



CAPITAL RUBBER CORP

METAL HOSE SOLUTIONS

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**KEEPING YOUR
BUSINESS FLOWING**



PENFLEX



Stainless Steel Hose Specifications

Construction: Annular / Standard Pitch/ Close Pitch

Material: Hose: 321 and 316L Stainless Steel

Braid: 304L Standard, 321 and 316L Stainless Steel Available

ALSO AVAILABLE IN:

- Heavy Duty
- Bronze
- Super Flex
- Exotic Alloys

Nom. I.D. (IN.)	Part Number	Braid Layers	Nom. O.D. (IN.)	Maximum Pressure @70°F(PSIG)			Centerline Bend Radius(IN.)		Weight per Foot (LB.)
				Working	Test	Nominal Burst	Dynamic	Static	
1/4"	30xx-004	0	0.38	72	108	----	3.15	1.1	0.05
	P3-H30xx-B30xx-004	1	0.43	2,360	3,540	9,440			0.10
	P32SB-H30xx-B30xx-004	2	0.48	2,832	4,248	11,328			0.15
3/8"	30xx-006	0	0.56	72	108	----	5.08	1.52	0.07
	P3-H30xx-B30xx-006	1	0.62	1,639	2,458	6,556			0.16
	P32SB-H30xx-B30xx-006	2	0.68	1,967	2,950	7,868			0.25
1/2"	30xx-008	0	0.66	72	108	----	5.47	1.75	0.08
	P3-H30xx-B30xx-008	1	0.72	1,225	1,837	4,900			0.18
	P32SB-H30xx-B30xx-008	2	0.78	1,470	2,205	5,880			0.28
5/8"	30xx-010	0	0.85	71	107	----	6.28	2.21	0.12
	P3-H30xx-B30xx-010	1	0.92	1,200	1,800	4,800			0.27
	P32SB-H30xx-B30xx-010	2	0.99	1,440	2,160	5,760			0.42
3/4"	30xx-012	0	1.05	43	65	----	6.58	2.65	0.19
	P3-H30xx-B30xx-012	1	1.12	1,034	1,551	4,136			0.39
	P32SB-H30xx-B30xx-012	2	1.19	1,241	1,861	4,964			0.59
1"	30xx-016	0	1.27	43	65	----	7.5	3.33	0.24
	P-H30xx-B30xx-016	1	1.34	796	1,194	3,184			0.48
	P32SB-H30xx-B30xx-016	2	1.41	955	1,433	3,820			0.68
1-1/4"	30xx-020	0	1.62	43	65	----	10.2	4.1	0.33
	P3-H30xx-B30xx-020	1	1.69	600	900	2,400			0.66
	P32SB-H30xx-B30xx-020	2	1.76	720	1,080	2,880			0.99
1-1/2"	30xx-024	0	1.95	28	42	----	11.75	5.08	0.51
	P3-H30xx-B30xx-024	1	2.03	557	835	2,228			0.91
	P32SB-H30xx-B30xx-024	2	2.11	668	1,002	2,672			1.31
2"	30xx-032	0	2.38	28	42	----	12.55	6.27	0.64
	P3-H30xx-B30xx-032	1	2.48	570	855	2,280			1.27
	P32SB-H30xx-B30xx-032	2	2.58	6,84	1,026	2,736			1.90
2-1/2"	7xx-040°	0	3.23	12	18	----	20.00	8.00	1.16
	7xx-1SB-040	1	3.33	387	581	1,548			1.86
	7xx-2SB-040	2	3.43	619	929	2,477			2.56
3"	7xx-048°	0	3.78	10	15	----	22.00	9.00	1.21
	7xx-1SB-048	1	3.88	316	474	1,264			2.00
	7xx-2SB-048	2	3.98	506	758	2,022			2.80
3-1/2"	7xx-056°	0	4.32	9	14	----	24.00	10.00	1.62
	7xx-1SB-056	1	4.45	297	445	1,188			2.61
	7xx-2SB-056	2	4.58	475	712	1,900			3.6
4"	7xx-064°	0	4.85	8	12	----	27.00	13.00	1.69
	7xx-1SB-064	1	4.98	232	348	927			2.68
	7xx-2SB-064	2	5.10	371	557	1,485			3.68
5"	7xx-080°	0	5.90	6	9	----	31.00	18.00	2.50
	7xx-1SB-080	1	6.03	191	286	764			3.75
	7xx-2SB-080	2	6.15	306	458	1,222			5.00
6"	7xx-096°	0	6.87	5	8	----	36.00	19.00	3.47
	7xx-1SB-096	1	7.10	165	247	660			4.75
	7xx-2SB-096	2	7.33	264	396	1,056			6.04
8"	7xx-128°	0	9.09	6	9	----	40.00	20.00	5.56
	7xx-1SB-128	1	9.19	234	350	934			9.44
	7xx-2SB-128	2	9.28	374	561	1,495			13.36
10"	7xx-160°	0	11.18	5	8	----	50.00	25.00	6.80
	7xx-1SB-160	1	11.32	230	344	918			12.90
	7xx-2SB-160	2	11.45	367	551	1,469			19.00
12"	7xx-192°	0	13.23	3	5	----	60.00	30.00	9.02
	7xx-1SB-192	1	13.37	161	241	643			14.83
	7xx-2SB-192	2	13.50	257	386	1,029			20.64
14"	7xx-224°	0	14.70	3	5	----	70.00	35.00	14.10
	7xx-1SB-224	1	14.84	119	178	476			21.70
	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.



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Fitting Options & Accessories



Male Pipe Nipple

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1/8" thru 8"

Schedules: 40 and 80



Hex Males

Alloys: 304 and 316 Stainless Steel,
Carbon Steel, Brass

Sizes: 1/4" thru 4"



Female Union

Alloys: 304 and 316 Stainless Steel,
Carbon Steel, Malleable Iron, Brass

Sizes: 1/4" thru 4"

Class: 125#, 150#, 300#



Female Coupling

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1/4" thru 4"

Class: 150#, 300#



Fixed Flange

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1/2" thru 12"

Class: 150#, 300#



Floating Flange

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1/2" thru 12"

Class: 150#, 300#



Teflon Lined Metal Hose

Alloys: 304 and 316 Stainless Steel

Sizes: 1" thru 6"



TTMA (Tank Truck) Flange

Alloys: 304 and 316 Stainless Steel,
Carbon Steel, Aluminum

Sizes: 3" and 4"



Sanitary Tri-Clamp

Alloys: 304 and 316 Stainless Steel

Sizes: 1" thru 3"

Fitting Options & Accessories



37 Degree JIC

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1/4" thru 2"



Cam & Groove Female

Alloys: 304 and 316 Stainless Steel,
Carbon Steel, Brass, Aluminum

Sizes: 1/2" thru 8"



Cam & Groove Male

Alloys: 304 and 316 Stainless Steel,
Carbon Steel, Brass, Aluminum

Sizes: 1/2" thru 8"



Groove End

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1" thru 8"

Schedules: 40 and 80



Tube Ends

Alloys: 304 and 316 Stainless Steel,
Carbon Steel

Sizes: 1/8" thru 8"

Wall Thickness: Multiple



Copper Sweat Ends

Alloys: Copper

Sizes: 1/2" thru 3"



Female Ground Joint

Alloys: Malleable Iron

Sizes: 1/2" thru 4"



Fire Sleeve

Excellent way to protect handler from burns, withstands repeated exposure to molten steel, aluminum and glass, also provides effective insulation to prevent heat loss.



Armor Guard

Fantastic way to prolong the life of hose lines that are exposed to rugged operating conditions. It will distribute bending radii to avoid kinking and protect hose from abrasion and deep cuts.

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.

For Corrosion Resistance of Materials to different environment, refer to a chart posted on our web site:

<http://www.penflex.com/tools-corrosion-chart.php>.

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



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