



## **FLEXIBLE METAL HOSE PRODUCTS**

**2018**

**THE SOURCE FOR ALL YOUR FLUID POWER NEEDS**

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# Exceptional Value

## Locations

Hydraulic Supply is conveniently located throughout the Southeast. Our sales representatives, inside sales or technical support are capable of answering your questions, providing pricing and meeting your needs. We use manufacturers of only the highest quality, known for their durability and superior resistance to corrosion.



### Southeast Locations

State	Location	Contact Number
<b>ALABAMA</b>	Mobile	800-507-9651
<b>FLORIDA</b>	Belle Glade	561-996-4431
	Ft. Lauderdale	954-463-6460
	Ft. Myers	239-274-9229
	Homestead	305-248-3713
	Jacksonville	904-783-4401
	Lakeland	863-665-3589
	Medley	800-507-9651
	Miami	305-888-2415
	Naples	239-435-1642
	Orlando	407-295-4537
	Pompano	954-973-5900
	Tampa	813-621-0790
	West Palm Beach	561-863-6258

State	Location	Contact Number
<b>GEORGIA</b>	Augusta	706-790-0628
	Columbus	706-322-0707
	Forest Park	404-608-0995
	Mableton	678-398-6673
	Marietta	678-290-9227
	Savannah	912-965-6771
<b>LOUISIANA</b>	New Orleans	504-362-5901
<b>NORTH CAROLINA</b>	Charlotte	704-319-9685
	Greensboro	336-544-8502
<b>SOUTH CAROLINA</b>	Columbia	803-567-4098
	Greenville	864-249-7650
<b>TENNESSEE</b>	Chattanooga	423-553-8854
	Knoxville	865-321-9120
<b>MEXICO</b>	Monterrey	811-356-6525
<b>REPAIR CENTER</b>	Pompano Beach	954-861-4200
<b>SUNRISE—HQ</b>	Sunrise Florida	800-507-9651

## Assembly Components

In this section, we will discuss the various components that make up a corrugated metal hose assembly, and what information a metal hose fabricator will need in order to make an assembly for your application. If you need assistance determining this information, we have also included an explanation of how to analyze the application and make the appropriate selections.



In order to produce an assembly, the fabricator will need answers to the following five questions.

1. **Hose:** (type, alloy, and size)
2. **Fittings:** (type, alloy, and size for each end)
3. **Length of the Assembly:** (either overall length or live length)
4. **Fabrication Options**
5. **Accessories**

If you have the answers to these questions, a metal hose fabricator will be able to make your custom assembly. If you do not have the answers to all five questions, you will need to obtain them. The next section (S.T.A.M.P.E.D.) is designed to help you obtain the information necessary to determine the answers.

## S.T.A.M.P.E.D

To properly design a metal hose assembly for a particular application, the following design parameters must be determined. To help remember them, they have been arranged to form the acronym, “S.T.A.M.P.E.D.”

### 1. SIZE

The diameter of the connections to which the assembly will be installed is needed to provide a proper fit. This information is required.

### 2. TEMPERATURE

As the temperature to which the assembly is exposed (internally and externally) increases, the strength of the assembly's components decreases. Also, the coldest temperature to which the hose will be exposed can affect the assembly procedure and/or fitting materials. If you do not provide this information, it will be assumed that temperatures are 70° F.

### 3. APPLICATION

This refers to the configuration in which the assembly is installed. This includes both the dimensions of the assembly, as well as the details of any movement that the assembly will experience. This information is necessary to determine assembly length and required flexibility.

### 4. MEDIA

Identify all chemicals to which the assembly will be exposed, both internally and externally. This is important since you must be sure the assembly's components are chemically compatible with the media going through the hose, as well as the environment in which the hose is to be installed. If no media is given, it will be assumed that both the media and the external environment are compatible with all of the available materials for each component.

### 5. PRESSURE

Identify the internal pressure to which the assembly will be exposed. Also, determine if the pressure is constant or if there are cycles or spikes. This information is important to determine if the assembly is strong enough for the application. If no pressure is given it will be assumed that the pressure is low and there are no pressure surges or spikes.

### 6. END FITTINGS

Identify the necessary end fittings. This is required since fittings for the assembly must be chosen to properly fit the mating connections.

### 7. DYNAMICS

Identify the velocity at which the media will flow through the assembly. Since corrugated metal hose does not have a smooth interior, rapid media flow can create a resonant frequency that will cause the hose to vibrate and prematurely fail. If no velocity is given, it will be assumed that the velocity is not fast enough to affect the assembly's performance.



# Hydraulic Supply's Most Widely Used Hose

## FOR LOW PRESSURE APPLICATIONS

### P4 Series Braided Hose

Construction: Annular / Standard Pitch / Compressed Pitch

Material: Hose: For 321, use H4021; For 316L, use H4016 | Braid: For 304, use B4004; For 316L, use B4016

Characteristics: Medium Weight / Medium Flexibility | High Coverage Braid

Nom.I.D. (in.)	Part Number	Braids	Braid Construction	Braid Coverage (%)	Nom.O.D. (in.)	Maximum Pressure @70°F(PSIG) <sup>a</sup>		Bend Radius (in.)		Weight per Foot (LB.)
						Working <sup>b</sup>	Nominal Burst	Dynamic	Static	
1/4"	40xx-004	0			0.40	200	----			0.08
	P4-H40xx-B40xx-004	1	24 x 5 x .014	98	0.48	2,500	10,000	5.00	1.00	0.17
	P4-H40xx-2B40xx-004	2			0.56	4,000	16,000			0.26
5/16"	40xx-005	0			0.48	180	----			0.09
	P4-H40xx-B40xx-005	1	24 x 6 x .014	98	0.57	2,200	8,800	5.00	1.00	0.19
	P4-H40xx-2B40xx-005	2			0.64	3,520	14,080			0.29
3/8"	40xx-006	0			0.63	100	----			0.13
	P4-H40xx-B40xx-006	1	24 x 8 x .014	98	0.70	1,530	6,120	5.50	1.25	0.27
	P4-H40xx-2B40xx-006	2			0.81	2,448	9,792			0.41
1/2"	40xx-008	0			0.84	80	----			0.23
	P4-H40xx-B40xx-008	1	24 x 9 x .014	94	0.91	1,200	4,800	6.00	1.50	0.39
	P4-H40xx-2B40xx-008	2			0.98	1,920	7,680			0.55
3/4"	40xx-012	0			1.21	70	----			0.39
	P4-H40xx-B40xx-012	1	36 x 9 x .014	95	1.28	850	3,400	8.00	2.25	0.62
	P4-H40xx-2B40xx-012	2			1.35	1,360	5,440			0.85
1"	40xx-016	0			1.51	40	----			0.53
	P4-H40xx-B40xx-016	1	36 x 10 x .014	92	1.58	590	2,360	9.00	2.75	0.79
	P4-H40xx-2B40xx-016	2			1.65	944	3,776			1.05
1-1/4"	40xx-020	0			1.85	25	----			0.76
	P4-H40xx-B40xx-020	1	48 x 8 x .016	92	1.93	540	2,160	10.50	3.50	1.12
	P4-H40xx-2B40xx-020	2			2.02	864	3,456			1.48
1-1/2"	40xx-024	0			2.19	20	----			0.84
	P4-H40xx-B40xx-024	1	48 x 10 x .016	93	2.28	475	1,900	12.00	4.00	1.29
	P4-H40xx-2B40xx-024	2			2.37	760	3,040			1.74
2"	40xx-032	0			2.61	15	----			0.90
	P4-H40xx-B40xx-032	1	48 x 10 x .020	95	2.73	530	2,120	15.00	5.00	1.61
	P4-H40xx-2B40xx-032	2			2.85	848	3,392			2.33
2-1/2"	40xx-040	0			3.23	12	----			1.16
	P4-H40xx-B40xx-040	1	72 x 8 x .020	94	3.33	410	1,640	22.00	9.00	1.86
	P4-H40xx-2B40xx-040	2			3.43	656	2,624			2.56
3"	40xx-048	0			3.78	10	----			1.21
	P4-H40xx-B40xx-048	1	72 x 9 x .020	93	3.88	335	1,340	20.00	8.00	2.00
	P4-H40xx-2B40xx-048	2			3.98	536	2,145			2.80
4"	40xx-064	0			4.85	8	----			1.69
	P4-H40xx-B40xx-064	1	72 x 11 x .020	91	4.98	240	960	27.00	13.00	2.68
	P4-H40xx-2B40xx-064	2			5.08	384	1,536			3.68

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.

b. Test pressure is 1.5x the Maximum Working Pressure.

# Heavy Duty for **HIGHER PRESSURE APPLICATIONS** and Longer Resistance to Chemical Corrosion

## Series 800 Stainless Steel Hose

Construction: Annular / Close Pitch

Material: Hose: For 321, use 821; For 316L, use 816

Braid: For 304, use 1SHB; For 316L, use 1SHB-6; 6" is braided braid

Characteristics: Heavy Weight / Medium Flexibility

Nom. I.D. (in.)	Part Number	Braid Layers	Braid Construction	Braid Coverage (%)	Nom. O.D. (in.)	Maximum Pressure @70°F(PSIG) <sup>a</sup>		Centerline Bend Radius (in.)		Weight per Foot (LB.)
						Working <sup>b</sup>	Nominal Burst	Dynamic	Static	
1/4"	8xx-004	0			.50	180	---			0.09
	8xx-1SHB-004	1	24 x 5 x .014	89	.57	2,562	10,250	5.00	2.50	0.17
	8xx-2SHB-004	2			.64	4,099	16,400			0.26
3/8"	8xx-006	0			.67	100	---			0.13
	8xx-1SHB-006	1	24 x 7 x .014	91	.74	1,501	6,004	5.50	2.75	0.25
	8xx-2SHB-006	2			.81	2,401	9,604			0.36
1/2"	8xx-008	0			.82	80	---			0.39
	8xx-1SHB-008	1	24 x 7 x .020	96	.92	2,194	8,777	8.00	4.00	0.63
	8xx-2SHB-008	2			1.02	3,510	14,040			0.87
3/4"	8xx-012	0			1.21	70	---			0.48
	8xx-1SHB-012	1	36 x 6 x .020	92	1.31	1,311	5,244	8.00	4.00	0.79
	8xx-2SHB-012	2			1.41	2,098	8,392			1.10
1"	8xx-016	0			1.50	40	---			0.79
	8xx-1SHB-016	1	36 x 8 x .020	95	1.60	1,069	4,276	9.00	4.50	1.20
	8xx-2SHB-016	2			1.70	1,710	6,840			1.61
1-1/4"	8xx-020	0			1.85	33	---			1.02
	8xx-1SHB-020	1	48 x 6 x .025	95	1.97	1,110	4,443	10.00	5.00	1.66
	8xx-2SHB-020	2			2.10	1,776	7,040			2.30
1-1/2"	8xx-024	0			2.17	20	---			1.36
	8xx-1SHB-024	1	48 x 7 x .025	95	2.30	868	3,472	10.00	5.00	2.11
	8xx-2SHB-024	2			2.43	1,388	5,552			2.86
2"	8xx-032	0			2.51	15	---			1.60
	8xx-1SHB-032	1	48 x 9 x .025	95	2.64	810	3,240	11.50	5.75	2.56
	8xx-2SHB-032	2			2.76	1,296	5,184			3.52
2-1/2"	8xx-040	0			3.23	10	---			2.00
	8xx-1SHB-040	1	72 x 7 x .025	96	3.36	578	2,312	24.00	12.00	3.12
	8xx-2SHB-040	2			3.49	925	3,700			3.30
3"	8xx-048	0			3.78	10	---			2.97
	8xx-1SHB-048	1	72 x 9 x .025	88	3.91	540	2,160	28.00	14.00	4.42
	8xx-2SHB-048	2			4.03	864	3,456			5.87
4"	8xx-064	0			4.81	8	---			3.10
	8xx-1SHB-064	1	72 x 9 x .025	89	4.93	333	1,332	40.00	20.00	4.55
	8xx-2SHB-064	2			5.05	533	2,132			6.00
6"	8xx-096	0			6.87	5	---			3.85
	8xx-1SHB-096	1	96 x (13 x .025)	89	7.10	266	1,062	48.00	24.00	6.45
	8xx-2SHB-096	2			7.33	425	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.

b. Test pressure is 1.5x the Maximum Working Pressure.

# Heavy Duty for **EXTREME PRESSURE APPLICATIONS** and Longer Resistance to Chemical Corrosion



## Series 900 Stainless Steel Hose

Construction: Annular / Close Pitch  
 Material: Hose: 316L Stainless Steel  
 Braid: 304L Stainless Steel  
 Characteristics: Heavy Weight / Medium Flexibility

Nom. I.D. (in.)	Part Number	Braid Layers	Braid Construction	Braid Coverage	Nom. O.D. (in.)	Maximum Pressure @ 70°F (PSIG) <sup>a</sup>		Centerline Bend Radius (in.)		Weight per Foot (LB.)
						Working <sup>b</sup>	Nominal Burst	Dynamic	Static	
1/4"	916-004	0			.50	180	----			0.20
	916-1HTSB-004	1	24 x 4 .016	83	.58	2,754	11,017	12.00	6.00	0.28
	916-2HTSB-004	2			.64	4,406	17,627			0.36
3/8"	916-006	0			.67	100	----			0.31
	916-1HTSB-006	1	24 x 6 x .016	89	.75	1,921	7,682	12.00	6.00	0.43
	916-2HTSB-006	2			.83	3,073	12,291			0.55
1/2"	916-008	0			.82	80	----			0.40
	916-1HTSB-008	1	24 x 7 x .020	96	.92	2,194	8,777	14.00	7.00	0.58
	916-2HTSB-008	2			1.02	3,510	14,040			0.76
3/4"	916-012	0			1.22	70	----			0.65
	916-1HTSB-012	1	48 x 4 x .024	93	1.34	1,994	7,980	15.00	7.50	0.92
	916-2HTSB-012	2			1.46	3,192	12,769			1.19
1"	916-016	0			1.52	40	----			1.02
	916-1HTSB-016	1	48 x 5 .024	94	1.65	1,599	6,397	16.00	8.00	1.48
	916-2HTSB-016	2			1.77	2,558	10,234			1.94
1-1/4"	916-020	0			1.85	25	----			1.56
	916-1HTSB-020	1	48 x 6 x .024	93	1.97	1,317	5,270	18.00	9.00	2.02
	916-2HTSB-020	2			2.09	2,107	8,431			2.48
1-1/2"	916-024	0			2.19	20	----			2.01
	916-1HTSB-024	1	48 x 7 x .024	93	2.31	1,062	4,247	19.00	9.50	2.65
	916-2HTSB-024	2			2.43	1,698	6,795			3.30
2"	916-032	0			2.51	15	----			2.43
	916-1HTSB-032	1	48 x 8 x .024	93	2.64	842	3,368	24.00	12.00	3.17
	916-2HTSB-032	2			2.77	1,346	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.
- b. Test pressure is 1.5x the Maximum Working Pressure.

## Series 740 Monel™ Hose

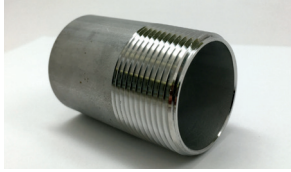
Construction: Annular / Standard Pitch  
 Material: Hose: Monel 400  
 Braid: Monel 400  
 Characteristics: Medium Weight / Medium Flexibility

Nom. I.D. (in.)	Part Number	Braid Layers	Braid Construction	Braid Coverage (%)	Nom. O.D. (in.)	Maximum Pressure @70°F(PSIG) <sup>ab</sup>		Centerline Bend Radius (in.)		Weight per Foot (LB.)
						Working <sup>c</sup>	Nominal Burst	Dynamic	Static	
1/4"	740-004	0			.50	144	----			0.09
	740-1MB-004	1	24 x 4 x .016	84	.58	1,722	6,888	5.00	2.50	0.19
	740-2MB-004	2			.66	2,755	11,021			0.29
1/2"	740-008	0			.82	64	----			0.39
	740-1MB-008	1	24 x 5 x .016	72	.90	741	2,964	8.00	4.00	0.63
	740-2MB-008	2			.98	1,186	4,742			0.87
3/4"	740-012	0			1.21	156	----			0.48
	740-1MB-012	1	36 x 6 x .016	82	1.29	629	2,516	8.00	4.00	0.79
	740-2MB-012	2			1.38	1,006	4,026			1.10
1"	740-016	0			1.50	32	----			0.79
	740-1MB-016	1	36 x 8 x .016	86	1.58	517	2,068	9.00	4.50	1.00
	740-2MB-016	2			1.66	827	3,309			1.20
1-1/2"	740-024	0			2.19	16	----			0.84
	740-1MB-024	1	48 x 9 x .016	87	2.27	343	1,372	12.00	6.00	1.28
	740-2MB-024	2			2.35	549	2,195			1.72
2"	740-032	0			2.60	12	----			1.04
	740-1MB-032	1	48 x 14 x .016	97	2.59	376	1,504	15.00	7.50	1.72
	740-2MB-032	2			2.67	602	2,022			2.40
3"	740-048	0			3.78	8	----			1.21
	740-1MB-048	1	72 x 12 x .016	82	3.88	221	884	22.00	11.00	2.04
	740-2MB-048	2			3.98	354	1,414			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.
- b. For chlorine transfer applications, consult factory for additional data.
- c. Test pressure is 1.5x the Maximum Working Pressure.

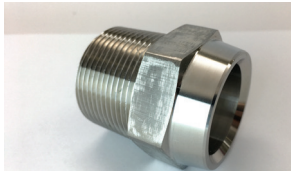
## Most Common Fittings

We carry a full line of fittings made from weldable material to be welded with all of our flexible metal hose. We hydrostatically test our metal hoses to the pressure appropriate for your specific application. All hoses can be tagged for traceability on our website with access by you to your specific hoses. Ask about our accessories such as spring guards, protective covers, certification process and tagging.



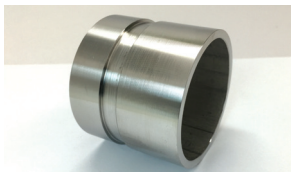
### Male Pipe Nipple

Alloys	T304 & T316 Stainless Steel, Carbon Steel, 276
Size Range	1/8" – 8"
Schedules	40, 80



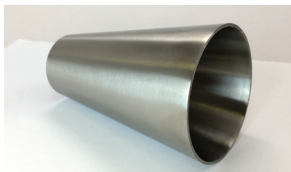
### Hex Male

Alloys	T304 & T316 Stainless Steel, Carbon Steel, Brass
Size Range	1/4" – 4"
Schedules	n/a



### Grooved-End Fitting (Victaulic)

Alloys	T304 & T316 Stainless Steel, Carbon Steel
Size Range	1" – 8"
Schedules	40



### Reducer

Alloys	T304 & T316 Stainless Steel, Carbon Steel
Size Range	3/4" – 12"
Schedules	10, 40 (carbon steel)



### Female Union (Threaded/Socket Weld)

Alloys	T304 & T316 Stainless Steel, Carbon Steel, Malleable Iron, Brass
Size Range	1/4" – 4"
Class	125#, 150#, 300#, 3000# (depending on alloy)



### Female Half Coupling (Threaded/Socket Weld)

Alloys	T304 & T316 Stainless Steel, Carbon Steel
Size Range	1/4" – 4"
Class	150#, 3000#



### JIC (SAE) Fittings (in 45° and 90° as well)

Alloys	T316 Stainless Steel, Carbon Steel
Size Range	1/4" – 2"
Schedules	n/a

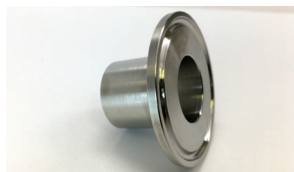


### Short & Long Radius Elbows (45° & 90°)

Alloys	T304 & T316 Stainless Steel, Carbon Steel, 276
Size Range	1/4" – 12"
Schedules	Schedule 10, 40



## Most Common Fittings



### Sanitary Flange (Raised Face)

Alloys	T316 Stainless Steel
Size Range	1/2" – 2"
Schedules	n/a



### Slip-On Flange

Alloys	T304 & T316 Stainless Steel, Carbon Steel
Size Range	1/2" – 12"
Class	150#, 300#



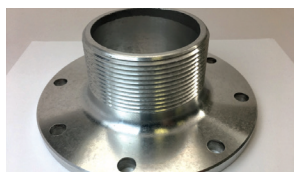
### Plate Flange

Alloys	T304 & T316 Stainless Steel, Carbon Steel
Size Range	1/2" – 24"
Class	125#, 150#



### Part A & Part D (Cam-Lock)

Alloys	T316 Stainless Steel, Brass, Aluminum
Size Range	1/2" – 8"
Schedules	n/a



### TTMA Flange

Alloys	T316 Stainless Steel, Carbon Steel
Size Range	2" – 6"
Schedules	n/a



### C-Stub with Floating Flange

Alloys	T304 & T316 Stainless Steel
Size Range	1/2" – 10"
Schedules	10



### A-Stub with Lap Joint Flange

Alloys	T304 & T316 Stainless Steel
Size Range	1/2" – 8"
Schedules	10, 40



### Beveled Pipe End

Alloys	T304 & T316 Stainless Steel, Carbon Steel, 276
Size Range	1/8" – 12"
Schedules	Various



### Tube End (Measured to O.D.)

Alloys	T304, T316 & T321 Stainless Steel, Carbon Steel
Size Range	1/8" – 12" (seamless or welded)
Schedules	Various

## Technical Information

### 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	316L Stainless Steel	321 Stainless Steel	Carbon Steel	Monel	Bronze	Inconel 625™	Hastelloy C276™
70	1.00	1.00	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	.96	----
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	.93	.87
450	.77	.78	.81	.86	.77	.75	----	----
500	.77	.77	.78	.81	.73	----	----	----
600	.76	.76	.77	.74	.72	----	.91	.96
700	.74	.76	.76	.66	.71	----	----	----
800	.73	.75	.68	.52	.70	----	.88	.82
900	.68	.74	.62	----	----	----	----	----
1,000	.60	.73	.60	----	----	----	.85	----
1,100	.58	.67	.58	----	----	----	----	----
1,200	.53	.61	.53	----	----	----	.84	----
1,300	.44	.55	.46	----	----	----	----	----
1,400	.35	.48	.42	----	----	----	.63	----
1,500	.26	.39	.37	----	----	----	----	----
1,600	----	----	----	----	----	----	.37	----
1,800	----	----	----	----	----	----	.18	----

### 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

## 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

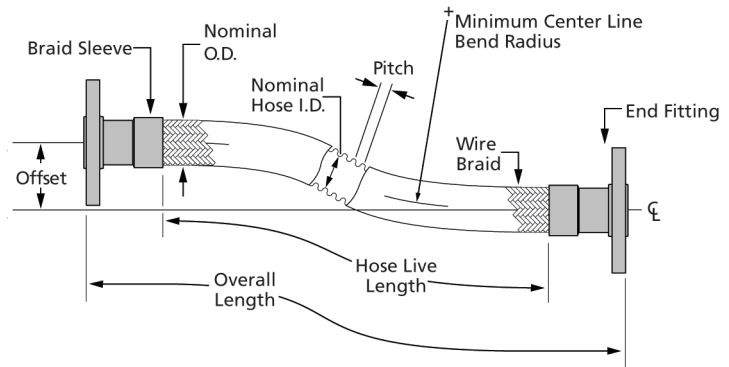
.014 = wire diameter in inches

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.

## Glossary (continued)

**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.

**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.

## Glossary (continued)

**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 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.

**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 or unbraided 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 insert 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.

3. **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.

4. **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 buffeting of high velocity gas or air flow.

**VIBRATION**: Low amplitude motion occurring at high frequency.

**WELDING**: The process of localized join 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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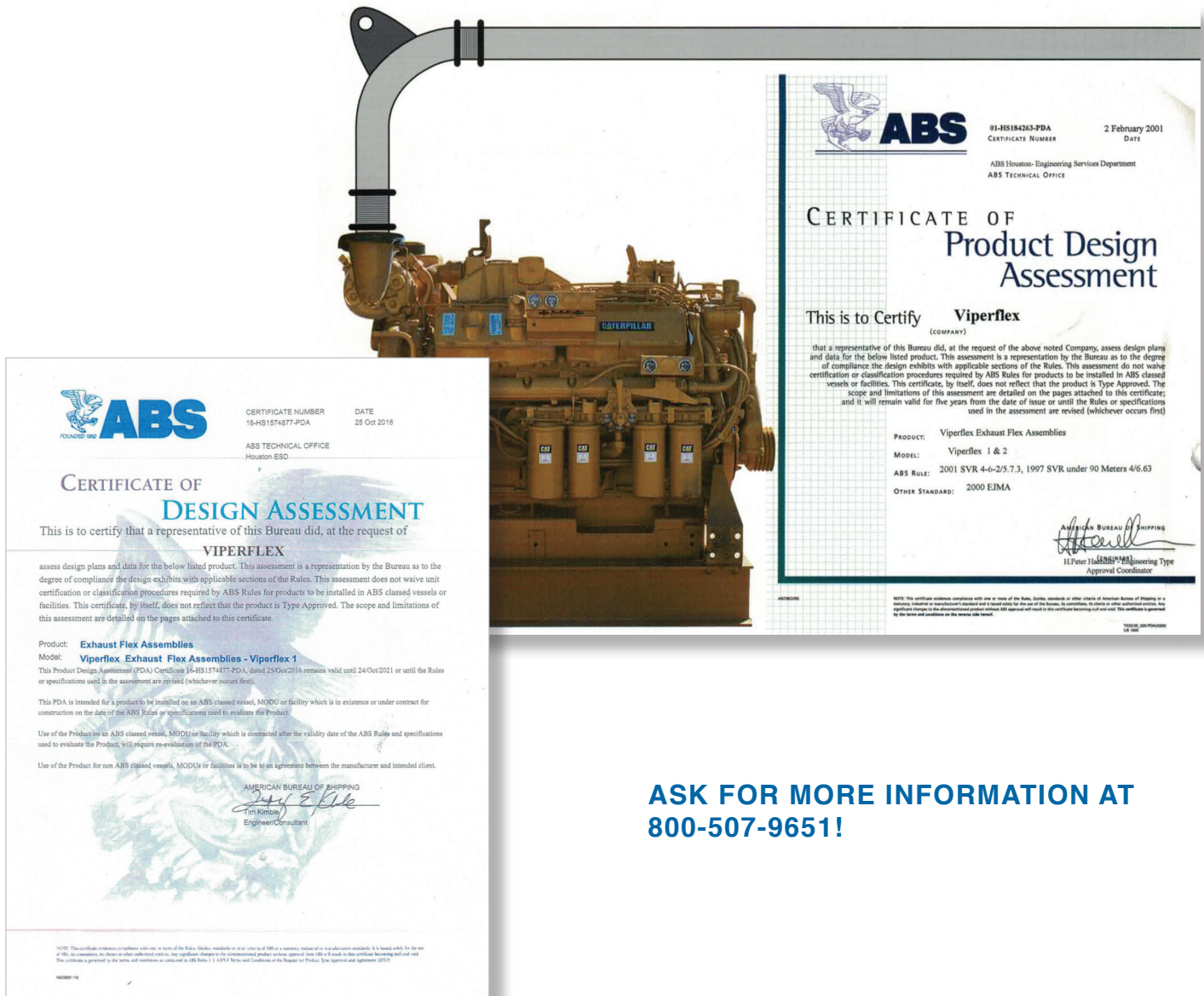
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