senior

Flexonics

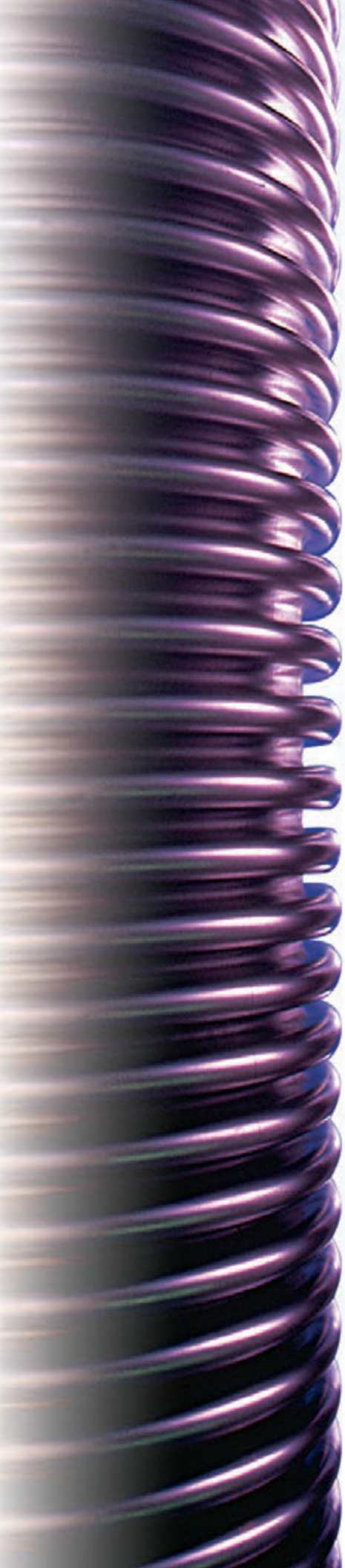
Canada



FLEXIBLE METAL HOSE ASSEMBLIES

NAHAD

THE ASSOCIATION FOR HOSE AND ACCESSORIES DISTRIBUTION



Introduction

With origins dating to 1902, Senior Flexonics Canada 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 Canada's quality assurance system is certified to ISO 9001:2008 + AS9100C

- Canadian Registration (CRN): Senior Flexonics Canada is fully registered with the provincial safety authority across all provinces and territories of Canada.

- 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.

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QUICK REFERENCE HOSE PRESSURE RATING CHART

Maximum Working Pressure (PSIG) @ 70°F

Hose Series	100/160 Annular Stainless		110/170 Annular Stainless		700 Annular Stainless		750 Helical Stainless	802 Annular Stainless	802A Annular Stainless	850 Annular Stainless		RF67-XFC Annular Stainless	200 Annular Bronze		500 Annular Monel		600 Annular Inconel
No. of Braids	1	2	1	2	1	2	2	2	2	3	4	Multi	1	2	1	2	1
Page No.	3-4		5		6-7		8	8	8	9		9	10		11		12
1/4	2360	2832	2500	3375	2562	4099	3625	5187	4406			12000	1035	1656	1701	2416	2116
3/8	1639	1967	1680	2700				3900	3073			9000	685	1096	1272	1953	1501
1/2	1225	1470	1240	1980	2194	3510	1750	3600	3510	3978		8500	706	1130	852	1346	1075
3/4	1034	1241	940	1500	1311	2098		3550	3192	4688		6800	577	923	709	1161	792
1	796	955	630	1000	1069	1710		2500	2375	4200		6250	470	752	692	1133	571
1-1/4	600	720	575	920	1110	1776		2480	2107			5500	361	577	611	991	531
1-1/2	557	668	500	800	868	1388		2200	1250	2750		5200	329	526	419	769	472
2	570	684	532	850	810	1296		1675	1346	1952		4350	317	507	313	616	516
2-1//2	387	619	500	700	578	925							272	435			387
3	316	506	400	600	540	864				1250		3000	201	338	300	500	316
4	232	371	300	444	333	533					1237		142	227	263	438	232
5	191	306			350	385											
6	165	264			266	425											
8	234	374			234	450											
10	230	367			250	375											
12	161	257			170	320											
14	150	170															
16	110																
18	85																
20	55																
22	50																
24	45																

HOSE DIAMETER

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
Size/Hose & Fittings	• Size of existing piping and mating fittings. • Flow requirements.	• "Hose Technical Data" pages
Temperature	• Maximum service temperature of the application. • Maximum allowable service temperature rating for hose and fitting alloys. • Reduced operating pressures at elevated temperatures.	• "Metal Hose Selection Factors" pages for maximum service temperature for alLoys and conversion factors
Alloy/hose & Fittings	• Corrosion resistance of hose and fittings alloys for the media conveyed. • Maximum service temperature and pressure for the alloy selected.	• "Corrosion Chart" pages • "Metal Hose Selection Factors" pages for maximum service temperature for alloys and conversion factors
Motion & Application	• 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.	• "Corrosion Chart" pages • "Metal Hose Selection Factors" pages for motion applications
Pressure	• Burst, test and operating pressure. • Constant, pulsating or shock pressures. Operating pressure at elevated temperature. • Braid selection to maximize pressure/minimize cost.	• "Metal Hose Selection Factors" pages for pressure definitions • "Metal Hose Selection Factors" pages for maximum service temperature and conversion factors • "Hose Technical Data" pages
End Fitting Attachment	• Methods of attachment applicable to type and alloy of hose and fittings. • Maximum temperature for alloys and methods of attachment.	• "Metal Hose Selection Factors" pages for maximum service temperature of alloys page • "Common Metal Hose Fitting" pages
Developed Assembly Length	• Minimum hose live length for type of motion. • Hose assembly length with fittings (overall length).	• "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 24"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238 °F to 1250 °F

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

Nominal Hose Size (in)	Hose Series T321/T316L	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	100/160	0	0.38	72	-			0.05
1/4	101/161	1	0.43	2360	9440	3.15	1.10	0.10
	102/162	2	0.48	2832	11328			0.15
	100/160	0	0.56	72	-			0.07
3/8	101/161	1	0.62	1639	6556	5.08	1.52	0.16
	102/162	2	0.68	1967	7868			0.25
	100/160	0	0.66	72	-			0.08
1/2	101/161	1	0.72	1225	4900	5.47	1.75	0.18
	102/162	2	0.78	1470	5880			0.28
	100/160	0	1.05	43	-			0.19
3/4	101/161	1	1.12	1034	4136	6.58	2.65	0.39
	102/162	2	1.19	1241	4964			0.59
	100/160	0	1.27	43	-			0.24
1	101/161	1	1.34	796	3184	7.50	3.33	0.48
	102/162	2	1.41	955	3820			0.68
	100/160	0	1.62	43	-			0.33
1 1/4	101/161	1	1.69	600	2400	10.2	4.1	0.66
	102/162	2	1.76	720	2880			0.99
	100/160	0	1.95	28	-			0.51
1 1/2	101/161	1	2.03	557	2228	11.75	5.08	0.91
	102/162	2	2.11	668	2672			1.31
	100/160	0	2.38	28	-			0.64
2	101/161	1	2.48	570	2280	12.55	6.27	1.27
	102/162	2	2.58	684	2736			1.90
	100/160	0	3.23	12	-			1.16
2 1/2	101/161	1	3.33	387	1548	20.00	8.00	1.86
	102/162	2	3.43	619	2477			2.56
	100/160	0	3.78	10	-			1.21
3	101/161	1	3.88	316	1264	22.00	9.00	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 24"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238°F to 1250 °F

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

Nominal Hose Size (in)	Hose Series T321/T316L	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	100/160	0	4.85	8	-			1.69
4	101/161	1	4.98	232	927	27.00	13.00	2.68
	102/162	2	5.10	371	1485			3.68
	100/160	0	5.90	6	-			2.50
5	101/161	1	6.03	191	764	31.00	18.00	3.75
	102/162	2	6.15	306	1222			5.00
	100/160	0	6.87	5	-			3.47
6	101/161	1	7.10	165	660	36.00	19.00	4.75
	102/162	2	7.33	264	1056			6.04
	100/160	0	9.09	6	-			5.56
8	101/161	1	9.19	234	934	40.00	20.00	9.44
	102/162	2	9.28	374	1495			13.36
	100/160	0	11.18	5	-			6.80
10	101/161	1	11.32	230	918	50.00	25.00	12.90
	102/162	2	11.45	367	1469			19.00
	100/160	0	13.23	3	-			9.02
12	101/161	1	13.37	161	643	60.00	30.00	14.83
	102/162	2	13.50	257	1029			20.64
	100/160	0	14.70	7.5	-			11.50
14	101/161	1	15.10	150	600	72.50	38.50	17.50
	102/162	2	15.50	170	660			23.50
	100/160	0	16.70	5.5	-			13.50
16	101/161	1	17.10	110	440	81.00	44.00	19.40
	102/162	2		call factory				
	100/160	0	18.70	4.3	-			15.20
18	101/161	1	19.10	85	340	90.00	49.50	21.20
	102/162	2		call factory				
	100/160	0	20.70	3.3	-			16.90
20	101/161	1	21.10	55	220	99.00	55.00	23.10
	102/162	2		call factory				
	100/160	0	22.70	2.5	-			18.70
22	101/161	1	23.10	50	200	107.50	60.50	25.20
	102/162	2		call factory				
	100/160	0	24.70	2.3	-			20.40
24	101/161	1	25.10	45	180	114.50	66.00	27.30
	102/162	2		call factory				

STANDARD PRESSURE HOSE
MID-WEIGHT CONSTRUCTION

SERIES 110/170 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 3"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238 °F to 1250 °F

- Series 110 & 170 Unbraided
- Series 111 & 171 Single Braided
- Series 112 & 172 Double Braided

Nominal Hose Size (in)	Hose Series T321/T316L	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	110/170	0	0.40	200	-			0.08
1/4	111/171	1	0.48	2500	10000	5.00	1.00	0.17
	112/172	2	0.56	3375	13500			0.26
	110/170	0	0.63	100	-			0.13
3/8	111/171	1	0.70	1680	6720	5.50	1.25	0.27
	112/172	2	0.81	2700	10742			0.41
	110/170	0	0.84	80	-			0.23
1/2	111/171	1	0.91	1240	4960	6.00	1.50	0.39
	112/172	2	0.98	1980	7920			0.55
	110/170	0	1.21	70	-			0.39
3/4	111/171	1	1.28	940	3760	8.00	2.25	0.62
	112/172	2	1.35	1500	6000			0.85
	110/170	0	1.51	40	-			0.53
1	111/171	1	1.58	630	2520	9.00	2.75	0.79
	112/172	2	1.65	1000	4000			1.05
	110/170	0	1.85	25	-			0.76
1 1/4	111/171	1	1.92	575	2300	10.50	3.50	1.12
	112/172	2	2.02	920	3680			1.48
	110/170	0	2.19	20	-			0.84
1 1/2	111/171	1	2.28	500	2000	12.00	4.00	1.29
	112/172	2	2.37	800	3200			1.74
	110/170	0	2.61	15	-			0.90
2	111/171	1	2.73	532	2128	15.00	5.00	1.61
	112/172	2	2.85	850	3400			2.33
	110/170	0	3.23	12	-			1.16
2 1/2	111/171	1	3.33	500	2000	20.00	8.00	1.86
	112/172	2	3.43	700	2800			2.56
	110/170	0	3.78	10	-			1.21
3	111/171	1	3.88	400	1600	22.00	9.00	2.00
	112/172	2	3.98	600	2400			2.80
	110/170	0	4.85	8	-			1.69
4	111/171	1	4.98	300	1200	27.00	13.00	2.68
	112/172	2	5.08	444	1776			3.68

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: -238°F to 1500 °F

- Series 700 Unbraided
- Series 701 Single Braided
- Series 702 Double Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	700	0	0.50	180	-			0.09
1/4	701	1	0.57	2562	10250	5.00	2.50	0.17
	702	2	0.64	4099	16400			0.26
	700	0	0.82	80	-			0.39
1/2	701	1	0.92	2194	8777	8.00	4.00	0.63
	702	2	1.02	3510	14040			0.87
	700	0	1.21	70	-			0.48
3/4	701	1	1.31	1311	5244	8.00	4.00	0.79
	702	2	1.41	2098	8392			1.10
	700	0	1.50	40	-			0.79
1	701	1	1.60	1069	4276	9.00	4.50	1.20
	702	2	1.70	1710	6840			1.61
	700	0	1.85	33	-			1.02
1 1/4	701	1	1.97	1110	4443	10.00	5.00	1.66
	702	2	2.10	1776	7040			2.30
	700	0	2.17	20	-			1.36
1 1/2	701	1	2.30	868	3472	10.00	5.00	2.11
	702	2	2.43	1388	5552			2.86
	700	0	2.51	15	-			1.60
2	701	1	2.64	810	3240	11.50	5.75	2.56
	702	2	2.76	1296	5184			3.52
	700	0	3.23	10	-			2.00
2 1/2	701	1	3.36	578	2312	24.00	12.00	3.12
	702	2	3.49	925	3700			3.30
	700	0	3.78	10	-			2.97
3	701	1	3.91	540	2160	28.00	14.00	4.42
	702	2	4.03	864	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: -238°F to 1500 °F

- Series 700 Unbraided
- Series 701 Single Braided
- Series 702 Double Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	700	0	4.81	8	-			3.10
4	701	1	4.93	333	1332	40.00	20.00	4.55
	702	2	5.05	533	2132			6.00
	700	0	5.93	4	-			3.20
5	701	1	6.03	350	1400	28.00	11.00	4.50
	702	2	6.13	385	1540			5.80
	700	0	6.87	5	-			3.85
6	701	1	7.10	266	1062	48.00	24.00	6.45
	702	2	7.33	425	1700			9.05
	700	0	9.09	6	-			6.00
8	701	1	9.19	234	934	63.00	32.00	10.00
	702	2	9.29	450	1800			18.00
	700	0	11.19	2.2	-			8.29
10	701	1	11.44	250	1000	68.00	34.00	12.66
	702	2	11.69	375	1500			17.03
	700	0	13.25	1.8	-			9.94
12	701	1	13.45	170	681	83.00	42.00	16.68
	702	2	13.65	320	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: -238 °F to 1500 °F

- Series 752 Double Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
1/4	752	2	0.54	3625	14500	6.0	4.00	0.26
1/2	752	2	0.93	1750	7000	5.0	3.00	0.55

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: -238 °F to 1500 °F

- Series 802 Double Braided Sizes 1-1/4", 1-1/2" and 2" are not CRN registersd. Consult factory for more information.

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
1/4	802	2	0.63	5187	20748	8.25	2.00	0.39
3/8	802	2	0.81	3900	15600	9.00	2.50	0.53
1/2	802	2	1.05	3600	14400	10.50	3.00	0.75
3/4	802	2	1.43	3550	14200	12.75	4.00	1.63
1	802	2	1.75	2500	10000	15.00	5.25	2.07
1-1/4	802	2	2.08	2480	9920	17.25	6.50	2.93
1-1/2	802	2	2.41	2200	8800	19.50	8.00	3.62
2	802	2	3.05	1675	6700	24.00	11.50	4.63

- Series 802A Double Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
1/4	802A	2	0.64	4406	17627	12.00	6.00	0.36
3/8	802A	2	0.83	3073	12291	12.00	6.00	0.55
1/2	802A	2	1.02	3510	14040	14.00	7.00	0.76
3/4	802A	2	1.46	3192	12769	15.00	7.50	1.19
1	802A	2	1.77	2375	9500	16.00	8.00	1.94
1-1/4	802A	2	2.09	2107	8431	18.00	9.00	2.48
1-1/2	802A	2	2.43	1250	5000	19.00	9.50	3.30
2	802A	2	2.77	1346	5388	24.00	12.00	3.91

ULTRA HIGH PRESSURE HOSE

SERIES 850 STAINLESS STEEL HOSE

Construction: Annular Corrugated T-316L Stainless Steel Hose, T-304 Stainless Steel Triple/Quad Braided
Size Range: 1/2" through 4"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238 °F to 1500 °F

- Series 853 Triple Braided
- Series 854 Quad Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
1/2	853	3	1.20	3978	15911	14.00	7.00	1.10
3/4	853	3	1.65	4688	18754	15.00	7.50	2.00
1	853	3	1.92	4200	16800	16.00	8.00	2.70
1 1/2	853	3	2.55	2750	11000	24.00	12.00	4.15
2	853	3	3.07	1952	7807	40.00	20.00	5.00
3	853	3	4.22	1250	5000	84.00	32.00	8.70
4	854	4	5.27	1237	4947	112.00	52.00	10.48

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 3"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238 °F to 1500 °F

- Series RF67-XFC Multi Braided

Not CRN registered. Consult factory for more information.

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
1/4	RF67-XFC	3	0.68	12000	48000	11.50	2.50	0.62
3/8	RF67-XFC	3	0.90	9000	36000	15.00	3.75	0.97
1/2	RF67-XFC	2	1.04	8500	34000	16.50	4.50	1.34
3/4	RF67-XFC	3	1.52	6800	27200	30.50	6.50	2.56
1	RF67-XFC	3	1.93	6250	25000	35.00	9.00	3.69
1 1/4	RF67-XFC	3	2.15	5500	22000	38.00	10.00	5.08
1 1/2	RF67-XFC	4	2.54	5200	20800	41.00	12.00	6.63
2	RF67-XFC	4	3.04	4350	17400	48.00	15.00	8.07
3	RF67-XFC	5	4.06	3000	12000	65.00	25.00	14.81

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: -238 °F to 450 °F

• Series 200 Unbraided • Series 201 Single Braided • Series 202 Double Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	200	0	0.49	100	-			0.13
1/4	201	1	0.57	1035	4142	5.50	1.00	0.23
	202	2	0.65	1656	6627			0.33
	200	0	0.67	40	-			0.25
3/8	201	1	0.75	685	2738	6.00	1.25	0.36
	202	2	0.83	1096	4381			0.47
	200	0	0.82	40	-			0.38
1/2	201	1	0.90	706	2825	7.00	1.50	0.57
	202	2	0.98	1130	4520			0.76
	200	0	1.21	30	-			0.50
3/4	201	1	1.31	577	2307	8.00	2.25	0.83
	202	2	1.41	923	3691			1.16
	200	0	1.51	20	-			0.68
1	201	1	1.61	470	1881	10.00	3.00	1.12
	202	2	1.71	752	3009			1.56
	200	0	1.85	15	—			0.80
1 1/4	201	1	1.95	361	1443	12.00	3.50	1.31
	202	2	2.05	577	2309			1.82
	200	0	2.18	10	-			1.03
1 1/2	201	1	2.31	329	1317	13.50	4.00	1.73
	202	2	2.43	526	2107			2.43
	200	0	2.50	8	-			1.81
2	201	1	2.63	317	1267	17.00	5.00	2.73
	202	2	2.75	507	2027			3.65
	200	0	3.18	8	-			1.39
2 1/2	201	1	3.31	272	1090	22.00	8.00	2.66
	202	2	3.43	435	1744			3.93
	200	0	3.65	10	-			1.44
3	201	1	3.78	201	805	24.00	12.00	2.84
	202	2	3.91	338	1352			4.11
	200	0	4.81	8	-			3.45
4	201	1	4.94	142	568	26.00	14.00	5.03
	202	2	5.06	227	909			6.61

4" is not CRN registered. Consult factory for more information.

SERIES 500 MONEL® HOSE

Construction: Annular Standard Pitch Monel® 400 Hose and Braid
Size Range: 1/4" through 4"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238 °F to 800 °F

- Series 500 Unbraided
- Series 501 Single Braided
- Series 502 Double Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
	500	0	0.46	130	-			0.13
1/4	501	1	0.52	1701	6805	6.00	2.00	0.21
	502	2	0.57	2416	9664			0.29
	500	0	0.61	90	-			0.16
3/8	501	1	0.67	1272	5087	6.00	2.00	0.27
	502	2	0.73	1953	7812			0.40
	500	0	0.76	65	-			0.19
1/2	501	1	0.81	852	3406	7.00	2.50	0.31
	502	2	0.87	1346	5385			0.43
	500	0	1.05	50	-			0.28
3/4	501	1	1.10	709	2835	8.00	2.50	0.43
	502	2	1.16	1161	4643			0.60
	500	0	1.34	35	-			0.50
1	501	1	1.42	692	2769	9.00	3.00	0.77
	502	2	1.50	1133	4533			1.08
	500	0	1.75	20	-			0.64
1 1/4	501	1	1.86	611	2445	10.00	4.00	0.98
	502	2	1.94	991	3962			1.36
	500	0	2.09	15	-			0.78
1 1/2	501	1	2.16	419	1677	10.00	4.00	1.18
	502	2	2.24	769	3075			1.62
	500	0	2.54	10	-			0.97
2	501	1	2.63	313	1250	11.00	6.00	1.45
	502	2	2.73	616	2463			1.99
	500	0	3.85	7	-			1.77
3	501	1	4.01	300	1200	20.00	10.00	2.67
	502	2	4.13	500	2000			3.67
	500	0	4.79	4	-			2.08
4	501	1	4.99	263	1050	24.00	12.00	3.54
	502	2	5.19	438	1750			5.17

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

Sizes over 2" are not CRN registered. Consult factory for more information.

Senior Flexonics Series 500 Monel® hose and braid is specifically designed for chlorine transfer as well as hydrochloric and hydroflouric 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.

SERIES 600 INCONEL® HOSE

Construction: Annular Corrugated Inconel® 625 Hose and Series 300 Braid (Inconel Braid also available)
Size Range: 1/4" through 4"
Pressure Ratings: Full vacuum to pressures indicated below.
Temperature Range: -238 °F to 1500 °F with Series 300 Braid / 1800 °F with Inconel Braid

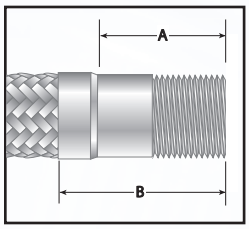
- Series 600 Unbraided
- Series 601 Single Braided

Nominal Hose Size (in)	Hose Series	Braid Layers	Nominal Outside Dia. (in)	Pressure @ 70°F (PSIG)		Bend Radius		Weight Per Foot (lb)
				Maximum Working	Nominal Burst	Dynamic (in)	Static (in)	
1/4	600	0	0.48	180	-	5.00	1.00	0.09
	601	1	0.57	2116	8464			0.17
3/8	600	0	0.63	100	-	5.50	1.25	0.13
	601	1	0.70	1501	6004			0.27
1/2	600	0	0.82	80	-	6.00	1.50	0.23
	601	1	0.89	1075	4301			0.39
3/4	600	0	1.21	70	-	8.00	2.25	0.39
	601	1	1.28	792	3168			0.62
1	600	0	1.51	40	-	9.00	2.75	0.53
	601	1	1.58	571	2285			0.79
1 1/4	600	0	1.85	25	-	10.50	3.50	0.76
	601	1	1.93	531	2125			1.07
1 1/2	600	0	2.19	20	-	12.00	4.00	0.84
	601	1	2.28	472	1887			1.29
2	600	0	2.60	15	-	15.00	5.00	0.90
	601	1	2.72	516	2064			1.61
2 1/2	600	0	3.23	12	-	20.00	8.00	1.16
	601	1	3.33	387	1548			2.01
3	600	0	3.78	10	-	22.00	9.00	1.21
	601	1	3.88	316	1264			2.16
4	600	0	4.85	8	-	27.00	13.00	1.69
	601	1	4.98	232	927			2.68

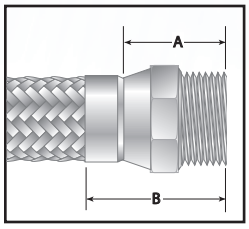
* Other sizes are available upon request. Please consult factory.

Senior Flexonics Series 600 Inconel® 625 annular corrugated hose with available Inconel® 625 braid or standard Series 300 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.

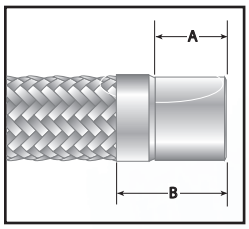
COMMON METAL HOSE FITTINGS



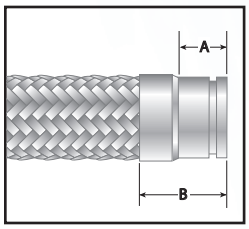
DESCRIPTION	MALE NPT NIPPLE										
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
DIMENSION A	1 1/2	1 1/2	1 1/2	2	2	2	2	2 1/2	3	3	4
DIMENSION B	CONSULT FACTORY										
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL, MONEL, SCH 40, 80										



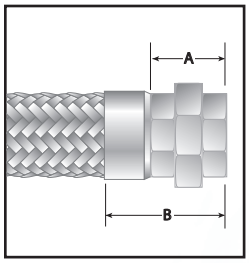
DESCRIPTION	HEX MALE NPT NIPPLE 1/4 TO 1-1/2 WITH INTEGRAL HEX										
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
DIMENSION A	1 3/16	1 1/4	1 7/16	1 1/2	1 11/16	1 15/16	2 1/8	2 1/2	3	3	4
DIMENSION B	CONSULT FACTORY										
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL										



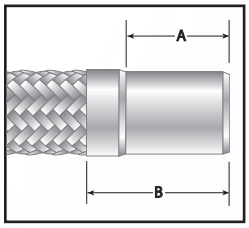
DESCRIPTION	CLASS 150 LB FEMALE NPT HALF COUPLING									
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
DIMENSION A	9/16	9/16	3/4	13/16	7/8	1	1	1 1/4	1 7/16	1 9/16	1 13/16
DIMENSION B	CONSULT FACTORY										
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL, * Also available in class 3000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



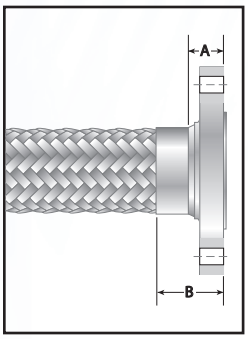
DESCRIPTION	CLASS 150 LB FEMALE NPT UNION										
HOSE I.D. (INS)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
DIMENSION A	1 1/2	1 5/8	2	2	2 3/8	2 5/8	3	3 1/8	3 3/4	4 1/8	4
DIMENSION B	CONSULT FACTORY										
MATERIAL	MALLEABLE IRON, STEEL, T-304 & T-316 S.S. * Also available in class 3000 LB Cast fittings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



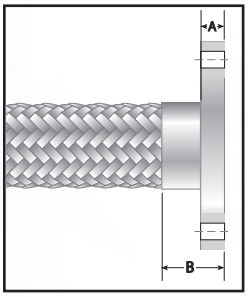
DESCRIPTION	WELDING NIPPLE 37-1/2˚ BEVEL													
HOSE I.D. (INS)	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14
DIMENSION A	2	2	2	2	2	3	3	3	3	4	4	4	4	4
DIMENSION B	CONSULT FACTORY													
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL, SCH 40, 80 & 160													

"A" Dimension may vary with material type

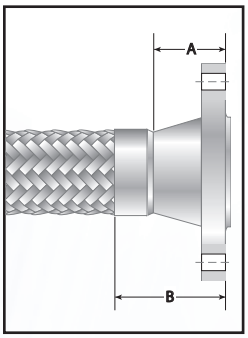
COMMON METAL HOSE FITTINGS



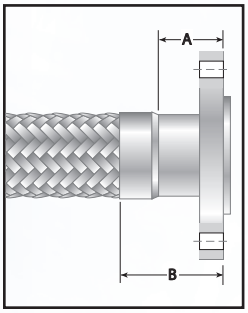
DESCRIPTION	CLASS 150 LB RAISED FACE SLIP ON FLANGE										
HOSE I.D. (INS)	2	2 1/2	3	4	5	6	8	10	12	14	16
DIMENSION A	1	1 1/8	1 3/16	1 5/16	1 7/16	1 9/16	1 3/4	1 15/16	2 3/16	2 1/4	2 1/2
DIMENSION B	CONSULT FACTORY										
DESCRIPTION	**CLASS 300 LB RAISED FACE SLIP ON FLANGE**										
DIMENSION 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										



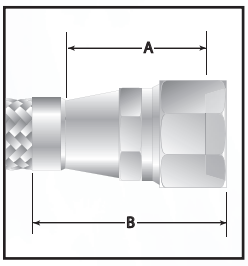
DESCRIPTION	CLASS 150 LB FLAT FACE PLATE FLANGE										
HOSE I.D. (INS)	2	2 1/2	3	4	5	6	8	10	12	14	16
DIMENSION A	5/8	5/8	5/8	5/8	3/4	3/4	1	1	1	1 1/4	1 1/4
DIMENSION B	CONSULT FACTORY										
MATERIAL	STEEL, T-304 & T-316 STAINLESS STEEL * Also available in class 300LB										



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 UNBRAIDE 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 neccessary 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.

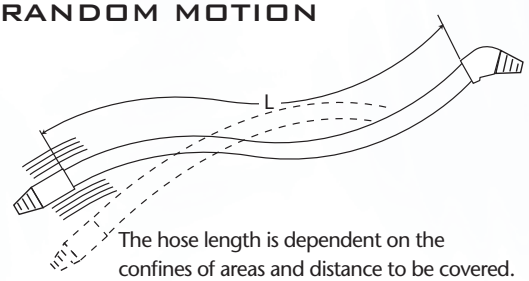
2. Axial Motion: This type of motion occurs when one end of a hose assembly is deflected along its longitudinal axis. Axial motion is applicable to annular corrugated, unbraided flexible hose only. Neither helical hose nor braided hose should be used in axial motion applications.

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.

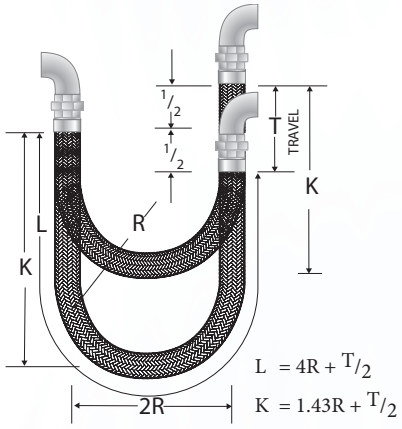
RANDOM MOTION



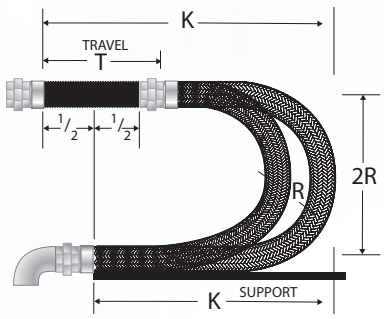
The hose length is dependent on the confines of areas and distance to be covered.

CLASS A TRAVELING LOOPS

FOR MAXIMUM VERTICAL TRAVEL

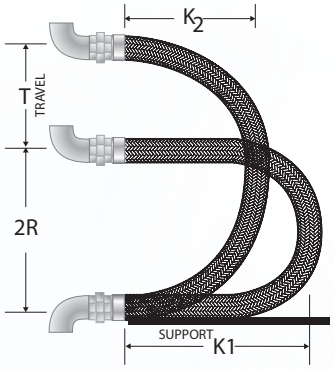


FOR MAXIMUM HORIZONTAL TRAVEL

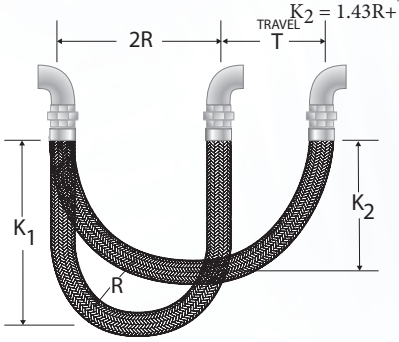


CLASS B TRAVELING LOOPS

FOR SHORT HORIZONTAL TRAVEL



L = 4R + 1.57T
K1 = 1.43R + .785T
K2 = 1.43R+T/2



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 notion 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.

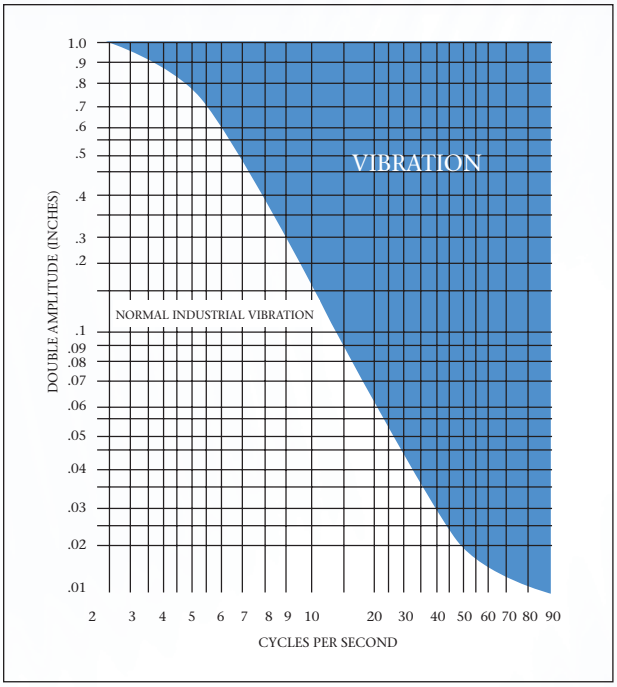
Caution: Avoid hose resonance. If resonance is anticipated, consult Senior Flexonics Engineering.

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 corrugtion 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

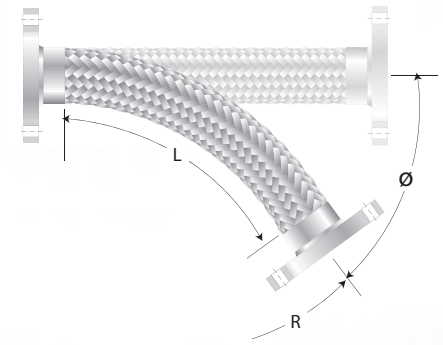
Angular movement is defined as the bending of the hose so that the ends are no longer parallel. Amount of movement is measured in degrees from centerline of the hose if were installed straight.

MINIMUM LIVE LENGTH OF HOSE FOR ANGULAR OFFSET MOTION

Degree of Angular Movement = Ø

* Centerline Bend Radius (in.) = R	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

ANGULAR MOTION



Formula: $L = \frac{\prod R Ø}{180}$

L = Live Length (inches)
R = Centerline bend radius (inches)
Ø = Angle of Bend (degrees)
$\prod$ = 3.1416

METAL HOSE SELECTION FACTORS

LATERAL OFFSET MOTION

MINIMUM LIVE LENGTH OF HOSE FOR INTERMITTENT OFFSET MOTION

Maximum Distance from Centerline

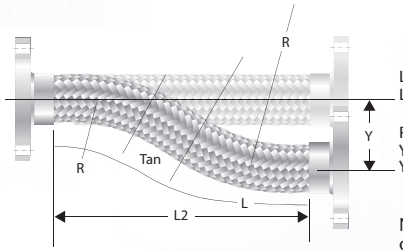
* Centerline Bend Radius (in.) = R	1/8"	1/4"	3/8"	1/2	3/4"	1"	1 1/2"	2"	3"	4"	5"	6"	8"	10"
2	1 1/4	1 3/4	2 1/4	2 1/2	3 1/4	3 3/4	4 1/4	5 1/4	6 3/4	8	9 1/4	10 1/2	11 3/4	15
4	1 3/4	2 1/2	3	3 1/2	4 1/2	5	6 1/4	7 1/4	9	10 3/4	12	13 1/2	16	18 1/2
6	2 1/4	3 1/4	3 3/4	4 1/4	5 1/2	6 1/4	7 1/2	8 3/4	10 3/4	12 3/4	14 3/4	16	19	21 1/2
8	2 1/4	3 1/2	4 1/4	5	6	7	8 3/4	10	12 1/2	14 1/2	16 1/4	18	21 1/4	24 1/4
10	2 3/4	4	4 3/4	5 1/2	6 3/4	8	9 3/4	11 1/4	13 3/4	16	18	20	23 1/2	26 1/2
12	3	4 1/4	5 1/4	6	7 1/2	8 1/2	10 1/2	12 1/4	15	17 1/2	19 1/2	21 1/2	25 1/2	28 3/4
14	3 1/4	4 3/4	5 3/4	6 1/2	8	9 1/4	11 1/4	13 1/4	16 1/4	18 3/4	21	23 1/2	27 1/4	30 3/4
16	3 1/2	5	6	7	8 1/2	10	12 1/4	14	17 1/4	20	22 1/2	25	29	32 3/4
18	3 3/4	5 1/4	6 1/2	7 1/2	9	10 1/2	13	15	18 1/4	21 1/4	24	26	30 1/2	34
20	4	5 1/2	6 3/4	7 3/4	9 1/2	11	13 1/2	15 3/4	19 1/4	22 1/2	25	27 1/2	32 1/4	36 1/4
25	4 1/2	6 1/4	7 1/2	8 3/4	10 3/4	12 1/4	15	17 1/2	21 1/2	25	28	30 1/2	35 3/4	40
30	4 3/4	6 3/4	8 1/4	9 1/2	11 3/4	13 1/2	16 1/2	19	23 1/2	27 1/4	30 1/2	33 1/2	39	43 3/4
35	5 1/4	7 1/4	9	10 1/4	12 1/2	14 1/2	18	20 3/4	26 1/4	29 1/2	32 3/4	36	42	47
40	5 1/2	7 3/4	9 1/2	11	13 1/2	15 1/2	19	22	27	31 1/4	35	38 1/2	44 3/4	50
45	6	8 1/4	10	11 3/4	14 1/4	16 1/2	20 3/4	23 1/2	28 1/2	33 1/4	37	41	47 1/2	53
50	6 1/4	8 3/4	10 3/4	12 1/4	15	17 1/2	21 1/4	24 1/2	30	35	39	43	50	56
60	6 3/4	9 1/2	11 3/4	13 1/2	16 1/2	19	23 1/4	27	33	38 1/4	43	47	54 1/4	61
70	7 1/4	10 1/4	12 3/4	14 3/4	17 3/4	20 1/2	25 1/4	29	35 1/2	41 1/2	46	51	58 3/4	65 3/4
80	7 3/4	11	13 1/2	15 1/2	19	22	27	31	38	44	49 1/2	54	62 3/4	70
90	8 1/4	11 3/4	14 1/4	16 1/2	20 1/4	23 1/2	28 1/2	33	40 1/2	46 3/4	52	57 1/4	66 1/4	74 1/4
100	8 3/4	12 1/4	15	17 1/2	21 1/4	24 1/2	30	35	42 1/2	49 1/4	55	60 1/2	69 3/4	78 1/4

* Centerline Bend Radius (in.) = R

IMPORTANT NOTE:

The values shown are minimum live lengths for most centerline bend radii and total offset travel combinations. If the exact radius or travel are not shown on the chart, then the next larger value may be used or use the lateral offset formula. The values as shown in the shaded portion are applicable to static bends only. The offset motion should never be greater that 1/4 (25%) of the centerline bend radius.

OFFSET MOTION



L = Hose live length (inches)
L2 = Projected linear length at offset (inches)
R = Centerline bend radius (inches)
Y = Centerline offset, Motion (inches)
Y_M = Centerline maximum offset for a given L and R (inches)

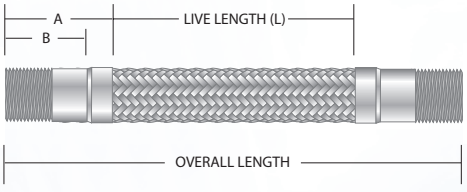
Note: Where Offset Motion "y" occurs both sides of Centerline the Hose Live Length should be based on Total Travel or 2 times Y

$$L = \sqrt{6YR+Y^2}$$
$$L2 = \sqrt{L^2-Y^2}$$
$$Y_M = \sqrt{9R^2+L^2} - 3R$$

Assembly Length (Live Length and Over-all Length)

After the hose is selected for the application, the live length and over-all length of the assembly must be determined to complete the design. The live length is the flexible portion of an assembly and can be determined for the class motion from the motion diagrams and for vibration.

After the live length has been determined, the over-all length is calculated by adding the dimensions for the end fittings. Refer to the Fitting Charts for fitting lengths. Add the "A" dimension for braided hose or the "B" dimension for unbraided hose. Be sure to add fitting lengths for each end.



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 or 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.

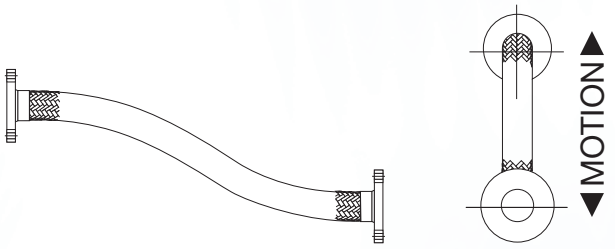
B) Twisting on flexure. Always install the hose so that flexing takes place in one plane only, and in the plane of bending.

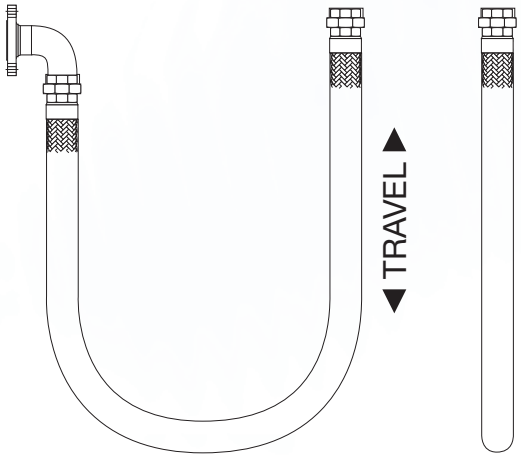
2) **Avoid Sharp Bends**

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.

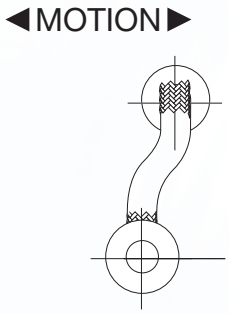
Should piping restrictions make it impractical to install hose in the proper manner, the use of an interlocked hose guard will limit the hose bending to a suitable radius, thus prolonging the life of the corrugated hose.

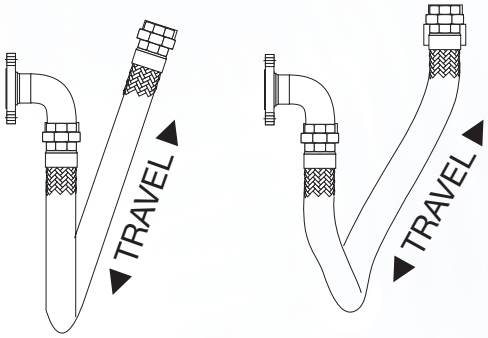
RIGHT





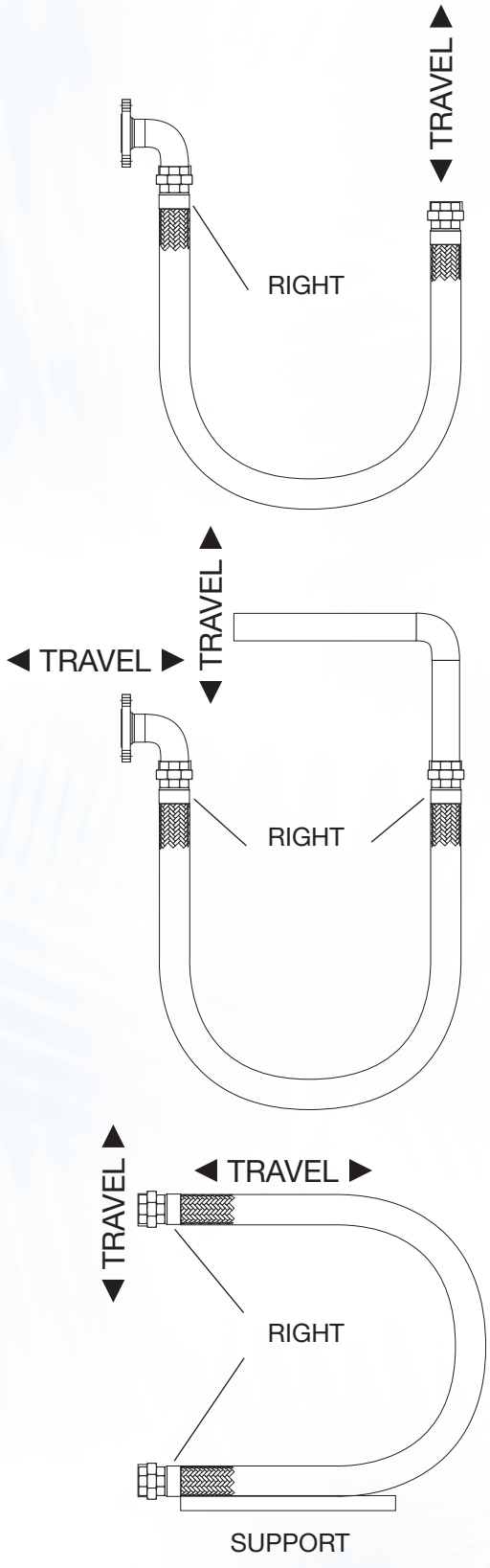
WRONG



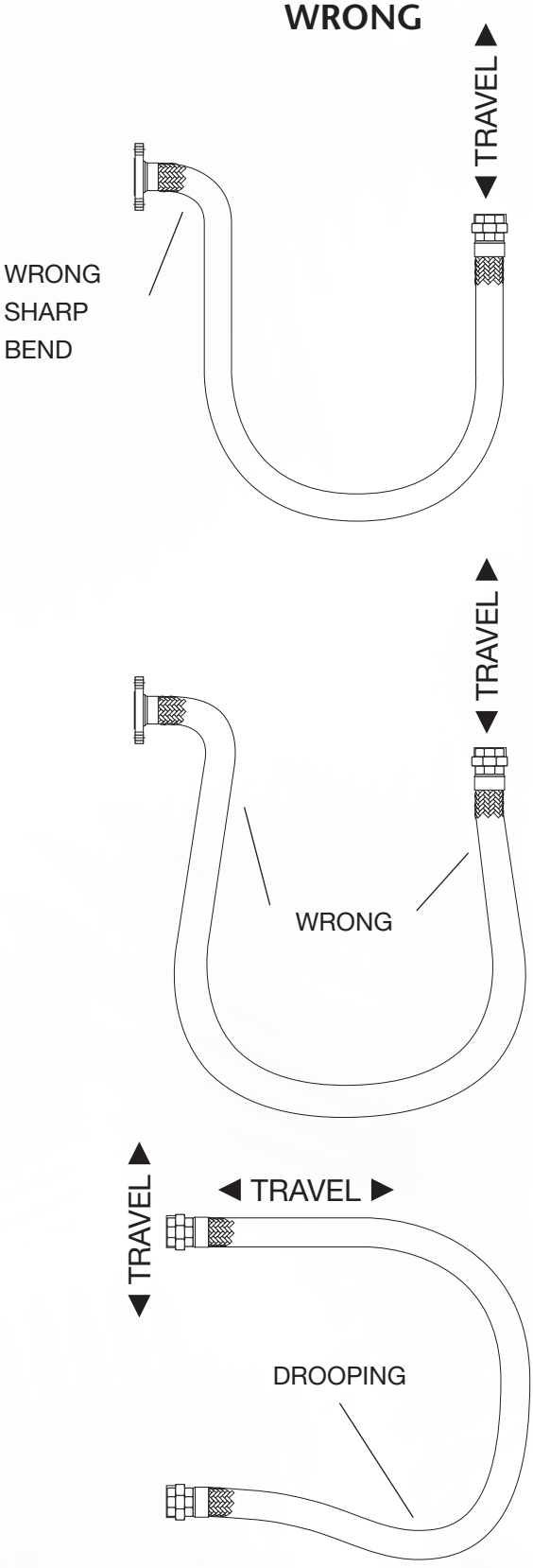


CORRUGATED METAL HOSE INSTALLATION DATA

RIGHT



WRONG



PIPE ANCHORING AND GUIDING

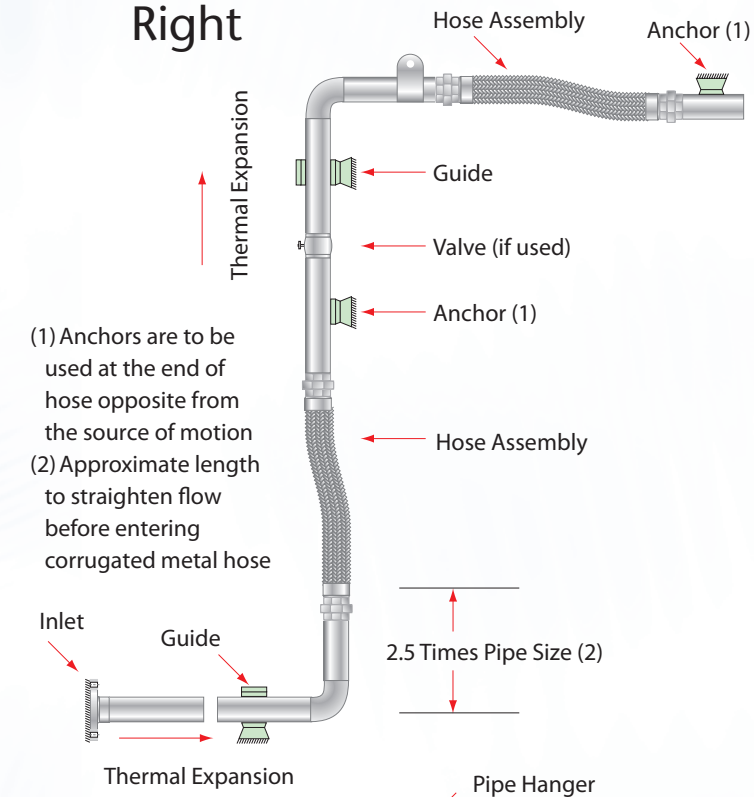
A piping system which utilizes flexible metal hose to absorb pipe movement must be properly anchored and guided to assure correct functioning and maximum service life of the metal hose. The basic principles to be observed are:

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

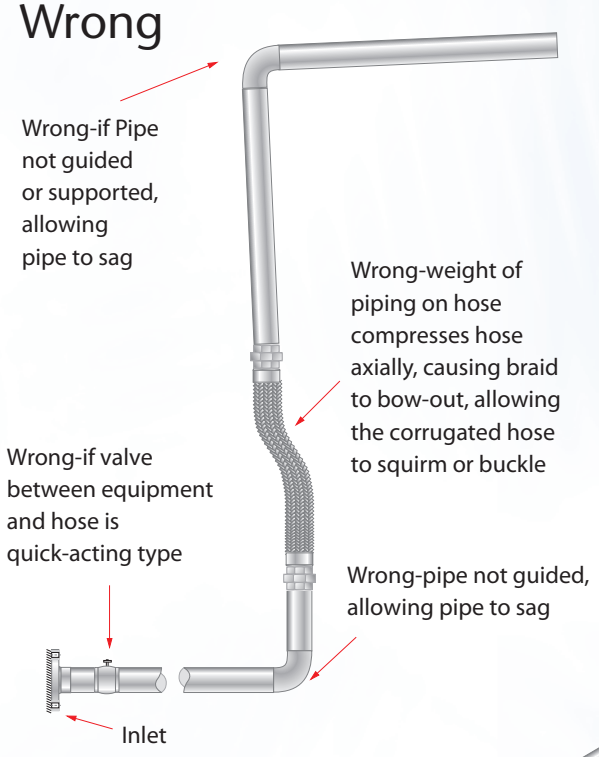
2) The pipe must be anchored at each change of direction where a flexible metal hose is employed to prevent torsional stress.

Typical examples of correct and incorrect guiding are shown below.

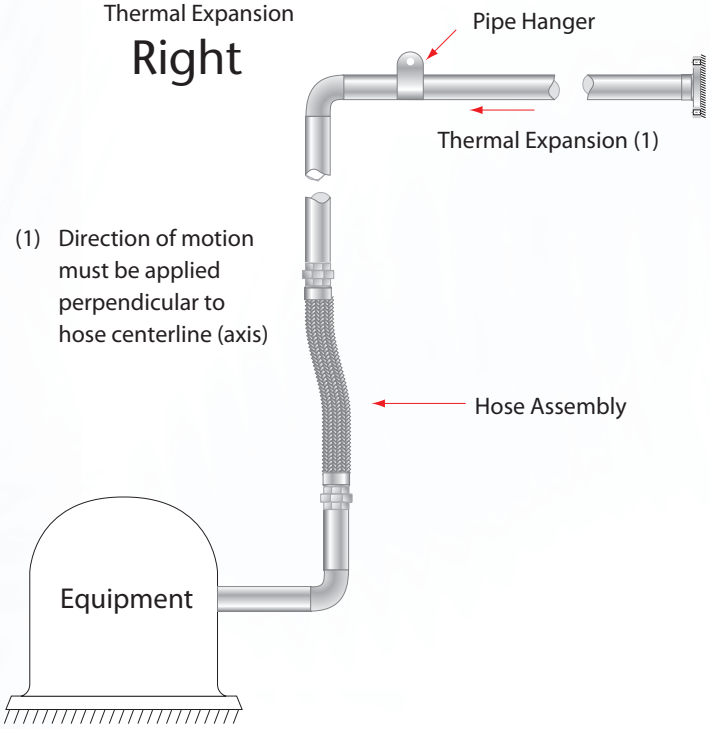
Right



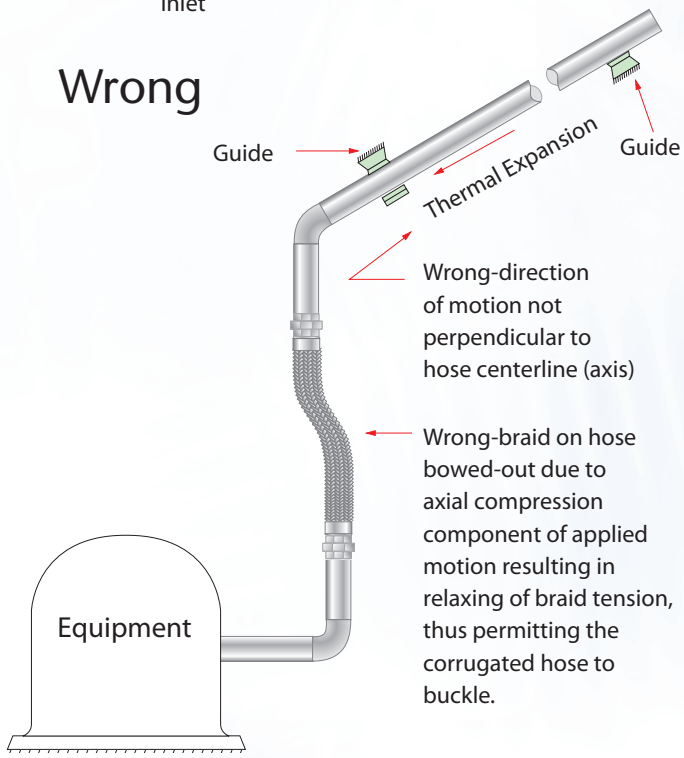
Wrong



Right



Wrong



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

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)	Austentitic 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	0.26	1.23	1.07	1.62
-3.16	200	0.99	1.46	0.94	0.86	0.21	1.22	0.94	0.56	1.52	1.33	2.00
4.22	225	1.21	1.75	1.13	1.03	1.45	1.46	1.13	0.86	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	8.98	12.40	13.39		
	1050	9.46	12.16	8.55	7.95	10.54	11.09	9.14	12.76	13.81		
	1075	9.75	12.50	8.80	8.18	10.83	10.43	9.29	13.11	14.23		
	1100	10.04	12.84	9.05	8.31	11.12	11.77	9.45	13.47	14.65		
	1125	10.31	13.18	9.28	8.53	11.41	12.11	9.78				
	1150	10.57	13.52	9.52	8.76	11.71	12.47	10.11				
	1175	10.83	13.86	9.76	8.98	12.01	12.81	10.44				
	1200	11.10	14.20	10.00	9.20	12.31	13.15	10.78				
	1225	11.38	14.54	10.26	9.42	12.59	13.50					
	1250	11.66	14.88	10.53	9.65	12.88	13.86					
	1275	11.94	15.22	10.79	9.88	13.17	14.22					
	1300	12.22	15.56	11.06	10.11	13.46	14.58					
	1325	12.50	15.90	11.30	10.33	13.75	14.94					
	1350	12.78	16.24	11.55	10.56	14.05	15.30					
	1375	13.06	16.58	11.80	10.78	14.35	15.66					
	1400	13.34	16.92	12.05	11.01	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

Index to Laboratory Corrosion Data Chart

I. <.00035 inches in penetration/month
.00035-.0035 inches of penetration/month
>.0035 inches of penetration/month

II. * Subject to decomposition (forming HCl) in presence of moisture
** Subject to pitting at air line or when allowed to dry
*** Subject to attack in presence of H^2SO^4

Corrosion Rate
-Resistant -Class 1
-Partially Resistant -Class 2
-Not Resistant -Class 3

Typical 18-8 Stainless Steels are Types 304, 404L,321 & 347

Typical 18-8 Mo. Stainless Steels are Types 316 & 316L

Chemical	Temp. °F	Stainless Steel 18 - 8	Stainless Steel 18 - 8 Mo	Mild Steel	Brass (80 - 20)	Bronze (Phos)	Monel
Acetic Acid 5%-20%							
Agitated or Aerated	70	1	1	3	3	3	2
50%	70	1	1	3	3	3	3
50%-80%	Boiling	3	2	3	3	3	3
80%	70	1	1	3	3	3	1
100%	70	1	1	3	3	3	1
100%	Boiling	3	2	3	3	3	2
100% - 150lbs.pressure	400	3	3	3	3	3	2
Acetic Anhydride	70	1	1	3	3	3	2
	Boiling	1	1	3	3	3	2
Acetic Acid Vapors, 30%	Hot	3	2	3	3	3	3
100%	Hot	3	3	3	3	3	2
Acetone	Bioling	1	1	3	1	1	1
Acetyl Chloride	Cold	2	2	3	2	2	1
	Boiling	2	2	3	2	2	3
Acetylene Concentrated	70	1	1	1	3	3	1
Commercially Pure	70	1	1	1	3	3	1
Acid Salt Mixture 10% H2SO4 Sp. G. 1.07 + 10% CuSO4 • 5 H2O	Boiling	1	1	3	3	3	3
Acid Salt Mixture 10% H2SO4 Sp. G. 1.07 + 2% FeSO4 • 7 H2O	Boiling	1	1	3	3	3	3
Alcohol, Ethyl, 70° & Boiling	70	1	1	1	1	1	1
Alcohol, Methyl	70	1	1	1	1	1	1
	(150)						
	Bioling	3	2	3	1	1	1
Aluminium, Molten	1400	3	3	3	3	3	3
Aluminum Acetate, Saturated	70 &						
	Boiling	1	1	3	3	3	1
Aluminum Chloride							
10% Quiescent	70	3	3	3	3	3	2
25% Quiescent	70	1	1	3	3	3	2
Aluminum Flouride	70	3	3	3	3	3	2
Aluminum Hudroxide, Saturated	70	1	1	1	1	1	1
Aluminum Sulphate, 5%	150	1	1	3	3	3	1
10%	70	1	1	3	3	3	1
10%	Boiling	2	1	3	3	3	1
Saturated	70	1	1	3	3	3	1
Saturated	Boiling	2	1	3	3	3	1
Aluminum Potassium Sulphate (alum) 2% - 10%	70	1	1	3	2	2	2
10%	Boiling	2	1	3	3	3	2
Saturated	Boiling	3	2	3	3	3	2
Ammonia (Anhydrous)							
All Concentrations	70	1	1	1	1	1	1
Gas	Hot	3	3	3	3	3	
Ammonia Liquor	70	1	1	3	3	3	3
	Boiling	1	1	3	3	3	3
Ammonium Bicarbonate	70	1	1	3	3	3	2
	Hot	1	1	3	3	3	2
Ammonium Bromide	70	2	1	3	3	3	2
Ammonium Carbonate 1 & 5%	70	1	1	1	3	3	3
Ammoium Chloride 1%	70	1	1	2	3	3	1
10%	Boiling	1	1		3	3	2
28%	Boiling	2	1		3	3	2
50%	Boiling	2	1		3	3	2
Ammonium Hydroxide							
All Concentrations	70	1	1	2	3	3	3
Ammonium Monophosphate	70	1	1	2	3	3	2
Ammonium Nitrate							
All Concentrate Agitated	70	1	1	3	3	3	2
All Concentrate Aerated	70	1	1	3	3	3	2
All Concentrate Saturated	Boiling	1	1	3	3	3	2
Ammonium Oxatate	70	1	1	2	3	3	-
Ammonium Perchlorate 10%	Boiling	1	1	2	3	3	-
Ammonium Persulphate 5%	70	1	1		3	3	3
Ammonium Phosphate 5%	70	1	1	2	3	3	3
Ammonium Sulphate 1% Aerated or Agitated	70	1	1	3	3	3	2
Ammonium Sulphate 5% Aerated & Agitated	70	1	1	3	3	3	2
10% & Saturated	Boiling	2	1	3	3	3	2
Ammonium Sulphite, 70° & Boiling	70	1	1	3	3	3	3
Amyl Acetate Concentrate	70	1	1	2	1	1	1
Amyl Chloride	70	1	1	3	2	2	2
Aniline							
3%	70	1	1	2	3	3	2
Concentrate Crude	70	1	1	1	3	3	2
Aniline Hydrochloride	70	3	3		3	3	3
Antimony Trichloride	70	3	3	3	3	3	3
Barium Carbonate	70	1	1	2	1	1	2
Barium Chloride							
5% & Saturated	70	1	1	3	2	2	2
Barium Hydroxide							
Aqueous Solution	Hot	1	1	2	1	1	2
Barium Nitrate							
Aqueous Solution	Hot	1	1	2			-
Barium Sulphate							
(Barytes-Blanc Fixe)	70	1	1		1	1	2
Barium Sulphide							
Saturated Solution	70	1	1	3	3	3	-
Beer (Barley Malt & Hops)	70	1	1	3	1	1	1
3.5%-4.5% Alcohol	160	1	1	3	1	1	1
Benzene (Benzol) 70° or Hot	70	1	1	2	1	1	2
Benzoic Acid	70	1	1	1	1	1	-
Blood (MeatJuices)	Cold	1	1	3			2
Borax 5%	Hot	1	1	2	1	1	2
Boracic Acid 5%	Hot or						
	Cold	1	1				
Boric Acid							
5% Solution, 70° or Hot	70	1	1	3	1	1	2
5% Solution	Boiling	1	1	3	2	1	2
Saturated Solution	70	1	1	3	3	2	2
Saturated Solution	Boiling	1	1	3	3	3	2
Bromine, Bromine Water	70	3	3	3	3	3	3
Buttermilk	70	1	1	3	3	3	2
Butyl Acetate		1	1	2			2
Butyric Acid 5%	70-150	1	1	3	2	2	2
Aqueous Soln. Sp. G. 964	Boiling	1	1	3	3	3	2
Calcium Carbonate	70	1	1	1			1
Calcium Chlorate							
Dilute Solution	70 or						
	Hot	1	1	2			2
Calcium Chloride							
Dilute or Concen. Solution	70	2	1	3	2	2	3
Calcium Chlorohypochlorite (Bleaching Powder) 1%	70	3	3	3	2	2	3
5%	70	3	3	3	2	2	3
Calcium Hypochlorite, 2%	70	2	1	3	2	2	3
Calcium Hydroxide, 10-20%	Boiling	1	1	3	1	1	1
Calcium Sulphate, Saturated	70	1	1	3	1	1	2
Carbonic Acid Saturated Soln.	70	1	1	3	3	1	3
Carbolic Acid C.P.	70 or						
	Boiling	1	1	3	2	2	1
Carbonated Water		1	1	3	2	2	3
Carbon Bisulfide	70	1	1	2	1	2	2
Carbon Monoxide Gas	1400						
	1600	1	1	1	3	3	1
Carbon Tetrachloride							
C.P.	70	1	1	2	1	1	1
Dry C.P.	Boiling	1	1	2	1	1	2
Commercial +1% Water		3	3	3	2	2	2
Carnallite - Cold Saturated Soln. (KCl . MgCl2 . 6H2O)	Boiling	3	1				
Cellulose		1	1				1
Chloracetic Acid	70	3	3	3	2	2	2
Chlorbenzol Conc. Pure Dry	70	1	1	2	2	2	2
Chloric Acid	70	3	3	3	3	3	3
Chlorine Gas (Dry)	70	3	2	2	1	1	2
Moist)	70	3	3	3	3	3	3
Chlorinated Water. Saturated		3	2	3			2
Chloroform	70	1	1	1	1	1	1
Chromic Acid 5% C.P.	70	1	1	3	3	3	3
10%	70	3	2	3	3	3	3
Chromic Acid 10% C.P.	Boiling	3	2	3	3	3	3
50% C.P.	70	3	2	3	3	3	3
50% C.P.	Boiling	3	3	3	3	3	3
Commercial 50% (Cont. SO3)70	3	3	3	3	3	3	
Commercial 50% (Cont. SO3)	Boiling	3	3	3	3	3	3
Chromium Plating Bath	70	1	1	2			3
Cider	70	1	1	3	1	1	1
Citric Acid, 5% Still	70-150	1	1	3	2	1	2
15% Still	70	1	1	3	3	2	2
15% or Concentrated	Boiling	2	1	3	3	2	3
Coca-Cola Syrup (Pure)	70	1	1	3			2
Coffee	Boiling	1	1	3	1	1	1
Copper Acetate (Sat. Sol.)	70	1	1	3			2
Copper Carbonate (Sat. Sol.) in 50% NH4OH		1	1		3	3	-
Copper Chloride, 1% Agitated	70	2	1	3	3	3	3
1% Agitated	158	3	3	3	3	3	3
1% Aerated	70	2	1	3	3	3	3
5% Agitated	70	3	2	3	3	3	3
5% Aerated	70	3	3	3	3	3	3
Copper Cyanide (Sat. Sol.)	Boiling	1	1		3	3	2
Copper Nitrate							
1% Still, Agitated & Aerated	70	1	1	3	3	3	3
5% Still, Agitated or Aerated	70	1	1	3	3	3	3
50% Aqueous Solution	Hot	1	1	3	3	3	3
Copper Sulphate							
5% Agitated Still or Aerated	70	1	1	3	2	2	3
Saturated Solution	Boiling	1	1	3	2	2	3
Creosote (Coal Tar)	Hot	1	1	2	1	1	2
Creosote Oil	Hot	1	1	2	2	2	2
Cynogen Gas	70	1	1				-
Dichloroethane (Dry)	Boiling	1	1	3	3	3	2
Dinitrochlorobenzene							
Melted & Solidified	70	1	1	3			-
Distillery Wort	70	1	1				-
Developing Solutions	70	1	1				-
Dyewood Liquor	70	1	1	3			2
Epsom Salt (Magnesium Sulfate)	Hot &						
	Cold	1	1	3	1	1	2
Ethers	70	1	1	2	1	1	2
Ethyl Acetate(Conc. Sol.)	70	1	1	2	1	1	2
Ethyl Chloride	70	1	1	2	2	2	1
Ethylene Chloride	70	1	1	2	2	2	1
Ethylene Glycol	70	1	1	2	1	1	1
Ferric Chloride 1% Solution Still	70	2	1	3	3	3	3
1% Solution	Boiling	3	3	3	3	3	3
5% Solution, Agitated, Aerated	70	3	3	3	3	3	3
Ferric Hydroxide (Hydrated Iron Oxide)	70	1	1	3			2
Ferric Nitrate							
1%-5% Quiescent or Agitated	70	1	1	3	3	3	3
1%-5% Aerated	70	1	1	3	3	3	3
Ferric Sulphate							
1%-5% Quiescent or Agitated	70	1	1	3	3	3	3
1%-5% Aerated	70	1	1	3	3	3	3
10%	Boiling	1	1	3	3	3	3
Ferrous Chloride Saturated Solution	70	3	1	3	2	2	-
Ferrous Sulphate							
Dilute Solution	70	1	1	3	2	2	3
Fluorine (Gas) Moist	70	3	3	3	3	3	3
Formaldehyde 40% Solution		1	1	2	1	1	1
Formic Acid, 5% Still	70	2	1	3	2	2	2
5% Still	150	2	1	3	2	2	3
Fruit Juices	70	1	1	3	2	2	2
Fuel Oil	Hot	1	1	2	1	1	2
Containing Sulphuric Acid		3	2		3	3	2
Furfural	70	1	1	2	1	1	2
Gallic Acid, 5%	70-150	1	1	3			2
Saturated	212	1	1	3			2
Gasoline	70	1	1	2	1	1	1
Gelatin		1	1	3	1	1	1
Glue Dry	70	1	1	1	2	2	2
Solution-Acid	70-140	2	1	2	3	3	2
Glycerine	70	1	1	2	1	1	1
Hydrochloric Acid All Concentrations	70	3	3	3	3	3	3
Hydrocyanic Acid	70	1	1	3	3	3	2
Hydrofluoric Acid	70	3	3	3	3	3	1

LABORATORY CORROSION CHART

These charts contain recommendations based on published corrosion data for valid laboratory or fiels 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 18 - 8	Stainless Steel 18 - 8 Mo	Mild Steel	Brass (80 - 20)	Bronze (Phos)	Monel
Hydrofluosilicic Acid	70	3	3	3	2	2	2
Hydrogen Peroxide	70	1	1	3	3	3	2
	Boiling	2	1	3	3	3	2
Hydrogen Sulphide (Dry)	70	1	1	2	1	1	3
(Wet)	70	2	1	3	3	3	3
Hyposulphite Soda (Hypo)		1	1			-	
Ink	70	2	1	3	3	3	1
Iodine	70	3	3	3	3	3	3
Iodoform	70	1	1	3			2
Kerosene	70	1	1	2	1	1	2
Ketchup, Quiescent	70-150	1	1	3			2
Lactic Acid, 1%	70	1	1	3	2	2	2
1%	Boiling	1	1	3	3	3	2
5%	70	1	1	3	2	2	2
5%	150						
	Boiling	2	1	3	3	3	2
10%	70	2	1	3	2	2	2
	10%	150					
	Boiling	3	2	3	3	3	2
Concentrated	70	2	1	3	2	2	2
Concentrated	Boiling	3	2	3	3	3	2
Lard	70	1	1				1
Lead (Molten)	750	2	2		3	3	3
Lead Acetate 5%	Boiling	1	1	3			2
Linseed Oil	701	1	1	2	2	2	1
Plus 3% H_2SO_4	390	2	1	3	3	3	1
Magnesium Chloride							
1% Quiescent	70	1	1	3	2	2	1
1% Quiescent	Hot	3	2	3	2	2	1
5% Quiescent	70	1	1	3	2	2	1
5% Quiescent	Hot	3	2	3	2	2	1
Magnesium Oxychloride	70	3	2	3			-
Magnesium Sulphate	Hot &						
	Cold	1	1	3	1	1	1
Malic Acid	Hot &						
	Cold	2	1	3			2
Mash	Hot	1	1				2
Mayonnaise	70	1	1	3			2
Mercury		1	1	1	3	3	3
Mercuric Chloride Dilute Sol.	70	3	3	3	3	3	3
Methanol (Methyl Alcohol)		1	1	2	1	1	1
Milk, Fresh or Sour	70	1	1	3	1	1	2
	Boiling	1	1	3	1	1	2
Mixed Acids							
53% H_2SO_4 +45% HNO_3	Cold	1	1	3	3	3	3
Molasses		1	1	2	2	1	1
Muriatic Acid	70	3	3	3	3	3	2
Mustard	70	1	1	3			2
Naphtha, Crude	70	1	1	2	2	2	1
Naphtha, Pure	70	1	1	2	2	2	1
Naphthalene Sulfonic Acid	70	1	1	3			1
Nickel Chloride Solution	70	1	1	3	3	2	2
Nitrating Solutions	Cold &						
	Hot	2	2		3	2	3
Nickel Sulphate	Cold &						
	Hot	1	1	3	3	1	1
Niter Cake	Fused	2	1	3			2
Nitric Acid							
5%-50%-70%	Boiling	1	1	3	3	3	3
65%	70	1	1	3	3	3	3
65%	Boiling	2	2	3	3	3	3
Concentrated	70	1	1	3	3	3	3
Concentrated	Boiling	3	3	3	3	3	3
Fuming Concentrated	70-110	1	1	3	3	3	3
Fuming Concentrated	Boiling	3	3	3	3	3	3
Nitrous Acid 5%	70	1	1	3	3	3	3
Oils, Crude	Cold &						
	Hot	1	1		2	2	1
Oils, Vegetable, Mineral	Cold &						
	Hot	1	1		2	2	1
Oleic Acid	70-400	1	1	2	2	2	2
Oxalic Acid							
5%-10%	70 &						
	Boiling	1	1	3	3	2	2
10%	Boiling	3	3	3	3	2	2
25%-50%	Boiling	3	3	3	3	2	1

Chemical	Temp. °F	Stainless Steel 18 - 8	Stainless Steel 18 - 8 Mo	Mild Steel	Brass (80 - 20)	Bronze (Phos)	Monel
Paraffine	Cold &						
	Hot	1	1	2	1	1	1
Phenol (See Carbonic Acid)							
Petroleum Ether		1	1	2			2
Phosphoric Acid							
1%	70	1	1	3	3	3	2
1%	Boiling	1	1	3	3	3	2
1%-45 lbs. Pressure	284	1	1	3	3	3	2
5% Quiescent, or Agitated	70	1	1	3	3	3	2
5% Aerated	70	1	1	3	3	3	2
10% Quiescent	70	3	1	3	3	3	2
10% Agitated or Aerated	70	3	2	3	3	3	2
10%-50%	Boiling	1	1	3	3	3	3
80%	70	3	3	3	3	3	2
80%	230	3	3	3	3	3	3
85%	Boiling	3	3	3	3	3	3
Picric Acid	70	1	1	3	3	3	3
Potassium Bichromate, 25%	70	1	1		3	3	2
25%	Boiling	1	1		3	3	2
Potassium Bromide	70	2	1	3	2	2	2
Potassium Carbonate 1%	70	1	1	2	2	2	1
Potassium Carbonate	Hot	1	1	2	3	3	1
Potassium Chlorate							
Sat. at 212°	Boiling	1	1	2	3	3	3
Potassium Chloride							
1% Quiescent	70	1	1	3	3	2	1
1% Agitated or Aerated	70	1	1	3	3	2	1
5% Quiescent	70	1	1	3	3	2	1
5% Agitated or Aerated	70	1	1	3	3	2	1
5%	Boiling	1	1	3	3	2	1
Potassium Chromium Sulfate							
5%	70	1	1	3	3	2	-
Sp. G 1.6	Boiling	3	3	3	3	3	-
Potassium Cyanide	70	1	1	2	3	3	2
Potassium Ferricyanide, 5%-25%	70	1	1	3			2
25%	Boiling	1	1	3			2
Potassium Ferricyanide, 5%	70	1	1	3			2
Potassium Hydroxide, 5%	70	1	1	2	3	2	1
27%	Boiling	1	1	2	3	2	1
50%	Boiling	2	1	3	3	2	1
Potassium Hypochlorite	70	2	2	3	3	3	3
Potassium Nitrate							
1%-5% Still or Agitated	70	1	1	3	2	2	1
1%-5%Aerated	70	1	1	3	2	2	1
50%	70	1	1	3	2	2	1
50%	Boiling	1	1	3			1
	Molten	1022	1	1	3		
	-						
Potassium Oxalate		1	1				-
Potassium Permanganate, 5%	70	1	1	2			3
Potassium Sulphate							
1%-5% Still or Agitated	70	1	1	2	2	1	2
1%-5% Aerated	70	1	1	2	2	1	2
	Hot	1	1	3	2	1	2
Potassium Sulphide (Salt)		1	1	3			-
Pyrogallic Acid		1	1	2			-
Quinine Bisulphate (Dry)		2	1	3			-
Quinine Sulphate (Dry)		1	1	3	2	2	2
Rosin	Molten	1	1	3	1	1	1
Sea Water	70	1	1	3	2	2	1
Sewage		1	1		1	1	1
Silver Bromide		2	1	3	3	3	-
Silver Chloride		3	3	3	3	3	3
Silver Nitrate		1	1	3	3	3	3
Soap	70	1	1	2	1	1	1
Sodium Acetate (Moist)		1	1	3			2
Sodium Bicarbonate							
All Concentrations	70	1	1	3	2	2	1
5% Still	150	1	1	3	2	2	1
Sodium Bisulphate, Solution	70	1	1	3	3	2	2
Saturated Solution	70	3	3	3	3	2	2
2 g. + 1 g. H_2SO_4 liter	68	3	1	3	3	2	2
Sodium Carbonate, 5%	70-150	1	1	2	2	2	1
5%-50%	Boiling	1	1	2	2	2	1
Molten	1650	3	3	3	3	3	1
Sodium Chloride, 5% Still	70-150	1	1	3	3	2	1
20% Aerated	70	1	1	3	3	2	1
Saturated	70	1	1	3	3	2	1
Saturated	Boiling	2	1	3	3	2	1

Mild steel severely stressed subject to caustic embrittlement.

Chemical	Temp. °F	Stainless Steel 18 - 8	Stainless Steel 18 - 8 Mo	Mild Steel	Brass (80 - 20)	Bronze (Phos)	Monel
Sodium Cyanide	70	1	1	2	3	3	-
Sodium Fluoride, 5% Solution	70	2	1	3	1	1	1
Sodium Hydroxide	70	1	1	2	3	2	1
Sodium Hypochlorite, 5% Still		2	1	3	3	2	3
Sodium Hyposulfite	70	1	1	3			1
Sodium Nitrate	Fused	1	1	2	1	1	2
Sodium, Perchlorate, 10%	70	1	1				-
	Boiling	1	1				-
Sodium Phosphate	70	1	1	2	2	2	2
Sodium Sulphate, 5% Still	70	1	1	3	1	1	1
All Concentrations	70	1	1	3	1	1	1
Sodium Sulphide, Saturated		2	1	3	3	3	2
Sodium Sulphite, 5%	70	1	1	3	3	2	2
10%	150	1	1	3	3	2	2
Sodium Thiosulphate							
Saturated Solution	70	1	1	3	3	3	1
Acid Fixing Bath (Hypo)	70	1	1	3	3	3	2
25% Solution	70 &						
	Boiling	1	1	3	3	3	2
Stannic Chloride Solution							
Sp. G. 1.21	70 &						
	Boiling	3	3	3	3	3	3
Stannous Chloride, Saturated		3	1	3			3
Steam		1	1	3	2	1	1
Stearic Acid	70	1	1	3	3	2	2
Starch, Aqueous Solution		1	1				2
Strontium Hydroxide		1	1				-
Strontium Nitrate Solution	Hot	1	1	3			2
Sulphur, Moist	70	2	1	3	3	3	2
Molten	266	1	1	3	3	3	1
Molten	833	3	3	3	3	3	3
Sulphur Chloride (Dry)		3	3	3	1	1	2
Sulphur Dioxide Gas (Moist)	70	2	1	3	2	2	3
Gas (Dry)	575	1	1	3	1	1	2
Sulphuric Acid							
5%-10%	70	3	2	3	3	2	3
5%-10%	Boiling	3	3	3	3	3	3
50%	70	3	3	3	3	3	3
50%	Boiling	3	3	3	3	3	3
Concentrated	70	1	1	3	3	2	3
Concentrated	Boiling	3	3	3	3	2	3
Concentrated	300	3	3	3	3	3	3
Fuming	70	3	2	3	3	2	3
Sulphurous Acid, Saturated	70	3	2	3	3	2	3
Saturated - 60 lb. Pressure	250	3	2	3	3	2	3
Saturated -70-125 lb. Pressure	310	3	2	3	3	2	3
150 lbs. Pressure	375	3	2	3	3	2	3
Sulphurous Spray	70	3	3	3	3	3	3
Tannic Acid	70	1	1	3	2	1	3
	150	1	1		2	1	3
Tanning Liquor	70	1	1				1
Tar		1	1	2	1	1	2
Tartaric Acid, 10%	70	1	1	3	2	1	2
10%-50%	Boiling	2	1	3	2	1	2
Tin	Molten	3	3	3	3	3	-
Trichloracetic Acid	70	3	3	3	3	2	3
Trichlorethylene (Dry)	70	1	1	3	1	1	1
(Moist)					2	2	-
Varnish	70	1	1	2	1	1	1
Vegetable Juices		1	1	2	3	2	2
Vinegar Fumes		2	1	3	3	2	3
Vinegar, Still, Agitated ot Aerated	70	1	1	3	3	2	3
Water		1	1	2	1	1	1
Whiskey		1	1	3	2	1	1
Wine - All Phases of Processing							
and Storing	75	1	1	3	3	3	2
Yeast		1	1		3	3	1
Zinc	Molten	3	3	3	3	3	3
Zinc Chloride, 5% Still	70	1	1	3	3	3	2
	Boiling	2	2	3	3	3	2
Zinc Cyanide, Moist	70	1	1	3			-
Zinc Nitrate, Solution	Hot	1	1	3			-
Zinc Sulphate Sulphate, 5%	70	1	1	3	3	2	2
25%	Boiling	1	1	3	3	2	2
Saturated	70	1	1	3	3	2	2

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

Nominal Diameter (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	1078
3/4	SA-BSN-012-12	12	6 3/4	3/4	1034	910
1	SA-BSN-016-12	12	6 1/2	1	796	700
1 1/4	SA-BSN-020-12	12	6 1/4	1 1/4	600	528
1 1/2	SA-BSN-024-12	12	6 1/4	1 1/2	557	490
2	SA-BSN-032-12	12	5	2	570	502
2 1/2	SA-BSN-040-14	14	6	4	387	341
3	SA-BSN-048-14	14	6 3/4	5	316	278
4	SA-BSN-064-18	18	8 1/2	8 1/2	232	204



NOTE: Also available from 18", 24", 36" and 48" overall in sizes ½" – 2"
Optional • SCH 80 fittings • Stainless Steel Fittings
• HEX Male Nipples • Double Braid for higher pressure

BRC BRONZE CONNECTORS

Nominal Diameter (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
BRC Bronze connectors are not CRN registered. Consult factory for more information.

FLEXIBLE METAL PUMP CONNECTORS

DESIGN CHARACTERISTICS

BSN Conectors: 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

Nominal Diameter (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



Optional:
- Stainless Steel Flanges
- 300 Lb Flanges

TCS-R STAINLESS STEEL CONNECTORS

Nominal Diameter (in)	Model Number	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	TCSR-FLG-032	6	4 3/4	5/8	20 1/2	225	210	6.9
2 1/2	TCSR-FLG-040	6	4 3/4	5/8	24	225	210	6.9
3	TCSR-FLG-048	6	4 3/4	5/8	25	225	210	8.8
4	TCSR-FLG-064	6	4 1/2	3/4	35	225	210	15.1
5	TCSR-FLG-080	6	4 1/2	3/4	38	225	210	23.5
6	TCSR-FLG-096	6	4 1/2	3/4	41 1/2	225	210	33.2
8	TCSR-FLG-128	6	4	1	68	225	210	59.3
10	TCSR-FLG-160	8	6	1	118	225	210	93.5
12	TCSR-FLG-192	8	6	1	147	225	210	134.0
14	TCSR-FLG-224	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

NOMINAL HOSE AND FITTING SIZE

END FITTING TYPE

HOSE LENGTH IN INCHES

OPERATING PRESSURE IN PSIG

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	Minimum Live Length (in)	Centerline Bend Radius (in) Dynamic	Static	End Fitting Type (Options)	Overall Length (in)	Max. Working Pressure PSIG (Class 300/150)
FLT	025 (1/4")	6.00	4.30	1.00	A - Sch 80 MNPT	Overall Length	350
FLT	038 (3/8")	6.00	6.00	1.50	B - 3000# FNPT Coupling	as Required	350
FLT	050 (1/2")	6.00	6.50	1.75	C - Weld Nipple (Sch 40/80)		350/275*
FLT	075 (3/4")	6.00	8.00	2.75	D - 150# Weld Neck Flange		350/275*
FLT	100 (1")	6.00	10.00	3.50	E - 300# Weld Neck Flange		350/275*
FLT	125 (1-1/4")	8.00	11.00	4.50	F - 150# S/O Flange RF		350/275*
FLT	150 (1-1/2")	8.00	12.00	5.00	G - 300# S/O Flange RF		350/275*
FLT	200 (2")	8.00	14.00	7.00	H - 150# Lap Joint Flange		350/275*
FLT	250 (2-1/2")	8.00	16.00	7.90	I - 300# Lap Joint Flange		250
FLT	300 (3")	11.00	18.00	8.25	J - Sch 80 Hex MNPT		250
FLT	400 (4")	12.00	22.00	11.00	K - 3000# FNPT Union		200
FLT	500 (5")	18.00	28.00	11.00	L - JIC Female Swivel		200
FLT	600 (6")	19.00	41.00	16.50			200

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

U.L. CERTIFIED ASSEMBLIES

SERIES "HUL" STAINLESS STEEL METAL HOSE ASSEMBLIES FOR U.L. REQUIRED APPLICATIONS.

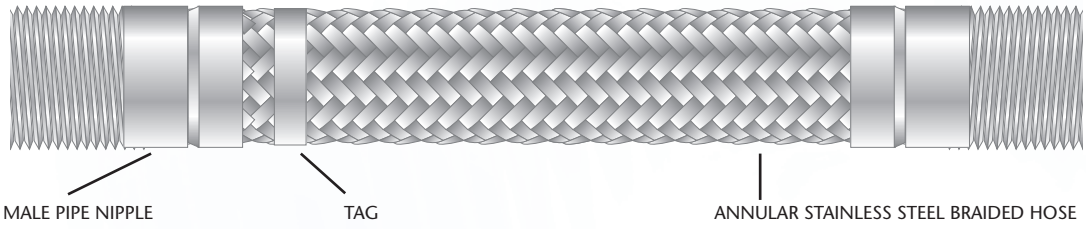
- Certified to UL 536
- Sizes 1/2" ID through 4" ID with fittings welded each end
- Hoses are single braided for all sizes
- HUL labels permenently attached
- Hoses 100% tested per HUL standard
- Supplied with carbon steel or stainless steel end fittings

c UL us LISTED MH65022

PRESSURE RANGE

- Max WP 150 PSIG for all sizes

STANDARD HOSE ASSEMBLY



PART NUMBER DESIGNATION

HUL1-050-AA-030.5-150

- 1 — HOSE ALLOY (1=321SS/6 = 316SS)
- 050 — NOMINAL HOSE AND FITTING SIZE
- AA — END FITTING TYPE
- 030.5 — HOSE LENGTH IN INCHES
- 150 — OPERATING PRESSURE IN PSIG

EXAMPLE: The above part number designation is for a 1/2" size hose with a SCH 80 Steel Male Nipple on each end, 30.5" long, working at an operating pressure of 150 PSIG.

Series	Size	Minimum Live Length (in)	Centerline Bend Radius (in) Dynamic	Static	End Fitting Type (Options)	Overall Length (in)	Max. Working Pressure PSIG (Class 300/150)
HUL	050 (1/2")	10.00	6.00	1.50	A - Sch 80 MNPT	Sum of Required Live Length + Width of Braid Bands + Length of Fittings For Length of Fittings see Common Metal Hose Fittings section	150
HUL	075 (3/4")	10.00	8.00	2.25	B - 3000# FNPT Coupling		150
HUL	100 (1")	10.00	10.00	2.75	C - Weld Nipple (Sch 40/80)		150
HUL	125 (1 1/4")	10.00	10.50	3.50	D - 150# Weld Neck Flange		150
HUL	150 (1 1/2")	10.00	12.00	4.00	E - 300# Weld Neck Flange		150
HUL	200 (2")	10.00	15.00	5.00	F - 150# S/O Flange RF		150
HUL	250 (2-1/2")	11.00	20.00	8.00	G - 300# S/O Flange RF		150
HUL	300 (3")	12.00	22.00	9.00	H - 150# Lap Joint Flange		150
HUL	400 (4")	14.00	27.00	13.00	I - 300# Lap Joint Flange		150
					J - Sch 80 Hex MNPT		
					K - 3000# FNPT Union		
					L - JIC Female Swivel		

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

In the USA

1. National Fuel Gas Code, NFPA 54/ANSI Z223.1
2. Liquified Petroleum Gas Code, NFPA 58
3. Applicable Federal and State regulations for gas piping

In Canada

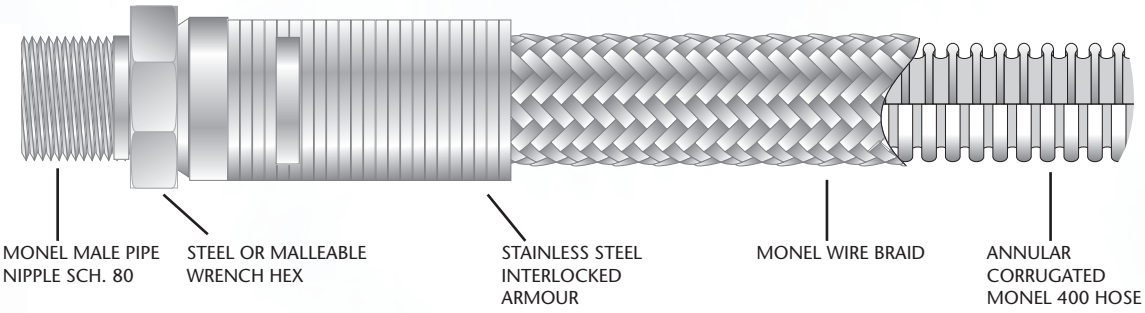
1. National Fire Code of Canada
2. Installation Code for Oil Burning Equipment, CSA B139
3. The Environmental Codes of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Products
4. Natural Gas Installation Code, CAN/CGA-B149.1
5. Propane Installation Code, CAN/CGA-B149.2

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 1875 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

- CMA-050 — NOMINAL HOSE AND FITTING SIZE
- 72 — HOSE LENGTH IN INCHES
- 1 — END FITTING TYPE

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)	Max. Working Pressure (PSIG) @70°F	Nominal Burst Pressure (PSIG) @70°F
CMA	050 (1/2")	1 - Sch 80 Monel Male NPT with Steel Wrench Hex 2 - 300 LB FS Lap Joint Flange	Overall Length as Required	681	3406
CMA	075 (3/4")			567	2835
CMA	100 (1")			554	2769
CMA	125 (1-1/4")			489	2445
CMA	150 (1-1/2")			*	*
CMA	200 (2")			*	*

* Contact factory for additional information

JACKETED ASSEMBLY

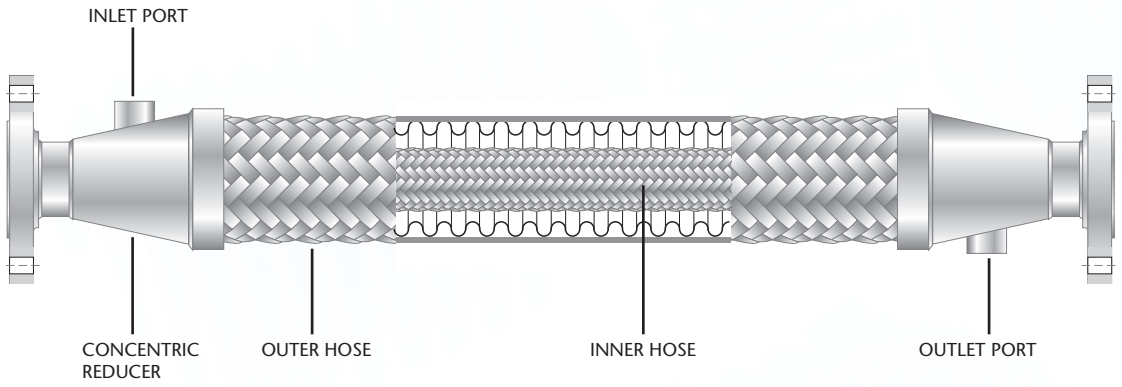
JACKETED ASSEMBLIES ARE USED IN THE FOLLOWING APPLICATIONS:

HEATED TRANSFER HOSE

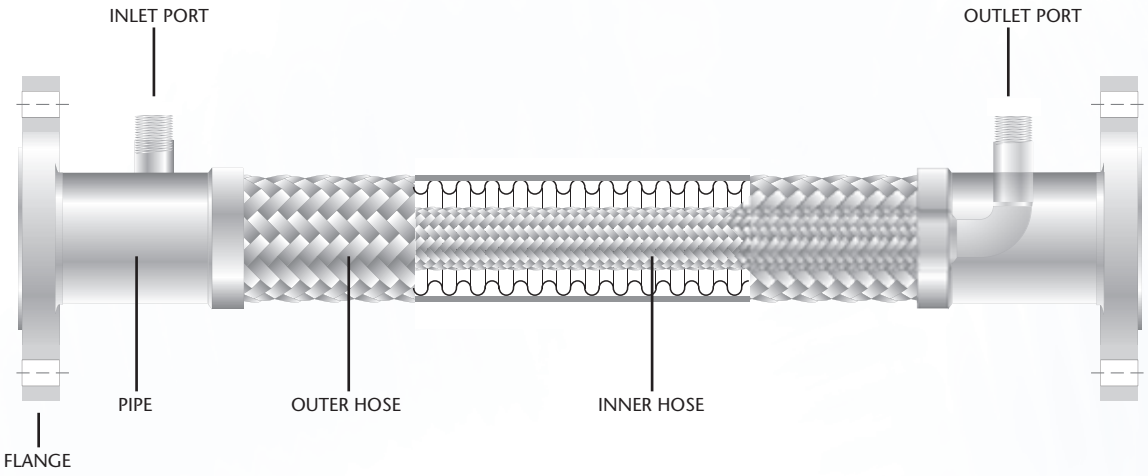
- For media that must be at elevated temperatures in order to flow readily, steam or hot oil is circulated through the outer hose which heats the inner hose conveying the media.

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

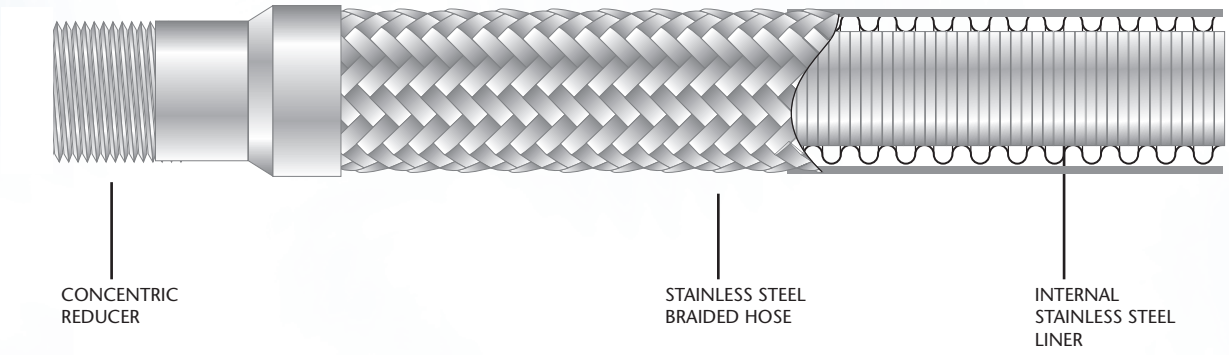
SPECIALTY ASSEMBLIES

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.

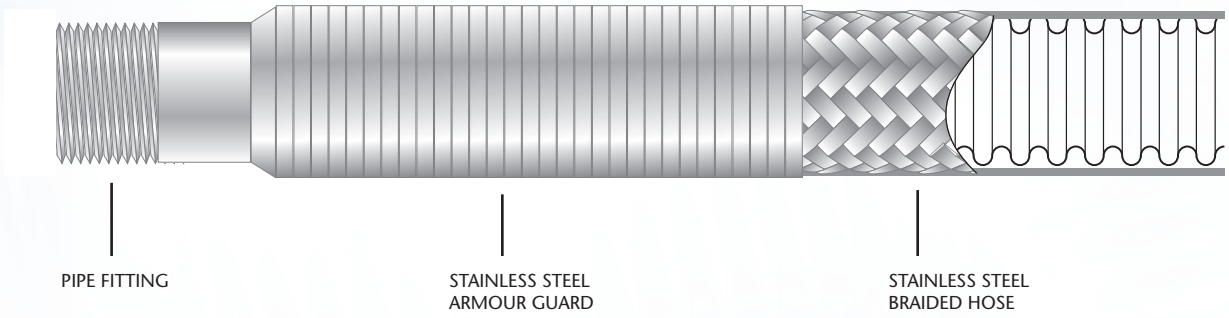
Also used to protect the inside of corrugated hose from abrasive media.



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.



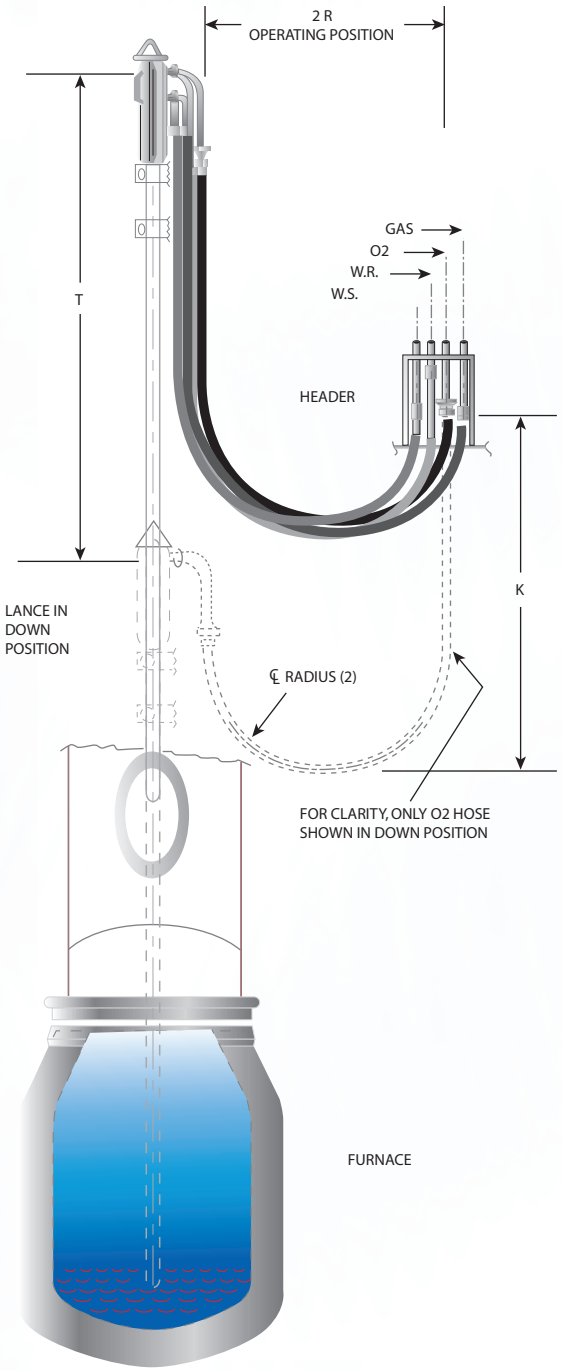
ENGINEERED METAL HOSE ASSEMBLY

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

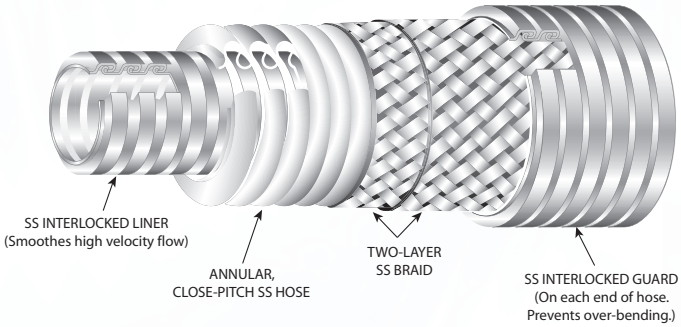


LENGTH DETERMINATION FORMULA

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 hase- optimum protection against breakage
- Double Braiding, Double Hose Layer- optimum operation, safety and performance.

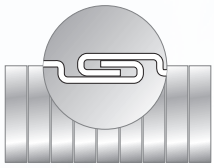
METAL HOSES FOR ALL STEEL MAKING APPLICATIONS

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.

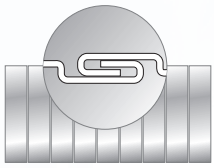


GALVANIZED					STAINLESS STEEL		
Nominal Inside Diameter	Nominal Outside Diameter	Min Inside Bend Diameter (in)	Wt/Ft (lb)		Nominal Outside Diameter	Min Inside Bend Diameter (in)	Wt/Ft (lb)
1/2	0.609	4	0.15				
3/4	0.859	6	0.22				
7/8	1.036	7	0.25				
1	1.147	8	0.29				
1-1/16	1.203	8-1/2	0.30				
1-1/8	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	Min Inside Bend Diameter (in)	Wt/Ft (lb)		Nominal Outside Diameter	Min Inside Bend Diameter (in)	Wt/Ft (lb)
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.

Senior Flexonics Warranty

The following warranty is given by Senior Flexonics Canada (SFC) to the purchaser only and to the exclusion of any other warranty or condition either expressed or implied.

All products/services provided by SFC are warranted for one (1) year after system startup or eighteen (18) months after shipment, whichever occurs first. The warranty covers defects in workmanship, material, and material non-conformance to specifications as demonstrated by the inspection and testing protocol in use by SFC. SFC at its sole option will either repair or replace any supplied defective products. The effects of corrosion, erosion, aging, normal wear, or negligence, incidental or consequential damages are specifically excluded from the warranty. All products must be installed in strict accordance with the installation instructions. Failure to comply with installation instructions will nullify the warranty.

Notwithstanding any discussions between the purchaser and SFC, SFC does not warrant the use of its products for any particular purpose and any reliance on SFC's skill or judgment is done at the sole risk of the purchaser.

Further, notwithstanding any usage of trade, SFC does not warrant its products as being fit for a particular purpose. All warranty claims must be made in writing. Claims made by phone must be confirmed in writing within 10 days.

All removal, reinstallation, and freight costs to and from SFC are excluded from warranty coverage.

The warranty on products repaired shall not be extended beyond the original warranty period.

The purchaser shall be responsible for the correct sizing, specifications, quantities, installation and suitability of all flex connectors, expansion joints, flanges, gaskets, bolting, victaulic clamps, anchors and pipe alignment guides so as to ensure the proper functioning of the products and to maintain full manufacturer's warranty.

Please refer to section 7 in our Terms and Conditions document on www.flexonics.com for the current version of our warranty.

Notes



TSSA CERTIFIED TO:

- ASME Sect. VIII, Div.I
- ASME B31.1
- ASME B31.3
- CSA B51
- EJMA Standards

senior Flexonics
www.flexonics.com
Email:sales@flexonics.com

Guide: 350-04/13 REV 1

Head Office/Plant
134 Nelson Street West
Brampton, Ontario L6X 1C9
Phone: 905 451 1250
Toll Free: 800 267 1975
Fax: 905 451 1315

Branch Office
147 3953 112 Ave SE
Calgary, Alberta T2C 0J4
Phone: 403 253 7919
Toll Free: 800 342 2320
Fax: 403 253 7921

Branch Office
1177 Autoroute 440,
Suite 212
Laval, Québec H7L 3W3
Phone: 450 629 5301
Toll Free: 877 629 5301
Fax: 450 629 9734

24/7 EMERGENCY SERVICE HOTLINE: 855-375-FLEX
855-375-3539

REV-12/25