	51
TriClamp® (Two Steps Up)	52
TriClamp® 45° Elbow	57
TriClamp® 90° Elbow	53
TriClamp® (Flare Through)*	54
Mini-Sanitary	55
Mini-Sanitary 45° Elbow	5K
Mini-Sanitary 90° Elbow	5L
Mini Sanitary (Flare through)*	56
Mini-Sanitary Step-Up	58
I-Line Male (Flare Through)*	59
I-Line Male	60
I-Line Female	61
I-Line Female (One Step Up)	62
I-Line Female (Flare Through)*	63
Bevel Seat Male	65
Bevel Seat Female	66
Female RJT Swivel	67
Female SMS Swivel	68
Female DIN Swivel	69
Industrial Fittings	
Male Pipe (NPT)	10
Female Pipe (NPT)	11
Male Pipe Union	12
Male NPT Step-Down	14
Male NPT Step-Up	16
Female Pipe Union	13
Female JIC (Swivel)	15
Male NPT Union Step-Down	17
Male NPT Union Step-Up	19
Female NPT Union Step-Down	18
Flanged	
Flange Retainer	30
Flare Through	35

* Flare Through available on TRC PTFE Hose, only

Special Fitting	
Non-Standard Special	99

Teflon® Encapsulated (Natural)	E
Teflon® Encapsulated (Conductive)	A
316 SS	6
Spec EP/Passivation	Q
15 Ra EP 316SS	R
Special Material	X
None	0

316 Stainless 150#	6
316 Stainless 150# (Domestic)	7
316 Stainless 300#	G
316 Stainless 600#	8
316 Stainless DIN PN10	N
None	0

* Assembly length is defined as sealing surface to sealing surface

Metal Tag Attached (see note)	T
Paper Tag	TP
Pin Stamp on Collar	TC
Encapsulated Label	L

Note: Content for tags to be specified in the description

Special Accessory	X

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www.resistopure.com

DuPont™ Teflon® fluoropolymer

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NAHAD NATIONAL ASSOCIATION OF HOSE AND ACCESSORIES DISTRIBUTORS