

senior

Flexonics



FLEXIBLE METAL HOSE ASSEMBLIES



THE ASSOCIATION FOR HOSE AND
ACCESSORIES DISTRIBUTION





Introduction

With origins dating to 1902, Senior Flexonics is today recognized as the leader in the metal hose industry. Our leadership has been earned through consistent application of solid engineering principles, stringent quality standards and product innovation to produce safe and reliable metal hose assemblies for various industrial piping applications.

This catalogue contains product performance data and physical descriptions for each of our series of metal hose. In addition, applications engineering information is included to provide guidance in the selection and installation of metal hose assemblies in your piping system. Hopefully, you will find this catalogue to be a useful and informative technical reference manual that assists you in making an educated selection of the most suitable products for your application.

Quality Programs and Certifications

- **ISO Certification:** As part of our continual business improvement process, Senior Flexonics quality assurance system is certified to ISO 9001:2000.
- **Welding:** All welding is performed by certified welders to ASME Section IX of the Boiler and Pressure Vessel Code.
- **Testing:** All hose assemblies are 100% tested prior to shipment. Standard tests include hydrostatic and pneumatic. Other tests are available upon request. Test reports are supplied with shipment upon request.
- **Tagging:** All assemblies are tagged with CRN number and any other information required.

NOTICE: The information and technical data contained herein is believed to be accurate and the best information available to us at the time of printing this catalogue. All information and data contained herein is subject to change at any time, without notice. Because we have no control over the selection, installation or use of our products, we cannot be responsible for their improper application or misuse.

Senior Flexonics Ltd., Warranty

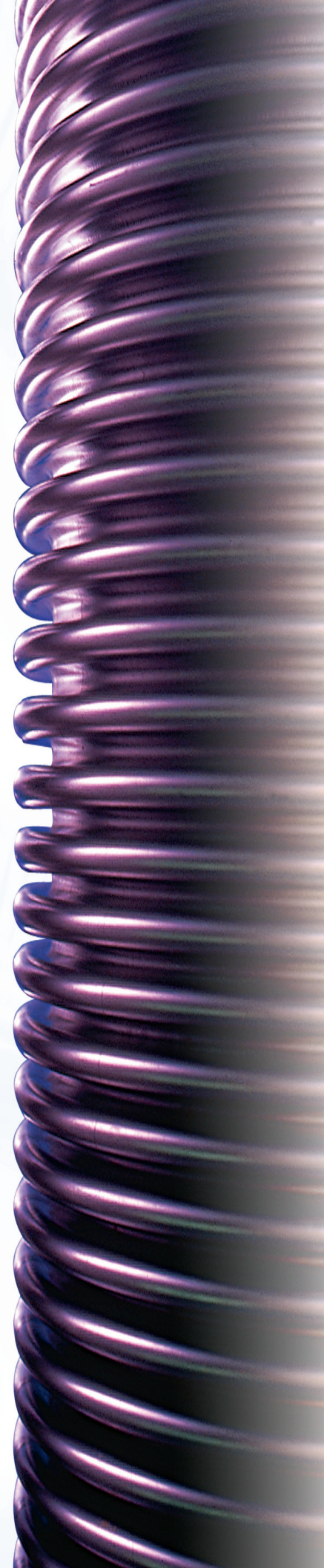
Senior Flexonics Ltd., warrants that products furnished will, at the time of shipment, be free from defects in material and workmanship under normal use and service.

Senior Flexonics Ltd., will repair or replace any product in which defects occur within one (1) year from the date of installation or eighteen (18) months from the date of shipment, whichever occurs first. Purchaser shall be responsible for proper installation of the products purchased and that the products purchased are operating within the design limits of each unit.

Senior Flexonics Ltd., makes no other warranty, express or implied, of merchantability and no other warranty, express or implied, of fitness for a particular purpose which extends beyond those warranties above. In no event shall Senior Flexonics Ltd., be liable for consequential or incidental damages. Liability shall not exceed the unit value of the item supplied.

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[QUICK REFERENCE HOSE PRESSURE RATING CHART]

MAXIMUM WORKING PRESSURE (PSIG) @ 70 °F

H O S E D I A M E T E R

Hose Series	100/160 Annular Stainless		700 Annular Stainless		750 Helical Stainless	800 Annular Stainless	850 Annular Stainless		RF67-XFC Annular Stainless	900 Annular Stainless		200 Annular Bronze		500 Annular Monel		600 Annular Inconel
	1	2	1	2	2	2	3	4	Multi	1	2	1	2	1	2	1
No. of Braids																
Page No.	3-4		5-6		7	7	8		8	9		10		11		12
1/4	2360	2832	2562	4099	3625	5300			12000			1035	1656			2660
3/8	1639	1967	1501	2401		3900			9000			685	1096			1610
1/2	1225	1470	2194	3510	1750	3600			8500			706	1130	852	1346	1310
3/4	1034	1241	1311	2098		3550			6800	682	1015	577	923	709	1161	915
1	796	955	1069	1710		2800			6250	551	798	470	752	692	1133	645
1-1/4	600	720	1110	1776		2480			5500	493	696	361	577	611	991	545
1-1/2	557	668	868	1388		2200			5200	435	595	329	526	419	769	560
2	570	684	810	1296		1675			4350	363	522	317	507	313	616	460
2-1/2	387	619	578	925								272	435			
3	316	506	540	864			1200		3000			201	322			
4	232	371	333	533				1200				142	227			
5	191	306	350	385												
6	165	264	266	425												
8	234	374	275	350												
10	230	637	250	375												
12	161	257	180	320												
14	150	190														
16	110	170														
18	85	150														

* Sizes 20" through 30" diameter are available upon request. Please consult factory.

[FLEXIBLE METAL HOSE APPLICATION]

DESIGN AND APPLICATION GUIDE

The selection of the correct metal hose is critical to insure optimum field performance. To accomplish this, there are a number of important applications requirements that must be known. The guide below will help you identify the requirements, and design the most cost effective, engineering sound product. The word “STAMPED” is useful as a checklist of applications requirements to be considered.

Consider	check for	Refer to
S ize/Hose & Fittings	<ul style="list-style-type: none"> • Size of existing piping and mating fittings. • Flow requirements. 	<ul style="list-style-type: none"> • “Hose Technical Data” pages
T emperature	<ul style="list-style-type: none"> • Maximum service temperature of the application. • Maximum allowable service temperature rating for hose and fitting alloys. • Reduced operating pressures at elevated temperatures. 	<ul style="list-style-type: none"> • “Metal Hose Selection Factors” pages for maximum service temperature for all alloys and conversion factors
A lloy/hose & Fittings	<ul style="list-style-type: none"> • Corrosion resistance of hose and fittings alloys for the media conveyed. • Maximum service temperature and pressure for the alloy selected. 	<ul style="list-style-type: none"> • “Corrosion Chart” pages • “Metal Hose Selection Factors” pages for maximum service temperature for alloys and conversion factors
M otion & Application	<ul style="list-style-type: none"> • Type of motion-angular, axial, offset, radial, random, vibration, amount and frequency. • Hose type best suited for application and motion, including external durability requirements. • Cycle life requirement. 	<ul style="list-style-type: none"> • “Corrosion Chart” pages • “Metal Hose Selection Factors” pages for motion applications
P ressure	<ul style="list-style-type: none"> • Burst, test and operating pressure. • Constant, pulsating or shock pressures. Operating pressure at elevated temperature. • Braid selection to maximize pressure/minimize cost. 	<ul style="list-style-type: none"> • “Metal Hose Selection Factors” pages for pressure definitions • “Metal Hose Selection Factors” pages for maximum service temperature and conversion factors • “Hose Technical Data” pages
E nd Fitting Attachment	<ul style="list-style-type: none"> • Methods of attachment applicable to type and alloy of hose and fittings. • Maximum temperature for alloys and methods of attachment. 	<ul style="list-style-type: none"> • “Metal Hose Selection Factors” pages for maximum service temperature of alloys page • “Common Metal Hose Fitting” pages
D eveloped Assembly Length	<ul style="list-style-type: none"> • Minimum hose live length for type of motion. • Hose assembly length with fittings (overall length). 	<ul style="list-style-type: none"> • “Metal Hose Selection Factors” pages for assembly life length, motion and vibration. • “Hose Technical Data” pages

NOTICE: This Engineering Guide is to assist you in the selection and application of flexible metal hose for your particular requirements. The information and data contained in this Engineering Guide are the result of years of our experience and research in flexible metal hose. As such it is the best information and data available to us as of the date of printing. Progress is part of any dynamic program of research and development, such as the company sponsors, so that all information and data contained herein are subject to change (without notice) at any time.

Should you be unable to determine a specification for a particular application, we solicit receiving details describing the application so that we may make a recommendation. Because we do not supervise or control the installation and use our products, **we cannot be responsible for their performance or the improper application and usage of the data.**

[STANDARD PRESSURE HOSE]

SERIES 100/160 STAINLESS STEEL HOSE

Construction: T-321 and T-316L Annular Standard Pitch Stainless Steel Hose, Series 300 Stainless Steel Braid

Size Range: 1/4" through 30"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1250 °F.

- Series 100 & 160 Unbraided
- Series 101 & 161 Single Braided
- Series 102 & 162 Double Braided

Nominal I.D. (in.)	Part Number T321/T316L	Braid Layers	Braid Construction	Braid Coverage %	Nominal O.D. (in.)	Max. Pressure @ 70°F (PSIG)		Bend Radius(in)		Weight Per Foot (lb.)
						Working	Nominal Burst	Dynamic	Static	
1/4	100/160	0			0.38	72	-			0.05
	101/161	1	24 x 6 x .010	95	0.43	2360	9440	3.15	1.1	0.10
	102/162	2			0.48	2832	11328			0.15
5/16	100/160	0			0.48	72	-			0.05
	101/161	1	24 x 7 x .010	92	0.53	1647	6588	4.85	1.23	0.12
	102/162	2			0.58	1976	7904			0.19
3/8	100/160	0			0.56	72	-			0.07
	101/161	1	24 x 7 x .012	93	0.62	1639	6556	5.08	1.52	0.16
	102/162	2			0.68	1967	7868			0.25
1/2	100/160	0			0.66	72	-			0.08
	101/161	1	24 x 8 x .012	92	0.72	1225	4900	5.47	1.75	0.18
	102/162	2			0.78	1470	5880			0.28
5/8	100/160	0			0.85	71	-			0.12
	101/161	1	36 x 6 x .014	93	0.92	1200	4800	6.28	2.21	0.27
	102/162	2			0.99	1440	5760			0.42
3/4	100/160	0			1.05	43	-			0.19
	101/161	1	36 x 8 x .014	96	1.12	1034	4136	6.58	2.65	0.39
	102/162	2			1.19	1241	4964			0.59
1	100/160	0			1.27	43	-			0.24
	101/161	1	48 x 7 x .014	95	1.34	796	3184	7.50	3.33	0.48
	102/162	2			1.41	955	3820			0.68
1 1/4	100/160	0			1.62	43	-			0.33
	101/161	1	48 x 9 x .014	95	1.69	600	2400	10.2	4.1	0.66
	102/162	2			1.76	720	2880			0.99
1 1/2	100/160	0			1.95	28	-			0.51
	101/161	1	48 x 9 x .014	94	2.03	557	2228	11.75	5.08	0.91
	102/162	2			2.11	668	2672			1.31
2	100/160	0			2.38	28	-			0.64
	101/161	1	48 x 9 x .020	94	2.48	570	2280	12.55	6.27	1.27
	102/162	2			2.58	684	2736			1.90
2 1/2	100/160	0			3.23	12	-			1.16
	101/161	1	72 x 7 x .020	86	3.33	387	1548	20.00	8.0	1.86
	102/162	2			3.43	619	2477			2.56
3	100/160	0			3.78	10	-			1.21
	101/161	1	72 x 8 x .020	85	3.88	316	1264	22.00	9.0	2.00
	102/162	2			3.98	506	2022			2.80

[STANDARD PRESSURE HOSE]

SERIES 100/160 STAINLESS STEEL HOSE

Construction: T-321 and T-316L Annular Standard Pitch Stainless Steel Hose, Series 300 Stainless Steel Braid

Size Range: 1/4" through 30"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1250 °F.

- Series 100 & 160 Unbraided
- Series 101 & 161 Single Braided
- Series 102 & 162 Double Braided

Nominal I.D. (in.)	Part Number T321/T316L	Braid Layers	Braid Construction	Braid Coverage %	Nominal O.D. (in.)	Max. Pressure @ 70°F (PSIG)		Bend Radius(in)		Weight Per Foot (lb.)
						Working	Nominal Burst	Dynamic	Static	
4	100/160	0			4.85	8	-			1.69
	101/161	1	72 x 10 x .020	84	4.98	232	927	27.00	13.00	2.68
	102/162	2			5.10	371	1485			3.68
5	100/160	0			5.90	6	-			2.50
	101/161	1	72 x 8 x .025	74	6.03	191	764	31.00	18.00	3.75
	102/162	2			6.15	306	1222			5.00
6	100/160	0			6.87	5	-			3.47
	101/161	1	96 x 12 x .020	90	7.10	165	660	36.00	19.00	4.75
	102/162	2			7.33	264	1056			6.04
8	100/160	0			9.09	6	-			5.56
	101/161	1	96 x 21 x .024	96	9.19	234	934	40.00	20.00	9.44
	102/162	2			9.28	374	1495			13.36
10	100/160	0			11.18	5	-			6.80
	101/161	1	96 x 25 x .028	98	11.32	230	918	50.00	25.00	12.90
	102/162	2			11.45	367	1469			19.00
12	100/160	0			13.23	3	-			9.02
	101/161	1	96 x 25 x .028	97	13.37	161	643	60.00	30.00	14.83
	102/162	2			13.50	257	1029			20.64
14	100/160	0			14.37	2.5	-			10.63
	101/161	1	96 x 29 x .025	80	14.62	150	600	66.00	35.00	17.03
	102/162	2			14.88	190	760			23.43
16	100/160	0			16.37	2	-			12.23
	101/161	1	96 x 29 x .025	74	16.62	110	440	74.00	40.00	18.44
	102/162	2			16.88	170	680			24.65
18	100/160	0			18.75	1	-			13.83
	101/161	1	96 x 29 x .025	67	19.00	85	340	82.00	45.00	20.23
	102/162	2			19.25	150	600			26.63
20	100/160	0			20.75	1	-			15.44
	101/161	1	96 x 29 x .025	62	21.00	65	260	90.00	50.00	21.84
	102/162	2			21.25	115	460			28.24
22	100/160	0			22.75	1	-			17.10
	101/161	1	96 x 29 x .025	58	23.00	50	200	98.00	55.00	23.50
	102/162	2			23.25	90	360			29.90
24	100/160	0			24.75	1	-			18.64
	101/161	1	96 x 29 x .025	55	25.00	45	180	104.00	60.00	25.04
	102/162	2			25.25	80	320			31.44
30	100/160	0			30.75	3/4	-			24.45
	101/161	1	96 x 29 x .025	52	31.00	20	80	128.00	75.00	30.85
	102/162	2			31.25	36	144			37.25

[HIGH PRESSURE HOSE]

SERIES 700 STAINLESS STEEL HOSE

Construction: Annular Close Pitch T-316L Heavy Weight Stainless Steel Hose, Series 300 Stainless Steel Braid

Size Range: 1/4" through 12"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

• Series 700 Unbraided

• Series 701 & Single Braided

• Series 702 Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	700	0.50			180	270	-	0.09
	701	0.57	2.50	5.00	2562	3844	10250	0.17
	702	0.64			4099	6150	16400	0.26
3/8	700	0.67			100	150	-	0.13
	701	0.74	2.75	5.50	1501	2251	6004	0.25
	702	0.81			2401	3602	9604	0.36
1/2	700	0.82			80	120	-	0.39
	701	0.92	4.00	8.00	2194	3291	8777	0.63
	702	1.02			3510	5265	14040	0.87
3/4	700	1.21			70	105	-	0.48
	701	1.31	4.00	8.00	1311	1967	5244	0.79
	702	1.41			2098	3147	8392	1.10
1	700	1.50			40	60	-	0.79
	701	1.60	4.50	9.00	1069	1604	4276	1.20
	702	1.70			1710	2566	6840	1.61
1 1/4	700	1.85			33	50	-	1.02
	701	1.97	5.0	10.00	1110	1666	4443	1.66
	702	2.10			1776	2665	7040	2.30
1 1/2	700	2.17			20	30	-	1.36
	701	2.30	5.0	10.00	868	1302	3472	2.11
	702	2.43			1388	2082	5552	2.86
2	700	2.51			15	23	-	1.60
	701	2.64	5.75	11.50	810	1215	3240	2.56
	702	2.76			1296	1944	5184	3.52
2 1/2	700	3.23			10	15	-	2.00
	701	3.36	12.00	24.00	578	867	2312	3.12
	702	3.49			925	1387	3700	3.30
3	700	3.78			10	15	-	2.97
	701	3.91	14.00	28.00	540	810	2160	4.42
	702	4.03			864	1295	3456	5.87

[HIGH PRESSURE HOSE]

SERIES 700 STAINLESS STEEL HOSE

Construction: Annular Close Pitch T-316L Heavy Weight Stainless Steel Hose, Series 300 Stainless Steel Braid

Size Range: 1/4" through 12"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

• Series 700 Unbraided

• Series 701 & Single Braided

• Series 702 Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
4	700	4.81			8	12	-	3.10
	701	4.93	20.00	40.00	333	500	1332	4.55
	702	5.05			533	800	2132	6.00
5	700	5.93			4	6	-	3.20
	701	6.03	11.00	28.00	350	525	1400	4.50
	702	6.13			385	578	1540	5.80
6	700	6.87			5	-	-	3.85
	701	7.10	24.00	48.00	266	399	1062	6.45
	702	7.33			425	637	1700	9.05
8	700	9.06			5	7.5	-	7.37
	701	9.31	21.50	54.00	275	410	1100	10.91
	702	9.56			350	525	1400	14.45
10	700	11.19			2.2	3.3	-	8.29
	701	11.44	34.00	68.00	250	375	1000	12.66
	702	11.69			375	563	1500	17.03
12	700	13.25			1.8	2.8	-	9.94
	701	13.45	42.00	83.00	180	270	720	16.68
	702	13.65			320	480	1280	23.02

[ULTRA HIGH PRESSURE HOSE]

SERIES 750 STAINLESS STEEL HOSE

Construction: Helical Close Pitch T-316L Stainless Steel Hose, Series 300 Stainless Steel Double Braided

Size Range: 1/4" and 1/2"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

- Series 752 Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	752	0.54	4.00	6.00	3625	5438	14500	0.26
1/2	752	0.84	3.00	5.00	1750	2625	7000	0.37

SERIES 800 STAINLESS STEEL HOSE

Construction: Annular/Close Pitch T316L Heavy Weight Hose, T321 Double Braid (T304L Double Braid for 802A)

Size Range: 1/4" through 2"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

- Series 802 Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	802	0.63	2.0	8.25	5300	7950	21200	0.39
3/8	802	0.81	2.5	9.00	3900	5850	15600	0.53
1/2	802	1.05	3.00	10.50	3600	5400	14400	0.75
3/4	802	1.43	4.00	12.75	3550	5325	14200	1.63
1	802	1.75	5.25	15.00	2800	4200	11200	2.07
1-1/4	802	2.08	6.50	17.25	2480	3720	9920	2.93
1-1/2	802	2.41	8.00	19.50	2200	3300	8800	3.62
2	802	3.05	11.50	24.00	1675	2512	6700	4.63

- Series 802A Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	802A	0.64	6.0	12.00	4406	6609	17627	0.36
3/8	802A	0.83	6.0	12.00	3073	4610	12291	0.55
1/2	802A	1.02	7.0	14.00	3510	5265	14040	0.76
3/4	802A	1.46	7.5	15.00	3192	4788	12769	1.19
1	802A	1.77	8.0	16.00	2558	3837	10234	1.94
1-1/4	802A	2.09	9.0	18.00	2107	3161	8431	2.48
1-1/2	802A	2.43	9.5	19.00	1698	2547	6795	3.30
2	802A	2.77	12.0	24.00	1346	2019	5388	3.91

[ULTRA HIGH PRESSURE HOSE]

SERIES 850 STAINLESS STEEL HOSE

Construction: Annular Close Pitch T-321 Stainless Steel Hose, T-321 Stainless Steel Double Braided

Size Range: 3" and 4"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

- Series 853 Triple Braided
- Series 854 Quad Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
3	853	3.94	25.00	86.00	1200	1800	4800	5.47
4	854	5.20	33.00	114.00	1200	1800	4800	9.19

SERIES RF67-XFC STAINLESS STEEL HOSE

Construction: Helical Ultra Heavy T-321 Hose, T-321 Stainless Steel Braid (Multi Layers)

Size Range: 1/4" through 2"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

- Series RF67-XFC Multi Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	RF67-XFC	0.68	2.50	11.50	12000	18000	48000	0.62
3/8	RF67-XFC	0.90	3.75	15.00	9000	13500	36000	0.97
1/2	RF67-XFC	1.04	4.50	16.50	8500	12750	34000	1.34
3/4	RF67-XFC	1.52	6.50	30.50	6800	10200	27200	2.56
1	RF67-XFC	1.93	9.00	35.00	6250	9375	25000	3.69
1 1/4	RF67-XFC	2.15	10.00	38.00	5500	8250	22000	5.08
1 1/2	RF67-XFC	2.54	12.00	41.00	5200	7800	20800	6.63
2	RF67-XFC	3.04	15.00	48.00	4350	6525	17400	8.07
3	RF67-XFC	4.06	25.00	65.00	3000	4500	12000	14.81

— [ULTRA FLEXIBLE HOSE] —

SERIES 900 STAINLESS STEEL HOSE

Construction: T-321 and T-316L Annular Close Pitch Stainless Steel Hose, Series 300 Stainless Steel Braid

Size Range: 3/4" through 2"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F.

- Series 900 & 960 Unbraided
- Series 901 & 961 Single Braided
- Series 902 & 962 Double Braided

Nominal Hose Size (in.)	Hose Series T321/T316L	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
3/4	900/960	1.10			44	66	-	0.30
	901/961	1.18	2.95	7.87	682	1023	2727	0.42
	902/962	1.26			1015	1523	4061	0.54
1	900/960	1.42			29	44	-	0.39
	901/961	1.50	3.35	8.46	551	827	2205	0.58
	902/962	1.57			798	1197	3191	0.76
1-1/4	900/960	1.73			22	33	-	0.49
	901/961	1.81	4.53	9.06	493	740	1973	0.81
	902/962	1.89			696	1044	2785	1.14
1-1/2	900/960	2.01			17	26	-	0.59
	901/961	2.13	5.51	11.02	435	653	1740	1.00
	902/962	2.24			595	893	2379	1.42
2	900/960	2.60			10	15	-	0.83
	901/961	2.72	6.30	13.1	363	545	1450	1.38
	902/962	2.83			522	783	2089	1.94

* Hydro Formed, 95% Braid Coverage, Annular Convolutions, Extreme Flexibility, Reduced Metal Fatigue, Shorter Minimum Live Lengths

* Other sizes are available upon request. Please consult factory.

[SPECIALTY HOSE]

SERIES 200 BRONZE HOSE

Construction: Annular Standard Pitch Bronze Hose and Braid

Size Range: 1/4" through 4"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 450 °F.

• Series 200 Unbraided

• Series 201 Single Braided

• Series 202 Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	200	0.49	1	5.5	100	150	-	0.13
	201	0.57			1035	1553	4142	0.23
	202	0.65			1656	2649	6627	0.33
3/8	200	0.67	1.25	6	40	75	-	0.25
	201	0.75			685	1027	2738	0.36
	202	0.83			1096	1644	4381	0.47
1/2	200	0.82	1.5	7	40	60	-	0.38
	201	0.90			706	1059	2825	0.57
	202	0.98			1130	1695	4520	0.76
3/4	200	1.21	2.25	8	30	36	-	0.50
	201	1.31			577	865	2307	0.83
	202	1.41			923	1384	3691	1.16
1	200	1.51	3	10	20	30	-	0.68
	201	1.61			470	705	1881	1.12
	202	1.71			752	1128	3009	1.56
1-1/4	200	1.85	3.5	12	15	23	—	0.80
	201	1.95			361	541	1443	1.31
	202	2.05			577	865	2309	1.82
1-1/2	200	2.18	4	13.5	10	15	-	1.03
	201	2.31			329	493	1317	1.73
	202	2.43			526	789	2107	2.43
2	200	2.50	5	17	8	12	-	1.81
	201	2.63			317	475	1267	2.73
	202	2.75			507	760	2027	3.65
2-1/2	200	3.18	8	22	8	12	-	1.39
	201	3.31			272	408	1090	2.66
	202	3.43			435	653	1744	3.93
3	200	3.65	12	24	10	15	-	1.44
	201	3.78			211	316	844	2.84
	202	3.91			338	507	1352	4.11
4	200	4.81	14	26	8	12	-	3.45
	201	4.94			142	213	568	5.03
	202	5.06			227	341	909	6.61

[SPECIALTY HOSE]

SERIES 500 MONEL HOSE

Construction: Annular Standard Pitch Monel® 400 Hose and Braid

Size Range: 1/2" through 2"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 800 °F.

• Series 500 Unbraided

• Series 501 Single Braided

• Series 502 Double Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/2	500	0.76			65	98	-	0.19
	501	0.81	2.5	7	852	1277	3406	0.31
	502	0.87			1346	2019	5385	0.43
3/4	500	1.05			50	75	-	0.28
	501	1.10	2.5	8	709	1063	2835	0.43
	502	1.16			1161	1741	4643	0.60
1	500	1.34			35	52.5	-	0.50
	501	1.42	3	9	692	1038	2769	0.77
	502	1.50			1133	1700	4533	1.08
1-1/4	500	1.75			20	30	-	0.64
	501	1.86	4	10	611	917	2445	0.98
	502	1.94			991	1486	3962	1.36
1-1/2	500	2.09			15	22.5	-	0.78
	501	2.16	4	10	419	629	1677	1.18
	502	2.24			769	1153	3075	1.62
2	500	2.54			10	15	-	0.97
	501	2.63	6	11	313	469	1250	1.45
	502	2.73			616	924	2463	1.99

* Other sizes are available upon request. Please consult factory.

Senior Flexonics Series 500 Monel® hose and braid is specifically designed for chlorine transfer as well as hydrochloric and hydrofluoric acid applications. The hose and braid combination meets and exceeds the Chlorine Institute's Pamphlet 6 specification, "Recommended Specifications for Chlorine Transfer Hose". Our series 500 hose and braid combination is particularly effective in the harsh seawater environment of ocean going vessels and offshore drilling platforms, where reliable performance is needed every day. Use Senior Flexonics 500 series for dependable and safe chlorine transfer.

— [SPECIALTY HOSE] —

SERIES 600 INCONEL® HOSE

Construction: Annular Standard Pitch Inconel® 625 Hose and T-321 Braid (Inconel Braid also available)

Size Range: 1/4" through 2"

Pressure Ratings: Full vacuum to pressures indicated below.

Temperature Range: Cryogenic to 1500 °F with T-321 Braid/1800 °F. with Inconel Braid

• Series 600 Unbraided

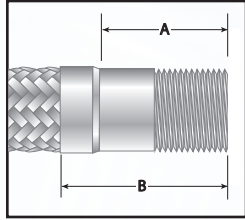
• Series 601 Single Braided

Nominal Hose Size (in.)	Hose Series	Nominal Outside Diameter	Minimal Centerline Bend Radius (in.)		Pressure Ratings at 70°F (PSIG)			Weight Per Foot (lb.)
			Static	Dynamic	Max. Working	Max. Test	Nominal Burst	
1/4	600	0.49	0.88	5.00	228	342	-	0.11
	601	0.55			2660	3990	10640	0.18
3/8	600	0.66	1.13	5.50	150	225	-	0.15
	601	0.73			1610	2415	6440	0.23
1/2	600	0.84	1.50	6.00	79	119	-	0.21
	601	0.90			1310	1965	5240	0.32
3/4	600	1.21	2.13	8.00	32	48	-	0.34
	601	1.27			915	1373	3660	0.50
1	600	1.53	2.75	9.00	38	57	-	0.59
	601	1.59			645	968	2580	0.78
1 1/4	600	1.86	3.25	10.50	22	33	-	0.78
	601	1.92			545	818	2180	1.02
1 1/2	600	2.19	3.75	12.00	26	39	-	0.93
	601	2.27			560	840	2240	1.27
2	600	2.72	5.00	15.00	14	21	-	1.23
	601	2.80			460	675	1800	1.68

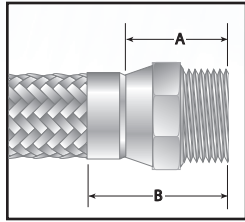
* Other sizes are available upon request. Please consult factory.

Senior Flexonics Series 600 Inconel® 625 annular corrugated hose with available Inconel® 625 braid or standard T321 stainless steel braid offers superior corrosion resistance. As a low temperature corrosion resistant material, 625 alloy has an excellent record in use in the chemical processing industry, in sea and brackish water and in power plant scrubber applications. It resists chloride pitting and crevice corrosion as well as chloride stress-corrosion cracking.

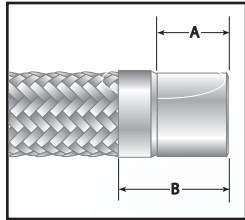
[COMMON METAL HOSE FITTINGS]



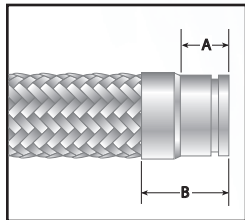
DESCRIPTION	MALE NPT NIPPLE											
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
DIMENSION A	1 1/2	1 1/2	1 1/2	2	2	2	2	2 1/2	3	3	3	4
DIMENSION B	CONSULT FACTORY											
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL, MONEL, SCH 40, 80											



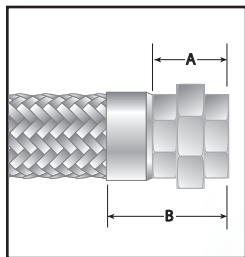
DESCRIPTION	HEX MALE NPT NIPPLE 1/4 TO 1-1/2 WITH INTEGRAL HEX											
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
DIMENSION A	1 3/16	1 1/4	1 7/16	1 1/2	1 11/16	1 15/16	2 1/8	2 1/2	3	3	3	4
DIMENSION B	CONSULT FACTORY											
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL											



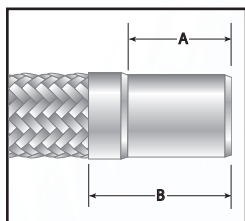
DESCRIPTION	CLASS 150 LB FEMALE NPT HALF COUPLING											
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
DIMENSION A	9/16	9/16	3/4	13/16	7/8	1	1	1 1/4	1 7/16	1 9/16	1 13/16	
DIMENSION B	CONSULT FACTORY											
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL, * Also available in class 3000 LB, and full length											



DESCRIPTION	GROOVED PIPE END													
HOSE I.D. (INS)	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14
DIMENSION A	3	3	3	3	3	3	3	3	3	3	3	3	3	4
DIMENSION B	CONSULT FACTORY													
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL													



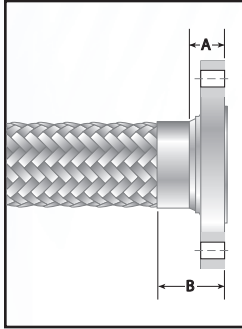
DESCRIPTION	CLASS 150 LB FEMALE NPT UNION											
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
DIMENSION A	1 1/2	1 5/8	2	2	2 3/8	2 5/8	3	3 1/8	3 3/4	4 1/8	4	
DIMENSION B	CONSULT FACTORY											
MATERIAL	MALLEABLE IRON, STEEL, T-304 & T-316 S.S. * Also available in class 3000 LB Cast fittings are threaded onto male NPT nipples and are not welded directly to hose.											



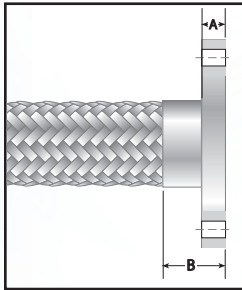
DESCRIPTION	WELDING NIPPLE 37-1/2° BEVEL													
HOSE I.D. (INS)	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14
DIMENSION A	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/8	1 3/8	1 3/8	1 1/8	1 1/8	6
DIMENSION B	CONSULT FACTORY													
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL, SCH 40, 80 & 160													

"A" Dimension may vary with material type

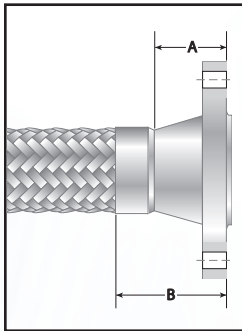
[COMMON METAL HOSE FITTINGS]



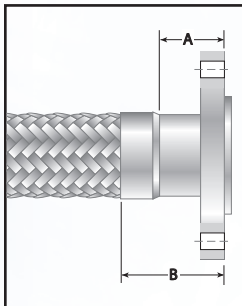
DESCRIPTION	CLASS 150 LB RAISED FACE SLIP ON FLANGE										
HOSE I.D. (INS)	2	2 1/2	3	4	5	6	8	10	12	14	16
DIMENSION A	1	1 1/8	1 3/16	1 5/16	1 7/16	1 9/16	1 3/4	1 15/16	2 3/16	2 1/4	2 1/2
DIMENSION B	CONSULT FACTORY										
DESCRIPTION	CLASS 300 LB RAISED FACE SLIP ON FLANGE										
DIMENSION A	1 5/16	1 1/2	1 11/16	1 7/8	2	2 1/16	2 7/16	2 5/8	2 7/8	3	3 1/4
DIMENSION B	CONSULT FACTORY										
MATERIAL	ASTM A-105 F. STL., ASTM/ASME A/SA-182 T-304 & T-316 STAINLESS STEEL										



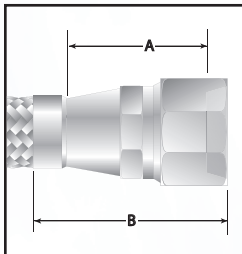
DESCRIPTION	CLASS 150 LB FLAT FACE PLATE FLANGE										
HOSE I.D. (INS)	2	2 3/8	3	4	5	6	8	10	12	14	16
DIMENSION A	5/8	5/8	5/8	5/8	3/4	3/4	1	1	1	1 1/4	1 1/4
DIMENSION B	CONSULT FACTORY										
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL * Also available in class 300LB										



DESCRIPTION	CLASS 150 LB RAISED FACE WELD NECK FLANGE										
HOSE I.D. (INS)	2	2 1/2	3	4	5	6	8	10	12	14	16
DIMENSION A	2 1/2	2 3/4	2 3/4	3	3 1/2	3 1/2	4	4	4 1/2	5	5
DIMENSION B	CONSULT FACTORY										
DESCRIPTION	CLASS 300 LB RAISED FACE WELD NECK FLANGE										
DIMENSION A	2 3/4	3	3 1/8	3 3/8	3 7/8	3 7/8	4 3/8	4 5/8	5 1/8	5 5/8	5 3/4
DIMENSION B	CONSULT FACTORY										
MATERIAL	ASTM A-105 F. STL., ASTM/ASME A/SA-182 T-304 & T-316 STAINLESS STEEL										



DESCRIPTION	CLASS 150 LB LAP JOINT FLANGE WITH STUB END										
HOSE I.D. (INS)	2	2 1/2	3	4	5	6	8	10	12	14	16
DIMENSION A	2 1/2	2 1/2	2 1/2	3	3	3 1/2	4	5	6	6	6
DIMENSION B	CONSULT FACTORY										
MATERIAL	STUB ENDS: ASTM/ASME A/SA-403 T-304 & T-316 S.S., SCH 10, 40, 80, 160 FLANGES: ASTM A-105 F. STL., ASTM/ASME A/SA-182 T-304 & T316 & S.S. * Also available with class 300LB flanges										



DESCRIPTION	JIC SWIVEL FEMALE (37° FLARE)										
HOSE I.D. (INS)	1/4	3/8	3/8	1/2	1/2	3/4	1	1 1/4	1 1/2	2	
TUBE O.D. (INS)	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	
DIMENSION A	1 5/16	1 3/8	1 3/8	1 1/2	1 1/2	1 5/8	1 3/4	1 5/8	1 3/4	2	
DIMENSION B	CONSULT FACTORY										
MATERIAL	STEEL & STAINLESS STEEL										

"A" Dimension may vary with material type

[METAL HOSE SELECTION FACTORS]

1. PRESSURE

Senior Flexonics pressure ratings are in accordance with industry-wide good practice and are consistent with the requirements of the Standard Code for Pressure Piping and the ASME Boiler and Pressure Vessel Code, Sec. VIII.

MAXIMUM WORKING PRESSURE:

Maximum operating pressure to which the hose should be subjected. It is established at 25% of the Nominal Design Burst Pressure. The hose may be deflected within the specified bend radius range.

MAXIMUM PROOF PRESSURE:

Maximum test pressure to which the hose should be subjected. It is established at 150% of the Maximum Working Pressure with the hose installed straight. No harmful deformation shall occur.

Hydrostatic field tests of hose assemblies installed in varying degrees of radial bend or parallel offset should be limited to 120% of the maximum rated working pressure at 70°F, or 150% of the actual operating pressure, whichever is lower.

NOMINAL DESIGN BURST PRESSURE:

The pressure at which the hose can be expected to rupture, based on the minimum annealed ultimate tensile strength of the braid wire and corrugated hose alloys at 70°F and the hose installed straight.

PULSATING OR SHOCK PRESSURE:

When pulsating, surge or shock pressures exist, such as occur due to fast closing valves, the peak pressure shall not exceed 50% of the Maximum Working Pressure. Installation shall be such that there is no initial slack in the braid when the pressure pulse, surge or shock occurs.

PRESSURE RELATIVE TO UNBRAIDED HOSE:

At Maximum Working Pressure, 1 to 2.5 % elastic elongation will occur in unbraided hose assemblies. To avoid squirm, unbraided hose should be unrestrained at one end, or installed in such a manner as to allow free axial expansion due to pressure, as in a 180° loop.

PRESSURE RELATIVE TO BRAIDED HOSE:

Whenever appreciable internal pressure is applied to a corrugated metal hose, it will elongate unless restrained. Generally this restraint is provided by a wire braid sheath over the hose. The braid has little effect on bending or flexibility of the hose. However, in extremely short lengths of braided and pressurized hose, additional bending forces are required because of braid friction.

Where the strength of the braid sheath is the limiting factor, additional working pressure may be gained by using a heavier than standard single braid, or two or more braids. However, when the hoop rupture strength of corrugated hose is the limiting factor, no additional pressure resistance is gained with additional braids.

Contact Senior Flexonics Engineering for braid/hose design assistance to determine maximum pressure ratings at lowest total cost for an application.

PRESSURE RELATIVE TO TEMPERATURE:

For operating temperatures in excess of 70°F, the tabulated pressures must be decreased in accordance with the "Conversion Factors" (refer to table on page 16). Since the pressure ratings are based on annealed material properties, no reduction in pressure ratings is necessary for fitting attachment by TIG welding, brazing, silver brazing, or soft solder.

II. MAXIMUM SERVICE TEMPERATURE OF MATERIALS

(Refer to table on page 16)

III. FLOW VELOCITY

1) Where flow velocity exceeds 100ft/sec gas (50ft/sec liquid), in unbraided hose, or 150 ft/sec gas (75ft/sec liquid), in braided hose, a flexible metal liner of fully interlocked (RT) hose should be used. When the hose is installed in a bent condition, these flow values should be reduced by 50% for a 90° bend, 25% for a 45° bend, and so on, proportional to the angle of bend. In cases where velocity exceeds the above values, the next larger size corrugated hose should be used with the flexible RT liner sized equivalent to the mating pipe size.

2) Where the amount of pressure drop through longer lengths of hose is a significant factor, a larger diameter hose may be required. As a broad rule of thumb, pressure drop through a corrugated metal hose is approximately three times that in comparable size standard steel pipe. For more accurate calculations of pressure drop, consult Senior Flexonics Engineering.

[METAL HOSE SELECTION FACTORS]

CONVERSION FACTORS						
Apply to pressure rating for elevated temperatures.						
TEMP. F°	304/304L Stainless Steel	316L Stainless Steel	321 Stainless Steel	Carbon Steel	Monel	Bronze
70	1.00	1.00	1.00	1.00	1.00	1.00
150	.95	.93	.97	.99	.93	.92
200	.91	.89	.94	.97	.90	.89
250	.88	.86	.92	.96	.87	.86
300	.85	.83	.88	.93	.83	.83
350	.81	.81	.86	.91	.82	.81
400	.78	.78	.83	.87	.79	.78
450	.77	.78	.81	.86	.77	.75
500	.77	.77	.78	.81	.73	
600	.76	.76	.77	.74	.72	
700	.74	.76	.76	.66	.71	
800	.73	.75	.68	.52	.70	
900	.68	.74	.62			
1000	.60	.73	.60			
1100	.58	.67	.58			
1200	.53	.61	.53			
1300	.44	.55	.46			
1400	.35	.48	.42			
1500	.26	.39	.37			

Consult Senior Flexonics Engineering whenever service conditions necessitate consideration of the influence of long time exposure at elevated temperature.

MAXIMUM SERVICE TEMPERATURE			
ALLOY	MAXIMUM TEMP. °F.	ALLOY	MAXIMUM TEMP. °F.
Inconel 625	1800	Brazing (RCuZn-C or BCuP-2)	
AISI Stainless Steel Type		Bronze Hose	450
321	1500	Steel Hose	850
316 ELC	1500	Silver Brazing	
304L	1500	(AWS-BAg-2)	600
304	850	Asbestos Packing Grade	
302	850	Commercial Asbestos	400
Mild Steel	850	Underwriters Asbestos	450
Malleable Steel	800	Aluminum 52S-0 (5052-0)	600
Monel	800	Galvanizing	450
Bronze	450	Soft Solder (Pb: 60, Sn: 40)	250
Brass	450	(Pb: 95, Sn: 5)	350
Copper	400		

Consult Senior Flexonics Engineering whenever service conditions necessitate consideration of the influence of long time exposure at elevated temperature.

[METAL HOSE SELECTION FACTORS]

IV. MOTION

Most industrial applications can be reduced to one of five classes of motion: (1) **Angular** (2) **Axial**; (3) **Offset** (4) **Radial**; or (5) **Random**.

1. Angular Motion: Motion that occurs when one end of a hose assembly is deflected in a simple bend with the ends not remaining parallel. Angular motion may be incorporated in an installation to accommodate misalignment and vibration only, but must not be used to accommodate expansion that would result in unloading the braid.

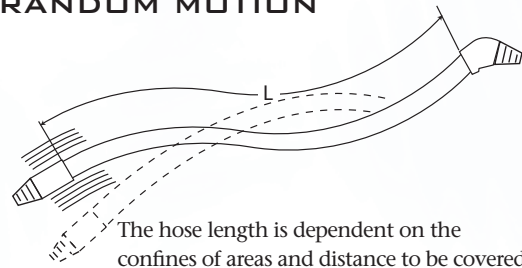
2. Axial Motion: This type of motion occurs when one end of a hose assembly is deflected along its longitudinal axis. Axial motion is applicable to annular corrugated, unbraided flexible hose only. Neither helical hose nor braided hose should be used in axial motion applications.

3. Offset Motion: Motion that occurs when one end of the hose assembly is deflected in a plane perpendicular to the longitudinal axis with the end remaining parallel. Offset is measured in inches of displacement of the free end centerline from the fixed end center line. In offset motion applications, the offset should never be greater than one-fourth (25%) if the minimum center line bend radius.

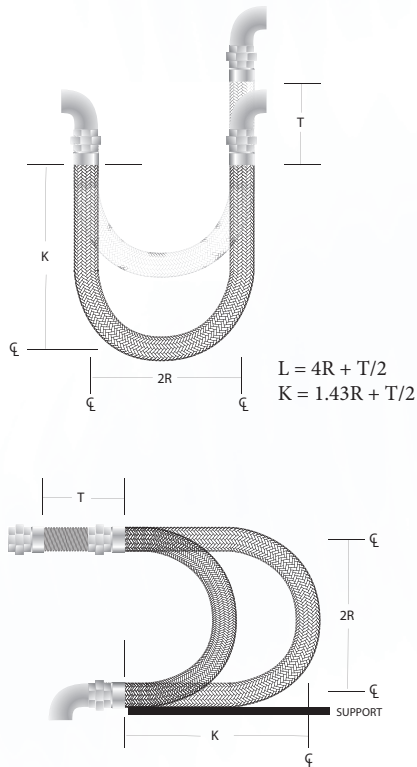
4. Radial Motion: This type of motion occurs when the center line of a hose assembly is bent in a circular arc. In industrial applications, radial motion is most commonly found in travelling loops.

5. Random Motion: Non-predictable motion that occurs from manual handling of a hose assembly. Loading and unloading hose would generally fall into this category. Abusive handling of hose is an important factor to consider in applications involving random motions. The use of an interlocked (RT-6 or RT-8) guard over the corrugated hose is recommended to protect the hose assembly from rough handling and "overbending" adjacent to the end fittings.

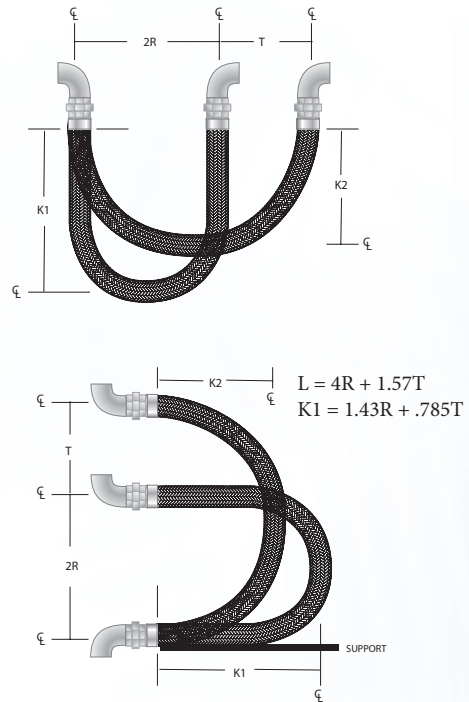
RANDOM MOTION



CLASS A TRAVELING LOOPS FOR MAXIMUM VERTICAL TRAVEL



CLASS B TRAVELING LOOPS FOR SHORT HORIZONTAL TRAVEL



T = Total travel (in.)

R = Center line bend radius (in.)

L = Hose live length (in.)

K = Loop Length (in.)

Note: In loop installations both connections and travel should be in same plane as the bend.

[METAL HOSE SELECTION FACTORS]

V. MOTION FREQUENCY

The frequency of a particular class of motion to which a flexible metal hose may be subjected by repeated flexing or bending. The frequency of motion may be divided into three basic categories: namely vibration, intermittent, and continuous. The minimum live length required for these motion categories may be selected as follows:

1. Vibration: For the normal vibration encountered in industrial applications, such as pump and compressor discharge lines and engine exhaust installations, the hose live lengths should be taken from the Minimum Live Length For Vibration column on Technical Data Pages.

Normal vibration is shown as the unshaded area of the chart below. If the expected combination of double amplitude (total motion excursion) and frequency falls into the shaded area, consult Senior Flexonics Engineering.

Caution: Avoid hose resonance. If resonance is anticipated, consult Senior Flexonics Engineering.

2. Intermittent motion: Motion that occurs on a regular or irregular cyclic basis normally the result of thermal expansion and contraction or other noncontinuous actions.

The intermittent flexing bend radius shown on Hose Technical Data Pages shall be used in the formulas for angular, radial and offset motion when determining hose live length for intermittent motion.

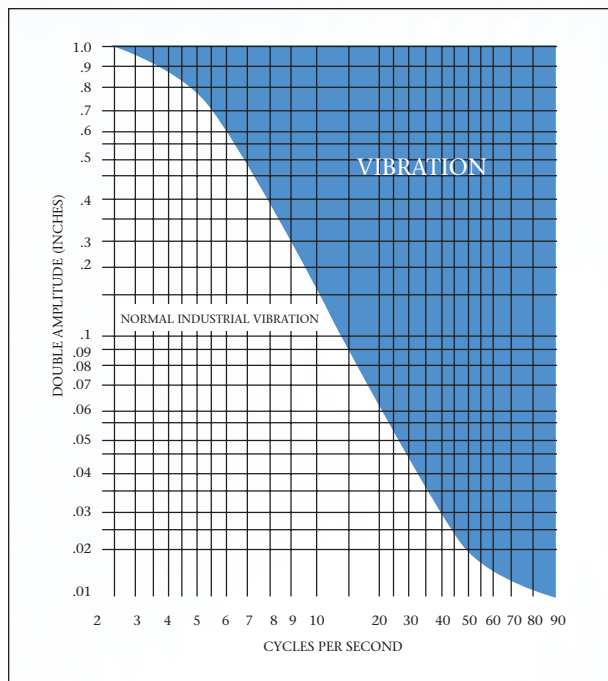
3. Continuous motion: Motion that occurs on a regular cyclic basis normally at a slow cyclic rate and constant travel. For Continuous Lateral Offset Motion double the minimum centerline bend radius required for Intermittent Flexing shown on Hose Technical Data Pages.

4. Static Bend: The minimum center line bend radius to which a flexible metal hose may be bent for installation. No further motion is to be imposed other than normal vibration.

VI. CYCLE LIFE

The cycle life expectancy of a metal hose is affected by various factors such as: operating pressure, operating temperature, materials, bend radius (the movement per corrugation due to the flexure), the thickness of the corrugation, the corrugation pitch, depth, and shape of the corrugation. Any change in one of these factors will result in a change in the cycle life of a metal hose assembly.

The cycle life of a metal hose assembly is proportional to the sum of the pressure stress range and deflection stress range. The life expectancy can be defined as the total number of completed cycles which can be expected from the metal hose



assembly based on S/N curves and data tabulated from tests performed under simulated operating conditions. A cycle is defined as one complete movement from the initial position in the system to some operating point and returning to the original position.

This information should be used as a guide only. We cannot predict every variable which might be encountered in every application nor any misapplication, mechanical damage, and/or any uncontrollable situation.

Please consult Senior Flexonics Engineering for any additional information or cycle life data.

[METAL HOSE SELECTION FACTORS]

ANGULAR OFFSET MOTION

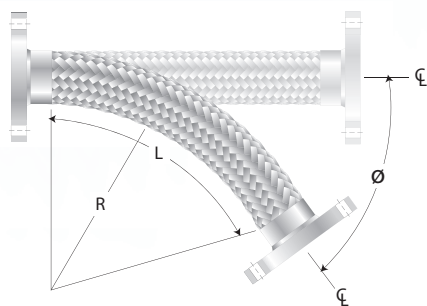
Angular movement is defined as the bending of the hose so that the ends are no longer parallel. Amount of movement is measured in degrees from centerline of the hose if were installed straight.

MINIMUM LIVE LENGTH OF HOSE FOR ANGULAR OFFSET MOTION

Degree of Angular Movement = \emptyset

	0	10	15	20	25	30	40	50	60	70	80	90	120	150	180
2	0.4	0.6	0.7	0.9	1.1	1.4	1.8	2.1	2.5	2.8	3.2	4.2	5.3	6.3	
3	0.6	0.8	1.1	1.4	1.6	2.1	2.7	3.2	3.7	4.2	4.8	6.3	7.8	9.5	
4	0.7	1.1	1.4	1.8	2.1	2.8	3.5	4.2	4.9	5.6	6.3	8.4	10.5	12.6	
5	0.9	1.4	1.8	2.2	2.7	3.5	4.4	5.3	6.2	7.0	7.9	10.5	13.1	15.8	
6	1.1	1.6	2.1	2.7	3.2	4.2	5.3	6.3	7.4	8.4	9.5	12.6	15.8	18.9	
7	1.3	1.9	2.5	3.1	3.7	4.9	6.2	7.4	8.6	9.8	11.0	14.7	18.4	22.0	
8	1.4	2.1	2.8	3.5	4.2	5.6	7.0	8.4	9.8	11.2	12.6	16.8	21.0	25.2	
9	1.6	2.4	3.2	4.0	4.8	6.3	7.9	9.5	11.0	12.6	14.2	18.9	23.6	28.3	
10	1.8	2.7	3.5	4.4	5.3	7.0	8.8	10.5	12.3	14.0	15.8	21.0	26.2	31.5	
11	2.0	2.9	3.9	4.8	5.8	7.7	9.6	11.6	13.5	15.4	17.3	23.1	28.8	34.6	
12	2.1	3.2	4.2	5.3	6.3	8.4	10.5	12.6	14.7	16.8	18.9	25.2	31.5	37.7	
13	2.3	3.5	4.6	5.7	6.9	9.1	11.4	13.7	15.9	18.2	20.5	27.3	34.1	40.9	
14	2.5	3.7	4.9	6.2	7.4	9.8	12.3	14.7	17.2	19.6	22.0	29.4	36.7	44.0	
15	2.7	4.0	5.3	6.6	7.9	10.5	13.1	15.8	18.4	21.0	23.6	31.5	39.3	47.2	
16	2.8	4.2	5.6	7.0	8.4	11.2	14.0	16.8	19.6	22.4	25.2	33.6	41.9	50.3	
17	3.0	4.5	6.0	7.5	9.0	11.9	14.9	17.9	20.8	23.8	26.8	35.7	44.6	53.5	
18	3.2	4.8	6.3	7.9	9.5	12.6	15.8	18.9	22.0	25.2	28.3	37.7	47.2	56.6	
19	3.4	5.0	6.7	8.3	10.0	13.3	16.6	19.6	23.3	26.6	29.9	39.8	49.8	59.7	
20	3.5	5.3	7.0	8.8	10.5	14.0	17.5	21.0	24.5	28.0	31.5	41.9	52.4	62.9	
22	3.9	5.8	7.7	9.6	11.6	15.4	19.2	23.1	26.9	30.8	34.6	46.1	57.6	69.2	
24	4.2	6.3	8.4	10.5	12.6	16.8	21.0	25.2	29.4	33.6	37.7	50.3	62.9	75.4	
26	4.6	6.9	9.1	11.4	13.3	18.2	22.7	27.3	31.8	36.4	40.9	54.5	68.1	81.7	
28	4.9	7.4	9.8	12.3	14.7	19.6	24.5	29.4	34.3	39.1	44.0	58.7	73.4	88.0	
30	5.3	7.9	10.5	13.1	15.8	21.0	26.2	31.5	36.7	41.9	47.2	62.9	78.6	94.3	
35	6.2	9.2	12.3	15.3	18.4	24.5	30.6	36.7	42.8	48.9	55.0	73.4	91.7	110.0	
40	7.0	10.5	14.0	17.5	21.0	28.0	35.0	41.9	48.9	55.9	62.9	83.8	104.8	125.7	
45	7.9	11.8	15.8	19.7	23.6	31.5	39.3	47.2	55.0	62.9	70.7	94.3	117.9	141.4	
50	8.8	13.1	17.5	21.9	26.2	35.0	43.7	52.4	61.1	69.9	78.6	104.8	130.9	157.1	
60	10.5	15.8	21.0	26.2	31.5	41.9	52.4	62.9	73.4	83.8	94.3	125.7	157.1	188.5	
70	12.3	18.4	24.5	30.6	36.7	48.9	61.1	73.4	85.6	97.8	110.0	146.7	183.3	220.0	
80	14.0	21.0	28.0	35.0	41.9	55.9	69.9	83.8	97.8	111.8	125.7	167.6	209.5	251.4	
90	15.8	23.6	31.5	39.3	47.2	62.9	78.6	94.3	110.0	125.7	141.4	188.5	235.7	282.8	
100	17.5	26.2	35.0	43.7	52.4	69.9	87.3	104.8	122.2	139.7	157.1	209.5	261.8	314.2	

* Centerline Bend Radius (in.) = R



Formula: $L = \pi R \emptyset / 180$

L = Live Hose Length (inches)

$\pi = 3.1416$

R = Minimum centerline bend radius for constant flexing (inches)

\emptyset = Angular deflection (degrees)

CORRUGATED METAL HOSE INSTALLATION DATA

INSTALLATION RULES

To obtain maximum service life from metal hose, two IMPORTANT installation rules must be kept in mind:

1) Do Not Torque

A hose is subjected to torque by:

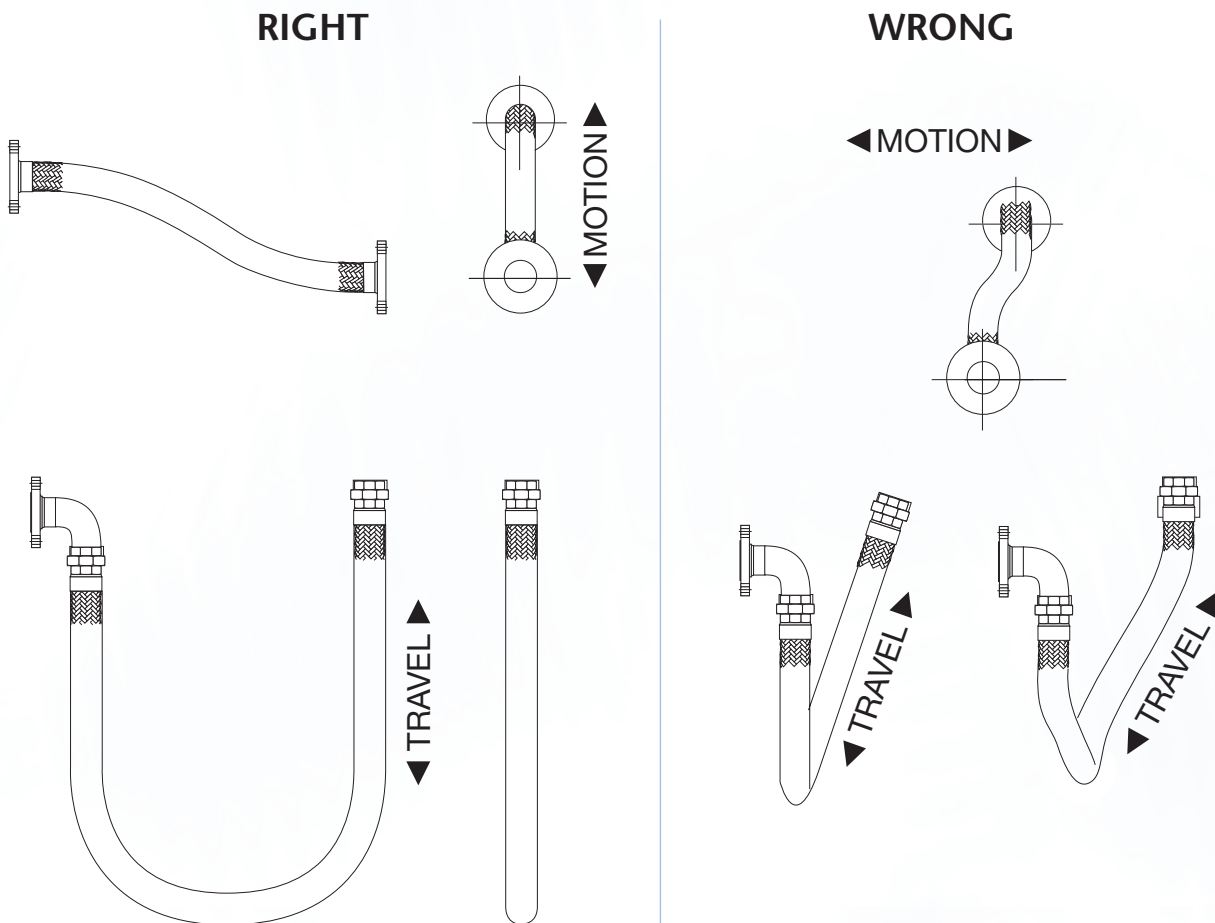
A) Twisting in installation. To minimize possible torque damage to a hose, a union of floating flange should be used at one end of the hose assembly. Where flanges are used, the fixed flange end should be bolted into place before the floating flange end. Where a threaded nipple and a union are used, the nipple end should be threaded into place, and then the union tightened into place using two wrenches.

B) Twisting on flexure. Always install the hose so that flexing takes place in one plane only, and in the plane of bending.

2) Avoid Sharp Bends

There are many ways a hose can be subjected to recurring sharp bends as a result of improper installation. A few examples are illustrated below. The minimum centerline bend radius for intermittent flexing should never be less than the values specified in the Technical Data Section.

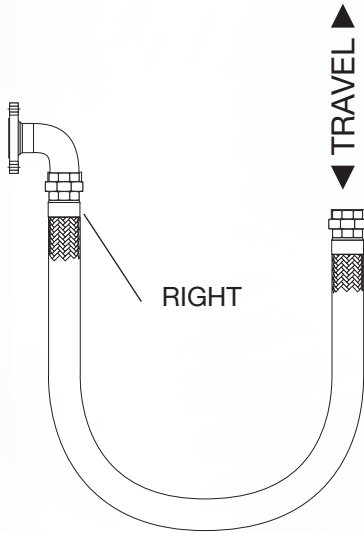
Should piping restrictions make it impractical to install hose in the proper manner, the use of an interlocked hose guard will limit the hose bending to a suitable radius, thus prolonging the life of the corrugated hose.



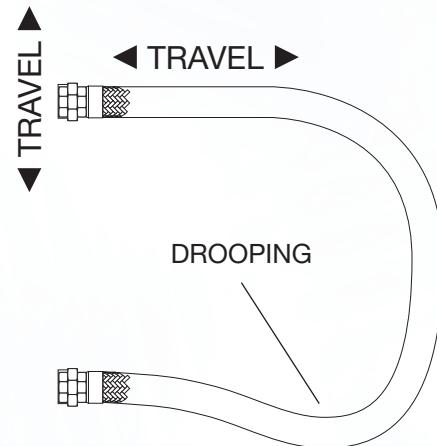
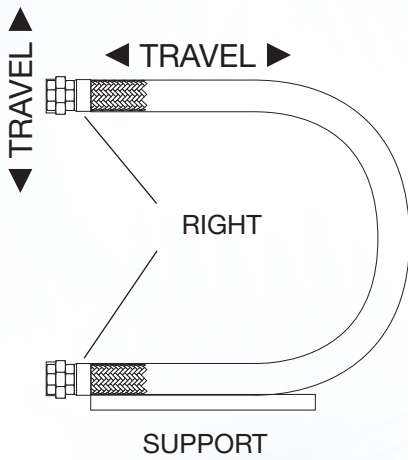
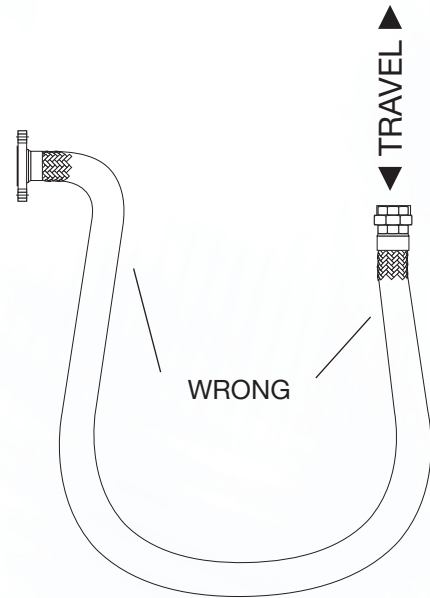
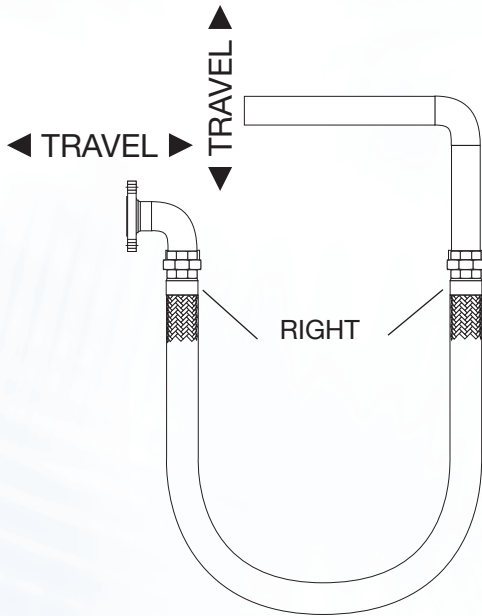
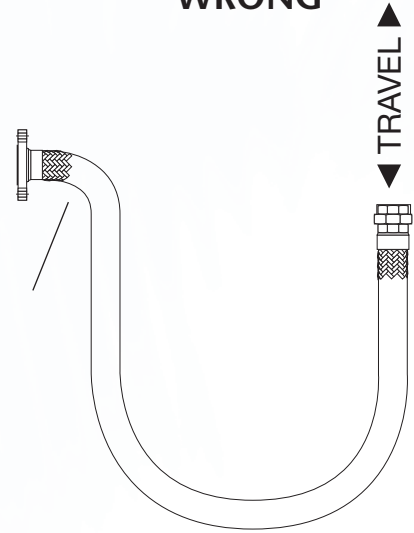
[CORRUGATED METAL HOSE INSTALLATION DATA]

RIGHT

WRONG



WRONG SHARP BEND



PIPE ANCHORING AND GUIDING

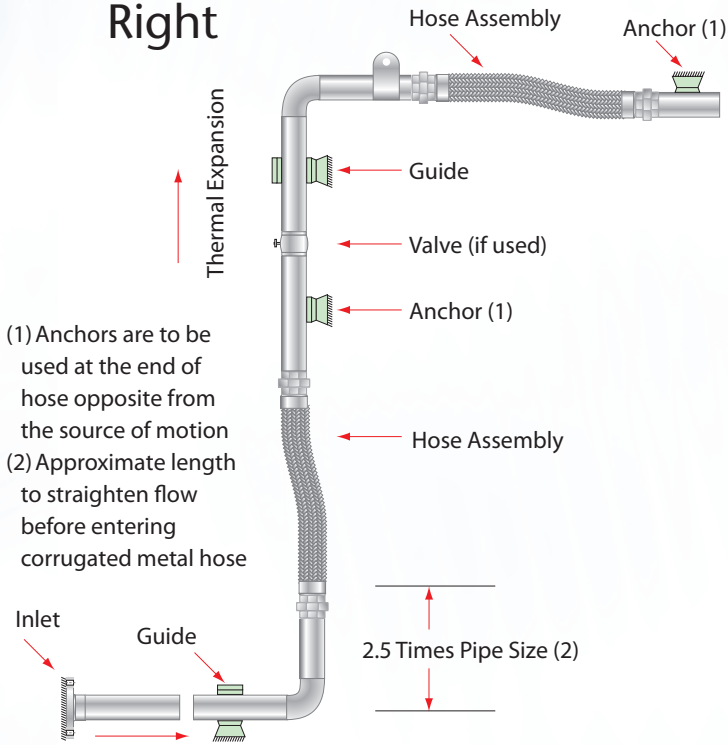
A piping system which utilizes flexible metal hose to absorb pipe movement must be properly anchored and guided to assure correct functioning and maximum service life of the metal hose. The basic principles to be observed are:

1) The direction of pipe motion must be perpendicular to the center line (axis) of the hose.

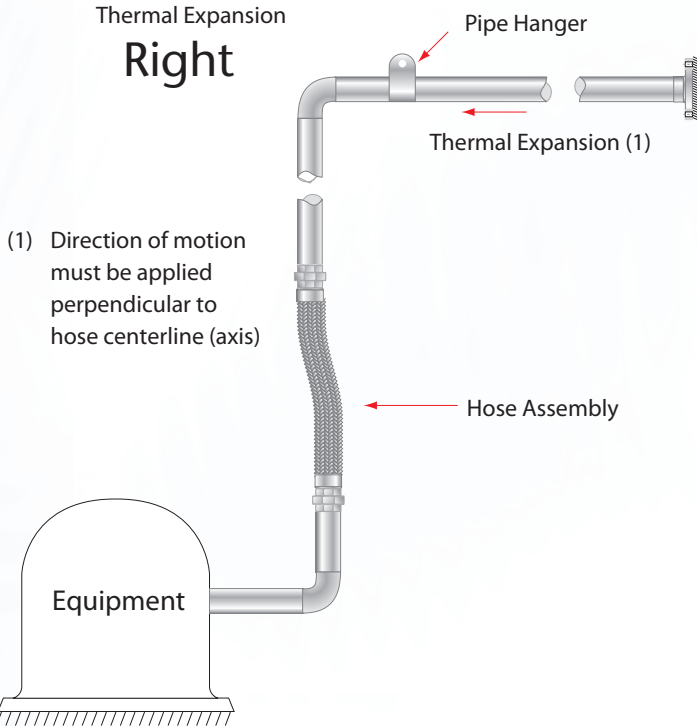
2) The pipe must be anchored at each change of direction where a flexible metal hose is employed to prevent torsional stress.

Typical examples of correct and incorrect guiding are shown below.

Right

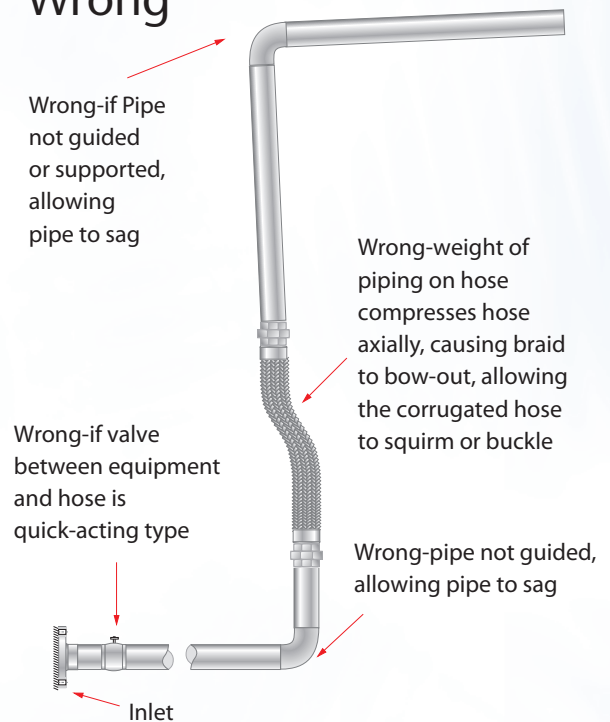


Right

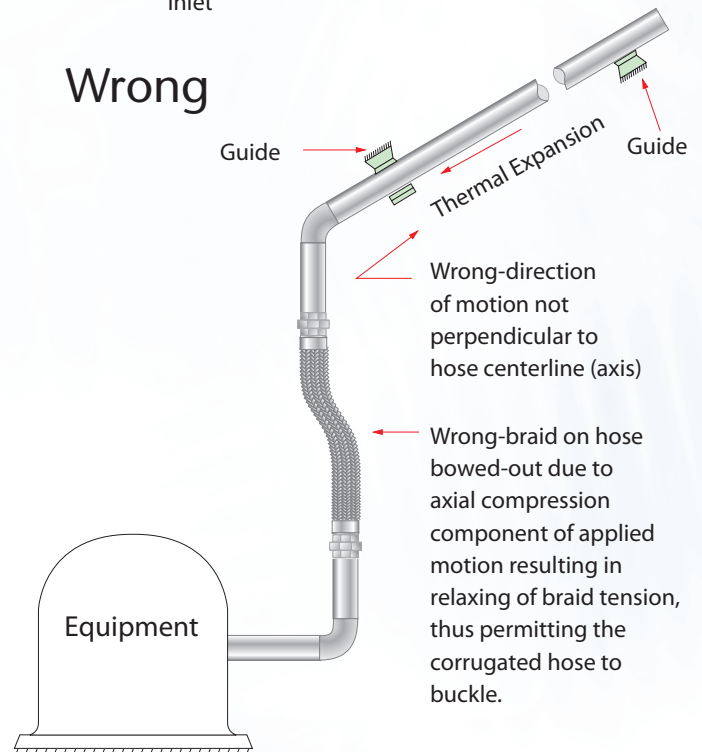


(1) Direction of motion must be applied perpendicular to hose centerline (axis)

Wrong



Wrong



[THERMAL EXPANSION DATA]

Linear Thermal Expansion between 70F and Indicated Temperature, inches/100 feet

MATERIALS

Saturated Steam (PSIG)	Temp. deg. F	Carbon Steel Carbon-Maloy Low-Chrome (thru 3 Cr Mo)	Austenitic Stainless Steels Cr 8 Ni	5 Cr Mo thru 9 Cr Mo 18	12 Cr 17 Cr 27 Cr	25 Cr 20 Ni	Monel 67 Ni 30 Cr	3 1/2 Nickel	Bronze	Brass	70 Cu 30 Ni	Aluminum
	-325	-2.37	-3.85	-2.22	-2.04	-3.00	-2.62	-2.22	-3.98	-3.88	-3.15	-4.68
	-300	-2.24	-3.65	-2.10	-1.92	-2.83	-2.50	-2.10	-3.74	-3.64	-2.87	-4.46
	-275	-2.11	-3.41	-1.98	-1.80	-2.66	-2.38	-1.98	-3.50	-3.40	-2.70	-4.21
	-250	-1.98	-3.19	-1.86	-1.68	-2.49	-2.26	-1.86	-3.26	-3.16	-2.53	-3.97
	-225	-1.85	-2.96	-1.74	-1.57	-2.32	-2.14	-1.74	-3.02	-2.93	-2.36	-3.71
	-200	-1.71	-2.73	-1.62	-1.46	-2.15	-2.02	-1.62	-2.78	-2.70	-2.19	-3.44
	-175	-1.58	-2.50	-1.50	-1.35	-1.98	-1.90	-1.50	-2.54	-2.47	-2.12	-3.16
	-150	-1.45	-2.27	-1.37	-1.24	-1.81	-1.79	-1.38	-2.31	-2.24	-1.95	-2.88
	-125	-1.30	-2.01	-1.23	-1.11	-1.60	-1.59	-1.23	-2.06	-2.00	-1.74	-2.57
	-100	-1.15	-1.75	-1.08	-0.98	-1.39	-1.38	-1.08	-1.81	-1.76	-1.53	-2.27
	-75	-1.00	-1.50	-0.94	-0.85	-1.18	-1.18	-0.93	-1.56	-1.52	-1.33	-1.97
	-50	-0.84	-1.24	-0.79	-0.72	-0.98	-0.98	-0.78	-1.32	-1.29	-1.13	-1.67
	-25	-0.68	-0.98	-0.63	-0.57	-0.78	-0.77	-0.62	-1.25	-1.02	-0.89	-1.32
	0	-0.49	-0.72	-0.46	-0.42	-0.57	-0.57	-0.46	-0.77	-0.75	-0.66	-0.97
	25	-0.32	-0.46	-0.30	-0.27	-0.37	-0.37	-0.30	-0.49	-0.48	-0.42	-0.63
	50	-0.14	-0.21	-0.13	-0.12	-0.16	-0.20	-0.14	-0.22	-0.21	-0.19	-0.28
-14.33	70	0	0	0	0	0	0	0	0	0	0	0
-13.75	100	0.23	0.34	0.22	0.20	0.28	0.28	0.22	0.36	0.35	0.31	0.46
-12.75	125	0.42	0.62	0.40	0.36	0.51	0.52	0.40	0.66	0.64	0.56	0.85
-10.97	150	0.61	0.90	0.58	0.53	0.74	0.75	0.58	0.96	0.94	0.82	1.23
-7.98	175	0.80	1.18	0.76	0.69	0.98	0.99	0.76	1.23	1.23	1.07	1.62
-3.16	200	0.99	1.46	0.94	0.86	1.22	1.22	0.94	1.52	1.52	1.33	2.00
4.22	225	1.21	1.75	1.13	1.03	1.45	1.46	1.13	1.83	1.83	1.59	2.41
15.12	250	1.40	2.03	1.33	1.21	1.70	1.71	1.32	2.17	2.14	1.86	2.83
30.71	275	1.61	2.32	1.52	1.38	1.94	1.96	1.51	2.48	2.45	2.13	3.24
52.31	300	1.82	2.61	1.71	1.56	2.18	2.21	1.69	2.79	2.76	2.40	3.67
81.46	325	2.04	2.90	1.90	1.74	2.43	2.44	1.88	3.11	3.08	2.68	4.09
119.9	350	2.26	3.20	2.10	1.93	2.69	2.68	2.08	3.42	3.41	2.96	4.52
169.6	375	2.48	3.50	2.30	2.11	2.94	2.91	2.27	3.74	3.73	3.24	4.95
232.6	400	2.70	3.80	2.50	2.30	3.20	3.25	2.47	4.05	4.05	3.52	5.39
311.3	425	2.93	4.10	2.72	2.50	3.46	3.52	2.69	4.37	4.38		5.83
407.9	250	3.16	4.41	2.93	2.69	3.72	3.79	2.91	4.69	4.72		6.28
525.2	475	3.39	4.71	3.14	2.89	3.98	4.06	3.13	5.01	5.06		6.72
666.2	500	3.62	5.01	3.35	3.08	4.24	4.33	3.34	5.33	5.40		7.17
833.6	525	3.86	5.31	3.58	3.28	4.51	4.61	3.57	5.65	5.75		7.63
1031	550	4.11	5.62	3.80	3.49	4.79	4.90	3.80	5.98	6.10		8.10
1261	575	4.35	5.93	4.02	3.69	5.06	5.18	4.03	6.31	6.45		8.56
1529	600	4.60	6.24	4.24	3.90	5.33	5.46	4.27	6.64	6.80		9.03
	625	4.86	6.55	4.47	4.10	5.60	5.75	4.51	6.96	7.16		
	650	5.11	6.87	4.69	4.31	5.88	6.05	4.75	7.29	7.53		
	675	5.37	7.18	4.92	4.52	6.16	6.34	4.99	7.62	7.89		
	700	5.63	7.50	5.14	4.73	6.44	6.64	5.24	7.95	8.26		
	725	5.90	7.82	5.38	4.94	6.73	6.94	5.50	8.28	8.64		
	750	6.16	8.15	5.62	5.16	7.02	7.25	5.76	8.62	9.02		
	775	6.43	8.47	5.86	5.38	7.31	7.55	6.02	8.96	9.40		
	800	6.70	8.80	6.10	5.60	7.60	7.85	6.27	9.30	9.78		
	825	6.97	9.13	6.34	5.82	7.89	8.16	6.54	9.64	10.17		
	850	7.25	9.46	6.59	6.05	8.19	8.48	6.81	9.99	10.57		
	875	7.53	9.79	6.83	6.27	8.48	8.80	7.08	10.33	10.96		
	900	7.81	10.12	7.07	6.49	8.78	9.12	7.35	10.68	11.35		
	925	8.08	10.46	7.31	6.71	9.07	9.44	7.72	11.02	11.75		
	950	8.35	10.80	7.56	6.94	9.37	9.77	8.09	11.37	12.16		
	975	8.62	11.14	7.81	7.17	9.66	10.09	8.46	11.71	12.57		
	1000	8.89	11.48	8.06	7.40	9.95	10.42	8.83	12.05	12.98		
	1025	9.17	11.82	8.30	7.62	10.24	10.75	9.18	12.40	13.39		
	1050	9.46	12.16	8.55	7.95	10.54	11.09	9.51	12.76	13.81		
	1075	9.75	12.50	8.80	8.18	10.83	11.43	9.89	13.11	14.23		
	1100	10.04	12.84	9.05	8.41	11.12	11.77	10.27	13.47	14.65		
	1125	10.31	13.18	9.28	8.63	11.41	12.11	10.65				
	1150	10.57	13.52	9.52	8.86	11.71	12.47	11.03				
	1175	10.83	13.86	9.76	9.08	12.01	12.81	11.44				
	1200	11.10	14.20	10.00	9.30	12.31	13.15	11.86				
	1225	11.38	14.54	10.26	9.52	12.59	13.50					
	1250	11.66	14.88	10.53	9.75	12.88	13.86					
	1275	11.94	15.22	10.79	9.98	13.17	14.22					
	1300	12.22	15.56	11.06	10.21	13.46	14.58					
	1325	12.50	15.90	11.30	10.43	13.75	14.94					
	1350	12.78	16.24	11.55	10.66	14.05	15.30					
	1375	13.06	16.58	11.80	10.88	14.35	15.66					
	1400	13.34	16.92	12.05	11.11	14.65	16.02					
	1425		17.30									
	1450		17.69									
	1475		18.08									
	1500		18.47									

These data are for information and it is not to be implied that materials are suitable for all the temperatures shown

LABORATORY CORROSION CHART

These charts contain recommendations based on published corrosion data for valid laboratory or field tests. However, this data should be used only as a guide and is not a guarantee of actual service performance. It is recommended that the user test the combination before connecting the product to any application. For additional recommendations contact Senior Flexonics.

Chemical	Temp. °F	Stainless Steel					Chemical	Temp. °F	Stainless Steel					Chemical	Temp. °F	Stainless Steel							
		18 - 8	18 - 8 Mo	Mild Steel	Brass (80 - 20)	Bronze (Phos)			Monel	18 - 8	18 - 8 Mo	Mild Steel	Brass (80 - 20)			Bronze (Phos)	Monel	18 - 8	18 - 8 Mo	Mild Steel	Brass (80 - 20)	Bronze (Phos)	Monel
Hydrofluosilicic Acid	70	3	3	3	2	2	2	Paraffine	Cold & Hot	1	1	2	1	1	1	Sodium Cyanide	70	1	1	2	3	3	-
Hydrogen Peroxide	70	1	1	3	3	3	2	Phenol (See Carbonic Acid)							Sodium Fluoride, 5% Solution	70	2	1	3	1	1	1	
	Boiling	2	1	3	3	3	2	Petroleum Ether							Sodium Hydroxide	70	1	1	2	3	2	1	
Hydrogen Sulphide (Dry)	70	1	1	2	1	1	3	Phosphoric Acid		1	1	2		2	Sodium Hypochlorite, 5% Still	70	2	1	3	3	2	3	
(Wet)	70	2	1	3	3	3	3	1%	70	1	1	3	3	3	Sodium Hyposulfite	70	1	1	3		1		
Hyposulphite Soda (Hypo)		1	1					1%	Boiling	1	1	3	3	3	Sodium Nitrate	Fused	1	1	2	1	1	2	
Ink	70	2	1	3	3	3	1	1%	Boiling	1	1	3	3	3	Sodium Perchlorate, 10%	70	1	1					
Iodine	70	3	3	3	3	3	3	1%-45 lbs. Pressure	284	1	1	3	3	3	Boiling	1	1						
Iodoform	70	1	1	3			2	5% Quiescent, or Agitated	70	1	1	3	3	3	Sodium Phosphate	70	1	1	2	2	2	2	
Kerosene	70	1	1	2	1	1	2	5% Aerated	70	1	1	3	3	3	Sodium Sulphate, 5% Still	70	1	1	3	1	1	1	
Ketchup, Quiescent	70-150	1	1	3			2	10% Quiescent	70	3	1	3	3	3	All Concentrations	70	1	1	3	1	1	1	
Lactic Acid, 1%	70	1	1	3	2	2	2	10% Agitated or Aerated	70	3	2	3	3	3	Sodium Sulphide, Saturated	70	2	1	3	3	3	2	
1%	Boiling	1	1	3	3	3	2	10%-50%	Boiling	1	1	3	3	3	Sodium Sulphite, 5%	70	1	1	3	3	2	2	
5%	70	1	1	3	2	2	2	80%	70	3	3	3	3	10%	150	1	1	3	3	2	2		
5%	150							80%	230	3	3	3	3	3	Sodium Thiosulphate								
10%	Boiling	2	1	3	3	3	2	85%	Boiling	3	3	3	3	3	Saturated Solution	70	1	1	3	3	3	1	
	70	2	1	3	2	2	2	Picric Acid	70	1	1	3	3	3	Acid Fixing Bath (Hypo)	70	1	1	3	3	3	2	
	10%	150						Potassium Bichromate, 25%	70	1	1	3	3	2	25% Solution	70 & Boiling	1	1	3	3	3	2	
	Boiling	3	2	3	3	3	2	25%	Boiling	1	1	3	3	2									
Concentrated	70	2	1	3	2	2	2	Potassium Bromide	70	2	1	3	2	2	Stannic Chloride Solution								
Concentrated	Boiling	3	2	3	3	3	2	Potassium Carbonate 1%	70	1	1	2	2	1	Sp. G. 1.21	70 & Boiling	3	3	3	3	3	3	
Lard	70	1	1				1	Potassium Carbonate	Hot	1	1	2	3	3	1								
Lead (Molten)	750	2	2				3	Potassium Chlorate															
Lead Acetate 5%	Boiling	1	1	3			2	Sat. at 212°	Boiling	1	1	2	3	3	3	Stannous Chloride, Saturated							
Linseed Oil	701	1	1	2	2	2	1	Potassium Chloride								Steam	70	1	1	3	2	1	1
Plus 3% H2SO4	390	2	1	3	3	3	1	1% Quiescent	70	1	1	3	3	2	1	Stearic Acid	70	1	1	3	3	2	2
Magnesium Chloride								1% Agitated or Aerated	70	1	1	3	3	2	1	Starch, Aqueous Solution							
1% Quiescent	70	1	1	3	2	2	1	5% Quiescent	70	1	1	3	3	2	1	Strontium Hydroxide							
1% Quiescent	Hot	3	2	3	2	2	1	5% Quiescent	70	1	1	3	3	2	1	Strontium Nitrate Solution	Hot	1	1	3			
5% Quiescent	70	1	1	3	2	2	1	5% Agitated or Aerated	70	1	1	3	3	2	1	Sulphur, Moist	70	2	1	3	3	3	2
5% Quiescent	Hot	3	2	3	2	2	1	5%	Boiling	1	1	3	3	2	1	Molten	266	1	1	3	3	3	1
Magnesium Oxchloride	70	3	2	3			-	Potassium Chromium Sulfate								Molten	833	3	3	3	3	3	3
Magnesium Sulphate	Hot & Cold	1	1	3	1	1	1	5%	70	1	1	3	3	2	-	Sulphur Chloride (Dry)							
	Hot & Cold	1	1	3	1	1	1	Sp. G. 1.6	Boiling	3	3	3	3	3	-	Sulphur Dioxide Gas (Moist)	70	2	1	3	2	2	3
Malic Acid	Hot & Cold	2	1	3			2	Potassium Cyanide	70	1	1	2	3	3	2	Gas (Dry)	575	1	1	3	1	1	2
	Hot & Cold	2	1	3			2	Potassium Ferricyanide, 5%-25%	Boiling	1	1	3	3	2		Sulphuric Acid							
Mash	Hot	1	1				2	25%	Boiling	1	1	3	3	2		5%-10%	70	3	2	3	3	2	3
Mayonnaise	70	1	1	3			2	Potassium Ferricyanide, 5%	70	1	1	3	3	2		5%-10%	Boiling	3	3	3	3	3	3
Mercury		1	1	1	3	3	3	Potassium Hydroxide, 5%	70	1	1	2	3	2	1	50%	70	3	3	3	3	3	3
Mercuric Chloride Dilute Sol.	70	3	3	3	3	3	3	27%	Boiling	1	1	2	3	2	1	Concentrated	70	1	1	3	3	2	3
Methanol (Methyl Alcohol)		1	1	2	1	1	1	50%	Boiling	2	1	3	3	2	1	Concentrated	Boiling	3	3	3	3	2	3
Milk, Fresh or Sour	70	1	1	3	1	1	2	Potassium Hypochlorite	70	2	2	3	3	3	3	Concentrated	300	3	3	3	3	3	3
	Boiling	1	1	3	1	1	2	Potassium Nitrate								Fuming	70	3	2	3	3	2	3
Mixed Acids								1%-5% Still or Agitated	70	1	1	3	2	2	1	Sulphurous Acid, Saturated	70	3	2	3	3	2	3
53% H2SO4 +45% HNO3	Cold	1	1	3	3	3	3	1%-5% Aerated	70	1	1	3	2	2	1	Saturated - 60 lb. Pressure	250	3	2	3	3	2	3
Molasses		1	1	2	2	1	1	50%	70	1	1	3	2	2	1	Saturated -70-125 lb. Pressure	310	3	2	3	3	2	3
Muriatic Acid	70	3	3	3	3	3	2	50%	Boiling	1	1	3	3	1		150 lbs. Pressure	375	3	2	3	3	2	3
Mustard	70	1	1	3			2	Potassium Oxalate	-						Sulphurous Spray	70	3	3	3	3	3	3	
Naphtha, Crude	70	1	1	2	2	2	1	Potassium Permanganate, 5%	70	1	1	2			Tannic Acid	70	1	1	3	2	1	3	
Naphtha, Pure	70	1	1	2	2	2	1	Potassium Sulphate							Tanning Liquor	150	1	1					
Naphthalene Sulfonic Acid	70	1	1	3			1	1%-5% Still or Agitated	70	1	1	2	2	1	2	Tar	70	1	1	2	1	1	2
Nickel Chloride Solution	70	1	1	3	3	2	2	1%-5% Aerated	70	1	1	2	2	1	2	Tartaric Acid, 10%	70	1	1	3	2	1	2
Nitrating Solutions	Cold & Hot	2	2				3	Potassium Sulphide (Salt)	Hot	1	1	3	2	1	2	10%-50%	Boiling	2	1	3	2	1	2
Nickel Sulphate	Cold & Hot	1	1	3	3	1	1	Pyrogallol Acid							Tin	Molten	3	3	3	3	3	-	
	Cold & Hot	1	1	3	3	1	1	Quinine Bisulphate (Dry)							Trichloroacetic Acid	70	3	3	3	3	2	3	
Niter Cake	Fused	2	1	3			2	Quinine Sulphate (Dry)							Trichlorethylene (Dry)	70	1	1	3	1	1	1	
Nitric Acid															(Moist)								
5%-50%-70%	Boiling	1	1	3	3	3	3	Rosin	Molten	1	1	3	1	1	1	Varnish	70	1	1	2	1	1	1
65%	70	1	1	3	3	3	3	Sea Water	70	1	1	3	2	2	1	Vegetable Juices							
65%	Boiling	2	2	3	3	3	3	Sewage								Vinegar Fumes	2	1	3	3	2	2	
Concentrated	70	1	1	3	3	3	3	Silver Bromide	2	1	3	3	3	-	Vinegar, Still, Agitated or Aerated	70	1	1	3	3	2	3	
Concentrated	Boiling	3	3	3	3	3	3	Silver Chloride	3	3	3	3	3	3	Water	1	1	2	2	1	1		
Fuming Concentrated	70-110	1	1	3	3	3	3	Silver Nitrate	1	1	3	3	3	3	Whiskey	1	1	3	2	1	1		
Fuming Concentrated	Boiling	3	3	3	3	3	3	Soap	70	1	1	2	1	1	Wine - All Phases of Processing and Storing	75	1	1	3	3	3	2	
Nitrous Acid 5%	70	1	1	3	3	3	3	Sodium Acetate (Moist)							Yeast								
Oils, Crude	Cold & Hot	1	1				1	Sodium Bicarbonate							Zinc	Molten	3	3	3	3	3	3	
	Cold & Hot	1	1				1	All Concentrations	70	1	1	3	2	2	1	Zinc Chloride, 5% Still	70	1	1	3	3	3	2
Oils, Vegetable, Mineral	Cold & Hot	1	1				1	5% Still	150	1	1	3	2	2	1	Boiling	2	2	3				

FLEXIBLE METAL PUMP CONNECTORS

WHY USE SENIOR FLEXONICS PUMP CONNECTORS?

The basic function of pump connectors is to provide piping systems with the flexibility needed to absorb noise and vibration, compensate for thermal growth, or permit motion of other piping elements.

Senior Flexonics pump connectors are a perfect match of style, wall thickness and design to minimize the forces and stress within piping systems. These pump connectors are factory engineered, manufactured and tested to effectively minimize the stress on pump and compressor housings and to isolate vibrations transmitted by mechanical equipment. Senior Flexonics can help you comply with noise level requirements by reducing pipe vibration throughout a structure.

FEATURES:

- **ABSORBS THERMAL GROWTH MOTION**
Excellent protection to adjacent piping and equipment.
- **COMPENSATES FOR MISALIGNMENT**
Reduces stresses.
- **CONTROLS VIBRATION**
Normal mechanical equipment vibrations are reduced at the connector.
- **REDUCES NOISE**
High pipe vibration noise is greatly reduced . . . often eliminated.
- **ALL METAL CONSTRUCTION**
Eliminates shelf life problems and allows operation at elevated temperature.

BSN STAINLESS STEEL CONNECTORS

Pipe Size (in)	Model Number	Overall Length (in)	Live Length (in)	Design Data		
				Approx. Wt. (lb.)	Working Pressure	
					@ 70°F.	@ 250°F.
1/2	SA-BSN-008-12	12	8	3/8	1225	1125
3/4	SA-BSN-012-12	12	6 3/4	3/4	1034	921
1	SA-BSN-016-12	12	6 1/2	1	796	732
1 1/4	SA-BSN-020-12	12	6 1/4	1 1/4	600	552
1 1/2	SA-BSN-024-12	12	6 1/4	1 1/2	557	512
2	SA-BSN-032-12	12	5	2	570	524
2 1/2	SA-BSN-040-14	14	6	4	387	356
3	SA-BSN-048-14	14	6 3/4	5	316	291
4	SA-BSN-064-18	18	8 1/2	8 1/2	232	213



NOTE: Also available from 18", 24", 36" and 48" overall in sizes 1/2" – 2"
Optional • SCH 80 fittings • Stainless Steel Fittings
• HEX Male Nipples • Double Braid for higher pressure

BRC BRONZE CONNECTORS

Pipe Size (in)	Model Number	Overall Length (in)	Live Length (in)	Design Data		
				Approx. Wt. (lb.)	Working Pressure	
					@ 70°F.	@ 250°F.
1/2	SA-BRC-008-12	12	8	1/2	706	607
3/4	SA-BRC-012-12	12	7 1/2	1	577	496
1	SA-BRC-016-12	12	6 3/4	1 1/4	470	404
1-1/4	SA-BRC-020-12	12	5 3/4	1 3/4	361	310
1-1/2	SA-BRC-024-12	12	5 3/4	2	329	282
2	SA-BRC-032-12	12	4 3/4	2 1/2	317	272



• For use in copper piping systems

FLEXIBLE METAL PUMP CONNECTORS

DESIGN CHARACTERISTICS

BSN Connectors: Stainless Steel hose and braid, SCH 40 carbon steel NPT nipples.

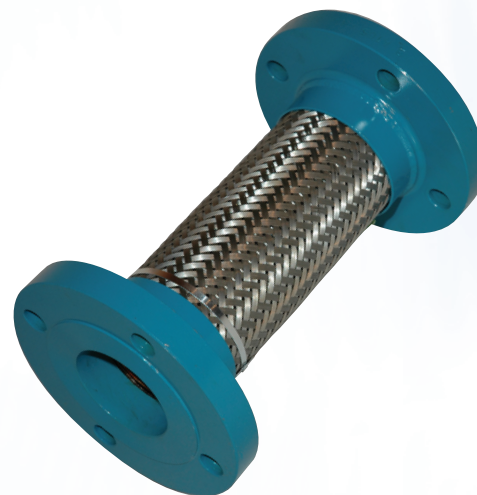
BRC Connectors: Bronze hose and braid, copper female sweat ends. For use in copper piping systems.

BSFS Connectors: Stainless Steel hose and braid, 150lb. raised face forged steel Slip On flanges.

TCS-R Connectors: Multi-Ply Stainless Steel bellows, carbon steel 150lb. flat faced flanges.

BSFS STAINLESS STEEL CONNECTORS

Pipe Size (in)	Model Number	Overall Length (in)	Live Length (in)	Design Data		
				Approx. Wt. (lb.)	Working Pressure	
					@ 70°F.	@ 250°F.
2	SA-BSFS-032-12	12	8	11	285	245
2 1/2	SA-BSFS-040-12	12	7 3/4	15	285	245
3	SA-BSFS-048-12	12	7 5/8	21	285	245
	SA-BSFS-048-18	18	13 5/8	22	285	245
4	SA-BSFS-064-12	12	7 3/8	28	232	204
	SA-BSFS-064-18	18	13 3/8	29	232	204
5	SA-BSFS-080-12	12	6 1/4	33	191	168
	SA-BSFS-080-18	18	12 1/4	36	191	168
6	SA-BSFS-096-12	12	6	41	165	145
	SA-BSFS-096-18	18	12	43	165	145
8	SA-BSFS-128-12	12	5 5/8	63	234	206
	SA-BSFS-128-18	18	11 5/8	66	234	206
10	SA-BSFS-160-18	18	11 1/4	90	230	202
12	SA-BSFS-192-18	18	10 3/4	135	161	142
14	SA-BSFS-224-18	18	10 5/8	190	119	105

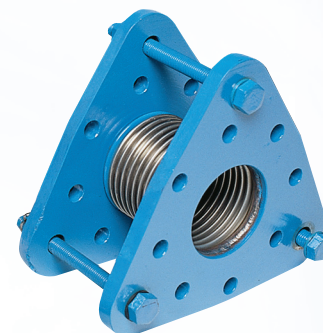


Optional:

- Stainless Steel Flanges
- 300 Lb Flanges

TCS-R STAINLESS STEEL PUMP CONNECTORS

Pipe Size (in)	Style	Overall Length (in)	Live Length (in)	Fitting Length (in)	Design Data			Effective Area (in. ²)
					Approx. Wt. (lb.)	Working Pressure		
						@ 70°F.	@ 250°F.	
2	TCS-R-200	6	4 3/4	5/8	20 1/2	225	210	6.9
2 1/2	TCS-R-250	6	4 3/4	5/8	24	225	210	6.9
3	TCS-R-300	6	4 3/4	5/8	25	225	210	8.8
4	TCS-R-400	6	4 1/2	3/4	35	225	210	15.1
5	TCS-R-500	6	4 1/2	3/4	38	225	210	23.5
6	TCS-R-600	6	4 1/2	3/4	41 1/2	225	210	33.2
8	TCS-R-800	6	4	1	68	225	210	59.3
10	TCS-R-1000	8	6	1	118	225	210	93.5
12	TCS-R-1200	8	6	1	147	225	210	134.0
14	TCS-R-1400	8	5 1/2	1 1/4	205	225	210	171.0



NOTE

- Model TCS-R rated for 1" compression, 3/8" extension, 1/8" -5/16" lateral and pump vibration. (Depending on size)
- Movements shown are non-concurrent
- Larger sizes available upon request.

[C.S.A CERTIFIED ASSEMBLIES]

SERIES "FLT" STAINLESS STEEL METAL HOSE ASSEMBLIES FOR NATURAL GAS AND PROPANE TRANSFER

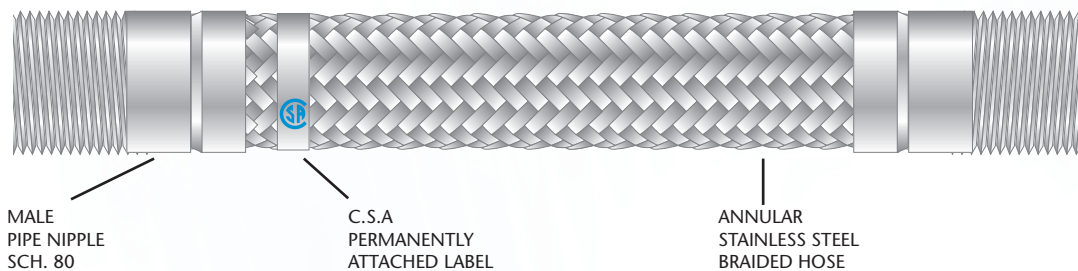
- Sizes 1/4" ID through 6" ID with fittings welded each end
- Single Braided to 2-1/2" ID, Double-Braided from 3" through 6" ID
- CSA labels permanently attached
- Hoses 100% tested per CSA standard for minimum of 1 minute
- Supplied with carbon steel or stainless steel end fittings



PRESSURE RANGE

- Max WP 350 PSIG (* 275 PSIG for Class 150# Flanges) - 1/4" through 2" ID
- Max WP 250 PSIG (All end fitting types) - 2-1/2" and 3" ID
- Max WP 200 PSIG (All end fitting types) - 4" through 6" ID

STANDARD HOSE ASSEMBLY



PART NUMBER DESIGNATION

FLT-025-AA-030.5-350



EXAMPLE: The above part number designation is for a 1/4" size hose with a SCH 80 Steel Male Nipple on each end, 30.5" long, working at an operating pressure of 350 PSIG.

Series	Size	Max. Working Pressure PSIG (Class 300/150)	Overall Length (Inches)	End Fitting Type (Options)
FLT	025 (1/4")	350	Overall Length as Required	A - Sch 80 MNPT
FLT	038 (3/8")	350		B - 3000# FNPT Coupling
FLT	050 (1/2")	350/275*		C - Weld Nipple (Sch 40/80)
FLT	075 (3/4")	350/275*		D - 150# Weld Neck Flange
FLT	100 (1")	350/275*		E - 300# Weld Neck Flange
FLT	125 (1-1/4")	350/275*		F - 150# S/O Flange RF
FLT	150 (1-1/2")	350/275*		G - 300# S/O Flange RF
FLT	200 (2")	350/275*		H - 150# Lap Joint Flange
FLT	250 (2-1/2")	250		I - 300# Lap Joint Flange
FLT	300 (3")	250		J - Sch 80 Hex MNPT
FLT	400 (4")	200		K - 3000# FNPT Union
FLT	500 (5")	200		L - JIC Female Swivel
FLT	600 (6")	200		

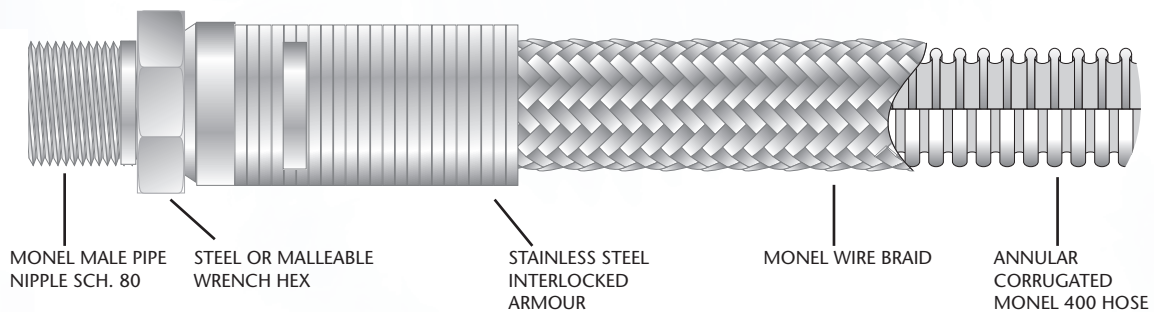
NOTE: Add suffix S04 or S06 to part designation for T304 or T316 fittings. Carbon steel fittings are supplied with standard part designation.

[MONEL® CHLORINE ASSEMBLIES]

SERIES "CMA" MONEL® 400 BRAIDED HOSE ASSEMBLIES FOR CHLORINE TRANSFER

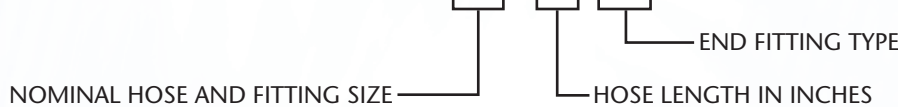
- Sizes 1/2" through 2" ID with fittings welded each end
- Manufactured and tested in accordance with the chlorine institute recommendations per pamphlet 6 - appendix A, latest edition
- Minimum Design Pressure 375 PSIG @ 70 °F.
- Minimum burst pressure 1876 PSIG, Pamphlet 6 - edition 16
- Factory assembled and gas pressure tested to 750 PSIG
- Cleaned and capped prior to shipping
- Permanently labeled with SS Tag
- Standard Monel Hex Male NPT pipe nipple end fittings or optional 300 LB Forged Steel Lap Joint flange on Sch 80 Type "A" Stub End

STANDARD HOSE ASSEMBLY



PART NUMBER DESIGNATION

CMA-050-72-1-1



EXAMPLE: The above part number designation is for a 1/2" size hose with a Sch 80 Monel Hex Male Nipple on each end, 72" long.

Series	Size	End Fitting Type	Overall Length (Inches)
CMA	050 (1/2")	1 - Sch 80 Monel Male NPT with Steel Wrench Hex	Overall Length as Required
CMA	075 (3/4")		
CMA	100 (1")	2 - 300 LB FS Lap Joint Flange	
CMA	125 (1-1/4")		
CMA	150 (1-1/2")		
CMA	200 (2")		

[SPECIALTY ASSEMBLIES]

JACKETED ASSEMBLY

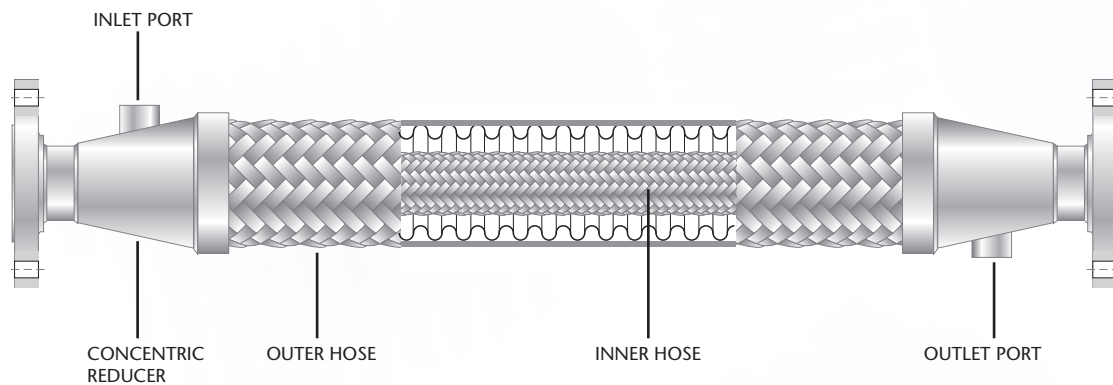
JACKETED ASSEMBLIES ARE USED IN THE FOLLOWING APPLICATIONS:

HEATED TRANSFER HOSE

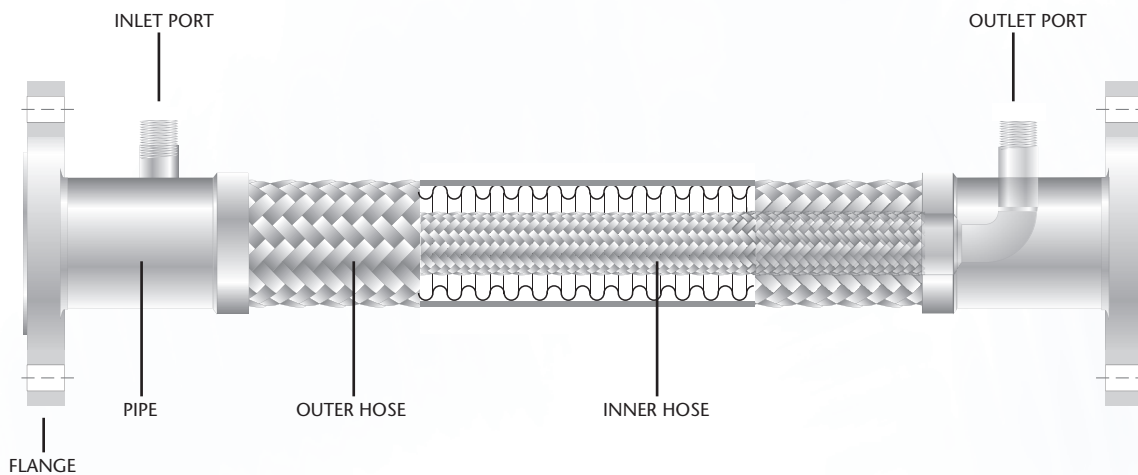
- For media that must be at elevated temperatures in order to flow readily, steam or hot oil is circulated through the outer hose which heats the inner hose conveying the media.

VACUUM INSULATED HOSE

- For vacuum jacketed (VJ) cryogenic transfer lines. A vacuum is drawn between the inner and outer hose to insulate the inner hose.



TRACED ASSEMBLY



Media (steam or hot oil) conveyed through the inner hose in order to increase temperature of the media being conveyed through the outer hose assembly

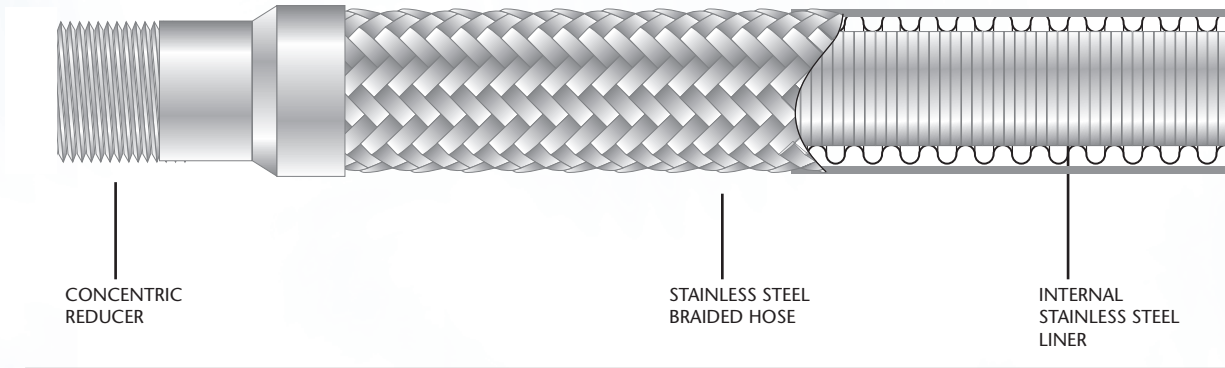
[SPECIALTY ASSEMBLIES]

LINED ASSEMBLY

LINED ASSEMBLIES ARE USED IN THE FOLLOWING APPLICATIONS:

Assemblies can be furnished with a stainless steel interlocked metal hose installed inside the corrugated hose. This liner reduces turbulence when high product velocity is a concern.

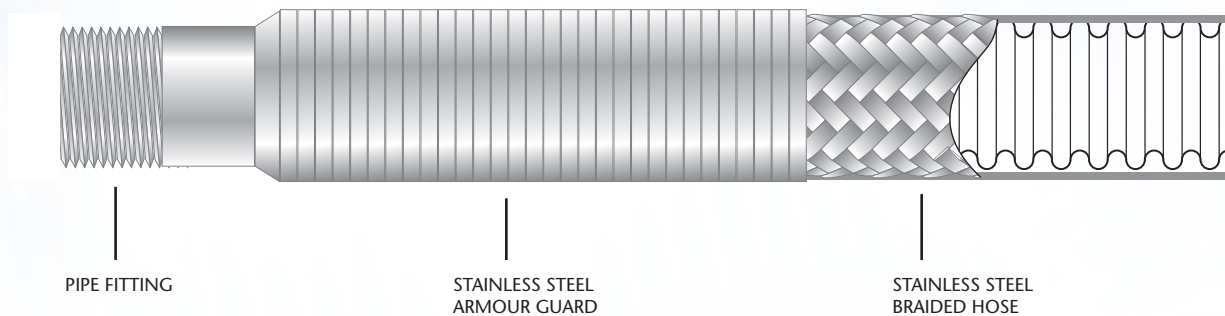
Also used to protect the inside of corrugated hose from abrasive media.



GUARDED ASSEMBLY

GUARDED ASSEMBLIES ARE USED IN THE FOLLOWING APPLICATIONS:

Assemblies can be furnished with a stainless steel interlocked metal hose covering some or all of the outside of the corrugated hose. This guard helps to protect the hose assembly from damage and over bending.



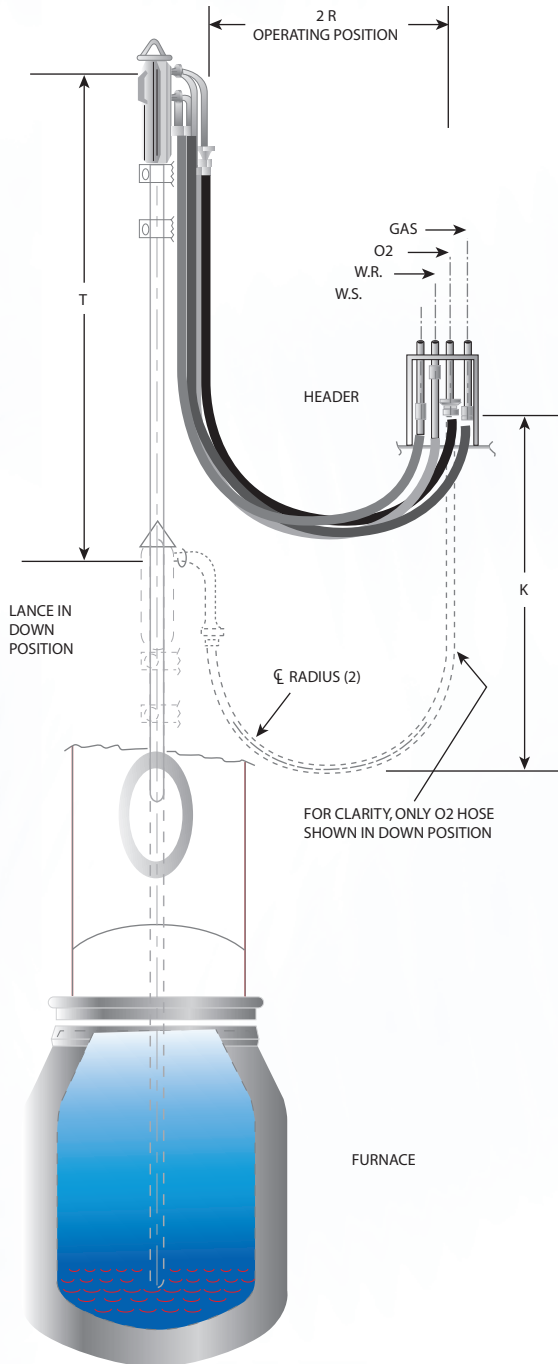
ENGINEERED METAL HOSE ASSEMBLY

OXYGEN LANCE HOSES

Senior Flexonics has for decades manufactured and supplied all metal corrugated stainless steel hoses for handling oxygen. Our lance hoses have provided documented operating performance improvements, and are a practical answer to the many uncertainties of rubber or packed interlocked lance hoses.

Senior Flexonics all metal construction is safe, non-combustible, pressure tight, and wear resistant.

TYPICAL OXYGEN LANCE INSTALLATION



LENGTH DETERMINATION FORMULA

$$L = 4R + T/2$$

$$K = 1.43R + T/2$$

Notation:

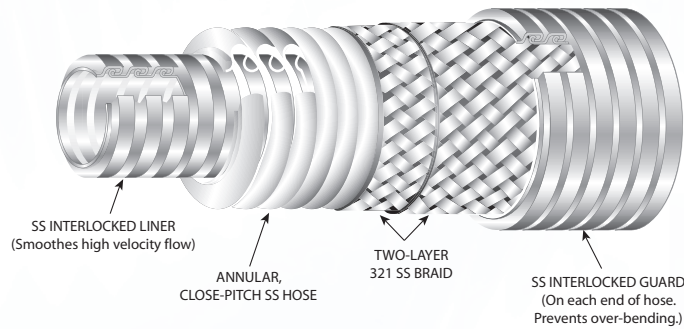
K = Loop Length (Inches)

L = Hose Live Length (Inches)

R = Center Bend Radius (Inches)

T = Total Travel (Inches)

*Over-all Hose Assembly Length = L + Total Fittings Length Both Ends.
Water and or natural gas lines follow the same loop and also available from Senior Flexonics



8 GOOD REASONS TO SPECIFY SENIOR FLEXONICS S.S. LANCE HOSE

- 100% Metal... Withstands temperatures up to 1500°F without deterioration, superior fire, flame, and char-proof characteristics.
- Complete Oxygen Compatibility- assures flow of pure oxygen
- Zero Leakage- saves oxygen, adds extra safety dimension
- More flexible than rubber- longer cycle life.
- Weighs less than rubber- easier handling, easier to install.
- No age hardening, no shelf life limitations.
- Fittings welded to hose- optimum protection against breakage
- Double Braiding, Double Hose Layer- optimum operation, safety and performance.

METAL HOSES FOR ALL STEEL MAKING APPLICATIONS

Senior Flexonics has available, metal hose products for most steel making applications. Our developmental approach is to research a problem area and design a product to solve the specific need. This technique has been used for over 100 years and has enabled us to develop an unsurpassed line of standard steel mill products. Our applications engineering expertise can help you with the design of any new product.

[INTERLOCKED HOSE]

SERIES RT-6 LIGHTWEIGHT INTERLOCK STAINLESS STEEL HOSE

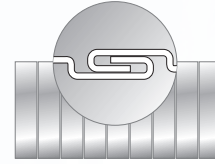
Assemblies can be furnished with a stainless steel interlocked metal hose installed inside the corrugated hose.

Construction: Fully Interlocked. Galvanized Steel, Stainless Steel

Size Range: 1/2" through 12"

Metal Thickness: .010"

Application: Auto heater tubing, ventilation ducting, automotive exhaust, moderate suction lines, dust collecting, refrigeration tubing armour, air blower ducting, wiring conduit, carburetor air intake.



GALVANIZED

STAINLESS STEEL

Nominal Inside Diameter	Nominal Outside Diameter	Max Inside Bend Diameter (in.)	Wt/Ft (lbs.)		Nominal Outside Diameter	Max Inside Bend Diameter (in.)	Wt/Ft (lbs.)	
1/2	0.609	4	0.15					
3/4	0.859	6	0.22					
7/8	1.036	7	0.25					
1	1.147	8	0.29					
1-1/16	1.203	8-1/2	0.30					
1-1/8	1.272	9	0.32					
1-3/16	1.347	9-1/2	0.34					
1-1/4	1.425	10	0.36		1.430	11	0.37	
1-5/16	1.472	10-1/2	0.37		1.480	11-1/2	0.38	
1-3/8	1.550	11	0.39		1.560	12	0.40	
1-7/16	1.597	11-1/2	0.41		1.600	12-1/2	0.45	
1-1/2	1.650	12	0.48		1.680	13-1/2	0.50	
1-5/8	1.775	13	0.53		1.805	14-1/2	0.54	
1-3/4	1.900	14	0.56		1.930	16	0.58	
1-7/8	2.025	15	0.59		2.055	17	0.62	
2	2.150	16	0.62		2.180	18	0.66	
2-1/8	2.275	17	0.66		2.305	19	0.70	
2-1/4	2.400	18	0.69		2.430	20-1/2	0.74	
2-3/8	2.525	19	0.73		2.555	21-1/2	0.77	
2-1/2	2.650	20	0.78		2.680	22-1/2	0.82	
2-5/8	2.775	21	0.81		2.805	24	0.85	
2-3/4	2.900	22	0.84		2.930	25-1/2	0.89	
2-7/8	3.025	23	0.88		3.055	26-1/2	0.93	
3	3.150	24	0.90		3.180	27	0.97	
3-1/4	3.400	26	0.98		3.430	29-1/2	1.05	
3-3/8	3.525	27	1.01		3.555	30-1/2	1.09	
3-1/2	3.655	28	1.06		3.680	31-1/2	1.13	
3-3/4	3.900	30	1.12		3.930	33-3/4	1.21	
4	4.150	32	1.19		4.180	36	1.29	
4-1/2	4.650	36	1.34		4.680	40-1/2	1.45	
5	5.150	40	1.47		5.180	45	1.61	
5-1/2	5.650	44	1.61		5.680	50	1.78	
5-3/4	5.900	46	1.67		5.930	52	1.85	
6	6.150	48	1.75		6.180	54	1.93	
7	7.150	56	2.02		7.180	63	2.25	
8	8.150	64	2.30		8.180	72	2.56	
10	10.150	72	3.50					
12	12.150	95	5.00					

— [INTERLOCKED HOSE] —

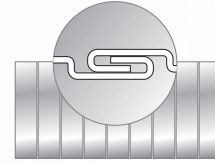
SERIES RT-8 HEAVYWEIGHT INTERLOCK STAINLESS STEEL HOSE

Construction: Fully Interlocked. Galvanized Steel, Stainless Steel

Size Range: 1/2" through 12"

Metal Thickness: .016" to .018"

Application: Truck exhaust, ventilating ducting, tractor exhaust, suction hose, voice tubing, conveying sawdust and grain, engine exhaust, air intake, protective armour or guard.



GALVANIZED

STAINLESS STEEL

Nominal Inside Diameter	Nominal Outside Diameter	Max Inside Bend Diameter (in.)	Wt/Ft (lbs.)		Nominal Outside Diameter	Max Inside Bend Diameter (in.)	Wt/Ft (lbs.)	
1	1.200	9-1/4	0.55		1.240	9-1/4	0.47	
1-1/8	1.325	10-1/4	0.65		1.365	10-1/4	0.52	
1-1/4	1.450	11-1/2	0.72		1.490	11-1/2	0.57	
1-3/8	1.575	12-1/4	0.78		1.165	12-1/4	0.62	
1-1/2	1.700	13-3/4	0.82		1.740	13-3/4	0.68	
1-5/8	1.825	15-3/4	0.89		1.865	15-3/4	0.73	
1-3/4	1.950	16-1/4	0.94		1.990	16-1/4	0.78	
1-7/8	2.075	17-1/4	1.00		2.115	17-1/4	0.84	
2	2.200	18-1/4	1.06		2.240	18-1/4	0.89	
2-1/8	2.325	19-1/4	1.11		2.365	19-1/4	0.94	
2-1/4	2.450	21	1.17		2.490	21	0.99	
2-3/8	2.575	22	1.24		2.615	22	1.04	
2-1/2	2.700	23	1.29		2.740	23	1.10	
2-3/4	2.950	26	1.39		2.990	26	1.21	
2-7/8	3.075	27-1/2	1.47		3.115	27-1/2	1.26	
3	3.200	27-1/2	1.51		3.240	27-1/2	1.31	
3-1/4	3.450	30-1/4	1.62		3.490	30-1/4	1.41	
3-1/2	3.700	32-1/4	1.74		3.740	32-1/4	1.52	
3-3/4	3.950	34-1/2	1.85		3.990	34-1/2	1.63	
4	4.200	37	1.95		4.240	37	1.73	
4-1/2	4.700	41-1/2	2.18		4.740	41-1/2	1.94	
5	5.200	46	2.40		5.240	46	2.16	
5-1/2	5.700	51	2.63		5.740	51	2.38	
6	6.200	56	2.82		6.240	56	2.58	
7	7.200	65	3.29		7.240	65	2.99	
8	8.200	74	3.74		8.240	74	3.43	
10	10.200	82	5.25		10.250	82	5.25	
12	12.200	105	7.50		2.250	105	7.50	

- Specifications are for standard sizes. Information on other sizes and metals is available on request.
- Also available with Hi-Temp cotton or wire packing.
- May be purchased as bulk hose or assembly with end fittings.



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Flexonics

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sales@flexonics.com

