



# Flexible Metal Hose

HAM-LET METAL HOSES



## STAINLESS STEEL METAL HOSES

The Ham-Let Flexible Metal Hose is designed to carry gases and liquids at elevated rates of pressures and temperatures or high vacuum, in a vibrating environment or where flexibility is required.

The hose is composed from an inner hydroformed corrugated thin-walled tube that is externally braided or unbraided for vacuum service.

The flexible tube can be welded to a variety of fittings and connectors allowing compatibility with industry interfaces.

### TYPICAL INDUSTRIES

- Pulp & Paper Mills
- Chemical Industries
- Pharmaceutical Industries
- Semiconductor Industries
- Vacuum Applications

### TYPICAL APPLICATIONS

- Temperature extremes
- Chemical compatibility
- Flexibility or vibration
- Permeability concerns
- Fire safety
- Achieving full vacuum

### MATERIALS

Tube: 321 Stainless Steel  
 316L Stainless Steel  
 316 Stainless Steel  
 Braid: 304 Stainless Steel

### HOW TO SELECT

When selecting a Flexible Metal Hose, five variables should be considered:

1. Temperature
2. Dynamic pressure carrying capability
3. Flexibility
4. Chemical compatibility
5. Optional accessories

#### 1. TEMPERATURE

As the temperature increases, hose working pressure decreases. After you have determined the proper alloy (see "Chemical Compatibility" below) go to the "Temperature De-rating" table #2 and match the alloy of the hose and braid with the highest temperature to which they will be exposed (either internally or externally) to obtain the proper de-rating factors. Then multiply the hose's Maximum Working Pressure by the most limiting temperature de-rating factor.

#### 2. DYNAMIC PRESSURE

Pulsating, surge, or shock pressures, like those encountered with quick opening or closing valves, can inflict severe damage on a hose. If your application entails pulsating pressures, the working pressure should be de-rated by 1/2. If your application entails shock pressures, de-rate the stated working pressure to 1/6 of its value. Example :

1/4" hose - T316L stainless steel hose and T304 stainless steel braid at 300°F with the shock pressures:

Catalog Maximum Working Pressure = 1800 psi

Temperature De-rating Factor at 300°F = 0.86

Pressure De-rating Factor = 1/6  
 Maximum Application Working Pressure = 1800 PSI x 0.86 x 1/6 = 258 psi

#### 3. FLEXIBILITY

Verify that the minimum bend radius of the hose is less than the bend radius required. Remember that the hose's minimum bend radius, will change with pressure. To determine the minimum bend radius, refer to the chart in Table #1 for the type of hose being used. Match the line for the hose's I.D. with the pressure requirement of your hose. The chart will show you the recommended bend radius for our HHF hose.

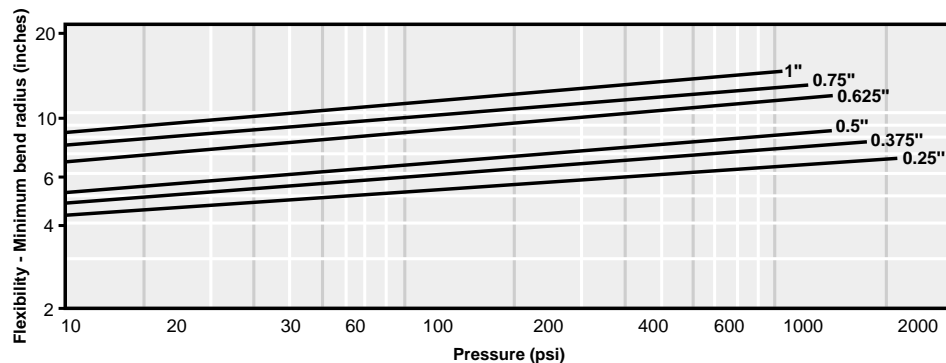
#### 4. CHEMICAL COMPATIBILITY

The material that you choose for the hose and braid must be compatible with the media being conveyed through the hose as well as the environment in which the hose is installed. When determining chemical compatibility, it is important to know the temperature and concentration of the chemical or chemicals. Although there are many resources to confirm chemical compatibility, two of the industry standards that you may find very useful are the National Association of Corrosion Engineers (NACE) and the Compass Corrosion Guides.

#### 5. ACCESSORIES

Optional accessories include spring guards, protective covers and Insulating covers.

**TABLE # 1 : TECHNICAL INFORMATION - MINIMUM BEND RADIUS (FOR HHF)**



**Select the right component for safety's sake**

The total design of the system must be taken into consideration when selecting components in order to ensure that your Ham-Let products provide safe, trouble-free operation. It is the responsibility of the system designer and the user to consider the compatibility of the materials, of the components and system, the function of the component, appropriate rating, and to insure proper installation, operation and maintenance.

**HOSE PARAMETERS**

Products	ID	Tube Material	Braid Material	Allow Temp (°F)	Max Allow Work Pres. at 70°F (psi)	Rated Impulse Pressure (psi)	Min. Burst Pressure (psi)	Min. Dynamic Bend Radius (in)	Min. Static Bend Radius (in)
<b>Flexible Metal Hose HHF Series</b>									
HHF 1/4	1/4	316L	304	1500	1800	900	7233	4.5	1.0
HHF 3/8	3/8	316L	304	1500	1558	779	6230	5.0	1.2
HHF 1/2	1/2	316L	304	1500	1186	593	4743	5.5	1.5
<b>High Pressure Flexible Metal Hose HHFH Series</b>									
HHFH 1/4	1/4		304	1500	4600	2300	18400	5.0	1.1
HHFH 3/8	3/8		304	1500	3800	1900	15200	5.5	1.4
HHFH 1/2	1/2		304	1500	2600	1300	10400	5.7	1.6
<b>Vacuum Flex Hose HHV Series</b>									
HHV 1/4	1/4	321	N/A	1500	90				
HHV 3/8	3/8	321	N/A	1500	70				
HHV 1/2	1/2	321	N/A	1500	70				

**TABLE # 2: WORKING PRESS. DE-RATING FACTOR**

Temperature in Degrees F	321/316/316L	304
70	1.00	1.00
150	0.97	0.96
200	0.94	0.92
250	0.92	0.91
300	0.88	0.86
350	0.86	0.85
400	0.83	0.82
450	0.81	0.80
500	0.78	0.77
600	0.74	0.73
700	0.70	0.69
800	0.66	0.64
900	0.62	0.58
1000	0.60	
1100	0.58	
1200	0.55	
1300	0.50	
1400	0.44	
1500	0.40	

To calculate a working pressure de-rated for elevated temperatures, multiply the hose working pressure shown in the catalog by the appropriate de-rating factor shown in Table #2.

**Note:** The working pressure of an assembly at elevated temperatures may be affected by fitting type, material and method of attachment.

**SPECS:** All Flexible Metal Hoses are manufactured in compliance with the **NAHAD** National Association of Hose and Accessories Distributors: **Standard ASC 001.01 Revised February 1996**

HH 5/2002 Rev. 1. 3900145

**HOW TO ORDER:**

Material	Hose	Type	Size	End Connection	Size	Overall Length	Options
P = St.St.	HH	F = Flexible Metal	1/4*	LK = Let-Lok	1/4	12 *	HLT = Helium Leak Test
		V = Flexible Metal - Vacuum	3/8*	GF = Female Face Seal	3/8	18 *	
		FH = Flexible Metal - High Pressure	1/2*	MP = Male Pipe	1/2	24 *	O2 = Oxygen Cleaning
				GM = Male Face Seal		36 *	
				TS = Tube Stub			
				FF = Female Flare 37°			

\* Standard Sizes and Lengths - Other Hose Sizes, Materials, End Connections and Lengths are available.

**ALL HOSES ARE 100% FACTORY LEAK TESTED**

**Examples:** P - HHF1/4 - LK1/4 - LK1/4 - 18 ■ SS - HHV3/8 - TS1/4 - TS3/8 - 24 ■ P - HHFH1/2 - GF1/2 - GF1/2 - 36 - HLT