



PENFLEX

Providing Fabricating Distributors
with quality products, world-class
customer service, convenient
packaging, on time shipping and
unbeatable pricing for over
100 years.

PENFLEX CORPORATION

Since 1902, Penflex has been engineering and manufacturing high-quality flexible metal hose products — both corrugated and interlocked styles, wire and synthetic braids, and most recently instrumentation tubing.

Penflex is an ISO 9001:2000 Certified Company, which has a comprehensive Quality Management System in place with continuously improving quality objectives to assure the product meets or exceeds customer expectations and requirements.

Penflex’s marketing strategy for corrugated hose and braid is to sell exclusively to fabricating distributors throughout North America and around the world.

Products

Whether you prefer fabricating thin wall, medium wall, or heavy wall hose, Penflex has a series of hose available. Typically our heavier wall thicknesses provide for easier welding and longer resistance to chemical corrosion. Our manufacturing process produces long lengths which are packaged in standard cartons or as braided hose-on-reels.

Focus on Fabricating Distributors

Penflex has a long standing tradition of providing value — a quality product for a competitive price. We believe strongly in the traditional manufacturer/distributor relationship. We are not fabricators, nor do we intend to be. You don’t have to worry about us being a competitor. If you find yourselves competing against a metal hose manufacturer, our competitive pricing can help you maintain your profit margin.

Delivery

To get the product in your shop fast, Penflex maintains inventories of hose and braid in warehouses located in Addison, IL; Baton Rouge, LA; Houston, TX and La Mirada, CA; as well as the factory location in Gilbertsville, PA.

Service

Penflex exceeds customer expectations for product, price, delivery and service. Our customer service is backed by in-house engineering so that you get the answers you need — when you need them.

This Specification Guide is intended to provide a quick reference. Please visit our web site at www.penflex.com and download our complete catalog. For additional engineering specifications, please call the factory at 800-232-3539 or 610-367-2260.

Penflex reserves the right to change specifications without notice.

Made in U.S.A.

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	LOW	MED	HIGH
Series 400 Page 3 (braid pg. 3)			
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	●	○
Wall Thickness	○	●	○
Series 500 Page 4 (braid pg. 7)			
Flexibility	○	○	●
Cycle Life	○	●	○
Working Pressure	●	○	○
Chemical Resistance	●	○	○
Wall Thickness	●	○	○
Series 600 Page 5 (braid pg. 7)			
Flexibility	○	○	●
Cycle Life	○	○	●
Working Pressure	○	●	○
Chemical Resistance	●	○	○
Wall Thickness	●	○	○
Series 700 Page 6 (braid pg. 7)			
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	●	○
Wall Thickness	○	●	○
Series 800 Page 8 (braid pg. 9)			
Flexibility	○	●	○
Cycle Life	○	○	●
Working Pressure	○	○	●
Chemical Resistance	○	○	●
Wall Thickness	○	○	●
Series 900 Page 10 (braid pg. 10)			
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	○	●
Chemical Resistance	○	○	●
Wall Thickness	○	○	●
Monel 740 Page 11 (braid pg. 11)			
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	○	●
Wall Thickness	○	●	○
Bronze 794 Page 12 (braid pg. 13)			
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	●	○
Wall Thickness	○	●	○

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System Pack

System Pack, Penflex's unique packaging program, was designed exclusively for the fabricating distributor. It assures that each size of product will arrive in the same size box with the same quantity — every time you order from Penflex.

Whether you are receiving product in, storing product or responsible for inventory control and reordering — System Pack makes your job easier.

All hose and braid products are manufactured, tested and boxed individually to insure you will always receive clean, damage-free product.

System Pack also assures you of 100 percent traceability. Every box and reel is shipped with clearly identified heat and lot information.

Nom. I.D. (in.)	Hose		Braided Hose on Reels		Braid	
	Mill Length (ft.)	Carton Qty (ft.)	Annular (ft.)	Helical (ft.)	Mill Length (ft.)	Carton Qty. (ft.)
1/4	50	100	500	500	110	110
3/8	50	100	500	500	110	110
1/2	50	100	500	500	110	110
3/4	50	100	500	500	110	110
1	50	100	450	500	110	110
1 1/4	50	50	400	—	110	110
1 1/2	50	50	350	—	110	110
2	50	50	250	—	110	110
2 1/2	12-15	25	—	—	110	110
3	12-15	25	—	—	110	110
4	12-15	25	—	—	110	110
5	12-15	25	—	—	110	110
6	12-15	12-15	—	—	100	100
8	12-15	12-15	—	—	100	100
10	12-15	12-15	—	—	100	100
12	12-15	12-15	—	—	100	100
14	12-15	12-15	—	—	100	100

Quick Find Pressure Chart Maximum Working Pressure @70°F (PSIG)^a

Series	400 Helical Stainless		500 Annular Stainless		600 Annular Stainless		700 Annular Stainless		800 Annular Stainless		900 Annular Stainless		740 Annular Monel		794 Annular Bronze	
	Braid Layers	1	2	1	2	1	2	1	2	1	2	1	2	1	2	
1/4"	1,987	4,126	1,697	2,715	2,082	3,331	2,116	3,125	2,562	4,099	2,892	4,627	1,882	3,010	1,035	1,656
3/8"	1,750	2,800	1,386	2,217	1,501	2,401	1,501	2,401	1,501	2,401	2,234	3,575			685	1,096
1/2"	1,100	1,760	806	1,290	1,075	1,720	1,075	1,720	2,194	3,510	2,194	3,510	701	1,121	706	1,130
3/4"	825	1,320	594	950	792	1,267	792	1,267	1,311	2,098	1,994	3,192	542	867	577	923
1"	800	1,280	428	686	571	914	571	914	1,069	1,710	1,599	2,558	464	742	470	752
1 1/4"			398	638	531	850	531	850	1,110	1,776	1,317	2,107			361	577
1 1/2"			354	566	472	755	472	755	868	1,388	1,062	1,698	330	528	329	526
2"			404	647	505	809	516	826	810	1,296	842	1,346	316	506	317	507
2 1/2"							387	619	578	925					272	435
3"							316	506	540	864			197	314	201	322
4"							232	371	333	533					142	227
5"							191	306								
6"							165	264								
8"							234	374								
10"							230	367								
12"							161	257								
14"							119	190								

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

Exotic alloys available upon request:

Inconel 600 | Inconel 625 | Hastelloy c276



Specifying Part Numbers for Hose

7 2 1 - 0 0 4

Hose Type

4 = 400 Series
5 = 500 Series
6 = 600 Series
7 = 700 Series
8 = 800 Series
9 = 900 Series

Hose Alloy

04 = 304 Stainless steel
21 = 321 Stainless steel
16 = 316L Stainless steel
40 = Monel
94 = Bronze

Size

004 = 1/4"
006 = 3/8"
008 = 1/2"
012 = 3/4"
016 = 1"
020 = 1 1/4"
024 = 1 1/2"
032 = 2"
040 = 2 1/2"
048 = 3"
064 = 4"
080 = 5"
096 = 6"
128 = 8"
160 = 10"
192 = 12"
224 = 14"

Specifying Part Numbers for Braid

1 S B - 6 - 0 0 4

Braid Layers

0 = none
1 = 1 layer
2 = 2 layers
(braided braid specified by size and pressure configuration)

Braid Type

HHB = Series 400
SB = Series 500, 600, 700
SMB = Series 700
SHB = Series 800
HTSB = Series 900
MB = Monel
BB = Bronze

Braid Alloy

(only used when ordering 321 or 316 braid)
1 = 321 Stainless steel
6 = 316L Stainless steel

Size

004 = 1/4"
006 = 3/8"
008 = 1/2"
012 = 3/4"
016 = 1"
020 = 1 1/4"
024 = 1 1/2"
032 = 2"
040 = 2 1/2"
048 = 3"
064 = 4"
080 = 5"
096 = 6"
128 = 8"
160 = 10"
192 = 12"
224 = 14"

Specifying Part Numbers for Braided Hose-on-Reels

7 2 1 - 1 S B - 6 - 0 0 4

Hose/Braid Type

4 = 400 Series
5 = 500 Series
6 = 600 Series
7 = 700 Series
8 = 800 Series
9 = 900 Series

Braid Layers

0 = none
1 = 1 layer
2 = 2 layers
(braided braid specified by size and pressure configuration)

Braid Type

HHB = Series 400
SB = Series 500, 600, 700
SMB = Series 700
SHB = Series 800
HTSB = Series 900
MB = Monel
BB = Bronze

Braid Alloy

(only used when ordering 321 or 316 braid)
1 = 321 Stainless steel
6 = 316L Stainless steel

Size

004 = 1/4"
006 = 3/8"
008 = 1/2"
012 = 3/4"
016 = 1"
020 = 1 1/4"
024 = 1 1/2"
032 = 2"
040 = 2 1/2"
048 = 3"
064 = 4"
080 = 5"
096 = 6"
128 = 8"
160 = 10"
192 = 12"
224 = 14"

Hose Alloy

04 = 304 Stainless steel
21 = 321 Stainless steel
16 = 316L Stainless steel
40 = Monel
94 = Bronze

Chart Terminology

NOMINAL I.D.

The nominal interior dimension of the hose in inches.

PART NUMBER

This column shows part numbers to be used when ordering.

BRAID LAYERS

This column shows the number of wire braid covering(s) required for the indicated pressure rating.

NOMINAL O.D.

The nominal exterior dimension of the hose in inches.

PRESSURE RATINGS

The maximum working, maximum test and nominal burst pressures for each hose size are shown with welded on fittings. All pressures listed in this catalog have been reduced by 20 percent to account for welding as the method of attachment.

CENTERLINE BEND RADIUS — DYNAMIC

This column states, in inches, the minimum bend radius to which a hose may be bent when installed in conditions of motion that occur on a regular or intermittent basis.

CENTERLINE BEND RADIUS — STATIC

This column states, in inches, the minimum bend radius to which a hose size may be bent when installed in conditions of no movement other than infrequent vibrations.

WEIGHT

This column shows approximate weight per foot for each size and is given in pounds per foot.

PACKAGING

Quantities listed are for pre-packaged product. Contact the factory for different quantities.



Series 400 Stainless Steel Hose

Construction: Helical / Standard Pitch

Material: Hose: 304 and 316L Stainless Steel

Braid: 304L Stainless Steel — HHB, see below

Characteristics: Medium Weight / Medium Flexibility

Packaging: Braided Hose-on-Reels

	LOW	MED	HIGH
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	●	○
Wall Thickness	○	●	○

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Reel Qty. ^b (ft.)
				Working	Test	Nominal Burst	Dynamic	Static		
1/4	4xx-004 ^c	0	.43	180	270	—			.07	500
	4xx-1HHB-004	1	.50	1,987	2,980	7,950	5.00	1.00	.15	
	4xx-2HHB-004	2	.58	4,126	6,189	16,504			.23	
3/8	4xx-006 ^c	0	.59	100	150	—			.11	500
	4xx-1HHB-006	1	.66	1,750	2,800	7,000	5.50	1.00	.21	
	4xx-2HHB-006	2	.74	2,800	4,200	11,200			.32	
1/2	4xx-008 ^c	0	.73	80	120	—			.15	500
	4xx-1HHB-008	1	.80	1,100	1,650	4,400	6.50	1.50	.25	
	4xx-2HHB-008	2	.87	1,760	2,640	7,040			.35	
3/4	4xx-012 ^c	0	1.00	52	78	—			.22	500
	4xx-1HHB-012	1	1.07	825	1,237	3,300	8.00	1.50	.37	
	4xx-2HHB-012	2	1.15	1,320	1,979	5,280			.52	
1	4xx-016 ^c	0	1.28	30	45	—			.27	500
	4xx-1HHB-016	1	1.37	800	1,200	3,200	8.75	1.75	.53	
	4xx-2HHB-016	2	1.46	1,280	1,920	5,120			.80	

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary \pm 20%.

c. For xx specify 04 for 304 stainless steel or 16 for 316L stainless steel.

Available fully compressed for superior flexibility and higher pressure rating — consult factory.

Stainless Steel Braid for Series 400 Helical Hose

Construction: Tubular

Material: 304L Stainless Steel

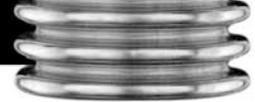
Use for: Series 400 Helical Hose

Packaging: Braided Hose-on-Reels

Nom. Size (in.)	Part Number	Braid Diameter (in.)	Braid Construction	Maximum Pressure @70°F (PSIG) ^a		Braid Coverage (%)	Weight per Foot (lb.)	Reel Qty. ^b (ft.)
				Working	Nominal Burst			
1/4		.43	24 x 6 x .012	1,987	7,950	98	.08	
3/8	see above	.59	24 x 8 x .012	1,750	7,000	98	.10	see above
1/2		.73	24 x 8 x .012	1,100	4,400	87	.11	
3/4		1.00	36 x 8 x .012	825	3,300	91	.15	
1		1.28	36 x 8 x .016	800	3,200	93	.26	

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary \pm 20%.



Series 500 Stainless Steel Hose

Construction: Annular / Standard Pitch

Material: Hose: 321 Stainless Steel

Braid: 304L Stainless Steel — SB, see pg. 7

Characteristics: Light Weight / High Flexibility

Packaging: Standard Cartons or Braided Hose-on-Reels

	LOW	MED	HIGH
Flexibility	○	○	●
Cycle Life	○	●	○
Working Pressure	●	○	○
Chemical Resistance	●	○	○
Wall Thickness	●	○	○

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. ^b (ft.)	Reel Qty. ^b (ft.)
				Working	Test	Nominal Burst	Dynamic	Static			
1/4	521-004	0	.48	108	161	—			.06		
	521-1SB-004	1	.55	1,697	2,545	6,788	5.00	1.00	.14	100	500
	521-2SB-004	2	.62	2,715	4,073	10,861			.22		
3/8	521-006	0	.65	60	89	—			.07		
	521-1SB-006	1	.74	1,386	2,079	5,544	5.50	1.25	.19	100	500
	521-2SB-006	2	.81	2,217	3,326	8,870			.31		
1/2	521-008	0	.80	48	72	—			.15		
	521-1SB-008	1	.89	806	1,210	3,225	6.00	1.50	.27	100	500
	521-2SB-008	2	.96	1,290	1,935	5,161			.39		
3/4	521-012	0	1.20	41	62	—			.26		
	521-1SB-012	1	1.27	594	891	2,376	8.00	2.25	.46	100	500
	521-2SB-012	2	1.34	950	1,426	3,801			.66		
1	521-016	0	1.47	24	36	—			.34		
	521-1SB-016	1	1.54	428	643	1,714	9.00	2.75	.57	100	450
	521-2SB-016	2	1.61	686	1,028	2,742			.80		
1 1/4	521-020	0	1.84	14	29	—			.60		
	521-1SB-020	1	1.93	398	598	1,594	10.50	3.50	.91	50	400
	521-2SB-020	2	2.02	638	956	2,550			1.22		
1 1/2	521-024	0	2.18	12	24	—			.67		
	521-1SB-024	1	2.27	354	531	1,416	12.00	4.00	1.07	50	350
	521-2SB-024	2	2.36	566	849	2,265			1.47		
2	521-032	0	2.50	9	14	—			.83		
	521-1SB-032	1	2.60	404	607	1,617	15.00	5.00	1.45	50	250
	521-2SB-032	2	2.70	647	970	2,588			2.07		

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary ± 20%.



Series 600 Stainless Steel Hose

Construction: Annular / Close Pitch

Material: Hose: 321 Stainless Steel

Braid: 304L Stainless Steel — SB, see pg. 7

Characteristics: Light Weight / Extremely High Flexibility

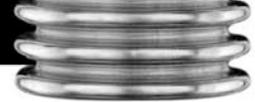
Packaging: Standard Cartons or Braided Hose-on-Reels

	LOW	MED	HIGH
Flexibility	○	○	●
Cycle Life	○	○	●
Working Pressure	○	●	○
Chemical Resistance	●	○	○
Wall Thickness	●	○	○

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. ^b (ft.)	Reel Qty. ^b (ft.)
				Working	Test	Nominal Burst	Dynamic	Static			
1/4	621-004	0	.50	180	270	—			.09		
	621-1SB-004	1	.57	2,082	3,122	8,326	3.00	1.00	.17	100	500
	621-2SB-004	2	.64	3,331	4,997	13,324			.25		
3/8	621-006	0	.67	100	150	—			.14		
	621-1SB-006	1	.74	1,501	2,251	6,004	3.50	1.25	.26	100	500
	621-2SB-006	2	.81	2,401	3,600	9,604			.38		
1/2	621-008	0	.82	80	120	—			.23		
	621-1SB-008	1	.89	1,075	1,613	4,301	4.00	1.50	.35	100	500
	621-2SB-008	2	.96	1,720	2,580	6,881			.47		
3/4	621-012	0	1.21	70	105	—			.34		
	621-1SB-012	1	1.28	792	1,188	3,168	6.00	2.25	.54	100	500
	621-2SB-012	2	1.35	1,267	1,901	5,069			.74		
1	621-016	0	1.48	40	60	—			.37		
	621-1SB-016	1	1.55	571	857	2,285	7.00	2.75	.60	100	450
	621-2SB-016	2	1.63	914	1,371	3,656			.83		
1 1/4	621-020	0	1.86	25	38	—			.76		
	621-1SB-020	1	1.93	531	797	2,125	8.00	3.00	1.07	50	400
	621-2SB-020	2	2.02	850	1,275	3,400			1.38		
1 1/2	621-024	0	2.19	20	30	—			.84		
	621-1SB-024	1	2.28	472	708	1,887	9.00	3.50	1.24	50	350
	621-2SB-024	2	2.37	755	1,132	3,020			1.64		
2	621-032	0	2.51	15	23	—			1.00		
	621-1SB-032	1	2.61	505	758	2,022	10.25	4.00	1.62	50	250
	621-2SB-032	2	2.71	809	1,213	3,235			2.24		

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary ± 20%.



Series 700 Stainless Steel Hose

Construction: Annular / Standard Pitch — **Open Pitch** available upon request, consult factory

Material: 1/4"-6" **Hose:** 321 and 316L Stainless Steel **Braid:** 304L Stainless Steel — SB, see pg. 7
 8"-12" **Hose:** 321 and 316L Stainless Steel **Braid:** 304 Stainless Steel — SB, see pg. 7
 14" **Hose:** 304 and 316 Stainless Steel **Braid:** 304 Stainless Steel — SB, see pg. 7

Characteristics: Medium Weight / Medium Flexibility

Packaging: Standard Cartons or Braided Hose-on-Reels

	LOW	MED	HIGH
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	●	○
Wall Thickness	○	●	○

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. ^b (ft.)	Reel Qty. ^b (ft.)
				Working	Test	Nominal Burst	Dynamic	Static			
1/4 ^d	7xx-004 ^c	0	.48	180	270	—			.09		
	7xx-1SB-004	1	.57	2,116	3,844	10,250	5.00	1.00	.17	100	500
	7xx-2SB-004	2	.64	3,125	4,687	12,500			.26		
3/8 ^d	7xx-006 ^c	0	.63	100	150	—			.13		
	7xx-1SB-006	1	.74	1,501	2,251	6,004	5.50	1.25	.25	100	500
	7xx-2SB-006	2	.81	2,401	3,602	9,604			.36		
1/2	7xx-008 ^c	0	.82	80	120	—			.23		
	7xx-1SB-008	1	.89	1,075	1,613	4,301	6.00	1.50	.34	100	500
	7xx-2SB-008	2	.96	1,720	2,580	6,880			.46		
3/4	7xx-012 ^c	0	1.21	70	105	—			.39		
	7xx-1SB-012	1	1.28	792	1,188	3,168	8.00	2.25	.59	100	500
	7xx-2SB-012	2	1.35	1,267	1,901	5,069			.79		
1	7xx-016 ^c	0	1.51	40	60	—			.53		
	7xx-1SB-016	1	1.58	571	857	2,285	9.00	2.75	.75	100	450
	7xx-2SB-016	2	1.65	914	1,370	3,654			.98		
1 1/4	7xx-020 ^c	0	1.85	25	38	—			.76		
	7xx-1SB-020	1	1.93	531	797	2,125	10.50	3.50	1.07	50	400
	7xx-2SB-020	2	2.02	850	1,274	3,398			1.37		
1 1/2	7xx-024 ^c	0	2.19	20	30	—			.84		
	7xx-1SB-024	1	2.28	472	708	1,887	12.00	4.00	1.23	50	350
	7xx-2SB-024	2	2.37	755	1,133	3,021			1.63		
2	7xx-032 ^c	0	2.60	15	23	—			.90		
	7xx-1SB-032	1	2.72	516	774	2,064	15.00	5.00	1.52	50	250
	7xx-2SB-032	2	2.84	826	1,239	3,302			2.14		
2 1/2	7xx-040 ^c	0	3.23	12	18	—			1.16		
	7xx-1SB-040	1	3.33	387	581	1,548	20.00	8.00	1.86	25 ^e	na
	7xx-2SB-040	2	3.43	619	929	2,477			2.56		
3	7xx-048 ^c	0	3.78	10	15	—			1.21		
	7xx-1SB-048	1	3.88	316	474	1,264	22.00	9.00	2.00	25 ^e	na
	7xx-2SB-048	2	3.98	506	758	2,022			2.80		
4	7xx-064 ^c	0	4.85	8	12	—			1.69		
	7xx-1SB-064	1	4.98	232	348	927	27.00	13.00	2.68	25 ^e	na
	7xx-2SB-064	2	5.10	371	557	1,485			3.68		
5	7xx-080 ^c	0	5.90	6	9	—			2.50		
	7xx-1SB-080	1	6.03	191	286	764	31.00	18.00	3.75	25 ^e	na
	7xx-2SB-080	2	6.15	306	458	1,222			5.00		
6	7xx-096 ^c	0	6.87	5	8	—			3.47		
	7xx-1SB-096	1	7.10	165	247	660	36.00	19.00	4.75	25 ^e	na
	7xx-2SB-096	2	7.33	264	396	1,056			6.04		
8	7xx-128 ^c	0	9.09	6	9	—			5.56		
	7xx-1SB-128	1	9.19	234	350	934	40.00	20.00	9.44	25	na
	7xx-2SB-128	2	9.28	374	561	1,495			13.36		
10	7xx-160 ^c	0	11.18	5	8	—			6.80		
	7xx-1SB-160	1	11.32	230	344	918	50.00	25.00	12.90	12-15	na
	7xx-2SB-160	2	11.45	367	551	1,469			19.00		
12	7xx-192 ^c	0	13.23	3	5	—			9.02		
	7xx-1SB-192	1	13.37	161	241	643	60.00	30.00	14.83	12-15	na
	7xx-2SB-192	2	13.50	257	386	1,029			20.64		
14	7xx-224 ^c	0	14.70	3	5	—			14.10		
	7xx-1SB-224	1	14.84	119	178	476	70.00	35.00	21.70	10.5	na
	7xx-2SB-224	2	14.98	190	285	760			29.30		

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary ± 20%.

c. For xx specify 21 for 321 stainless steel or 16 for 316L stainless steel.

d. Geometry of 1/4" and 3/8" hose is slightly modified; original geometry still available under 8XX series.

e. Segmented length.



Stainless Steel Standard Braid

Construction: Tubular — Braid and Braided Braid

Material: 304L Stainless Steel in stock (SB-304) — 321 (SB-321) and 316L (SB-316) available — other alloys available upon request

Use for: Series 500, 600, and 700 Stainless Steel Hose

Packaging: Standard Cartons

Nom. Size (in.)	Part Number	Braid Diameter (in.)	Braid Construction	Maximum Pressure @70°F(PSIG) ^a		Braid Coverage (%)	Weight per Foot (lb.)	Carton Qty. ^b (ft.)
				Working	Nominal Burst			
1/4	1SB-004	0.50	24 x 5 x .014	2,562	10,250	89	.08	110
3/8	1SB-006	0.67	24 x 7 x .014	1,501	6,004	91	.12	110
1/2	1SB-008	0.82	24 x 7 x .014	1,075	4,301	82	.12	110
3/4	1SB-012	1.21	36 x 8 x .014	792	3,168	90	.20	110
1	1SB-016	1.51	36 x 9 x .014	571	2,285	85	.23	110
1 1/4	1SB-020	1.85	48 x 7 x .016	531	2,125	83	.31	110
1 1/2	1SB-024	2.19	48 x 9 x .016	472	1,887	87	.40	110
2	1SB-032	2.60	48 x 9 x .020	516	2,064	89	.62	110
2 1/2	1SB-040	3.23	72 x 7 x .020	387	1,548	86	.70	110
3	1SB-048	3.78	72 x 8 x .020	316	1,264	85	.80	110
4	1SB-064	4.85	72 x 10 x .020	232	927	84	1.00	110
5	1SB-080	5.90	72 x 8 x .025	191	764	74	1.25	110
6	1SB-096	6.87	96 x 12 x .020	165	660	90	1.60	100
8	1SB-128 ^c	9.09	96 x (21 x .024)	234	934	96	3.87	100
10	1SB-160 ^c	11.18	96 x (25 x .028)	230	918	98	6.05	100
12	1SB-192 ^c	13.23	96 x (25 x .028)	161	643	97	5.81	100
14	1SB-224 ^c	14.70	96 x (25 x .028)	119	476	99	7.89	100

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary \pm 20%.

c. Braided braid.



Series 800 Stainless Steel Hose

Construction: Annular / Close Pitch

Material: Hose: 316L Stainless Steel

Braid: 304L Stainless Steel — SHB, see pg. 9

Characteristics: Heavy Weight / Medium Flexibility

Packaging: Standard Cartons or Braided Hose-on-Reels

	LOW	MED	HIGH
Flexibility	○	●	○
Cycle Life	○	○	●
Working Pressure	○	○	●
Chemical Resistance	○	○	●
Wall Thickness	○	○	●

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. ^b (ft.)	Reel Qty. ^b (ft.)
				Working	Test	Nominal Burst	Dynamic	Static			
1/4	8xx-004 ^c	0	.50	180	270	—			.09		
	8xx-1SHB-004	1	.57	2,562	3,844	10,250	5.00	1.00	.17	100	500
	8xx-2SHB-004	2	.64	4,099	6,150	16,400			.26		
3/8	8xx-006 ^c	0	.67	100	150	—			.13		
	8xx-1SHB-006	1	.74	1,501	2,251	6,004	5.50	1.25	.25	100	500
	8xx-2SHB-006	2	.81	2,401	3,602	9,604			.36		
1/2	8xx-008 ^c	0	.82	80	120	—			.39		
	8xx-1SHB-008	1	.92	2,194	3,291	8,777	8.00	1.50	.63	100	500
	8xx-2SHB-008	2	1.02	3,510	5,265	14,040			.87		
3/4	8xx-012 ^c	0	1.21	70	105	—			.48		
	8xx-1SHB-012	1	1.31	1,311	1,967	5,244	8.00	2.00	.79	100	500
	8xx-2SHB-012	2	1.41	2,098	3,147	8,392			1.10		
1	8xx-016 ^c	0	1.50	40	60	—			.79		
	8xx-1SHB-016	1	1.60	1,069	1,604	4,276	9.00	3.00	1.20	100	450
	8xx-2SHB-016	2	1.70	1,710	2,566	6,840			1.61		
1 1/4	8xx-020 ^c	0	1.85	33	50	—			1.02		
	8xx-1SHB-020	1	1.97	1,110	1,666	4,443	10.00	3.25	1.66	40-45	400
	8xx-2SHB-020	2	2.10	1,776	2,665	7,040			2.30		
1 1/2	8xx-024 ^c	0	2.17	20	30	—			1.36		
	8xx-1SHB-024	1	2.30	868	1,302	3,472	10.00	3.25	2.11	40-45	350
	8xx-2SHB-024	2	2.43	1,388	2,082	5,552			2.86		
2	8xx-032 ^c	0	2.51	15	23	—			1.60		
	8xx-1SHB-032	1	2.64	810	1,215	3,240	11.50	5.38	2.56	40-45	250
	8xx-2SHB-032	2	2.76	1,296	1,944	5,184			3.52		
2 1/2	8xx-040 ^c	0	3.23	10	15	—			2.00		
	8xx-1SHB-040	1	3.36	578	867	2,312	24.00	7.00	3.12	9-12	na
	8xx-2SHB-040	2	3.49	925	1,387	3,700			3.30		
3	8xx-048 ^c	0	3.78	10	15	—			2.97		
	8xx-1SHB-048	1	3.91	540	810	2,160	28.00	7.50	4.42	9-12	na
	8xx-2SHB-048	2	4.03	864	1,295	3,456			5.87		
4	8xx-064 ^c	0	4.81	8	12	—			3.10		
	8xx-1SHB-064	1	4.93	333	500	1,332	40.00	20.00	4.55	9-12	na
	8xx-2SHB-064	2	5.05	533	800	2,132			6.00		
6	8xx-096 ^c	0	6.87	5	8	—			3.85		
	8xx-1SHB-096	1	7.10	266	398	1,062	95.00	24.00	6.45	9-12	na
	8xx-2SHB-096	2	7.33	425	638	1,700			9.05		

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary ± 20%.

c. For xx specify 21 for 321 stainless steel or 16 for 316L stainless steel.



Stainless Steel High Pressure Braid

Construction: Tubular

Material: 304L Stainless Steel

Use for: Series 800 Stainless Steel Hose

Packaging: Standard Cartons

Nom. Size (in.)	Part Number	Braid Diameter (in.)	Braid Construction	Maximum Pressure @70°F(PSIG) ^a		Braid Coverage (%)	Weight per Foot (lb.)	Carton Qty. ^b (ft.)
				Working	Nominal Burst			
1/4	1SHB-004	0.50	24 x 5 x .014	2,562	10,250	89	.08	110
3/8	1SHB-006	0.67	24 x 5 x .014	1,501	6,004	91	.12	110
1/2	1SHB-008	0.82	24 x 7 x .020	2,194	8,777	96	.24	110
3/4	1SHB-012	1.21	36 x 6 x .020	1,311	5,242	92	.31	110
1	1SHB-016	1.51	36 x 8 x .020	1,069	4,276	95	.41	110
1 1/4	1SHB-020	1.85	48 x 6 x .025	1,110	4,443	95	.64	110
1 1/2	1SHB-024	2.19	48 x 7 x .025	868	3,473	95	.75	110
2	1SHB-032	2.51	48 x 9 x .025	810	3,240	95	.96	110
2 1/2	1SHB-040	3.23	72 x 7 x .025	578	2,311	96	1.12	110
3	1SHB-048	3.78	72 x 9 x .025	540	2,160	88	1.45	110
4	1SHB-064	4.81	72 x 9 x .025	333	1,334	89	1.45	110
6	1SHB-096 ^c	6.87	96 x (13 x .025)	266	1,062	89	2.60	55

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary \pm 20%.

c. Braided braid.



Series 900 Stainless Steel Hose

Construction: Annular / Close Pitch

Material: Hose: 316L Stainless Steel

Braid: 304L Stainless Steel — HTSB, see below

Characteristics: Heavy Weight / Medium Flexibility

Packaging: Available Double Braided Hose Cut to Length

	LOW	MED	HIGH
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	○	●
Chemical Resistance	○	○	●
Wall Thickness	○	○	●

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. (ft.)
				Working	Test	Nominal Burst	Dynamic	Static		
1/4	916-004	0	.50	180	270	—			.20	
	916-1HTSB-004	1	.58	2,754	4,131	11,017	12.00	6.00	.28	cut to length
	916-2HTSB-004	2	.64	4,406	6,609	17,627			.36	
3/8	916-006	0	.67	100	150	—			.31	
	916-1HTSB-006	1	.75	1,921	2,881	7,682	12.00	6.00	.43	cut to length
	916-2HTSB-006	2	.83	3,073	4,610	12,291			.55	
1/2	916-008	0	.82	80	120	—			.40	
	916-1HTSB-008	1	.92	2,194	3,291	8,777	14.00	7.00	.58	cut to length
	916-2HTSB-008	2	1.02	3,510	5,265	14,040			.76	
3/4	916-012	0	1.22	70	105	—			.65	
	916-1HTSB-012	1	1.34	1,994	2,991	7,980	15.00	7.50	.92	cut to length
	916-2HTSB-012	2	1.46	3,192	4,788	12,769			1.19	
1	916-016	0	1.52	40	60	—			1.02	
	916-1HTSB-016	1	1.65	1,599	2,398	6,397	16.00	8.00	1.48	cut to length
	916-2HTSB-016	2	1.77	2,558	3,830	10,234			1.94	
1 1/4	916-020	0	1.85	25	38	—			1.56	
	916-1HTSB-020	1	1.97	1,317	1,975	5,270	18.00	9.00	2.02	cut to length
	916-2HTSB-020	2	2.09	2,107	3,161	8,431			2.48	
1 1/2	916-024	0	2.19	20	30	—			2.01	
	916-1HTSB-024	1	2.31	1,062	1,592	4,247	19.00	9.50	2.65	cut to length
	916-2HTSB-024	2	2.43	1,698	2,547	6,795			3.30	
2	916-032	0	2.51	15	23	—			2.43	
	916-1HTSB-032	1	2.64	842	1,262	3,368	24.00	12.00	3.17	cut to length
	916-2HTSB-032	2	2.77	1,346	2,019	5,388			3.91	

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

Stainless Steel High Pressure Braid

Construction: Tubular

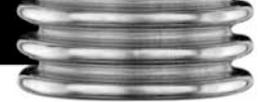
Material: 304L Stainless Steel

Use for: Series 900 Stainless Steel Hose

Packaging: Available in Cut Lengths

Nom. Size (in.)	Part Number	Braid Diameter (in.)	Braid Construction	Maximum Pressure @70°F (PSIG) ^a		Braid Coverage (%)	Weight per Foot (lb.)	Carton Qty. (ft.)
				Working	Nominal Burst			
1/4	1HTSB-004	.50	24 x 4 x .016	2,754	11,017	83	.09	cut to length
3/8	1HTSB-006	.67	24 x 6 x .016	1,921	7,682	89	.13	
1/2	1HTSB-008	.82	24 x 7 x .020	2,162	8,777	96	.24	
3/4	1HTSB-012	1.22	48 x 4 x .024	1,994	7,980	93	.38	cut to length
1	1HTSB-016	1.52	48 x 5 x .024	1,599	6,397	94	.48	
1 1/4	1HTSB-020	1.85	48 x 6 x .024	1,317	5,270	93	.58	
1 1/2	1HTSB-024	2.19	48 x 7 x .024	1,062	4,247	93	.67	cut to length
2	1HTSB-032	2.51	48 x 8 x .024	842	3,368	93	.77	

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.



Series 740 Monel Hose

Construction: Annular / Standard Pitch

Material: Hose: 400 Monel

Braid: 400 Monel — MB, see below

Characteristics: Medium Weight / Medium Flexibility

Packaging: Standard Cartons

	LOW	MED	HIGH
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	○	●
Wall Thickness	○	●	○

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^{ab}			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. ^c (ft.)	Reel Qty. (ft.)
				Working	Test	Nominal Burst	Dynamic	Static			
1/4	740-004	0	.50	144	216	—			.09		
	740-1MB-004	1	.58	1,882	2,822	7,527	5.00	1.00	.19	100	na
	740-2MB-004	2	.66	3,010	4,515	12,043			.29		
1/2	740-008	0	.82	64	96	—			.39		
	740-1MB-008	1	.90	701	1,051	2,805	8.00	1.50	.63	100	na
	740-2MB-008	2	.98	1,121	1,793	4,483			.87		
3/4	740-012	0	1.21	56	84	—			.48		
	740-1MB-012	1	1.29	542	814	2,171	8.00	2.00	.79	100	na
	740-2MB-012	2	1.38	867	1,301	3,469			1.10		
1	740-016	0	1.50	32	48	—			.79		
	740-1MB-016	1	1.58	464	696	1,857	9.00	3.00	1.00	100	na
	740-2MB-016	2	1.66	742	1,114	2,970			1.20		
1 1/2	740-024	0	2.19	16	24	—			.84		
	740-1MB-024	1	2.27	330	495	1,322	12.00	4.00	1.28	50	na
	740-2MB-024	2	2.35	528	792	2,112			1.72		
2	740-032	0	2.51	12	18	—			1.04		
	740-1MB-032	1	2.59	316	474	1,266	15.00	5.00	1.72	50	na
	740-2MB-032	2	2.67	506	758	2,022			2.40		
3	740-048	0	3.78	8	12	—			1.21		
	740-1MB-048	1	3.88	197	295	788	22.00	9.00	2.04	12-15	na
	740-2MB-048	2	3.98	314	471	1,258			2.87		

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. For chlorine transfer applications, consult factory for additional data.

c. Actual length may vary ± 20%.

Monel Braid

Construction: Tubular

Material: Monel (MB)

Use for: Series 740 Monel Hose

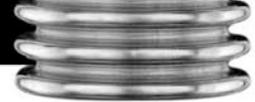
Packaging: Standard Cartons

Nom. Size (in.)	Part Number	Braid Diameter (in.)	Braid Construction	Maximum Pressure @70°F(PSIG) ^{ab}		Braid Coverage (%)	Weight per Foot (lb.)	Carton Qty. ^c (ft.)
				Working	Nominal Burst			
1/4	1MB-004	0.50	24 x 4 x .016	1,882	7,527	84	.10	110
1/2	1MB-008	0.82	24 x 5 x .016	701	2,805	72	.12	110
3/4	1MB-012	1.21	36 x 6 x .016	542	2,171	82	.22	110
1	1MB-016	1.51	36 x 8 x .016	464	1,857	86	.29	110
1 1/2	1MB-024	2.19	48 x 9 x .016	330	1,322	87	.44	110
2	1MB-032	2.70	48 x 14 x .016	316	1,266	97	.68	110
3	1MB-048	3.78	48 x 11 x .020	197	788	82	.83	110

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. For chlorine transfer applications, consult factory for additional data.

c. Actual length may vary ± 20%.



Series 794 Bronze Hose

Construction: Annular / Standard Pitch

Material: Hose: Bronze

Braid: Bronze — BB, see pg. 13

Characteristics: Medium Weight / Medium Flexibility

Packaging: Standard Cartons or Braided Hose-on-Reels

	LOW	MED	HIGH
Flexibility	○	●	○
Cycle Life	○	●	○
Working Pressure	○	●	○
Chemical Resistance	○	●	○
Wall Thickness	○	●	○

Nom. I.D. (in.)	Part Number	Braid Layers	Nom. O.D. (in.)	Maximum Pressure @70°F (PSIG) ^a			Centerline Bend Radius (in.)		Weight per Foot (lb.)	Carton Qty. ^b (ft.)	Reel Qty. ^b (ft.)
				Working	Test	Nominal Burst	Dynamic	Static			
1/4	794-004	0	.49	100	150	—			.13		
	794-1BB-004	1	.57	1,035	1,553	4,142	5.50	1.00	.23	100	500
	794-2BB-004	2	.65	1,656	2,649	6,627			.33		
3/8	794-006	0	.67	40	75	—			.25		
	794-1BB-006	1	.75	685	1,027	2,738	6.00	1.25	.36	100	500
	794-2BB-006	2	.83	1,096	1,644	4,381			.47		
1/2	794-008	0	.82	40	60	—			.38		
	794-1BB-008	1	.90	706	1,059	2,825	7.00	1.50	.57	100	500
	794-2BB-008	2	.98	1,130	1,695	4,520			.76		
3/4	794-012	0	1.21	30	36	—			.50		
	794-1BB-012	1	1.31	577	865	2,307	8.00	2.25	.83	100	500
	794-2BB-012	2	1.41	923	1,384	3,691			1.16		
1	794-016	0	1.51	20	30	—			.68		
	794-1BB-016	1	1.61	470	705	1,881	10.00	3.00	1.12	100	450
	794-2BB-016	2	1.71	752	1,128	3,009			1.56		
1 1/4	794-020	0	1.85	15	23	—			.80		
	794-1BB-020	1	1.95	361	541	1,443	12.00	3.50	1.31	50	400
	794-2BB-020	2	2.05	577	865	2,309			1.82		
1 1/2	794-024	0	2.18	10	15	—			1.03		
	794-1BB-024	1	2.31	329	493	1,317	13.50	4.00	1.73	50	350
	794-2BB-024	2	2.43	526	789	2,107			2.43		
2	794-032	0	2.50	8	12	—			1.81		
	794-1BB-032	1	2.63	317	475	1,267	17.00	5.00	2.73	50	250
	794-2BB-032	2	2.75	507	760	2,027			3.65		
2 1/2	794-040	0	3.18	8	12	—			1.39		
	794-1BB-040	1	3.31	272	408	1,090	22.00	8.00	2.66	12-15	na
	794-2BB-040	2	3.43	435	653	1,744			3.93		
3	794-048	0	3.65	10	15	—			1.44		
	794-1BB-048	1	3.78	201	301	805	24.00	12.00	2.84	12-15	na
	794-2BB-048	2	3.91	322	482	1,288			4.11		
4	794-064	0	4.81	8	12	—			3.45		
	794-1BB-064	1	4.94	142	213	568	26.00	14.00	5.03	12-15	na
	794-2BB-064	2	5.06	227	341	909			6.61		

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary \pm 20%.



Bronze Braid

Construction: Tubular

Material: Bronze (BB)

Use for: Series 794 Bronze Hose

Packaging: Standard Cartons

Nom. Size (in.)	Part Number	Braid Diameter (in.)	Braid Construction	Maximum Pressure @70°F(PSIG) ^a		Braid Coverage (%)	Weight per Foot (lb.)	Carton Qty. ^b (ft.)
				Working	Nominal Burst			
1/4	1BB-004	0.50	24 x 4 x .016	1,035	4,142	84	.10	110
3/8	1BB-006	0.67	24 x 5 x .016	685	2,738	81	.12	110
1/2	1BB-008	0.82	24 x 8 x .016	706	2,825	94	.19	110
3/4	1BB-012	1.21	36 x 6 x .020	577	2,307	92	.33	110
1	1BB-016	1.51	36 x 8 x .020	470	1,881	95	.44	110
1 1/4	1BB-020	1.85	48 x 7 x .020	361	1,443	93	.52	110
1 1/2	1BB-024	2.18	48 x 6 x .025	329	1,317	89	.69	110
2	1BB-032	2.50	48 x 8 x .025	317	1,267	92	.93	110
2 1/2	1BB-040	3.23	48 x 11 x .025	272	1,090	97	1.27	110
3	1BB-048	3.78	48 x 11 x .025	201	805	92	1.27	110
4	1BB-064	4.85	72 x 9 x .025	142	568	90	1.58	110

a. Pressures listed have been reduced to account for welding as the method of attachment. Other methods such as brazing, neck-down designs or crimping will result in different pressures. Contact the factory for details.

b. Actual length may vary \pm 20%.



SELECTION CRITERIA

The selection of flexible metal hose for a particular application is influenced by six primary considerations:

- Temperature
- Pressure
- Media
- Size
- End Fittings
- Motion

To make the best choice for a specific application, consider all the relevant operating factors against the properties of the various types of flexible metal hoses.

Temperature

The physical properties of any material varies with temperature. Limits for operating temperature are affected by the working pressure, the type of media being conveyed and the nature of the application. By careful selection of material, it is possible to provide flexible metal hose for a wide range of operating temperatures. The choice of hose type, metal alloy, end fitting and method of fitting attachment determines the temperature limit.

Pressure

The nominal pressure ratings of flexible metal hose varies according to type, material and size. Specific pressure ratings for each type of flexible metal hose are found in each section of this catalog. Under actual working conditions, pressure is affected by many other factors such as temperature, pulsating conditions and bending stresses.

Media

The type of media being conveyed is an important consideration in the selection process. Metal hose is subject to corrosion by both the material flowing through it and the outside environment. For almost all applications, a metal hose can be selected that is resistant to the intended media. Since metal hose is a thin-walled product, it will not have the same total life as heavier walled tube or pipe of the same material.

Size

The size of flexible metal hose is specified by the nominal diameter. The existing piping will normally dictate the size of the metal hose for a particular application. However, flow rate, velocity and pressure drop considerations may also influence the selection of the hose size.

End Fittings

The use of flexible metal hose is complimented by the extensive range of end fittings that are available. Such end fittings may be male or female pipe threads, unions, flanges, flared tube fittings or other specially designed connectors. End fittings are attached by welding, silver brazing, soldering and occasionally by mechanical means, depending on the type of hose and the alloy. For further detail on the appropriate type of end fitting please consult your fabricating distributor.

Motion

Flexible metal hose is generally used in four types of applications.

- To correct problems of misalignment.
- To provide flexibility in manual handling operations.
- To compensate for regular or constant movement.
- To absorb vibration.

In all types, careful hose selection, design of the assembly and installation are important for optimal service life. The flexibility of a hose is determined by its mechanical design and the inherent flexibility of its material.

TEMPERATURE

Temperature Adjustment Factors

In general, the strength and therefore the pressure rating of metal hose decreases as the temperature increases. Thus, as the operating temperature of a metal hose assembly increases, the maximum allowable working pressure of the assembly decreases. The pressure ratings shown in the specifications charts for corrugated and interlocked hose are valid at 70°F. Elevated service temperatures will decrease these pressure ratings by the factors shown in the following chart for the alloy used in the braid wire. What also must be considered is the maximum working temperature of the end fittings, of the hose and their method of attachment.

For example to calculate the maximum working pressure for:

- 3/4" ID, 321 stainless steel corrugated hose
- with single-braided, 304L braid
- at 800°F.

From the corrugated metal hose specification table, the maximum working pressure at 70°F is 792 PSIG. Multiply 792 PSIG by 0.73. The maximum working pressure at 800°F is 578 PSIG.

Temperature Adjustment Factor Based on Braid Alloy

Temperature (°F)	304/304L Stainless Steel	316 L 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			
1,000	.60	.73	.60			
1,100	.58	.67	.58			
1,200	.53	.61	.53			
1,300	.44	.55	.46			
1,400	.35	.48	.42			
1,500	.26	.39	.37			

Saturated Steam Pressure To Temperature (PSIG)

Saturated Steam (PSIG)	Temp (°F)	Saturated Steam (PSIG)	Temp (°F)	Saturated Steam (PSIG)	Temp (°F)
0	212	150	366	450	460
10	238	175	377	475	465
20	259	200	388	500	470
30	274	225	397	550	480
40	287	250	406	600	489
50	298	275	414	700	505
60	307	300	422	800	520
75	320	325	429	900	534
80	324	350	436	1000	546
90	331	375	442	1250	574
100	338	400	448	1500	606
125	353	425	454	2500	669

Saturated Steam Pressure To Temperature (Hg)

Saturated Steam Vacuum (in. of Hg)	Temp (°F)
—	0
29.84	20
29.74	32
29.67	40
29.39	60
28.89	80
27.99	100
26.48	120
24.04	140
20.27	160
15.20	180
6.46	200

PRESSURE LOSS AND FLOW VELOCITY INFORMATION

Pressure Loss

For the same flow characteristics, the pressure loss is higher in metal hoses than rigid piping, due to the profile of the corrugations. As a rough estimation, expect the pressure loss in corrugated hoses to be 150 percent higher than in new, smooth steel pipes.

Flow Velocity Consideration

The flow velocity in corrugated metal hose should never exceed 150 ft./sec. for gas or 75 ft./sec. for liquids. When a hose is installed in a bent condition, the flow values should be reduced proportionally to the degree of the bend. Where the flow velocity exceeds these rates, an interlocked metal hose liner or larger hose I.D. is recommended.

CLASSIFICATION OF MOTION

Random Motion

Such motion is non-predictable and occurs from the manual handling of a hose assembly. Care must be taken to prevent over-bending of the hose and to avoid external abrasion of the wire braid. An armor covering of interlocked hose provides protection against these abuses.

Axial Motion

This type of motion occurs when there is extension or compression of the hose along its longitudinal axis. This class of motion is restricted to unbraided corrugated hose only and is accommodated by traveling loops (see pg. 18) or bellows specifically designed for this purpose.

Angular Motion

This type of motion occurs when one end of a hose assembly is deflected in a simple bend with the ends not remaining parallel.

To find the live hose length:

$$L = \pi R \theta / 180 + 2(s)$$

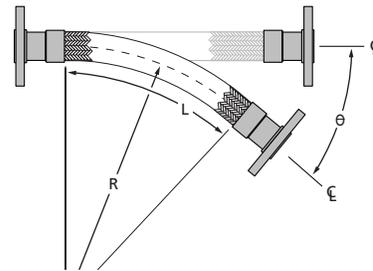
L = Live Hose Length (inches)

$\pi = 3.1416$

R = Minimum Centerline Bend Radius — Dynamic (in.)

θ = Angular Deflection (degrees)

S = Outside Diameter of Hose



CLASSIFICATION OF MOTION (continued)

Offset Motion

Offset motion occurs when one end of the hose assembly is deflected in a plane perpendicular to the longitudinal axis with the ends remaining parallel. This movement can be due to a one-time (static) bend or movement which repeatedly occurs slowly over time (such as thermal expansion).

- The appropriate formula to use to calculate Live Hose Length depends on the condition of the moving end.
- When the offset motion occurs to both sides of the hose centerline, use total travel in the formula; i.e., $2 \times "T."$
- The offset distance "T" for constant flexing should never exceed 25 percent of the centerline bend radius "R."
- If the difference between "L" and "Lp" is significant, exercise care at installation to avoid stress on hose and braid at the maximum offset distance.

L = Live Hose Length (inches)

Lp = Projected Live Hose Length (inches)

R = Minimum Centerline Bend Radius — Dynamic (in.)

T = Offset Motion to One Side of Centerline (inches)

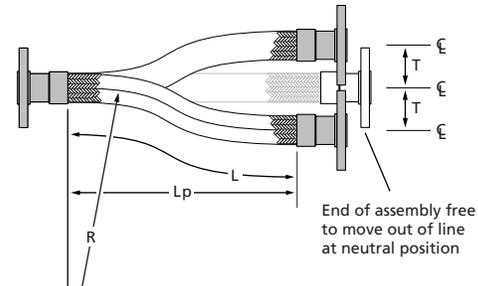
Minimum Bend Radius Occurs at Offset Position

Moving end is free to move "out of line" at neutral position.

To find the live hose length:

$$L = \sqrt{6(RT) + T^2}$$

$$Lp = \sqrt{L^2 - T^2}$$



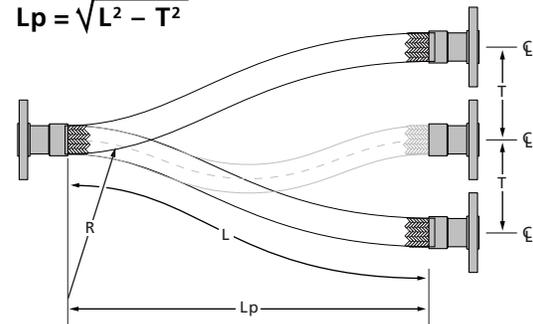
Minimum Bend Radius Occurs at Crowded Position

Moving end of hose is restricted to move only up and down as hose crosses neutral position.

To find the live hose length:

$$L = \sqrt{20(RT)}$$

$$Lp = \sqrt{L^2 - T^2}$$



CLASSIFICATION OF MOTION (continued)

Traveling Loops

In a piping system where axial movement must be accommodated or where the magnitude of the motion is in excess of the limits of an offset movement, the traveling loop configuration offers an ideal solution. In traveling loops, the centerline of a hose assembly is bent in a circular arc. Traveling loops accommodate movement in one of two ways. A constant radius traveling loop accommodates motion by varying the length of the arms of the assembly while the radius remains constant. A variable radius traveling loop accommodates motion by varying the bend radius of the hose assembly. Both types of traveling loops can be installed to absorb either horizontal or vertical movement. The constant radius traveling loop provides for greater movement while the variable radius traveling loop requires less installation space.

Traveling Loops

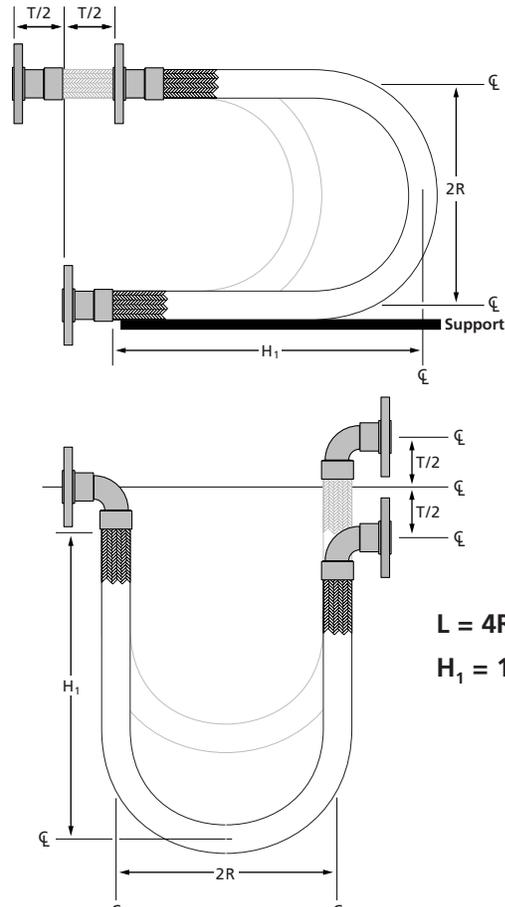
L = Live Hose Length (inches)

R = Minimum Centerline Bend Radius
for Constant Flexing (inches)

T = Total Travel (inches)

H = Hang Length of the Loop (inches)

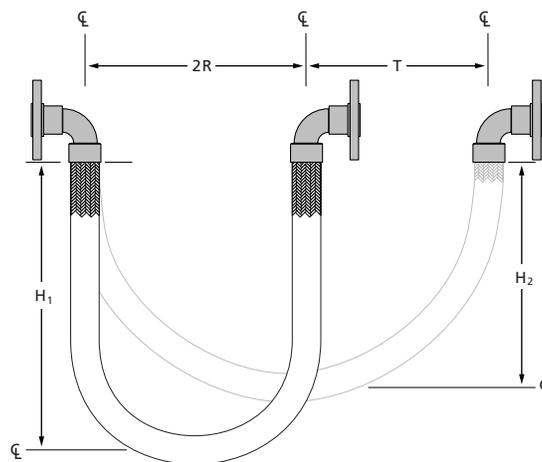
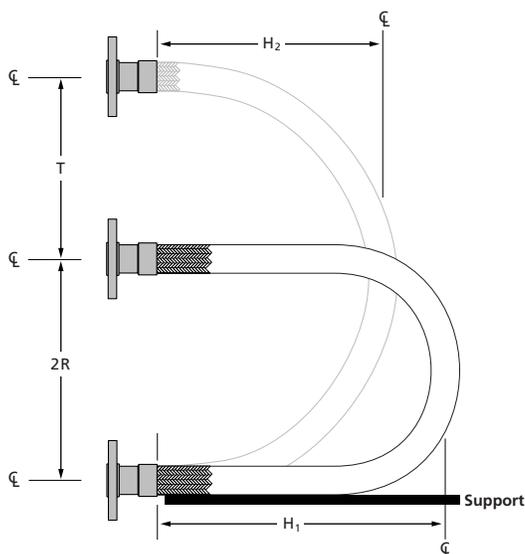
Constant Radius Traveling Loop — Class A



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

$$H_1 = 1.43R + T/2$$

Variable Radius Traveling Loop — Class B



$$L = 4R + 1.57T$$

$$H_1 = 1.43R + 0.79T$$

$$H_2 = 1.43R + 0.5T$$

ASSEMBLY INSTALLATION

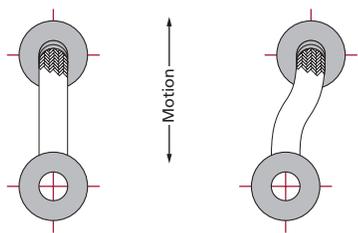
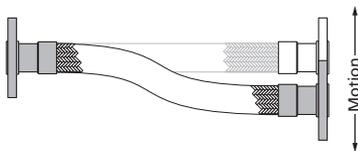
Penflex corrugated hose is engineered to provide maximum service life when properly installed. Improper installation, incorrect flexing or careless handling in an application will reduce the effective service life of the hose and cause premature failure of an assembly. The following installation and handling precautions should be observed to achieve optimum performance from your corrugated hose assemblies.

Avoid torque.

Do not twist the hose assembly during installation when aligning the bolt holes in a flange or in making up pipe threads. The utilization of lap joint flanges or pipe unions will minimize this condition. It is recommended that two wrenches be used in making the union connection; one to prevent the hose from twisting and the other to tighten the coupling.

In plane lateral offset installation.

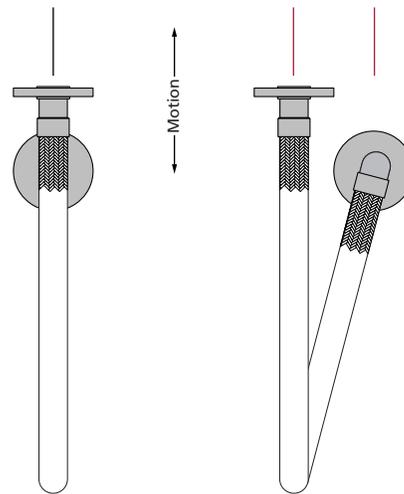
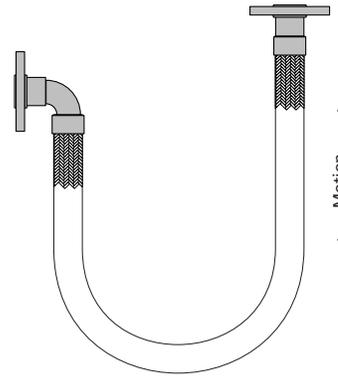
Prevent out-of-plane flexing in an installation. Always install the hose so that the flexing takes place in only one plane. This plane must be the plane in which the bending occurs.



Correct
in plane
flexing

Wrong
out of plane
flexing

In plane traveling loop installation.



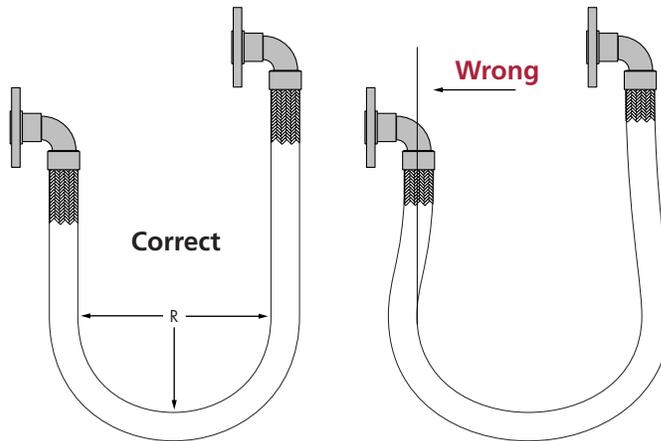
Correct
in plane
flexing

Wrong
out of plane
flexing

ASSEMBLY INSTALLATION (continued)

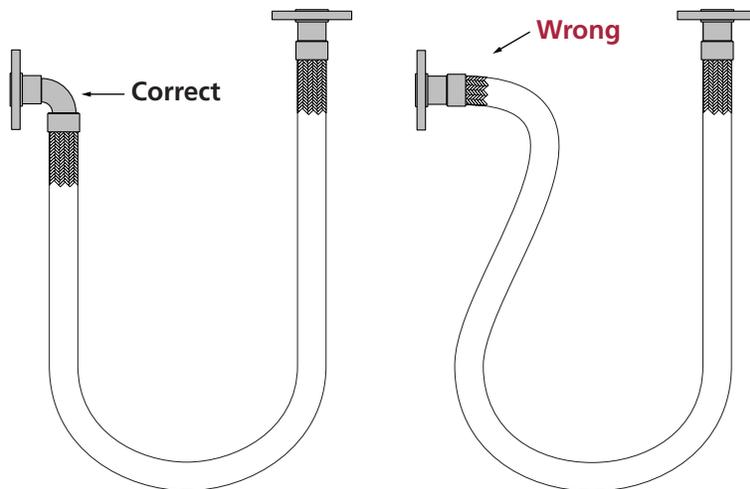
Avoid over bending.

The repetitive bending of a hose to a radius smaller than the radius listed in the specification tables for corrugated hose will result in premature hose failure. Always provide sufficient length to prevent over bending and to eliminate strain on the hose.



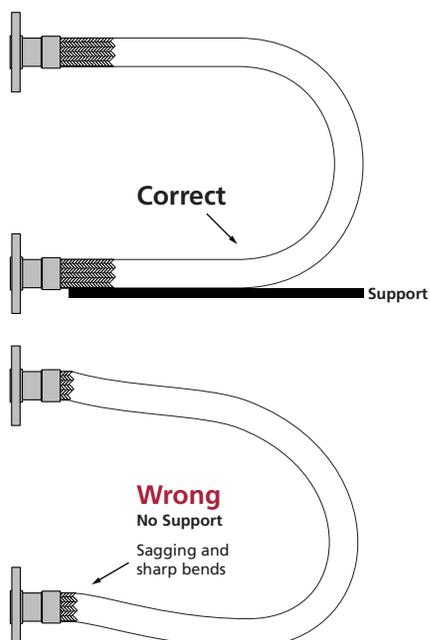
Avoid sharp bends.

Utilize sound geometric configurations that avoid sharp bends, especially near the end fittings of the assembly.



Provide support.

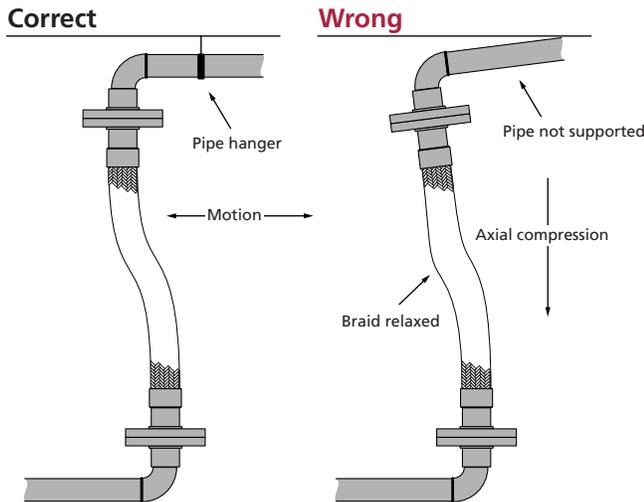
When installing the assembly in a horizontal loop, provide support for the arms to prevent the hose from sagging.



Do not extend or compress axially.

A piping system which utilizes metal hose to absorb movement must be properly anchored and/or guided.

Always support the piping to prevent excessive weight from compressing the hose and relaxing the braid tension.



Handle with care.

Avoid careless handling of the hose assembly. Always lift or carry metal hose to prevent abrasion damage particularly to braided corrugated hose. Store metal hose assemblies away from areas where it can be subjected to spillage, corrosive fumes or sprays, weld splatter, etc.

Do...

- follow any printed instructions included with the flexible connector.
- follow industry-recommended practices and use care in handling and installing flexible connector.
- install flexible connectors so that the bend is as close to the center of the connector as possible.
- observe the minimum bend radius as specified by the connector manufacturer.
- trial-fit threaded connections by hand, unmake and then make permanent.
- use a flexible connector of proper length to suit the installation.
- only wrench on the fitting hex flats as provided.
- design the installation to allow for ground movement after installation, such as settling or frost heave.
- install the proper length connector to allow a 2" straight run of hose at each end fitting.
- use pipe wrenches on both mating hexes to avoid twisting the hose.
- keep hose free from all objects and debris.
- handle and store connectors carefully prior to installation.
- check for leaks before covering the installation.
- install in such a manner that the connector can be removed.
- make sure the pressure rating of connector is not exceeded.

Don't...

- apply a wrench to a hose, collar or assembly.
- twist hose assemblies during installation or when aligning the bolt holes in a flange or when making up pipe threads.
- "pre-flex" a flexible connector to limber it up. Over-bending could cause damage and result in leakage.
- over-bend a flexible connector. A 45°-90° bend should be sufficient to install any flexible connector.
- install a flexible connector with the bend next to the end fittings. This could cause damage and result in leakage.
- lay the flexible connector on rocks or objects which could puncture the hose and cause leakage.
- attempt to stretch or compress a flexible connector to fit an installation.
- restrict flexibility by allowing connector to come into contact with other components or equipment during installation.

GLOSSARY

Abrasion: External damage to a hose assembly caused by its being rubbed on a foreign object.

Ambient or Atmospheric Conditions: The surrounding conditions, such as temperature, pressure and corrosion, to which a hose assembly is exposed.

Amplitude of Vibration and/or Lateral Movement: The distance a hose assembly deflects laterally to one side from its normal position, when this deflection occurs on both sides of the normal hose centerline.

Anchor: A restraint applied to a pipeline to control its motion caused by thermal growth.

Annular: Refers to the convolutions on a hose that are a series of complete circles or rings located at right angle to the longitudinal axis of the hose (sometimes referred to as bellows).

Application: The service conditions that determine how a metal hose assembly will be used.

Armor or Casing: Flexible interlocked tubing placed over the entire length or in short lengths at the end of a metal hose to protect it from physical damage and to limit the bending radius.

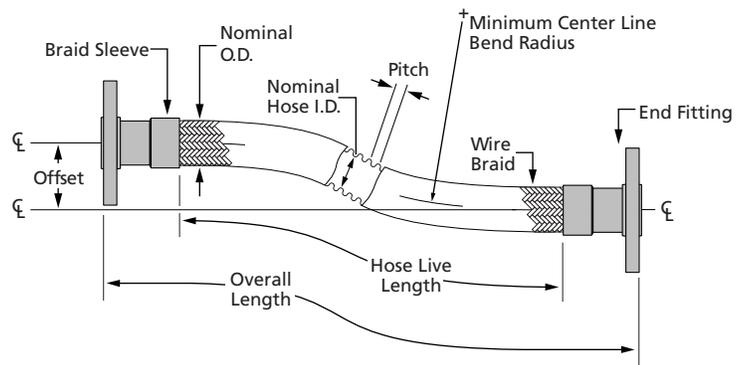
Attachment: The method of fixing end fittings to flexible metal hose — welding, brazing, soldering, swaging or mechanical.

Axial Movement: Compression or elongation of the hose along its longitudinal axis.

Basket Weave: A braid pattern in which the strands of wire alternately cross over and under two braid bands (two over — two under).

Bend Radius: The radius of a bend measured to the hose centerline.

Braid: A flexible wire sheath surrounding a metal hose that prevents the hose from elongation due to internal pressure. Braid is composed of a number of wires wrapped helically around the hose while at the same time going under and over each other in a basket weave fashion.



Braid Angle: The acute angle formed by the braid strands and the axis of the hose.

Braid Construction: Term applies to description of braid, i.e., 36 x 8 x .014, 304L SS.

36 = number of carriers or bands in a braid
8 = number of wires on each carrier
.014 = wire diameter in inches
304L = material, Type 304L stainless steel

Braid Sleeve, Braid Band or Ferrule: A ring made from tube or metal strip placed over the ends of a braided hose to contain the braid wires for attachment of fittings.

Braid Wear: Motion between the braid and corrugated hose which normally causes wear on the O.D. of hose.

Braided Braid: In this braid, the strands of wire on each carrier of the braiding machine are braided together, and then braided in normal fashion, hence the term braided braid.

Brazing: A process of joining metals using a non-ferrous filler metal, which melts above 800°F, yet less than the melting of the “parent metals” to be joined.

Butt Weld: A process in which the edges or ends of metal sections are butted together and joined by welding.

Casing: (See definition under Armor)

Controlled Flexing: Controlled flexing occurs when the hose is being flexed regularly, as in connections to moving components. Examples: Platen presses, thermal growth in pipe work.

Convolution: The annular or helical flexing member in corrugated or strip wound hose.

Corrosion: The chemical or electro-chemical attack of a media upon a hose assembly.

Cycle-Motion: The movement from normal to extreme position and return.

Developed Length: The length of a hose plus fitting (overall) required to meet the conditions of a specific application.

Diamond Weave: A braid pattern in which the strands alternately cross over one and under one of the strands (one over — one under). Also known as plain weave.

Dye Penetrant Inspection or Test: A method for detecting surface irregularities, such as cracks, voids, porosity, etc. The surface to be checked is coated with a red dye that will penetrate existing defects. Dye is removed from surface and a white developer is applied. If there is a defect in the surface being checked, the red dye remaining in it causes the white developer to be stained, thereby locating the defective area.

Displacement: The amount of motion applied to a hose defined as inches for parallel offset and degrees for radial misalignment.

Dog-Leg Assembly: Two hose assemblies joined by a common elbow.

Duplex Assembly: An assembly consisting of two hose assemblies — one inside the other — and connected at the ends.

Effective Thrust Area – Hose and Bellows: The cross-sectional area described by the outside diameter (at the tops of the convolutions) less two times the metal thickness of the hose or bellows.

Elastic (Intermittent Flexure): The smallest radius that a given hose can be bent to without permanent deformation of the metal in its flexing members (convolutions or corrugations).

Erosion: The wearing away of the inside convolutions of a hose caused by the flow of the media conveyed, such as wet steam, abrasive particles, etc.

Exposed Length: The amount of active (exposed) hose in an assembly. Does not include the length of fittings and ferrules.

Fatigue: Failure of the metal structure associated with, or due to, the flexing of metal hose or bellows.

Ferrule: (See definition for Braid Sleeve)

Fitting: A loose term applied to the nipple, flange, union, etc., attached to the end of a metal hose.

Flat Braid: Has a braid angle greater than 45° (See Braid Angle).

Flow Rate: Pertains to a volume of media being conveyed in a given time period, e.g., cubic feet per hour, pounds per second, gallons per minute, etc.

Frequency: The rate of vibration or flexure of a hose in a given time period, e.g., cycles per second (CPS), cycles per minute (CPM), cycles per day (CPD), etc.

Galvanic Corrosion: Corrosion that occurs on the less noble of two dissimilar metals in direct contact with each other in an electrolyte, e.g., water, sodium chloride in solution, sulphuric acid, etc.

Guide (For Piping): A device that supports a pipe radially in all directions, but allows free longitudinal movement.

Hardware: A loose term used to describe parts of a hose assembly other than the hose and braid, e.g., fittings, collars, valves, etc.

Helical: Used to describe a type of corrugated hose having one continuous convolution resembling a screw thread.

Helical Wire Armor: To provide additional protection against abrasion under rough operating conditions, metal hoses can be supplied with an external round or oval section wire spiral.

Inside Diameter: This refers to the free cross section of the hose and (in most cases) is identical to the nominal diameter.

Installation: Referring to the installed geometry of a hose assembly.

Interlocked Hose: Formed from profiled strip and wound into flexible metal tubing with no subsequent welding, brazing, or soldering. May be made pressure-tight by winding in strands of packing.

Intermittent Bend Radius: The designation for a radius used for non-continuous operation. Usually an elastic radius.

Lap Weld (LW): Type of weld in which the ends or edges of the metal overlap each other and are welded together.

Liner: Flexible sleeve used to line the I.D. of hose when the velocity of gaseous media is in excess of 180 ft. per second.

Loop Installation: The assembly is installed in a loop or "U" shape, and is most often used when frequent and/or large amounts of motion are involved.

GLOSSARY (continued)

Mechanical Fitting or Reusable Fitting: A fitting not permanently attached to a hose which can be disassembled and used again.

Medium (Singular)/Media (Plural): The substance(s) being conveyed through a piping system.

Minimum Bend Radius: The smallest radius to which a hose can be bent without suffering permanent deformation of its convolutions.

Misalignment: A condition in which two points, intended to be connected, will not mate due to their being laterally out of line with each other.

Nominal Diameter: A term used to define the dimensions of a component. It indicates the approximate inside diameter.

Offset – Lateral, Parallel, & Shear: The amount that the ends of a hose assembly are displaced laterally in relation to each other as the result of connecting two misaligned terminations in a piping system, or intermittent flexure required in a hose application.

Operating Conditions: The pressure, temperature, motion, media, and environment that a hose assembly is subjected to.

Outside Diameter: This refers to the external diameter of a metal hose, measured from the top of the corrugation or braiding.

Penetration (Weld): The percentage of wall thickness of the two parts to be joined that is fused into the weld pool in making a joint. Our standard for penetration of the weld is 100 percent, in which the weld goes completely through the parent metal of the parts to be joined and is visible on the opposite side from which the weld was made.

Percent Of Braid Coverage: The percent of the surface area of a hose that is covered by braid.

Permanent Bend: A short radius bend in a hose assembly used to compensate for misalignment of rigid piping, or where the hose is used as an elbow. Hose so installed may be subjected to minor and/or infrequent vibration or movement.

Pipe Gap: The open space between adjacent ends of two pipes in which a hose assembly may be installed.

Pitch: The distance between the two peaks of adjacent corrugation.

Ply, Plies: The number of individual thicknesses of metal used in the construction of the wall of a corrugated hose.

Pressure: Usually expressed in pounds per square inch (PSI) and, depending on service conditions, may be applied internally or externally to a hose.

a. Absolute Pressure — A total pressure measurement system in which atmospheric pressure (at sea level) is added to the gage pressure, and is expressed as PSIA.

b. Atmospheric Pressure — The pressure of the atmosphere at sea level which is 14.7 PSI, or 29.92 inches of mercury.

c. Burst Pressure (Actual And Rated)

1. Actual — Failure of the hose determined by the laboratory test in which the braid fails in tensile, or the hose ruptures, or both, due to the internal pressure applied. This test is usually conducted at room temperature with the assembly in a straight line, but for special applications, can be conducted at elevated temperatures and various configurations.

2. Rated — A burst value which may be theoretical, or a percentage of the actual burst pressure developed by laboratory test. It is expected that, infrequently, due to manufacturing limitations, an assembly may burst at this pressure, but would most often burst at a pressure greater than this.

d. Deformation Pressure (Collapse) — The pressure at which the corrugations of a hose are permanently deformed due to fluid pressure applied internally, or, in special applications, externally.

e. Feet of Water or Head Pressure — Often used to express system pressure in terms of water column height. A column of water 1 ft. high exerts a .434 PSI pressure at its base.

f. Proof Pressure or Test Pressure — The maximum internal pressure which a hose can be subjected to without either deforming the corrugations, or exceeding 50 percent of the burst pressure. When a hose assembly is tested above 50 percent of its burst pressure, there often is a permanent change in the overall length of the assembly, which may be undesirable for certain applications.

g. PSIA — Pounds per square inch absolute.

h. PSIG — Pounds per square inch gauge.

i. Pulsating Pressure — A rapid change in pressure above and below the normal base pressure, usually associated with reciprocating type pumps. This pulsating pressure can cause excessive wear between the braid and the tops of the hose corrugations.

j. Shock Pressure — A sudden increase of pressure in a hydraulic or pneumatic system, which produces a shock wave. This shock can cause severe permanent deformation of the corrugations in a hose, as well as rapid failure of the assembly due to metal fatigue.

k. Static Pressure — A non-changing constant pressure.

l. Working Pressure — The pressure, usually internal, but sometimes external, imposed on a hose during operating conditions.

Profile: Used in reference to the contour rolled into strip during the process of manufacturing stripwound hose, or the finished shape of a corrugation; formed from a tube by either the “bump-out”, “sink” or roll forming processes, used in making corrugated hose.

Random Motion: The non-cyclic uncontrolled motion of a metal hose, such as occurs in manual handling.

Reusable Fitting: (See Mechanical Fitting)

Safety Factor: The relationship of working pressure to burst pressure.

Scale: Generally refers to the oxide in a hose assembly brought about by surface conditions or welding. An oxide.

Seamless: Used in reference to a corrugated metal hose made from a base tube that does not have a longitudinal seam as in the case of a butt welded or lap welded tube.

Squirm: A form of failure in which the hose is deformed into an “S” or “U” bend as the result of excessive internal pressure being applied to unbraided corrugated hose while its ends are restrained, or in a braided corrugated hose which has been axially compressed, loosening the braid, while the hose is pressurized. This is particularly true with long lengths of braided hose subjected to manual or mechanical handling.

Strand(s): Individual groups of wires in a braid. Each group is supplied from a separate carrier in the braiding machine.

Stress Corrosion: A form of corrosion in stainless steel normally associated with chlorides.

Tig Weld: The tungsten inert gas welding process sometimes referred to as shielded arc. The common trade name is heliarc.

Traveling Loop: A general classification of bending, wherein the hose is installed to a U-shaped configuration.

Class A Loop — An application wherein the radius remains constant and one end of the hose moves parallel to the other end of the hose.

Class B Loop — A condition wherein a hose is installed in a U-shaped configuration and the ends move perpendicular to each other so as to enlarge or decrease the width of the loop.

Torque (Torsion): A force that produces, or tends to produce, rotation of or torsion through one end of a hose assembly while the other end is fixed.

Velocity: The speed at which the medium flows through the hose, usually specified in feet per second.

Velocity Resonance: The sympathetic vibration of convolutions due to the buffeting of a high velocity gas or air flow.

Vibration: Low amplitude motion occurring at high frequency.

Welding: The process of localized joining of two or more metallic components by means of heating their surfaces to a state of fusion, or by fusion with the use of additional filler materials.



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Since 1902, Penflex has been a leader in the design, manufacture and application of flexible metal hose and braid products.

