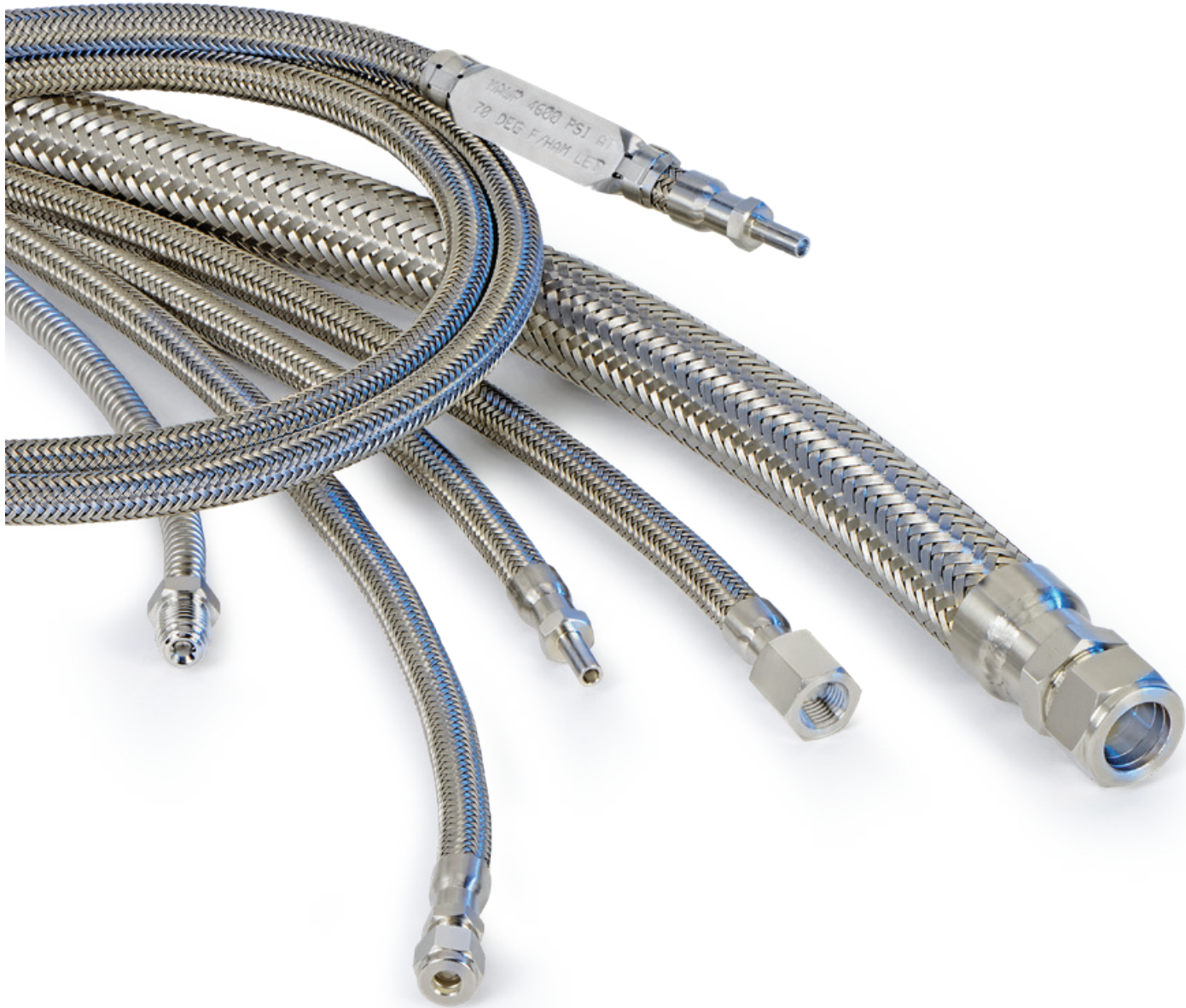


HAM-LET METAL HOSES



HAM-LET METAL HOSES

General

The HAM-LET Metal Hoses are top quality, all stainless steel factory welded assemblies that are manufactured and tested to meet industry demands and regulations for chemical, process, Oil & Gas, Power generation, Pumps & Vacuum, instrumentation, gases and Semiconductors manufacturing.

The HAM-LET Metal Hose assemblies are constructed from only best materials and components and by the most advanced corrugating and welding technologies for leak free durable performances.

HAM-LET Metal Hoses are the best solution for a flexible connection of Gas & Liquid lines where vibrating, moving parts and installations involve high temperatures, chemicals and aggressive media, high pressures and full vacuum.

Features

- All stainless steel assembly
- LET-LOK®, ONE-LOK®, Face seal, UH Line end fittings
- ID sizes: 1/4" up to 2"
- Pressure rating: Vacuum to 6,000 psi (414 bar), 4 to 1 safety factor
- Working temperatures -425°F (-254°C) up to 1300°F (705°C)
- Hydroformed or spirally-welded corrugated inner hose
- Machine braided (braid is woven directly on inner hose)
- Maximum Working Pressure marked on metal tag as standar.
- Manufactured in accordance to:
 - NAHAD – Corrugated Metal Hose Assembly specification guidelines
 - DIN ISO 10380 for designated items
 - Pipework – Corrugated metal hoses and hose assemblies

Metal Hoses Manufacturing Process

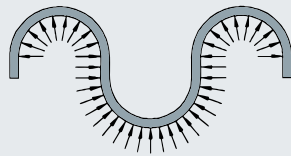
Corrugated Tube

A high-quality stainless steel thin walled tube is specifically manufactured. As a second stage, corrugations are formed into the tube to make it flexible. Corrugations are formed into the tube hydraulically using a unique process called "Hydroforming" (rather than the commonly used mechanical method).

Hydroforming process evenly distributes stresses on the tube wall. This unique method maintains wall thickness, reduces concentrated residual stress, and minimizes work hardening, resulting in enhanced flexibility and prolong cycle life.

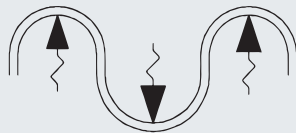
Hydroformed

Evenly distributed stresses



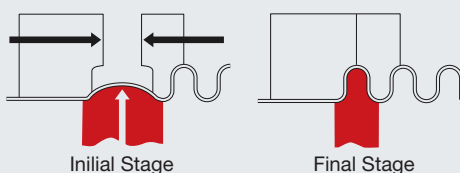
Mechanically Formed

Concentrated stresses



Hydroforming is a clean process, using water to form the hose, while most other processes require lubrication.

Hydroforming - HAM-LET utilizes a proprietary method of hydroforming in which corrugations are formed by expanding a section of stainless steel tube with high pressure water from inside the tube, while simultaneously feeding the tube axially into the process. Hydroforming is a clean, gentle process that enhances flexibility and cycle life, maintains wall thickness, reduces concentrated residual stress, and minimizes work hardening of materials.



Braid

As a third (optional) stage, stainless steel wire is braided over the hose enabling the corrugated hose the ability to withstand higher pressures. Hoses may be single braided (one layer of braid) or

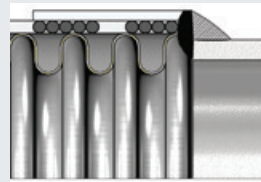


double braided (two layers of braid) to achieve even greater working pressures.

Braiding Superiority - A High Percentage Braid Coverage - highest percentage of braid coverage, yielding better cycle life and protection against damage to the hose.

Machine Braided - The braid is woven directly onto the hose, ensuring that the braid fits tightly against the hose, preventing potential hose deformation or squirm. Machine braided hose also offers repeatable performance and longer cycle life.

Assembly



Combining top quality hoses with top quality fittings together with a specialized welding, brazing, joining, fabrication procedures, and severe testing assures compatibility, integrity and serviceability of metal hose assemblies in even the most

extreme applications and demanding industries.

Standard assembly process consists of:

- Cutting the hose and braid through a hoses corrugation valley.
- Installing a braid collar over each end of the hose.
- Trimming of any excess braid.
- "Cap" welding the hose, braid, and braid collar together.
- Cleaning the cap weld surface.
- Placement and alignment of a fitting on the cap weld.
- "Attachment" welding the fitting to the cap weld.
- The assembled hose is tested, cleaned, marked and packed as required.

Metal Hose Selecting Considerations:

When selecting a Flexible Metal Hose, consider the following 5 characteristics:

1. Temperature

As the media or ambient temperature increases, the hose working pressure decreases. With your selected hose construction materials, go to "Working Pressure De-Rating Factor" table 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 maximum working pressure by the most limiting temperature de-rating factor, Maximum Working Pressures marked on metal tag as standard.

2. Dynamic Pressure

Pulsating, surge or shock pressures, like those encountered by 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 500°F with the shock pressures:
Catalog Maximum Working Pressure = 1800 psi
Temperature De-rating Factor at 500°F = 0.86
Pressure De-rating Factor = 1/6 Maximum Application Working Actual allowable 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.

Larger installation radius reduces fatigue on the hose for a longer assembly life.

4. Chemical Compatibility

The material that you choose for the hose and braid must be compatible with the media that will flow through the hose, as well as the environment in which the hose is installed. When determining chemical compatibility, be sure that you 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 useful are the National Association of Corrosion Engineers (NACE) and the Compass Corrosion Guides.

5. Accessories

Optional accessories available include spring guards, protective covers, insulating covers and protective armor.

Cleaning & Packing

The hydroforming hose manufacturing process yields a very clean product.

Clean and Degrease to CGA G-4.1 "Oxygen Clean" is available.

Ultrasonic Cleaning for Pharmaceutical application is available.

Each hose is packed in a plastic bag, end connections are capped.

Testing

All HAM-LET hose assemblies are 100% tested,

Helium leak testing up to 1×10^{-6} Std. CC/Sec.

Helium leak testing up to 1×10^{-9} Std. CC/Sec is available.

Other test such as Hydrostatic testing, Nitrogen/Helium bubble test are available.

*Helium leak test is available to hoses up to 100 inch (30m)

Working pressure de-rating factor:

Temp. in		304	304L	316	316L	321	C-276
Degrees F	Degrees C						
70	20	1.00	1.00	1.00	1.00	1.00	1.00
100	40	1.00	1.00	1.00	1.00	1.00	1.00
200	95	1.00	1.00	1.00	1.00	1.00	1.00
300	150	1.00	1.00	1.00	1.00	1.00	1.00
400	205	0.94	0.93	0.97	0.93	1.00	1.00
500	260	0.88	0.86	0.90	0.86	0.96	0.99
600	315	0.82	0.81	0.85	0.81	0.91	0.93
650	345	0.81	0.79	0.84	0.79	0.89	0.90
700	370	0.80	0.77	0.82	0.77	0.87	0.88
750	400	0.78	0.75	0.81	0.75	0.86	0.86
800	430	0.76	0.74	0.80	0.74	0.84	0.84
850	455	0.75	0.72	0.79	0.72	0.84	0.83
900	480	0.73	0.71	0.78	0.71	0.83	0.82
950	510	0.72	0.69	0.77	0.69	0.81	0.81
1000	540	0.69	0.67	0.77	0.67	0.81	0.80
1050	565	0.61	0.65	0.73	0.65	0.70	0.68
1100	595	0.49	0.62	0.62	0.61	0.55	0.55
1150	620	0.39	0.53	0.49	0.52	0.41	0.47
1200	650	0.30	0.38	0.37	0.38	0.32	0.36
1250	675	0.24	0.28	0.28	0.28	0.25	0.29
1300	705		0.21	0.21	0.21		

Selecting & Installing Metal Hose Assemblies

Media Flow Velocity

When gas liquid is being conveyed in a corrugated metal hose exceeds certain limits, resonant vibration can occur. Resonance may cause a very rapid failure of the assembly. In applications where product velocities exceed the limits shown in the chart below, a revision of the assembly design might include:

- 1. An addition of an interlocked metal hose liner
- 2. An increase in the corrugated hose I.D.
- 3. A combination of the above

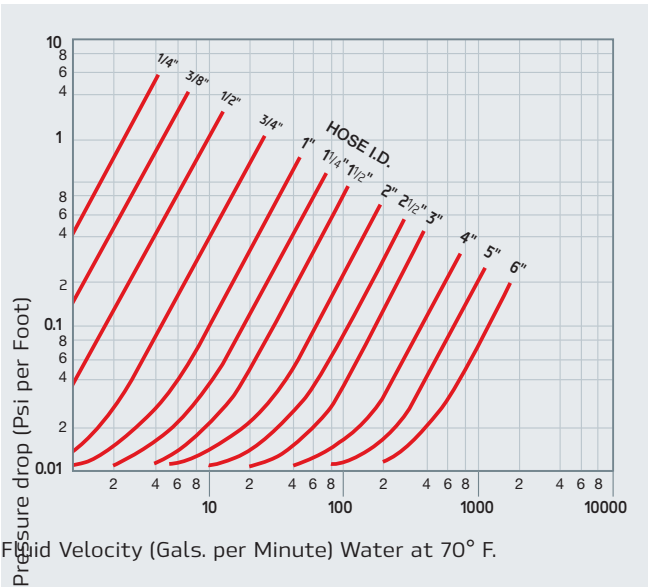
Velocity in Metal Hose

Installation Configuration	Maximum Product Velocity Feet/Second (Meter/Second)			
	Unbraided		Braided	
	Dry Gas	Liquid	Dry Gas	Liquid
Straight Run	100 (30)	50 (15)	150 (46)	75 (23)
45 Degree Bend	75 (23)	40 (12)	115 (35)	60 (18)
90 Degree Bend	50 (15)	25 (8)	75 (23)	40 (12)
180 Degree Bend	25 (8)	12 (4)	38 (12)	19 (6)

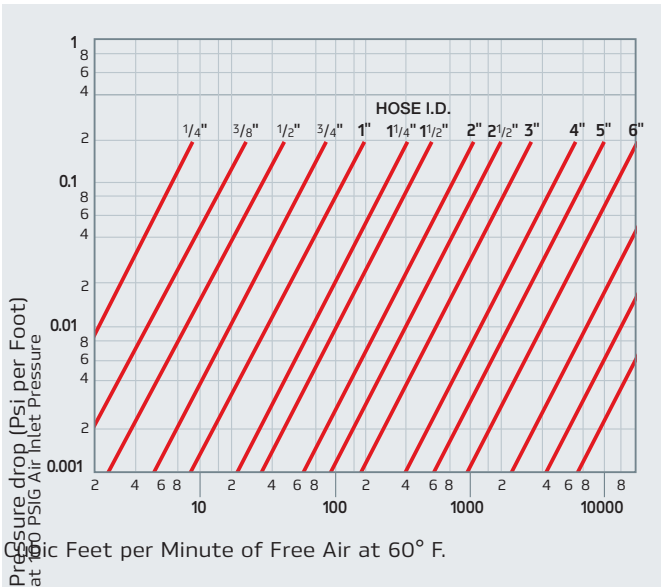
Pressure Drop

Pressure drop in a piping system is often a concern for the designer. Compared to rigid Tubes, there is always a greater pressure drop in corrugated metal hoses. The following graphs are offered as aids in estimating pressure drop in corrugated hose conveying water and air. The values derived are approximate and apply only to straight-line installations. Bends and fittings can increase the pressure drop.

Pressure Drop Graph For Water



Pressure Drop Graph For Air



SHF Series - General Use

General

The SHF – General Use hose series is the basic hose for industrial applications of gas & liquid lines with high temperatures, corrosive media and harsh environment.

Features

- Braided, double braided or unbraided corrugated tube assembly
- Core tube is made of 316L stainless steel, 321 stainless steel core tube is available
- Braid is made of 304 stainless steel, 316 stainless steel braid is available
- Annular Hydroformed corrugation
- Tube ID from ¼" to 2"
- Max. working pressure 2700psi (186bar)
- Min. static bend radius for braided hose 1.0inch (25mm)
- Min. dynamic bend radius for braided hose 4.5inch (114mm)
- Full range of end connections

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.35	0	0.41	10.4	1.0	25	4.5	114	90	6	N/A	N/A	0.04	0.06
		1	0.47	11.9					1,800	124	7,233	499	0.11	0.16
		2	0.53	13.5					2,700	186	9,100	627	0.18	0.27
3/8	9.53	0	0.65	16.5	1.2	30	5.0	127	70	5	N/A	N/A	0.10	0.15
		1	0.71	18.0					1,558	107	6,230	430	0.20	0.30
		2	0.77	19.6					2,336	161	9,345	644	0.30	0.45
1/2	12.70	0	0.77	19.6	1.5	38	5.5	140	70	5	N/A	N/A	0.11	0.16
		1	0.83	21.1					1,186	82	4,743	327	0.22	0.33
		2	0.89	22.6					1,779	123	7,115	491	0.33	0.49
5/8	15.88	0	0.96	24.4	1.8	46	7.0	178	57	4	N/A	N/A	0.17	0.25
		1	1.02	25.9					1,205	83	4,820	332	0.33	0.49
		2	1.08	27.4					1,808	125	7,230	498	0.49	0.73
3/4	19.05	0	1.16	29.5	2.1	53	8.0	203	43	3	N/A	N/A	0.19	0.28
		1	1.22	31.0					898	62	3,591	248	0.37	0.55
		2	1.28	32.5					1,347	93	5,387	371	0.55	0.82
1	25.40	0	1.47	37.3	2.7	69	9.0	229	43	3	N/A	N/A	0.26	0.39
		1	1.53	38.9					718	50	2,872	198	0.50	0.74
		2	1.59	40.4					1,077	74	4,308	297	0.74	1.10
1 1/4	31.75	0	1.75	44.5	3.1	79	10.0	254	43	3	N/A	N/A	0.29	0.43
		1	1.83	46.5					645	44	2,581	178	0.61	0.91
		2	1.91	48.5					968	67	3,872	267	0.93	1.38
1 1/2	38.10	0	2.08	52.8	3.9	99	11.0	279	28	2	N/A	N/A	0.47	0.70
		1	2.16	54.9					531	37	2,125	147	0.85	1.26
		2	2.24	56.9					797	55	3,188	220	1.23	1.83
2	50.80	0	2.61	66.3	5.1	130	13.0	330	14	1	N/A	N/A	0.59	0.88
		1	2.69	68.3					449	31	1,797	124	1.11	1.65
		2	2.77	70.4					674	46	2,696	186	1.63	2.43



Materials of Construction

Part	Material
Tube	SS 316L / SS 321
Braid	SS 304 / SS 316
End Connections	SS 316L

SHE Series - Extra Flexible

General

The SHE – Extra flexible hose series provides improved flexibility for smaller minimal static and dynamic bend radii. The extra flexibility is provided by denser corrugations while maintaining the same pressure rating.

Features

- Braided, double braided or unbraided corrugated tube assembly
- Core tube is made of 316L stainless steel, 321 stainless steel core tube is available
- Braid is made of 304 stainless steel, 316 stainless steel braid is available
- Annular Hydroformed corrugation
- Tube ID from ¼" to 2"
- Max. working pressure 2700psi (186bar)
- Min. static bend radius for braided hose 0.9inch (23mm)
- Min. dynamic bend radius for braided hose 3.7inch (94mm)
- Full range of end connections

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.35	0	0.42	10.7	0.9	23	3.7	94	90	6	N/A	N/A	0.07	0.10
		1	0.48	12.2					1,800	124	7,233	499	0.14	0.21
		2	0.54	13.7					2,700	186	9,100	627	0.20	0.30
3/8	9.53	0	0.65	16.5	1.0	25	4.0	102	70	5	N/A	N/A	0.15	0.22
		1	0.71	18.0					1,558	107	6,230	430	0.25	0.37
		2	0.77	19.6					2,336	161	9,345	644	0.36	0.54
1/2	12.70	0	0.77	19.6	1.2	30	4.4	112	70	5	N/A	N/A	0.18	0.27
		1	0.83	21.1					1,186	82	4,743	327	0.32	0.48
		2	0.89	22.6					1,779	123	7,115	491	0.47	0.70
5/8	15.88	0	0.96	24.4	1.4	36	5.6	142	57	4	N/A	N/A	0.19	0.28
		1	1.02	25.9					1,205	83	4,820	332	0.37	0.55
		2	1.08	27.4					1,808	125	7,230	498	0.54	0.80
3/4	19.05	0	1.16	29.5	1.7	43	6.4	163	43	3	N/A	N/A	0.31	0.46
		1	1.22	31.0					898	62	3,591	248	0.53	0.79
		2	1.28	32.5					1,347	93	5,387	371	0.74	1.10
1	25.40	0	1.47	37.3	2.1	53	7.1	180	43	3	N/A	N/A	0.41	0.61
		1	1.53	38.9					718	50	2,872	198	0.76	1.13
		2	1.63	41.4					1,077	74	4,308	297	1.11	1.65
1 1/4	31.75	0	1.75	44.5	2.5	64	7.9	201	43	3	N/A	N/A	0.63	0.94
		1	1.83	46.5					645	44	2,581	178	1.00	1.49
		2	1.91	48.5					968	67	3,872	267	1.37	2.04
1 1/2	38.10	0	2.08	52.8	3.1	79	8.7	221	28	2	N/A	N/A	0.70	1.04
		1	2.16	54.9					531	37	2,125	147	1.16	1.73
		2	2.24	56.9					797	55	3,188	220	1.63	2.43
2	50.80	0	2.61	66.3	4	102	10.3	262	14	1	N/A	N/A	0.88	1.31
		1	2.69	68.3					449	31	1,797	124	1.44	2.14
		2	2.77	70.4					674	46	2,696	186	1.99	2.96

Materials of Construction

Part	Material
Tube	SS 316L / SS 321
Braid	SS 304 / SS 316
End Connections	SS 316L



SHJ Series - Flexible High Pressure

General

The SHJ - High Pressure flexible hose series is hydroformed annular corrugated metal hose, made from heavy-wall stainless steel.

SHJ offers more flexibility and dependability at higher pressures.

Features

- Braided, double braided or unbraided corrugated tube assembly
- Core tube is made of 316L stainless steel, 321 stainless steel core tube is available
- Braid is made of 304 stainless steel, 316 stainless steel braid is available
- Annular Hydroformed corrugation
- Tube ID 1/4" up to 2"
- Max. working pressure 4000psi (276 bar), 4 to 1 safety rate factor
- Min. static bend radius for braided hose 1.0 inch (25mm)
- Min. dynamic bend radius for braided hose 5.5inch (140mm)
- Full range of end connections

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight per Foot	Weight per Meter
Inch	mm	(#)	Inch	mm	Inch	mm	Inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.35	0	0.42	10.7	1.0	25	5.5	140	450	31	N/A	N/A	0.08	0.12
		1	0.48	12.2					3,000	207	12,000	827	0.15	0.22
		2	0.54	13.7					4,000	276	16,000	1,103	0.22	0.33
3/8	9.52	0	0.655	16.64	1.5	38	8.5	216	400	28	N/A	N/A	0.12	0.05
		1	0.735	18.67					2400	166	12000	828	0.31	0.14
		2	0.815	20.70					3300	228	16000	1103	0.48	0.22
1/2	12.7	0	0.77	19.6	2.5	64	10.0	254	400	28	N/A	N/A	0.24	0.36
		1	0.85	21.6					2,400	165	9,600	662	0.40	0.6
		2	0.93	23.6					3,200	221	12,800	883	0.57	0.85
3/4	19.05	0	1.13	28.7	4.0	102	8.0	203	220	15	N/A	N/A	0.41	0.61
		1	1.19	30.2					1,100	76	4,430	305	0.58	0.86
		2	1.25	31.8					1,650	114	6,696	462	0.76	1.13
1	31.7	0	1.43	36.3	5.0	127	9.0	229	190	13	N/A	N/A	0.52	0.77
		1	1.49	37.8					1,000	69	4,187	289	0.76	1.13
		2	1.55	39.4					1,400	97	5,837	402	0.99	1.47
1 1/4	31.75	0	1.74	44.2	6.5	165	12.0	305	200	14	N/A	N/A	0.76	1.13
		1	1.82	46.2					900	62	3,758	259	1.13	1.68
		2	1.90	48.3					1,350	93	5,494	379	1.50	2.23
1 1/2	38.10	0	2.10	53.3	7.5	191	13.0	330	90	6	N/A	N/A	1.13	1.68
		1	2.18	55.4					750	52	3,070	212	1.54	2.29
		2	2.26	57.4					1,200	83	4,842	334	1.96	2.92
2	50.80	0	2.55	64.8	9.0	229	15.0	381	105	7	N/A	N/A	1.10	1.64
		1	2.68	68.1					800	55	3,304	228	2.29	3.41
		2	2.80	71.1					1,150	79	4,738	327	3.47	5.16



Materials of Construction

Part	Material
Tube	SS 316L / SS 321
Braid	SS 304 / SS 316
End Connections	SS 316L

SS 321 Tube is available for 1"-2"

SHU Series - Ultra High Pressure

General

The SHU – Ultra high pressure hose series is hydroformed annular, heavy-wall corrugated metal hose, specifically designed for ULTRA-high-pressure applications.

The SHU hoses offer superior flexibility and are made off heavy-wall 321 stainless steel.

Features

- Braided, double braided or unbraided corrugated tube assembly
- Core tube is made of 321 stainless steel, 316L stainless steel core tube is available
- Braid is made of 321 stainless steel
- Annular Hydroformed corrugation
- Tube ID 1/4", 3/4" up to 2"
- Max. working pressure 6000psi (414bar), 4 to 1 safety rate factor
- Min. static bend radius for braided hose 1.5 inch (38mm)
- Min. dynamic bend radius for braided hose 4.5inch (114mm)
- Full range of end connections

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.35	0	0.43	10.9	0.5	13	4.5	114	500	34	N/A	N/A	0.15	0.22
		1	0.56	14.1	1.5	38			5,000	345	20,000	1,379	0.32	0.48
		2	0.68	17.3	1.5	38			6,000	414	24,000	1,655	0.49	0.73
3/8	9.53	0	0.67	17.03	1.5	38.13	7.0	178	400	28	1,600	110	0.18	0.27
		1	0.80	20.21	2.5	63.55			3,500	241	14,000	965	0.46	0.68
		2	0.92	23.39	2.5	63.55			5,000	345	20,000	1,379	0.77	1.14
1/2	12.70	0	0.78	19.9	2.0	51	8.5	203	200	14	N/A	N/A	0.43	0.64
		1	0.88	22.5	3.0	76			2,700	186	10,800	744	0.64	0.95
		2	0.98	25.0	3.0	76			4,500	310	18,000	1,240	0.85	1.26
3/4	19.05	0	1.15	29.2	2.5	64	4.5	114	250	17	N/A	N/A	0.63	0.94
		1	1.28	32.5	4.0	102	10.0	254	2,650	183	10,669	736	1.09	1.62
		2	1.40	35.6	4.0	102	10.0	254	3,600	248	14,521	1,001	1.58	2.35
1	25.40	0	1.45	36.8	3.25	83	7.0	178	180	12	N/A	N/A	0.84	1.25
		1	1.57	39.9	5.0	127	11.0	279	2,500	172	10,000	689	1.53	2.28
		2	1.70	43.2	5.0	127	11.0	279	3,000	207	12,083	833	2.25	3.35
1 1/4	31.75	0	1.75	44.5	5.0	127	9.5	241	190	13	N/A	N/A	1.32	1.96
		1	1.88	47.8	6.5	165	12.5	318	1,775	122	7,119	491	2.09	3.11
		2	2.00	50.8	6.5	165	12.5	318	2,600	179	10,400	717	2.88	4.29
1 1/2	38.10	3	2.13	54.1	7.0	178	14.0	356	3,000	207	12,082	833	3.71	5.52
		0	2.11	53.6	6.0	152	11.5	292	110	8	N/A	N/A	1.75	2.60
		1	2.23	56.6	7.5	191	13.0	330	1,450	100	5,800	400	2.64	3.93
2	50.80	2	2.36	59.9	7.5	191	13.0	330	2,200	152	8,892	613	3.57	5.31
		0	2.57	65.3	7.5	191	12.0	305	100	7	N/A	N/A	2.04	3.04
		1	2.70	68.6	9.0	229	14.0	356	1,100	76	4,415	304	3.23	4.81
		2	2.82	71.6	9.0	229	14.0	356	1,675	115	6,710	463	4.45	6.62

Materials of Construction

Part	Material
Tube	SS 321 / SS 316L
Braid	SS 321
End Connections	SS 316L

SS 321 Tube is available for 1"-2"

SHV Series - Formable

General

The SHV – Formable hoses series are manually formable tubes that keep their formation. These hoses are designed to bend and stay in one position, providing a stress-free connection between tubing systems.

SHV hose can be compressed or stretched to fit into an exact space in the system

Features

- Braided or unbraided corrugated tube assembly
- Core tube is made of 321 stainless steel, 316L stainless steel core tube is available
- Braid is made of 304 stainless steel
- Annular Hydroformed corrugation
- Tube ID 1/4", 3/8", 1/2"
- Max. working pressure 900psi (62bar)
- Min. static bend radius for braided hose 1.0inch (25mm)
- Full range of end connections

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm	(#)	inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.35	0	0.41	10.4	1.0	25	N/A	N/A	90	6	N/A	N/A	0.04	0.06
		1	0.47	11.9					900	62	3,600	248	0.11	0.16
3/8	9.53	0	0.65	16.5	1.2	30	N/A	N/A	70	5	N/A	N/A	0.10	0.15
		1	0.71	18.0					800	55	3,200	221	0.17	0.25
1/2	12.70	0	0.77	19.6	1.5	38	N/A	N/A	70	5	N/A	N/A	0.11	0.16
		1	0.83	21.1					665	46	2,660	183	0.19	0.28



Materials of Construction

Part	Material
Tube	SS 321 / SS 316L
Braid	SS 304
End Connections	SS 316L

AHF Series - Standard

General

The AHF – chemical resistant, annular corrugated metal hose and manufactured with a special C-276 alloy.

Features

- Braided, double braided or unbraided corrugated tube assembly
- Core tube is made of C-276 stainless steel
- Braid is made of 316 stainless steel, C-276 stainless steel braid is available
- Annular Hydroformed corrugation
- Tube ID from 1/2." to 1"
- Max. working pressure 1779psi (122.7bar)
- Min. static bend radius for braided hose 1.5inch (38.1mm)
- Min. dynamic bend radius for braided

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	LBS	KG
1/2	12.7	0	0.77	19.56	1.5	38.1	5.5	139.7	70	4.8	N/A	N/A	0.11	0.24
		1	0.83	21.08					1186	81.8	4743	327.1	0.22	0.49
		2	0.89	22.61					1779	122.7	7115	490.7	0.33	0.73
3/4	19.05	0	1.16	29.46	2.1	53.34	8	203.2	43	3.0	N/A	N/A	0.19	0.42
		1	1.22	30.99					898	61.9	3591	247.7	0.37	0.82
		2	1.28	32.51					1347	92.9	5387	371.5	0.55	1.22
1	25.4	0	1.47	37.34	2.7	68.58	9	228.6	43	3.0	N/A	N/A	0.26	0.58
		1	1.53	38.86					718	49.5	2872	198.1	0.5	1.11
		2	1.59	40.39					1077	74.3	4308	297.1	0.74	1.64



Materials of Construction

Part	Material
Tube	C-276
Braid	C-276 / SS 316
End Connections	SS 316L / C-276

SHS Series - Standard

General

The SHS – Standard Use Hose series is a basic hose for industrial applications of gas & liquid lines with high temperatures, corrosive media and harsh environments.

Features

- Braided or unbraided corrugated tube assembly
- All stainless steel Assembly
- Annular Hydroformed corrugation
- Tube ID from ¼" to 2"
- Max. working pressure 1740 psi (120 bar)
- Min. static bend radius for braided hose 1.0 inch (25mm)
- Min. dynamic bend radius for braided hose 3.0 inch (85mm)
- Full range of HAM-LET's end connections
- Manufactured according EN ISO 10380

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.2	0	0.38	9.6	1.0	25	3.35	85	305	21	1218	84	0.12	0.08
		1	0.41	10.5					1,740	120	6,960	480	0.21	0.14
3/8	10.3	0	0.56	14.3	1.5	38	5.51	140	145	10	580	40	0.17	0.11
		1	0.61	15.5					1,233	85	4,930	340	0.29	0.19
1/2	12.2	0	0.66	16.7	1.8	45	5.51	140	102	7	406	28	0.18	0.12
		1	0.70	17.8					1,088	75	4,350	300	0.32	0.21
3/4	20.2	0	1.06	26.8	2.8	70	6.69	170	44	3	174	12	0.39	0.26
		1	1.11	28.3					928	64	3,712	256	0.72	0.48
1	25.4	0	1.27	32.2	3.3	85	7.48	190	44	3	174	12	0.56	0.37
		1	1.32	33.5					725	50	2,900	200	0.98	0.65
1 1/4	34.3	0	1.62	41.1	4.1	105	10.24	260	36	2.5	145	10	0.62	0.41
		1	1.69	42.8					580	40	2,320	160	1.14	0.76
1 1/2	40.1	0	1.95	49.5	5.1	130	11.81	300	36	2.5	145	10	0.80	0.53
		1	2.02	51.2					508	35	2,030	140	1.58	1.05
2	50.3	0	2.37	60.3	6.3	160	12.60	320	23	1.6	92.8	6.4	1.02	0.68
		1	2.44	62					435	30	1740	120	2.16	1.44



Materials of Construction

Part	Material
Tube	SS 316L
Braid	SS 304
End Connections	SS 316L

SHP Series - Industrial Gas Applications Compatible

General

The SHP – Industrial Gas Application hose series is made of heavy wall and close pitch, annular corrugation obtained by hydroforming.

Dedicated to transfer chemicals, gases, steam under pressure and in high vacuum conditions.

Features

- Single or double braided corrugated tube assembly
- Core tube is made of 316L stainless steel
- Annular Hydroformed corrugation
- Tube ID 1/4" up to 2"
- Max. dynamic working pressure 3698psi (255bar)
- Min. static bend radius for braided hose 1.0 inch (25mm)
- Min. dynamic bend radius for braided hose 4.3 inch (110mm)
- Full range of end connections.
- Manufactured according EN ISO 10380

Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure (static cond)		Maximum Working Pressure (dynamic cond)		Burst Pressure	
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	psi	bar
1/4	6	1	0.45	11.4	1.0	25	4.33	110	3,263	225	2,610	180	10,440	720
		2	0.51	13					4,249	293	3,698	255	14,790	1,020
3/8	10	1	0.70	17.8	1.5	38	5.91	150	2,407	166	2,103	145	8,410	580
		2	0.76	19.4					3,234	223	2,828	195	11,310	780
1/2	12	1	0.80	20.2	1.8	45	6.50	165	2,538	175	2,030	140	8,120	560
		2	1.21	30.7					3,089	213	2,683	185	10,730	740
3/4	20	1	1.15	29.1	2.8	70	8.86	225	1,436	99	1,233	85	4,930	340
		2	1.21	30.7					2,132	147	1,813	125	7,250	500
1	25	1	1.50	38	3.3	85	8.46	215	1,320	91	1,131	78	4,524	312
		2	1.57	40			10.24	260	2,059	142	1,798	124	7,192	496
1 1/4	32	1	1.83	46.5	4.1	105	11.81	300	1,131	78	943	65	3,770	260
		2	1.93	49					1,943	134	1,668	115	6,670	460
1 1/2	40	1	2.16	54.9	5.1	130	11.02	280	986	68	885	61	3,538	244
		2	2.26	57.4			13.39	340	1,508	104	1,305	90	5,220	360
2	50	1	2.65	67.3	6.3	160	15.35	390	899	62	798	55	3,190	220
		2	2.75	69.8					1,334	92	1,131	78	4,524	312



Materials of Construction

Part	Material
Tube	SS 316L / SS321
Braid	SS 304
End Connections	SS 316L

Cylinder Connections

End connectors	Gas Types
FA CGA 320	Carbon Dioxide, Methyl Fluoride
FA CGA 350	Arsine, Ethane, Methane, Natural Gas
FA CGA 540	Oxygen
FA CGA 580	Argon, Helium, Krypton, Neon, Nitrogen, Xenon
FA CGA 590	Sulfur Hexafluoride

SHG Series - High pressure industrial

General

The SHG – Gas application hose specially designed for high pressure clean gases.

Gas filling stations and connection between gas cylinders and regulators are good application examples.

* Leak test - 2 bar of air under water

Features

- Braided corrugated tube assembly
- All stainless steel Assembly
- Annular Hydroformed corrugation
- Tube ID from ¼" to ½"
- Max. working pressure 6090psi (420bar)
- Min. static bend radius for braided hose 1.18 inch (30mm)
- Min. dynamic bend radius for braided hose 7.48 inch (190mm)
- Full range of HAM-LET's end connections
- Manufactured according EN ISO 10380


Inside Diameter		Number of Braids	Outside Diameter		Static Minimum Bend Radius		Dynamic Minimum Bend Radius		Maximum Working Pressure		Burst Pressure		Weight Per Foot	Weight Per Meter
inch	mm		inch	mm	inch	mm	inch	mm	psi	bar	psi	bar	lbs	kg
1/4	6.35	1	0.48	12.2	1.18	30	7.48	190	3,625	250	14,500	1,000	0.17	0.26
		2	0.57	14.4					6,090	420	24,365	1,680	0.30	0.44
3/8	9.53	1	0.71	18	1.77	45	9.84	250	2,175	150	8,700	600	0.29	0.43
		2	0.79	20.1					3,540	244	14,155	976	0.42	0.63
1/2	12.7	1	0.82	20.8	2.17	55	11.81	300	2,175	150	8,700	600	0.39	0.58
		2	0.9	22.9					3,265	225	13,055	900	0.56	0.84

Materials of Construction

Part	Material
Tube	SS 316L
Braid	SS 304
End Connections	SS 316L



Metal Hoses - Ordering Information

OPTIONAL


S

S

H

H

F

F

1

1

04

04

LK 1/4


LK 1/4

TS 6M

TS 6M

123.4

123.4



Line		Hoses		Series		Configuration	Tube ID		End Connection 1	End Connection 2	Overall Length (OAL)		Options		
S	SS	H	Hose	F	General use	<div style="border: 1px solid black; padding: 2px;">1</div>	04	1/4	<div style="border: 1px solid black; padding: 2px;">LK 1/4</div>	<div style="border: 1px solid black; padding: 2px;">TS 6M</div>	XXX	inch	See page 31		
A*	Alloy 276			U	Ultra high pressure		06	3/8			XXXC	Centimeter			
				V	Formable		08	1/2			XXXM	Meters			
				E	Extra flexible		12	3/4							
				S	Standard use		16	1							
				G	Gas application		20	1 1/4							
				J	HP over Flexible		24	1 1/2							
				P	Industrial gas application		32	2							

* available only for AHF

Configuration

Series	Configuration	Tube Material	Braid Material	# of braids
F	0	316L	-	0
	1	316L	304	1
	2	316L	304	2
	3	321	-	0
	4	321	304	1
	5	321	304	2
	6	316L	316	1
	7	316L	316	2
	8	321	316	1
9	321	316	2	
U	1	321	321	1
	2	321	321	2
	3	316L	-	0
	4	316L	321	1
5	316L	321	2	
V	0	321	-	0
	1	321	304	1
	2	316L	-	0
	3	316L	304	1
E	0	316L	-	0
	1	316L	304	1
	2	316L	304	2
	3	321	-	0
	4	321	304	1
	5	321	304	2
	6	316L	316	1
	7	316L	316	2
	8	321	316	1
9	321	316	2	

Series	Configuration	Tube Material	Braid Material	# of braids
S	0	316L	-	0
	1	316L	304	1
G	0	316L	304	1
	1	316L	304	2
J	1	316L	304	1
	2	316L	304	2
	3	321	-	0
	4	321	304	1
	5	321	304	2
	6	316L	316	1
	7	316L	316	2
	8	321	316	1
	9	321	316	2
P	0	316L	304	1
	1	316L	304	2
AHF	0	C-276	-	0
	1	C-276	316	1
	2	C-276	316	2
	3	C-276	-	0
	4	C-276	C-276	1
5	C-276	C-276	2	

End Type		End Size
LK	LET-LOK®	inch
TS	Tube Adapter	1/4, 3/8, 1/2, 3/4, 1 1/4, 1 1/2
TP	Tube Adapter Preswaged	2
GF	Face Seal Female Swivel	mm
GM	Face Seal Male Swivel	6M, 8M, 10M, 12M, 18M, 25M, 38M
FP	Female Pipe NPT	
MP	Male Pipe NPT	
FG	Female BSP-P	
MG	Male BSP-P	
MR	Male BSP-T	
BW	Butt Weld Adapter	
HL	ONE-LOK®	
UH	UH-Line (Vacuum only)	
FH	Female Flare 37°	
MF	Male Flare 37°	
TC	Sanitary flange Tri-clamp	
LW	Long Butt Weld	
SW	Tube Socket Weld Elbow	

Warning!

The system designer and user have the sole responsibility for selecting products suitable for their special application requirements, ensuring their safe and trouble-free installation, operation, and maintenance. Application details, material compatibility and product ratings should all be considered for each selected product. Improper selection, installation or use of products can cause property damage or personal injury.

Metal Hoses - Options

Test		Cleaning		Internal Lamina		Outer Cover		Special Type		Tagging			
H	Helium Leak Test 1x10 ⁻⁹ Std. CC/Sec	O	Oxygen Cleaning	L	Liner	R	Protective Cover			P	Plastic Tag	None	On One End
						J	Insulating Jacket			M	Metal Tag ⁽¹⁾	B	Both Ends ⁽²⁾
A	Armor									Z	Crimp Ring with MWP and other standard information		
J1	Thermal Insulation Cover												
N	Interlock bend restrictor												
X	Anti whip external safety cable												
Y	Hydrostatic Test												

(1) One end metal tag with MWP marking – is supply as standard (no need to mark this option to have this tag)

(2) Metal tag can not be in both hands

Cover Options



Armor Protection

A mechanical armor can be installed with the hose assembly. This type of armor consists of a hard metallic shell protecting the flexible regions of the hose.



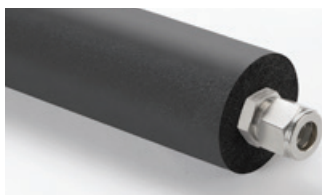
Protective Cover

For lighter protection of the corrugated hose and braid, plastic scuff guards can be installed with hose.



Insulating Jacket

High temperature insulation of the hose exterior is available by adding an insulated protective jacket. The jacket consists of braided fiberglass insulation, covered and impregnated with silicone rubber that is then installed over the corrugated hose and sealed. The Insulation jacket can also be used to prevent ambient heat from being conveyed to the media or to reduce media heat loss.



Thermal Insulation Cover

Thermal insulation of the hose exterior by adding thermal insulation cover. Reduces heat loss of media by decreasing conduction and convection heat exchanges with environment.



Certifications

Materials, Standard Conformance and testing certificates are available. Other customer specific certificates are available upon request.



Tagging

Customer or system information can be marked on hose assemblies using cardboard, plastic, and metal tags or permanently engraved onto braid collars. Tags and markings can be applied on single or both ends of assemblies.