CRANE RESISTOFLEX®

Nominal Smoothbore Hose and Fittings

Product Manual

NSB-2004

CRANE® RESISTOFLEX®

Resistoflex specializes in solving tough fluid handling problems. We have been in business since 1936, and we invented the smoothbore Teflon® lined hose in 1953.

Our customers make chemicals, paper, steel, and medicine. They process food, water, & minerals, convert energy, and build cars, ships and aircraft.

Our products combine the best materials with innovative manufacturing technology, to help customers operate more reliably, safely, and cost effectively.

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WARNING A failure of Teflon® PTFE hose in service can result in property damage, personal injury, or death.

WARNING When conveying any fluids capable of generating a static charge, conductive liner must be used.

WARNING These hoses can be used to convey hazardous chemical fluids, steam, hot liquids, or other dangerous materials which can cause death or serious injury, including burns, pressure wounds, or chemical exposure if released accidentally. These hoses should, therefore, only be handled or worked on by personnel properly trained in the safe handling of the materials or chemicals being conveyed in the hoses.

WARNING Do not use Teflon® PTFE hose at temperatures and/or pressures higher than those recommended by the manufacturer. All operators must be trained in the care and use of this hose and must wear appropriate protective clothing at all times.

Resistoflex Hose Products

Smooth Bore Teflon® Hoses

Rubber Covered Smooth Bore

EPDM rubber bonded to an inner liner of Teflon® PTFE or Teflon® FEP with full vacuum capabilities. Very flexible smooth bore hose with extreme external abrasion and corrosion resistance.

TRC FEP – Teflon® FEP smooth liner with EPDM bonded rubber

TRC – Teflon® PTFE smooth liner with EPDM bonded rubber (blue or gray)

TRC-Flare Through – Teflon® PTFE smooth liner with EPDM rubber cover (blue or white)

TRC-Lite Cirrus™ – Teflon® PTFE smooth liner with EPDM bonded rubber

Braided Smooth Bore

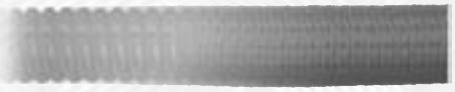
Teflon® PTFE inner core, stainless steel braid, full flow inside diameter, longer lengths, and the lowest cost smooth bore system.

SBT – Teflon® PTFE smooth liner with stainless steel wire braid

SFT-Si SuperFlex™ – Teflon® PTFE smooth liner, fiberglass braid, SS braid, and silicone cover.

Convoluted Bore Teflon® Hoses

Heavy wall Teflon® PTFE inner core with self-cleaning open pitched helical convolutions. Seamless vacuum-formed construction with full flow inside diameter. Standard braids are 316SS, Hastelloy® or polypropylene. Many other options available.

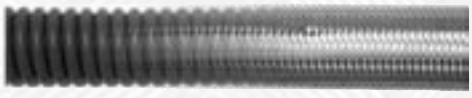


CPB – Teflon® PTFE convoluted liner with polypropylene braid

Twister™ CRC Hose

Unique reinforcement system and a high temperature (350 F) EPDM rubber cover. Virtually kink-proof

CKB – Convoluted Teflon® PTFE liner with Kynar® PVDF Braid



CB – Convoluted Teflon® PTFE liner with 316 stainless steel wire braid

Resistoflex Hose Products

Specialty Assemblies

CTH – Chlorine transfer

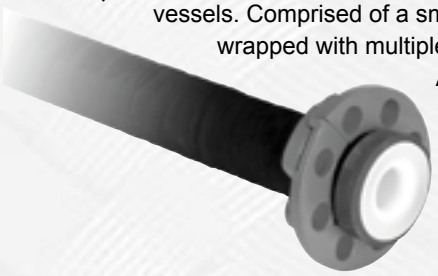
CGA 820 Cylinder Fitting
For Chlorine Transfer Hose

Chlorine Transfer Hose - Specifically designed for manufacturing, transporting and packaging applications in the chlorine & bromine industries. Convoluted bore Teflon® PTFE liner with Hastelloy® C-276 braid and Monel® end fittings. Optional smooth bore liner. Optional Kynar® PVDF monofilament braid.

Unique Flared-Through design eliminates entrapment between inner core and fitting which minimizes product flow disturbance between hose and fitting. Any braid option can be flared.

CBF– Convoluted Teflon® PTFE liner, stainless steel braided hose with Flared-Through liner

TR Hoses are a favorite for rail cars, barges and process vessels. Comprised of a smooth-bore Teflon® PTFE liner wrapped with multiple plies of fabric and rubber. A high tensile, spiral wire is incorporated under the tough, abrasion resistant, neoprene cover.

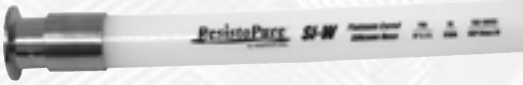


TR – Truck-rail transfer hose

TMH – Teflon® PTFE- lined corrugated stainless steel hose, with stainless steel braid. Hastelloy® C-276 or Monel® corrugated hose and braid also available.

Silicone Hoses

Suitable for pharmaceutical, biomedical, cosmetic and food applications. Excellent temperature application range of –100 °F (73.3 °C) to 400 °F (204.4 °C). ResistoPure™ hoses are made in accordance with CFR 177.26, and meet all USP Class VI, FDA, ISO 10993, and 3A standards.



Si-W – High Pressure, 4-Ply Polyester wrapped

Si-V – 4-Ply Suction Hose, Wire Reinforced

Si-Vc – 4-Ply, Wire Reinforced Suction Hose with Convoluted OD

4-Ply, Wire reinforced suction hose, full vacuum rated to 130°C

Heavy duty, yet flexible. Resists temperature extremes, compression set, chemical attack, ozone, radiation, moisture, and environmental exposure.

Si-B – Polyester Braid-Reinforced

Extremely flexible for moderate applications

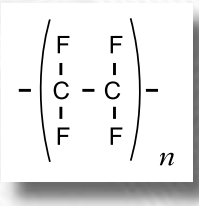
ResistoPure™
by RESISTOFLEX®

Teflon® Hose

Teflon® PTFE

Teflon® PTFE (polytetrafluoroethylene) was discovered by Dr. Roy Plunkett, a research chemist for DuPont, in 1938. The discovery was actually the accidental by-product of a "failed" experiment involving refrigeration gases.

The molecule is based on a carbon-fluorine chain, which has properties such that PTFE is the most chemical resistant material known, with a temperature resistance up to 500 deg. F.



The Carbon-Fluorine bond is among the strongest in single bond organic chemistry

Teflon® PTFE is chemically inert to:

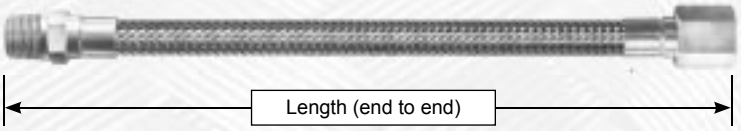
- All Acids, Bases, and Bleaches
- All Halogens and Halogenated Compounds
- All Organic Chemicals
- All Solvents and Lubricants
- All Hydraulic Fluids
- All Heat Transfer Fluids
- All Elastomers

Teflon® PTFE hoses:

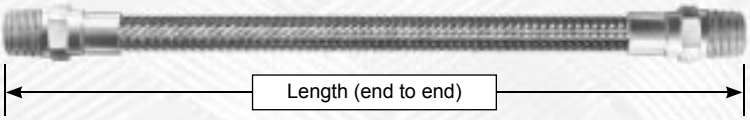
- Withstand continuous vibration, flexing, or impulse
- Are unaffected by extreme temperature cycling
- Are compatible with steam and all sanitizing agents
- Are non-contaminating to the service fluid
- Have lower pressure drops than other hose materials due to a lower friction factor
- Are impervious to weather and are non-aging

Hose Measurement Considerations

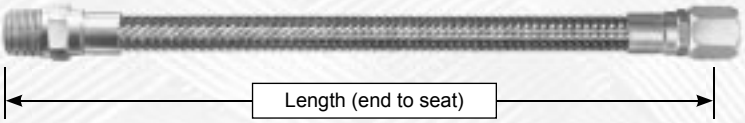
Male Pipe x Female Pipe Assembly



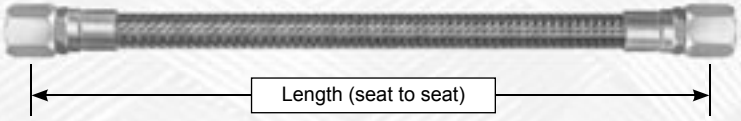
Male Pipe x Male Pipe Assembly



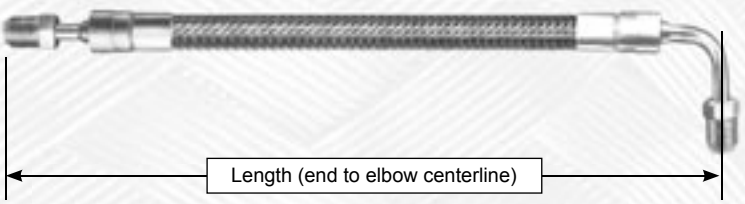
Male Pipe x Female JIC Assembly



Female JIC x Female JIC Assembly



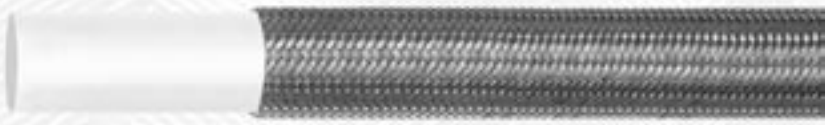
Male SAE Inverted Flare x SAE Inverted Flare 90° Assembly



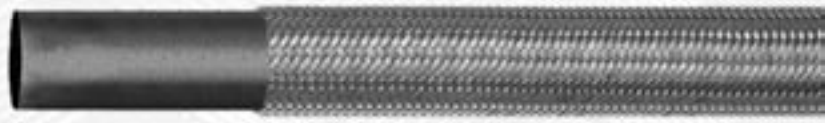
300 Series PTFE Smoothbore Hose

0.030” Wall Nominal I.D. PTFE-Lined Hose

Non-Conductive Liner



Conductive Liner



Dash Number	Non-Conductive Part Number	Conductive Part Number	ID (inches)	OD (inches)	Bend Radius (inches)	Working Pressure (psig)	Burst Pressure (psig)	Vacuum Rating (in. Hg)
-04	304-NSB-W	304-NSB-B	.187	.305	2.0	3,000	12,000	28
-05	305-NSB-W	305-NSB-B	.250	.375	3.0	3,000	12,000	28
-06	306-NSB-W	306-NSB-B	.312	.430	4.0	2,500	10,000	28
-08	308-NSB-W	308-NSB-B	.406	.535	5.0	2,000	8,000	28**
-10*	310-NSB-W	310-NSB-B	.500	.636	6.5	1,750	7,000	28**
-12*	312-NSB-W	312-NSB-B	.625	.765	7.5	1,500	6,000	28**
-16	316-NSB-W	316-NSB-B	.875	1.030	9.0	1,000	4,000	12**

Temperature range is -65 F (-54 C) to 450 F (230 C).

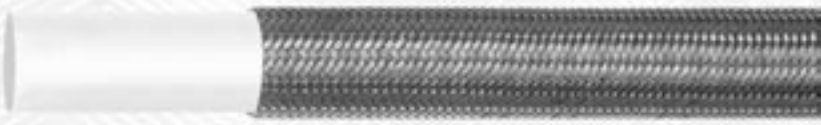
* The operating pressure of 1/2" ID hose is reduced to 1,500 psig and the operating pressure of 5/8" ID hose is reduced to 1,250 psig when brass fittings are used.

** For -06 and larger hose, the use of an internal support coil is recommended for tube support where extended or continuous service at high temperature with low or negative pressure is expected. Vacuum rating for -16 and larger hoses is for hose that has suffered no external damage or kinking. If higher vacuum levels are required for -16 and larger hoses, the use of an internal support coil is recommended.

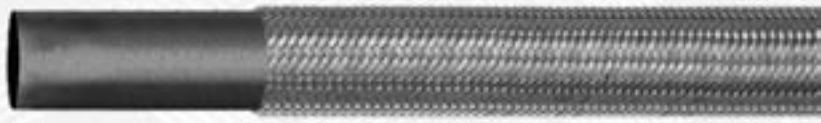
400 Series PTFE Smoothbore Hose

0.040” Wall Nominal I.D. PTFE-Lined Hose

Non-Conductive Liner



Conductive Liner



Dash Number	Non-Conductive Part Number	Conductive Part Number	ID (inches)	OD (inches)	Bend Radius (inches)	Working Pressure (psig)	Burst Pressure (psig)	Vacuum Rating (in. Hg)
-03	404-NSB-W	404-NSB-B	.125	.250	1.0	3,500	14,000	28
-04	404-NSB-W	404-NSB-B	.187	.320	1.5	3,000	12,000	28
-05	405-NSB-W	405-NSB-B	.250	.375	2.0	3,000	12,000	28
-06	406-NSB-W	406-NSB-B	.312	.435	3.5	2,500	10,000	28**
-08	408-NSB-W	408-NSB-B	.406	.565	4.5	2,000	8,000	28**
-10*	410-NSB-W	410-NSB-B	.500	.656	5.0	1,750	7,000	28**
-12*	412-NSB-W	412-NSB-B	.625	.780	6.0	1,500	6,000	28**
-16	416-NSB-W	416-NSB-B	.875	1.050	9.0	1,000	4,000	12**
-16Z‡	416-NSBD-W	416-NSB-B	.875	1.110	7.3	1,250	5,000	12**
-20Z‡	420-NSD-W	416-NSB-B	1.125	1.350	11.0	1,000	4,000	12**

Temperature range is -65 F (-54 C) to 450 F (230 C).

‡ "Z" designates a double braid of 304 stainless steel wire

* The operating pressure of 1/2" ID hose is reduced to 1,500 psig and the operating pressure of 5/8" ID hose is reduced to 1,250 psig when brass fittings are used.

** For -06 and larger hose, the use of an internal support coil is recommended for tube support where extended or continuous service at high temperature with low or negative pressure is expected. Vacuum rating for -16 and larger hoses is for hose that has suffered no external damage or kinking. If higher vacuum levels are required for -16 and larger hoses, the use of an internal support coil is recommended.

400B Series PTFE Smoothbore Hose

0.040” Wall Nominal I.D. PTFE-Lined Hose

(Bronze Braid)

Non-Conductive Liner

Dash Number	Non-Conductive Part Number	ID (inches)	OD (inches)	Bend Radius (inches)	Working Pressure (psig)	Burst Pressure (psig)
-03	404B-NSB-W	.125	.250	1.0	1,375	5,500
-04	404B-NSB-W	.187	.320	1.5	1,250	2,500
-05	405B-NSB-W	.250	.375	2.0	1,125	4,500
-06	406B-NSB-W	.312	.435	3.5	1,050	4,200
-08	408B-NSB-W	.406	.565	4.5	1,000	4,000
-10	410B-NSB-W	.500	.656	5.0	900	3,600
-12	412B-NSB-W	.625	.780	6.0	750	3,000
-16	416B-NSB-W	.875	1.050	9.0	625	2,500

Swage Style Fittings

Male Pipe

Dash	Part Number				Thread Size	Deduct Length
	Base Part Number	(Add to Base Part Number)				
		Brass	Carbon Steel	Stainless Steel		
-03	EMP-03X02	-B	N/A	-SS	1/8" - 27	3/4"
-04	EMP-04X02	-B	-CS	-SS	1/8" - 27	3/4"
-04	EMP-04X04	-B	-CS	-SS	1/4" - 18	7/8"
-05	EMP-05X02	-B	N/A	-SS	1/8" - 27	15/16"
-05	EMP-05X04	-B	-CS	N/A	1/4" - 18	7/8"
-05	EMP-05X06	-B	N/A	N/A	3/8" - 18	15/16"
-06	EMP-06X04	-B	-CS	-SS	1/4" - 18	7/8"
-06	EMP-06X06	-B	-CS	-SS	3/8" - 18	15/16"
-06	EMP-06X08	-B	N/A	-SS	1/2" - 14	1 1/8"
-08	EMP-08X06	-B	-CS	-SS	3/8" - 18	1"
-08	EMP-08X08	-B	-CS	-SS	1/2" - 14	1 1/8"
-10	EMP-10X08	-B	-CS	-SS	1/2" - 14	1 3/16"
-12	EMP-12X12	-B	-CS	-SS	3/4" - 14	1 5/16"
-16	EMP-16X16	-B	-CS	-SS	1" x 11.5	1 5/8"
-16Z	EMP-16DX16	-B	-CS	-SS	1" x 11.5	1 5/8"
-20Z	EMP-20DX20	-B	-CS	-SS	1 1/4" - 11.5	1 3/4"

Warning: Selection of the proper end fitting for the hose application is essential to the proper operation and safe use of the hose and related equipment. Selection of the improper end fitting for your application can result in leaks, or the hose end blowing off of the hose, which can lead to property damage, serious personal injury, or death.

To determine the hose cut-length, subtract the fittings deduct lengths from the desired overall length of the finished assembly.

37° Female JIC Swivel

Dash	Part Number				Thread Size	Deduct Length
	Base Part Number	(Add to Base Part Number)				
		Brass	Carbon Steel	Stainless Steel		
-03	EFJX-03X03	-B	N/A	-SS	3/8" - 24	9/16"
-03	EFJX-03X04	-B	N/A	N/A	7/16" - 20	7/16"
-04	EFJX-04X04	-B	-CS	-SS	7/16" - 20	7/8"
-05	EFJX-05X05	-B	-CS	-SS	1/2" - 20	15/16"
-06	EFJX-06X06	-B	-CS	-SS	9/16" - 18	1"
-08	EFJX-08X08	-B	-CS	-SS	3/4" - 16	1 3/16"
-10	EFJX-10X10	-B	-CS	-SS	7/8" - 14	1 5/16"
-12	EFJX-12X12	-B	-CS	-SS	1 1/16" - 12	1 7/16"
-16	EFJX-16X16	-B	-CS	-SS	1 5/16" - 12	1 5/8"
-16Z	EFJX-16DX16	-B	-CS	-SS	1 5/16" - 12	1 5/8"
-20Z	EFJX-20DX20	-B	-CS	-SS	1 5/8" - 12	1 11/16"

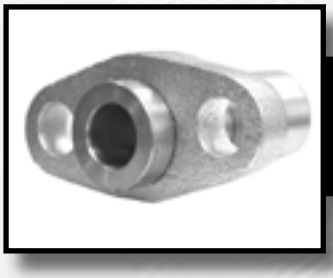
Swage Style Fittings

45° Female SAE JIC Swivel (Brass)

Dash	Part Number	Thread Size	Deduct Length
-04	ESFJX-04X04-B	7/16" - 20	7/8"
-05	ESFJX-05X05-B	1/2" - 20	15/16"
-06	ESFJX-06X06-B	5/8" - 18	1"
-08	ESFJX-08X08-B	3/4" - 16	1 3/16"
-10	ESFJX-10X10-B	7/8" - 14	1 5/16"
-12	ESFJX-12X12-B	1 1/16" - 14	1 7/16"

Female Pipe Rigid

Dash	Part Number			Thread Size	Deduct Length
	Base Part Number	(Add to Base Part Number)			
		Brass	Stainless Steel		
-04	EFP-04X02-B	-B	N/A	1/8" - 27	11/16"
-04	EFP-04X04-B	-B	N/A	1/4" - 18	11/16"
-05	EFP-05X02-B	-B	-SS	1/4" - 18	13/16"



Tire Mold Flange Swivel (Brass)

Dash	Part Number	Deduct Length
-12	ETMF-12X60-SS	1 5/8"
-16	ETMF-16X61-SS	2 1/8"
-16	ETMF-16X62-SS	1 11/16"

Power Trim (Stainless Steel)

Dash	Part Number	Thread Size	Deduct Length
-04	EPT-04-SS	3/8" - 24	1 7/16"
-04	EPT-45-SS	3/8" - 24	2"
-04	EPT-90-SS	3/8" - 24	1 1/2"

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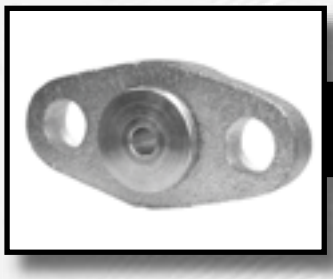
To determine the hose cut-length, subtract the fittings deduct lengths from the desired overall length of the finished assembly.

Swage Style Fittings

Tube Stub Ends (Stainless Steel)

Dash	Part Number	Tube O.D.	Deduct Length
-04	ESTUBE-04-SS	1/4"	1 1/8"
-05	ESTUBE-05-SS	1/4"	7/8"
-06	ESTUBE-06-SS	3/8"	1"
-08	ESTUBE-08-SS	1/2"	1 3/8"
-12	ESTUBE-12-SS	3/4"	1 1/2"
-16	ESTUBE-16-SS	1"	1 11/16"



Laundry Flange (Brass)

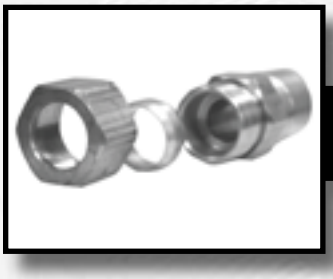
Dash	Part Number	Nominal I.D.	Deduct Length
-06	ELF-06-B	17/64"	5/16"

Paint Spray Swivel (Carbon Steel)

Dash	Part Number	Thread Size	Deduct Length
-05	EPSS-05-CS	1/4" NPSM	13/16"

SAE Male Compression (Brass)

Dash	Part Number	Thread Size	Tube Size	Deduct Length
-10	EMCOMP-10-B	13/16" - 18	5/8"	29/32"



SAE Female Compression (Brass)

Dash	Part Number	Thread Size	Tube Size	Deduct Length
-10	EFCOMP-10-B	13/16" - 18	5/8"	1 3/16"

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To determine the hose cut-length, subtract the fittings deduct lengths from the desired overall length of the finished assembly.

Adapters

Male JIC 37° x Male NPT

Dash	Part Number			JIC Thread Size	Pipe Thread Size
	Base Part Number	(Add to Base Part No.)			
		Carbon Steel	Stainless Steel		
-03	2404-03-02	-CS	-SS	3/8" - 24	1/8" - 27
-04	2404-04-02	-CS	-SS	7/16" - 20	1/8" - 27
-04	2404-04-04	-CS	-SS	7/16" - 20	1/4" - 18
-05	2404-05-02	-CS	-SS	1/2" - 20	1/8" - 27
-05	2404-05-04	-CS	-SS	1/2" - 20	1/4" - 18
-06	2404-06-04	-CS	-SS	9/16" - 18	1/4" - 18
-06	2404-06-06	-CS	-SS	9/16" - 18	3/8" - 18
-06	2404-08-04	-CS	-SS	3/4" - 16	1/4" - 18
-08	2404-08-06	-CS	-SS	3/4" - 16	3/8" - 18
-08	2404-08-08	-CS	-SS	3/4" - 16	1/2" - 14
-10	2404-10-08	-CS	-SS	7/8" - 14	1/2" - 14
-12	2404-12-08	-CS	-SS	1 1/16" - 12	1/2" - 14
-12	2404-12-12	-CS	-SS	1 1/16" - 12	3/4" - 14
-16Z	2404-03-02	-CS	-SS	1 5/16" - 12	1" - 11 1/2
-20Z	2404-03-02	-CS	-SS	1 5/8" - 12	1 1/4" - 11 1/2

Male JIC 37° x Male NPT 90° Elbow (Stainless Steel)

Dash	Part Number			JIC Thread Size	Pipe Thread Size
	Base Part Number	(Add to Base Part No.)			
		Carbon Steel	Stainless Steel		
-03	2501-03-02	-CS	-SS	3/8" - 24	1/8" - 27
-04	2501-04-02	-CS	-SS	7/16" - 20	1/8" - 27
-04	2501-04-04	-CS	-SS	7/16" - 20	1/4" - 18
-05	2501-05-02	-CS	-SS	1/2" - 20	1/8" - 27
-05	2501-05-04	-CS	-SS	1/2" - 20	1/4" - 18
-06	2501-06-04	-CS	-SS	9/16" - 18	1/4" - 18
-06	2501-06-06	-CS	-SS	9/16" - 18	3/8" - 18
-06	2501-08-04	-CS	-SS	3/4" - 16	1/4" - 18
-08	2501-08-06	-CS	-SS	3/4" - 16	3/8" - 18
-08	2501-08-08	-CS	-SS	3/4" - 16	1/2" - 14
-10	2501-10-08	-CS	-SS	7/8" - 14	1/2" - 14
-12	2501-12-08	-CS	-SS	1 1/16" - 12	1/2" - 14
-12	2501-12-12	-CS	-SS	1 1/16" - 12	3/4" - 14
-16Z	2501-03-02	-CS	-SS	1 5/16" - 12	1" - 11 1/2
-20Z	2501-03-02	-CS	-SS	1 5/8" - 12	1 1/4" - 11 1/2

Adapters

Male SAE 45° x Male NPT (Brass)

Dash	Part Number	SAE Thread Size	NPT Thread Size
-06	48F-06-04-B-B	9/16" - 18	1/4" - 18
-06	48F-06-06-B-B	9/16" - 18	3/8" - 18
-12	48F-12-08-B-B	1 1/16" - 12	1/2" - 14
-12	48F-12-12-B-B	1 1/16" - 12	3/4" - 14

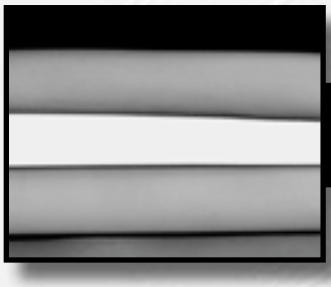
Male SAE 45° x Male NPT 90° Elbow (Brass)

Dash	Part Number	SAE Thread Size	NPT Thread Size
-06	49F-06-04-B-B	9/16" - 18	1/4" - 18
-06	49F-06-06-B-B	9/16" - 18	3/8" - 18
-12	49F-12-08-B-B	1 1/16" - 12	1/2" - 14
-12	49F-12-12-B-B	1 1/16" - 12	3/4" - 14

Accessories

Silicone Fire Sleeve

Dash	Part Number	Nominal I.D.
-03	06-FS	3/8"
-04	06-FS	3/8"
-05	06-FS	3/8"
-06	06-FS	3/8"
-08	08-FS	1/2"
-10	10-FS	5/8"
-12	12-FS	3/4"
-16	16-FS	1"
-16Z	16-FS	1"
-20Z	20-FS	1 1/4"



Polyolefin Shrink Sleeve

Dash	Part Number	I.D.
-03	08-NHS-COLOR	1/2"
-04	08-NHS-COLOR	1/2"
-05	08-NHS-COLOR	1/2"
-06	12-NHS-COLOR	3/4"
-08	16-NHS-COLOR	1"
-10	16-NHS-COLOR	1"
-12	24-NHS-COLOR	1 1/2"
-16	24-NHS-COLOR	1 1/2"
-16Z	24-NHS-COLOR	1 1/2"
-20Z	32-NHS-COLOR	2"

Carbon Steel Spring Guard

Dash	Part Number
-04	SG-04
-05	SG-05
-06	SG-06
-08	SG-08
-10	SG-10
-12	SG-12
-16	SG-16
-16Z	SG-16Z
-20Z	SG-20Z

Teflon® PTFE T-62 Resin

Not All Teflon® is the Same

A frequent point of confusion and misapplication for users specifying hoses is the technical distinction among the various resin options available for high purity, chemical resistant hose liners. Adding to the confusion is the fact that various resins are marketed under the brand name *Teflon*®, including *Teflon*® PTFE (polytetrafluo roethylene) and *Teflon*® FEP (fluorinated ethylene propylene copolymer). *Teflon*® PTFE and *Teflon*® FEP are not equivalent in every hose application.

The *Teflon*® PTFE T-62 used to make the liners for our Nominal Smoothbore Hoses has flex life up to 60 times greater than *Teflon*® FEP.

When specifying hoses for use in harsh or high purity applications, it is important to verify which resin is being supplied. Be sure that you're getting a resin suitable for your application. Not all fluoropolymer resins are created equal. Specifying hoses lined with *Teflon*® does not ensure that *Teflon*® PTFE will be supplied.

Properties of Teflon® PTFE T-62 Resin

Resistoflex Nominal Smoothbore Hoses are made exclusively with DuPont Teflon PTFE® T-62 resin because of the extraordinary performance it provides.

Properties	Unit	Teflon® PTFE T-62 Copolymer	PTFE Homopolymer	FEP
Continue Service Temp	°F	500°F	500°F	300°F
Tensile Strength	PSI	5,000	3,000	3,000
Flex Life	Cycles	>18,000,000	>1,000,000	5,000

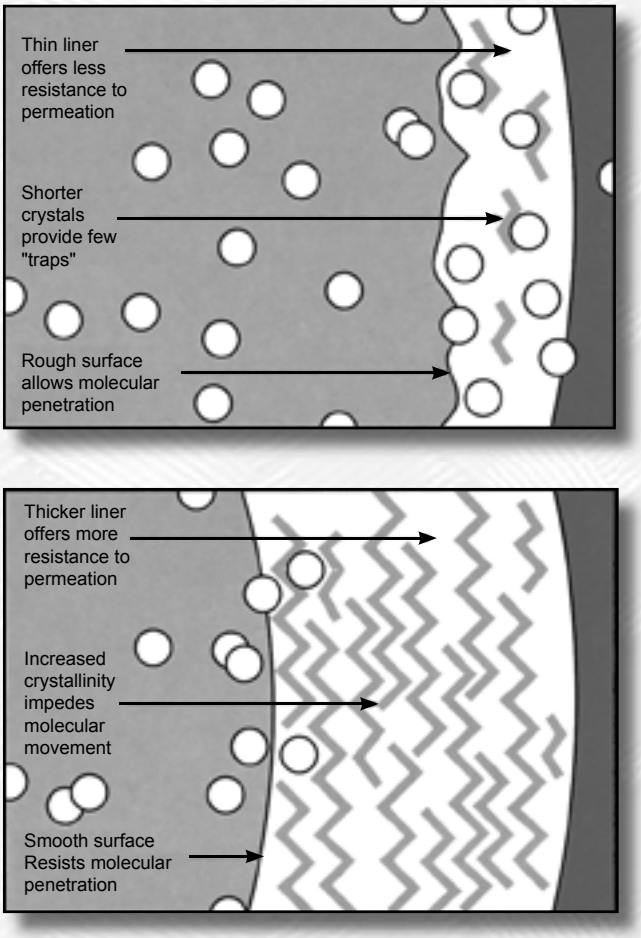
Liner Considerations

Permeation

Permeation is a process in which one material, usually a gas, diffuses into and through a solid barrier. All materials are permeable to a degree. The permeation of fluoropolymers in lined hose and piping systems is an important consideration because of the conditions under which they operate and the fluids they are meant to contain.
Many variables effect permeation rates through fluoropolymers. These can be broken into categories as follows:

1. Type of fluoropolymer and its associated molecular structure. PVDF, PFA, and PTFE all have different permeability, which is dependent upon all the other variables
2. The way in which the polymer is processed and its physical state – polymer crystallinity and liner thickness have a profound impact on permeability
3. The permeant itself – the smaller the molecule and greater its polarity, the faster it is likely to permeate through fluoropolymers.
4. Operating and environmental parameters – temperature and pressure have direct correlation to permeation rates. Temperature differential between process and the hose OD also impacts permeation rates.

Fluoropolymers are sometimes viewed as more permeable than other plastics. This view arises in part because fluoropolymers, especially PTFE, are used at higher temperatures and carry more aggressive fluids than other types of materials are capable of.
When conditions are favorable for permeation to occur, it is important to minimize the contributing variables, provide a vent path for permeants to escape, and use exterior materials resistant to the permeant.

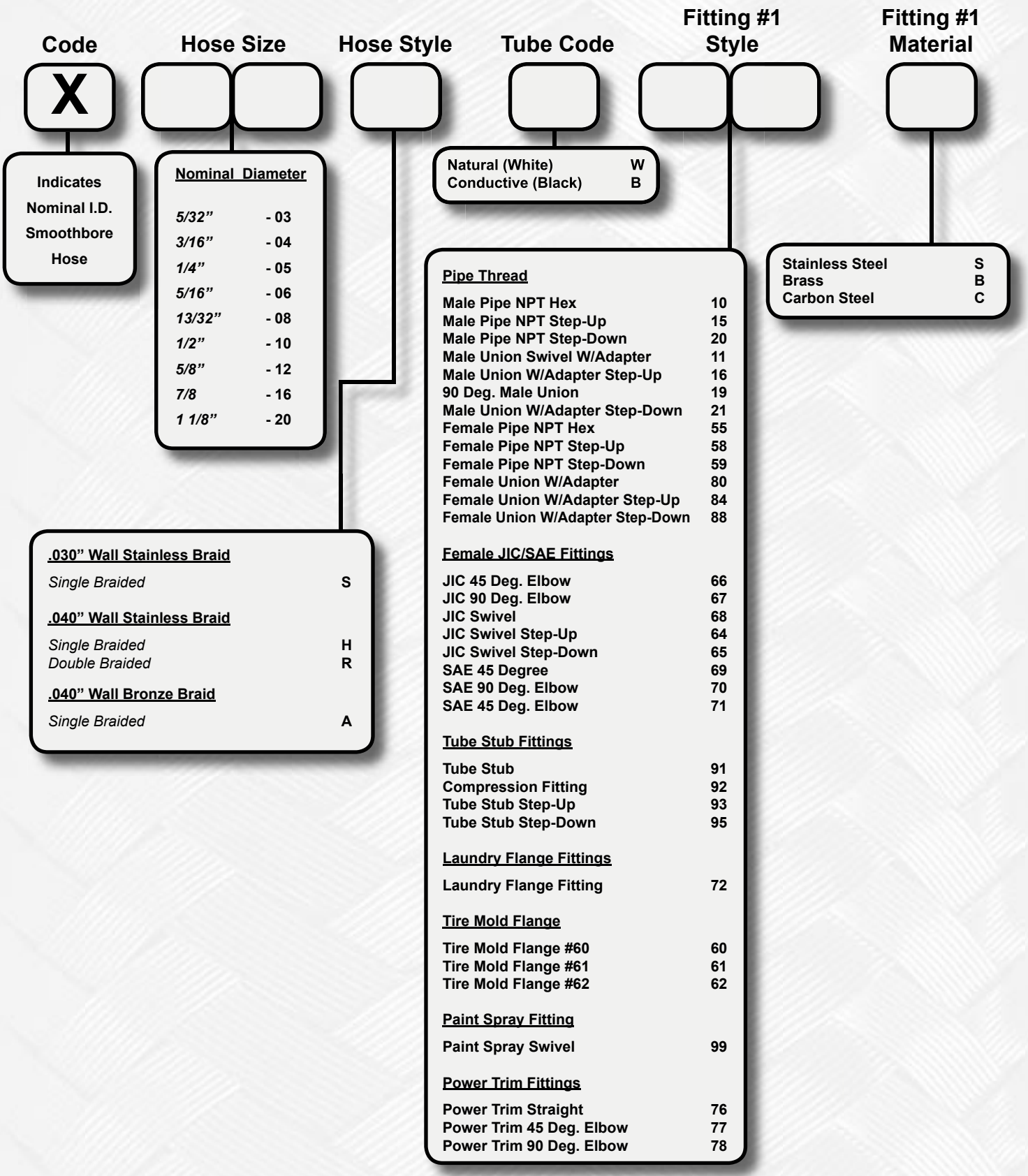


Static Electricity Considerations for Fluoropolymer Lined Hoses

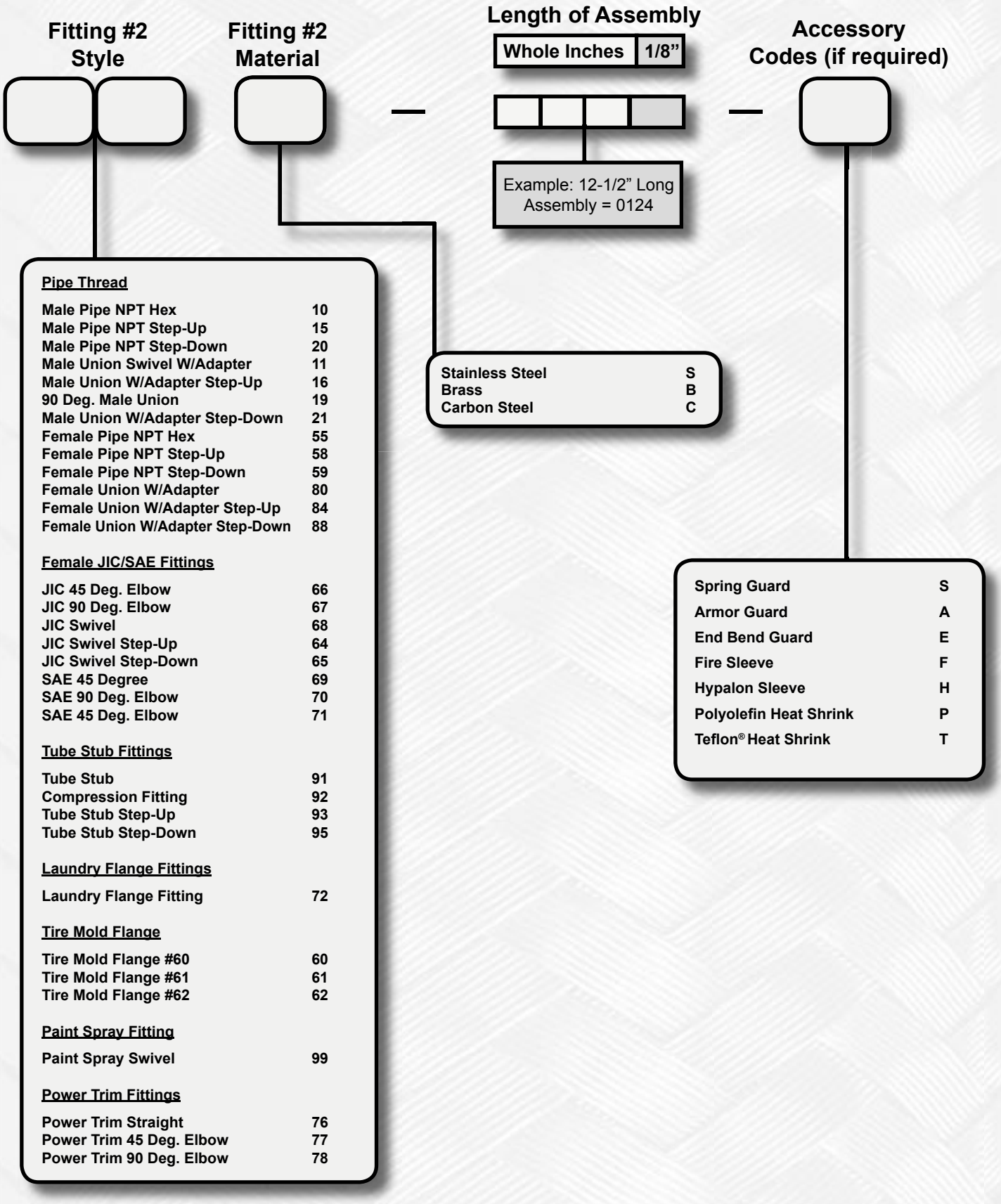
Electrostatic Discharge is a sudden flow of electric current through a material that is normally an insulator. As certain liquids flow through PTFE lined hoses, static charge generation can occur. These charges accumulate when they are not dissipated as fast as they are generated. Electrostatic discharge occurs when the potential difference between the liner and ground generates such a strong electric field that the liner's atoms turn into current conducting ions. The energy is then released through this newly formed conductor in the form of an electric spark. The discharge can burn through the liner, causing leaks and possible ignition hazards.

Charge generation depends upon the potential of the hose to accept or donate electrons, the fluid and its velocity, and the conductivity of the hose liner. In applications where charge generation is a concern, conductive fluoropolymer liners should be used. The conductive properties of the liner allow the generated charge to be dissipated quickly, reducing the risk of electrostatic discharge.

Assembly Numbering System



Assembly Numbering System



CRANE RESISTOFLEX®

Crane Resistoflex
One Quality Way
Marion, NC USA 28752
Tel: (828) 724-4000
Fax: (828) 724-4783

Crane Resistoflex GmbH
Industriestrasse 96
75181 Pforzheim, Germany
Tel: 49-7231-785-0
Fax: 49-7231-785-33

Resistoflex Asia Pte. Ltd.
16 Gul Link
Singapore 629 386
Tel: 65-6863-1559
Fax: 65-6863-1560

Crane Australia Pty. Limited
146-154 Dunheved Circuit
St. Mary's, NSW 2760
Tel: 612-9623-0234
Fax: 612-9673-3870

www.resistoflex.com
www.ptfeflexjoints.com
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