Important Safety Information

⚠ WARNING

Flexible hose lines offer many advantages over rigid tubing including routing ease, vibration absorption, sound deafening and the ability to accommodate movement of connected components. However, hose lines require caution in use not only to provide long service, but also to guard against potentially dangerous failure.

Important

The user should carefully observe the precautions listed in this catalog or brochure, including the recommendations on the selection of hose and fittings on the relevant pages on fluid compatibility. In addition, care should be taken not to exceed the minimum bend radius listed for each hose size and type in the hose section. Maximum operating pressure should not exceed pressures listed in the hose data. Instructions for assembling fittings to different hose should be followed carefully to ensure the performance of the completed assembly.

⚠ WARNING

Eaton's Weatherhead fitting tolerances are engineered to match Eaton's Weatherhead hose tolerances. The use of Weatherhead fittings on hose supplied by other manufacturers and/or the use of Weatherhead hoses with fittings supplied by other manufactures may result in the production of unreliable and unsafe hose assemblies and is neither recommended nor authorized by Eaton Corporation or any of its affiliates or subsidiaries.

⚠ WARNING

Application considerations must be observed in selecting appropriate components for the application of these products contained herein. The failure to follow the recommendations set forth in this catalog may result in an unstable application which may result in serious personal injury or property damage.

EATON CORPORATION OR ANY OF ITS AFFILIATES OR SUBSIDIARIES SHALL NOT BE SUBJECT TO AND DISCLAIMS ANY OBLIGATIONS OR LIABILITIES (INCLUDING BUT NOT LIMITED TO ALL CONSEQUENTIAL, INCIDENTIAL AND CONTINGENT DAMAGES) ARISING FROM TORT CLAIMS (INCLUDING WITHOUT LIMITATION NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES OF LAW WITH RESPECT TO ANY HOSE ASSEMBLIES NOT PRODUCTED FROM GENUINE WEATHERHEAD HOSE FITTINGS, HOSE AND WEATHERHEAD APPROVED EQUIPMENT, AND IN CONFORMANCE WITH EATON'S WEATHERHEAD PROCESS AND PRODUCT INSTRUCTIONS FOR EACH SPECIFIC HOSE ASSEMBLY.

Failure to follow these processes and product instructions and limitations could lead to premature hose assembly failures resulting in property damage, serious injury or death.

Routing

If the user follows the recommendations on hose line routing and installation as provided for herein, improved safety and longer service life of any hose installation will result.

Hose Installation

Proper installation of the hose is essential to the proper operation and safe use of the hose and related equipment. Improper installation of the hose can result in serious injury or property damage caused by spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from improper installation of the hose, you should carefully review the information in this catalog regarding hose installation.

Some of the factors you must consider in installing the hose properly are:

- changes in length
- proper bend radius
- protection from high temperature sources
- elbows and adapters to relieve strain
- rubbing or abrasion
- twisting
- improper hose movement

These factors and the other information in this catalog regarding hose installation should be considered by you before installing the hose.

If you have any questions regarding proper hose installation, please contact Eaton Technical Support at 1-888-258-0222.

Hose Maintenance

Proper maintenance of the hose is essential to the safe use of the hose and related equipment. Hose should be stored in a dry place. Hose should also be visually inspected. Any hose that has a cut or gouge in the cover that exposes the reinforcement should be retired from service. Hoses should also be inspected for kinking or broken reinforcement. If the outside diameter of the hose is reduced by 20% at the spot where it is bent then the hose should be retired from service. Inadequate attention to maintenance of the hose can result in hose leakage, bursting, or other failure which can cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances.

Hose and Field Attachable Hose Ends

Weatherhead Hose and Field Attachable Hose Ends have been engineered and designed as a complete hose assembly system. Component compatibility along with the use of quality components insures the production of reliable hose assemblies when assembled properly. The use or intermixing of ends and hose not specifically engineered and designed for use with each other may result in the production of unsafe or unreliable hose assemblies. This can result in hose assembly leakage, hose separation or other failures which can cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances. The Eaton warranty is limited to apply only when Weatherhead Field Attachable Hose Ends are used on compatible Weatherhead hose. See back inside cover for warranty information.

Coll-O-Crimp Hose, Hose Ends and Assembly Equipment Compatibility

The Coll-O-Crimp Equipment Package, Coll-O-Crimp Hose Ends and Coll-O-Crimp Hose have been engineered and designed as a complete hose assembly system. Each component of the Coll-O-Crimp hose assembly system is compatible with other Coll-O-Crimp components to which it relates. Component compatibility, along with the use of quality components, insures the production of reliable hose assemblies when assembled properly. The use or intermixing of fittings and hose not specifically engineered and designed for use with each other and Coll-O-Crimp equipment is not recommended and may result in the production of unsafe or unreliable hose assemblies. This can result in hose assembly leakage, hose separation or other failures which can cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances. The Eaton warranty is limited to apply only when Coll-O-Crimp Hose Ends and compatible Coll-O-Crimp Hose are used with Coll-O-Crimp assembly equipment.

Hose Selection Chart

How to use chart: Locate the hose I.D. required and move to the right to the correct pressure. Then move up or down in this column for data on material, temperature, etc. to quickly determine whether the hose meets your requirements. For complete information on any hose refer to hose catalog page number at bottom of column.

⚠ WARNING

Selection of hose: Selection of the proper hose for the application is essential to the proper operation and safe use of the hose and related equipment. Inadequate attention to selection of the hose for your application can result in hose leaking, bursting, or other failure which can cause serious bodily injury or property damage from spraying fluids or flying projectiles. You should carefully review the information in this catalog.

HOSE	H069	H057	H077	H166	H213	H229	H239	H429	H039	H039H	H009	H100	H101
Usage	Truck & Hydraulic	Fuel & Oil	Elec. Fuel Inject.	High Temp. Truck	High Temp. Truck	Air & Hydraulic	Transmission Oil Cooler, Diesel Fuel, Air Brake	Transmission Oil Cooler, Fuel and Diesel Lines	Hydraulic Suction Vacuum	Suction	Lube	General Purpose	General Purpose
Meets	DOT AII+ ABS	—	—	DOT AII	DOT AI	DOT AII	DOT AII	—	USCG ABS MSHA	—	USCG MSHA	—	MSHA
SAE No.	J1402 AII 100R5	30R7	30R9	J1402 Type AII	J1402 Type AI	J1402 Type AII	J1402 Type AII	J1019	100R4 J1942/1	100R4	J1942/1, 100R6	—	—
Temp. Range °F	See page 36	-40°F +275°F	-30°F +275°F	See page 43	See page 39	See page 39	See page 40	-55°F +302°F	-40°F +275°F	-40 - +300°F	-40°F +212°F	-40°F +212°F	-40°F +212°F
Inner Tube	Nitrile	Nitrile	Fluoro-elastomer Veneer	Nitrile	CPE	Nitrile	CPE	CPE	CPE	CPE	Nitrile	Nitrile	Nitrile
Reinforce-ment	1 Fiber & Steel Braid	1 Fiber Braid	Multi Fiber Braid	1 Fiber & 1 S.S. Braid	1 Fiber & 1 Wire Braid	2 Fiber Braids	2 Fiber	1 Wire Braid	2 Fiber Ply & Helical Wire	1 helical wire, 1 Fiber braid	1 Fiber Braid	1 Fiber Braid	1 Fiber Braid
Outer Tube	Fiber Braid	Hypalon[1]	ECO	Fiber Braid	Fiber Braid	Fiber Braid	Fiber Braid	Fiber Braid	Neoprene	CPE	Neoprene	Fiber Braid	Neoprene
Hose I.D. - Maximum Recommended Operating Pressure - PSI													
3/4	3000	50		1500	2000	225	225						
1/4	3000	50	125	500	1500						400	350	350
5/16	2250	50	125	500	1500	225					400	350	350
3/8		50	125								400	350	350
13/32	2000			500	1250	225	225	250					
7/16		35											
1/2	1750			450	1000	225	225	250			400	350	350
5/8	1500			450	750	225	225					350	350
3/4									300††	300		350	350
7/8	800			250	400	225	225						
1									250††	250			
1-1/8	625			250			225						
1-1/4									200††	200			
1-1/2									150	150			
1-3/8	500												
1-13/16	350												
2									100	100			
2-3/8	350												
3	200												
Hose	**Page 36**	**Page 37**	**Page 37**	**Page 38**	**Page 39**	**Page 39**	**Page 40**	**Page 40**	**Page 41**	**Page 41**	**Page 42**	**Page 42**	**Page 43**
Hose Ends													
C-O-C	113-116	—	—	113-116	—	113-116 135	113-116 135	126-133 134	140, 141-158 159-169	140 141-158 159-169	106-112	—	—
Field Attach.	196-197 206-210	187-188	103	185, 206-210	203-205	196-197 206-210	196-197 206-210	—	198 199	198 199	186	189-191	189-191

[1] Hypalon® is a registered trademark of E.I. DuPont.

**At 70° F.
† When used with 'U' Series Ends.

Hose Selection Chart

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HOSE	H209	H332	H400	H757	GH134W	H366	H059	H104	H017	H169	H324	H569	H338
Usage	Car Wash	General Purpose	Very High Pressure Hydraulic	Air Cond. R12 & R134a	Air Cond. R404a, HFC134a, R22, R407C	LPG	Fuel Oil/ Lube	Hydraulic	General Purpose Hydraulic	Hydraulic	Power Steering	A/B & Hydraulic	Air Brake
Meets	—	—	MSHA	—	—	UL 21	ABS NMMA USCG	USCG MSHA ABS	USCG MSHA	MSHA	—	ABS* DOT AII + USCG	DOT AII
SAE No.	—	—	—	J2064 Type C, CL-1	J2064 Type E Class 1	—	J1942/1	J1942 /1/1 100R1AT	J1942/1, 100R3	—	J188 Type 2	100R5 J1942 /1 J1402 Type AII	J1402 Type A
Temp. Range °F	-40°F +200°F	-40 - +300°F	-40°F +212°F	See page 41	-40°F +257°F	-40°F +300°F	-4°F +212°F	-40°F +212°F	-40°F +212°F	-40°F +212°F	-40°F +250°F	See page 49	-40°F +200°F
Inner Tube	Nylon 11	CPE	Nitrile	Rubber/ Nylon/ Rubber	Polyamide Veneer	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Neoprene	CPE	EPDM
Reinforcement	1 Fiber Braid	1 Fiber Braid	2 Steel Braids	1 Fiber Braid	Rubber Backing, 1 Fiber Braid	1 Fiber & 1 S.S. Braid	1 Wire 1 Fiber Braid	1 Steel Braid	2 Fiber Braids	1 Steel Braid	2 Fiber Braids	1 Fiber & 1 Steel Braid	Multi Fiber Braid
Outer Tube	Polyurethane	CPE	Vinyl Nitrile	Butyl Perforated	Chlorobutyl	Fiber Braid	Blue Neoprene	Neoprene	Neoprene	Neoprene (Perforated)	Neoprene	Blue Fiber Braid	EPDM
Hose I.D. - Maximum Recommended Operating Pressure - PSI													
3/4							500			3000		3000	
1/4	2250	250					500*	2750	1250	3000		3000	
5/16	1750			400		350	500			2250		2250	
3/8	1350	250			500			2250	1125		1500		225
13/32				400		350	500			2000		2000	
7/16													
1/2	1000	250		350	500		500	2000	1000	1750		1750	225
5/8		250	4000	350	500		500	1500		1500		1500	
3/4		250	4000		500			1250	750				
7/8										800		800	
1							500	1000	565				
1-1/8										625		625	
1-1/4								625	375				
1-1/2													
1-3/8										500			
1-13/16										350			
2													
2-3/8													
3													
Hose	**Page 43**	**Page 44**	**Page 44**	**Page 45**	**Page 45**	**Page 46**	**Page 46**	**Page 47**	**Page 47**	**Page 48**	**Page 48**	**Page 49**	**Page 49**
Hose Ends													
C-O-C	106-112		170-185	126-133	—	113-116	113-116 135	140 141-158 170-185	141-158	113-116	141-158	113-116	137
Field Attach.	—	189-191	—	—	216-241	196-197 206-210	206-210	200-202	—	196-197 206-210	—	206-210	193-195

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Hose Selection Chart

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HOSE	H290L	H421	H114	H145	H145R	H146	H190	H190H	H245	H280	H290	H290H	H325
Usage	Low Temp Flexing	Hyd. Jacking System	Ag. Hyd. & Hyd. Synthetic	Hydraulic	Construction	Ag. Hyd. & Hyd. Synthetic	Hydraulic	Hydraulics	Hydraulic	Hydraulic	Hydraulic	Hydraulics	Low Temp. Hydraulic
Meets	—	IJ00	MSHA	USCG MSHA	—	—	MSHA, USCG, ISO 1436a, EN 853 Type 1SN	MSHA, ISO1436a	USCG MSHA ABS	USCG, MSHA, ISO 1436, EN 857, Type 2SC	USCG, MSHA, ISO 1436, EN 853, Type 2SN	MSHA	—
SAE No.	100R16	—	—	J1942/1, 100R17	100R17	—	J1942/1, 100R1 AT	100R1, AT, 1SN, EB853	J1942 100R16	J1942, Code H, 100R16	J1942/1, 100R2 AT	100R2, 2SN, EN853	—
Temp. Range °F	-70 - +212°F	-40 - +212°F	-40°F +250°F	See Page 55	-40°F +250°F	-65°F +250°F	-40°F +212°F	-55 - +302°F	-40°F +212°F	See page 61	See page 62	-55 - +302°F	-67°F +175°F
Inner Tube	Nitrile	Synthetic Rubber	Hytrel[1]	Nitrile	Nitrile	Hytrel[1]	Nitrlie	CPE	Nitrile	Nitrile	Nitrile	CPE	Synthetic Rubber
Reinforcement	2 Wire Braids	2 Wire Braids	1 Steel Braid	1 Steel Braid†	1-2 Steel Braids	1 Steel Braid	1 Steel Braid	1 Steel Braid	2 Steel Braids	2 Steel Braids	2 Steel Braids	2 Steel Braids	2 Steel Braids
Outer Tube	Neoprene	Synthetic Rubber	Neoprene	Neoprene	UHMWPE	Polyester Braid	Vinyl Nitrile	CPE	Neoprene	Vinyl Nitrile	Vinyl Nitrile	CPE	Synthetic Rubber
Hose I.D. - Maximum Recommended Operating Pressure - PSI													
3/4													
1/4	5000	10000	3000	3045	3000	3000	3265	3265	5000	5800	5800	5800	5000
5/16													
3/8	4000	10000	3000	3045	3000	3000	2610	2610	4000	4800	4800	4800	4000
13/32													
7/16													
1/2	3500		3000	3045	3000	3000	2320	2320	3500	4000	4000	4000	3500
5/8	2750			3045	3000		1885	1885	2750	3630	3630	3630	
3/4	2250			3045	3000		1525	1525	2250	3120	3120	3120	2250
7/8												2400	
1	2000			3045	3000		1275	1275	2000	2400	2400		2000
1-1/8													
1-1/4	1250							900	1625			2250	
1-1/2												1750	
1-3/8													
1-13/16													
2	1125											1500	
2-3/8													
3													
Hose	**Page 50**	**Page 50**	**Page 51**	**Page 51**	**Page 52**	**Page 52**	**Page 53**	**Page 53**	**Page 54**	**Pages 54**	**Pages 55**	**Page 55**	**Page 56**
Hose Ends													
C-O-C	170-185		140 141-158	170-185, 140 141-158 159-169	170-185	141-158	170-185	170-185	170-185 140, 141-158 159-169	170-185	170-185	170-185	141-158
Field Attach.			—	—		—	—		—	—	—		—

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**At 70° F.

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Hose Selection Chart

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Selection of Hose: Selection of the proper hose for the application is essential to the proper operation and safe use of the hose and related equipment. Inadequate attention to selection of the hose for your application can result in hose leaking, bursting, or other failure which can cause serious bodily injury or property damage from spraying fluids or flying projectiles. You should carefully review the information in this catalog.

HOSE	H345	H350	H425	H430	H430R	H464	H470	H485	H545	H0105	H0106	H115	H116
Usage	Pressure Washer	Hydraulic	Hydraulic	Very High Pressure Hydraulic	Very High Pressure Hydraulic	Hydraulics	Very High Pressure Hydraulic	High Pressure Hydraulics	Hydraulic	Air & Water	Air/Water Apps.	Air Tool & Water	Pneumatic Tools
Meets	MSHA	MSHA	USCG MSHA ABS	USCG MSHA, ABS	MSHA	MSHA	USCG** MSHA, ABS	—	—	—	—	—	—
SAE No.	—	—	J1942/1, 100R2AT	J1942, 100R12	100R12	EN856, 4SH`	J1942/1, 100R13	100R15	—	—	—	—	—
Temp. Range ˚F	See Page 56	-40°F +212°F	-40°F +212°F	-40°F +250°F	-40°F +250°F	-40 - +212˚F	See page 60	-40 - +250˚F	-40°F +250°F	See page 62	See page 62	-40°F +160°F	-40 - +180˚F
Inner Tube	Nitrile	Synthetic Rubber	Nitrile	Neoprene	Nitrile	Nitrile	Neoprene	Nitrile	Nitrile	EPDM	EPDM	Nitrile	Nitrile
Reinforcement	1 Steel Braid	2 Steel Braids†	2 Steel Braids	Multi Spiral Steel	Steel Plies	4 Spiral Steel Plies	Multi Spiral Steel	Multi-Spiral Steel	1 Steel Braid*	Multi Fiber Spiral	2 Spiral	Multi Fiber Braid	Multi-Fiber Braids
Outer Tube	Blue Vinyl Nitrile	Neoprene	Neoprene	Hypalon	UHMW	Nitrile	EPDM	Vinyl Nitrile	Abrasive Resistant Nylon	Red EPDM	EPDM	Red Vinyl Nitrile	Vinyl Nitrile
Hose I.D. - Maximum Recommended Operating Pressure - PSI													
3/4													
1/4	3000		5000						3000	300†	200	300	225
5/16												300	225
3/8	3000	3500	4000	4000	4000				3000	300†	200	300	225
13/32													
7/16													
1/2	3000	3500	3500	4000	4000		5000		3000	300†	200	300	225
5/8		3500	2750	4000	4000				3000				
3/4		3500	2250	4000	4000	6090	5000		3000	300†	300	300	
7/8													
1		3500	2000	4000	4000	5510	5000	6000	3000	200†		300	
1-1/8													
1-1/4			1625	3000	3000	5075	5000	6000				225	
1-1/2			1250	2500	2500	4350	5000	6000				225	
1-3/8													
1-13/16													
2			1125	2500	2500	3625	5000						
2-3/8													
3													
Hose	Page 56	Page 57	Page 57	Page 58	Page 59	Page 60	Page 60	Page 61	Page 61	Page 69	Page 69	Page 68	Page 68
Hose Ends													
C-O-C	170-185	170-185 141-158 159-169	140, 141-158 170-185 159-169	159-169	159-169	350-359	121-125	350-359	140 141-158 159-169	141-158	141-158	141-158 159-169	141-158 159-169
Field Attach.	—	—	211-213	—			—		—	187-188 192	187-188 192	187-188 192	187-188 192

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*4-8 Size: 1 Steel Braid; 10-16 Size: 2 Steel Braids

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HOSE	H201	H243	H265	H275	H277	H335	H336	H435	H436	H900	H1571	H1719
Usage	General Purpose Air & Oil	Hydraulic/ Air/Steam	Air, Water	Air & Water	Hydraulic/ Air/Steam w/ Conductive Static Dissipating Liner	Hydraulic Non-Conductive	Hydraulic	Hydraulic Non-Conductive	Hydraulic	Propane	Air and Water Transfer	General Purpose
Meets	MSHA (Black only)	FDA	—	—	—	EN 855 Type R8	EN 855 Type R8	—	—	UL 21		
SAE No.	—	—	—	—	—	100R8 Non-Cond.	100R8	100R7	100R7			
Temp. Range °F	-40°F +212°F	-65°F +450°F	-20°F +180°F	-10°F +150°F	-65°F +450°F	See page 58	See page 58	-40°F +200°F	-40°F +200°F	-40-140F	-20 - 150 F	-15-150F
Inner Tube	Nitrile	PTFE	Modified PVC	PVC	PTFE	Nylon	Nylon	Nylon 11	Nylon 11	Nitrile	Modified PVC	Polyvinyl Chloride PVC
Reinforcement	1 Fiber Braid	1 S.S. Braid	2 Fiber Spirals	2 Fiber Spirals	1 S.S. Braid	Multi Yarn Braids	Multi Fiber Braids	2 Fiber Braids	2 Fiber Braids	Fiber Braid	4 Fiber Spiral	2 Fiber Spiral
Outer Tube	Neoprene (black), Vinyl Nitrile (colors)	Stainless Steel Braid	Blue Rubber Modified Thermoplastic	Red PVC	Stainless Steel Braid	Orange Polyurethane	Black Polyurethane Perforated	Orange Polyurethane	Polyurethane Perforated	Vinyl Nitrile Perforated	PVC/Nitrile Blend	Polyvinyl Chloride PVC
Hose I.D. - Maximum Recommended Operating Pressure - PSI												
3/4		3000			3000	5000	5000					
1/4	250	3000	350**	250**	3000	5000	5000	2750	2750	350		
5/16		2500			2500			2500	2500			
3/8	250	2000	350**	250**	2000	4000	4000	2250	2250	350		
13/32												
7/16												
1/2	250	1750	300**	250**	1750	3500	3500	2000	2000	350		
5/8	250											150
3/4	250	1000	250**	250**	1000		2250	1250	1250	350	400	150
7/8						2250						
1		1000	200**	200**	1000	2000	2000	1000	1000	350		
1-1/8												
1-1/4												
1-1/2												
1-3/8												
1-13/16												
2												
2-3/8												
3												
Hose	**Page 65**	**Page 76**	**Page 65**	**Page 66**	**Page 77**	**Page 75**	**Page 75**	**Page 73**	**Page 74**	**Page 72**	**Page 64**	**Page 70**
Hose Ends												
C-O-C	—	106-112	106-112 136	106-112 136	106-112	117-120	117-120	113-116 106-112 135	106-112	141-158	141-158	—
Field Attach.	189-191	—	—	—	—	—	—	196-197 206-210 214-215	214-215	—	—	—

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HOSE	H1776/7	H1812	H1981/2	H1987	H6002	H6008	H6009	H8679	H9622	H9949
Usage	Pneunatic Tools	Fertilizer and Pesticides	Air and Water Transfer	General Purpose	Construction	Construction	Construction	General Purpose	Construction	General Purpose / Non-Conductive
Meets										
SAE No.										
Temp. Range °F	-40 - 180F	-40 - 180F	-40 - 180F	-30-160F	-40-200F	-40-200F	-40-250F	-30-160F	-40-200F	-40 - 180F
Inner Tube	Nitrile	EPDM	Blended Nitrile	EPDM	Nitrile	Nitrile	Nitrile	Synthetic Rubber	Nitrile	Nitrile (Non-Conductive
Reinforcement	1 or 2 Fiber Braid	2 Fiber Braid	2 or 4 Spiral	2 Fiber Spiral	Fiber	1 or 2 Steel Braid	1 or 2 Steel Braid	2 Fiber Spirals	1 or 2 Steel Braid	2 Fiber Braid
Outer Tube	Red Vinyl Nitrile	Red EPDM	Neoprene Pinpricked	EPDM Perforated	1/2, 3/4, 1 Neoprene 1 1/4, 1 1/2, 1 1/2 Vinyl Nitrile	Yellow Neoprene	Carboxylated Nitrile/ Perforated	Synthetic Rubber	Neoprene / Perforated	Vinyle Nitrile (Non-Conductive)
Hose I.D. - Maximum Recommended Operating Pressure - PSI										
3/4										
1/4	325	275	200/300							275
5/16	325		200/300							
3/8	325	275	200/300							275
13/32										
7/16										
1/2	325	250	200/300		400				1000	275
5/8	325	250	300	600				100		
3/4	325	250	225/300	600	400				1000	275
7/8										
1	325	250	200		400	1000			850	275
1-1/8										
1-1/4	325	250			400		800		500	
1-1/2	325	250				600	600		500	
1-3/8										
1-13/16										
2					300	600	600		500	
2-3/8										
3						400	600			
Hose	Page 64	Page 70	Page 67	Page 71	Page 63	Page 62	Page 62	Page 71	Page 63	Page 66
Hose Ends										
C-O-C	141-158 159-169	141-158 159-169	141-158	—	141-158 159-169	159-169	159-169	—	159-169	141-158
Field Attach.	—	—	—	—	—	—	—	—	—	—

** Size -12 thru -20.

† 2 Steel Braids -06 thru -12.
4 Steel Spirals size -16.

Hose Selection

⚠ WARNING

For important safety information concerning hose selection, see page 4 of this catalog.

There are several factors which affect selection of a hose sized such that it will provide the desired rate of flow at the required pressure; these are:

- Hose size
- Hose length
- Hose ends
- Material conveyed
- Bends
- Static head pressure

Hose Size

Undersized pressure lines produce excessive pressure drop with attendant energy loss and heating, and undersized suction lines cause cavitation at the pump inlet. Oversized hose assemblies, on the other hand, are excessively costly and generally too heavy.

In selecting hose for hydraulic systems, the following empirical values can be used to achieve minimum pressure drop consistent with reasonable hose size (see Chart 2):

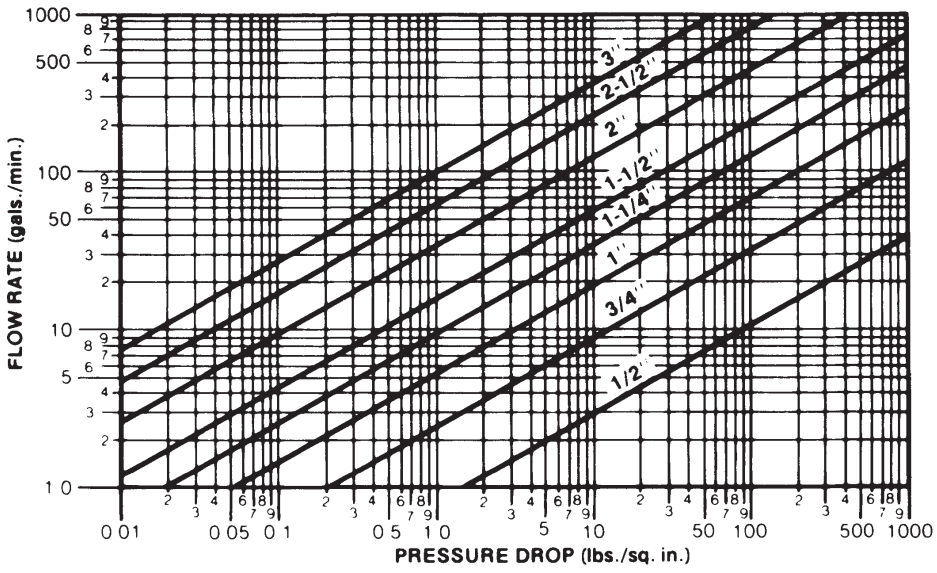
Velocity of pressure lines 7 to 15 ft./sec.Velocity of short pressure lines to 20 ft./sec.Velocity of suction lines 2 to 5 ft./sec.

To use Chart 2, lay a straight-edge across the chart as shown by the dotted line. To minimize pressure drop, always use the next larger size hose shown if the line passes between sizes listed.

Hose Length

Chart 1 gives the pressure drop in different-sized hoses based on hoses of 100-foot length, and is based on water as the material conveyed. For hoses of a different length, these values must be corrected. For example, a 100-foot length of 1/2" hose causes a pressure drop of 100 lbs./in.^{2} at a flow rate of 10 gal./min. If the hose in question is 50 feet long, the pressure drop derived from Chart 1 must be corrected by multiplying the value by the ratio of the actual length to 100 feet, or 50/100, or 0.5. Therefore, the actual pressure drop caused by a 50-foot length of 1/2" hose, at a flow rate of 10 gal./min., is 50 lbs./in.^{2} (0.5 x 100 = 50 lb./in.^{2}).

CHART 1. Hose Flow Rate vs. Pressure Drop



Hose Ends and Fluid Conveyed

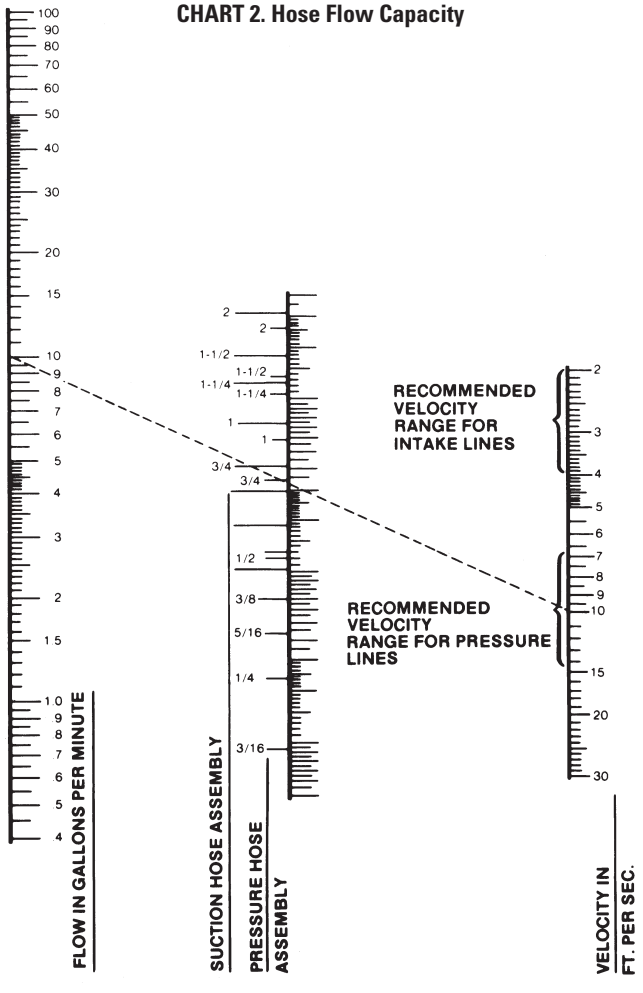
In most cases, the end fitting openings are slightly smaller than the hose itself. However, this varies widely with hose end designs from 'full-flow' ends which have the same I.D. as the hose, down to as much as 1/8" smaller I.D. than the hose bore. To allow for this, assume a 10-to-15% greater flow rate than actually measured in the system when determining pressure drop.

Chart 1 is based on water as the material conveyed, and for other fluids it is necessary to correct for the difference in specific gravity and viscosity. Chart 3 lists common fluids, their specific gravities, viscosities, and corresponding correction factors.

To determine the pressure drop for a specific fluid, first determine the pressure drop from Chart 1 for the hose length then divide this by the correction factor found in Chart 3.

For example, the 50-foot length of 1/2" hose just de-scribed had a pressure drop of 50 lbs./in.^{2} at a flow of 10 gal./min. of water. To determine the pressure drop if #2 fuel oil is the material conveyed, divide by 0.752 (from Chart 3)… 50 ÷ 0.752 = 66.5 lbs./in.^{2} pressure drop. If, on the other hand, the material conveyed is Type #3 gasoline, the pressure drop would be 50 ÷ 1.19 = 42 lbs./in.^{2}

CHART 2. Hose Flow Capacity



Hose Selection

⚠ WARNING

For important safety information concerning hose selection, see page 4 of this catalog.

Bends

If a hose of a given length is bent, the pressure drop will increase by some definite amount…the sharper the bend and the smaller the radius of bend the greater the pressure drop. The effect of a bend may be neglected if it is slight or if there are but few bends in a long length of hose. This is because the additional pressure drop caused by these bends is not significant when compared to the total pressure drop.

However, a dock hose may have four sharp 90° bends in a 25-foot length, and if pressure drop is important, these bends must be considered because they constitute a significant portion of the overall pressure drop.

The curves in Chart 4 show the effects of resistance due to 90° bends. This data can also be used as a guide for smooth bends less or greater than 90°. For example, a 45° bend has about 4/10 the resistance of a 90° bend.

Problem: Determine the equivalent length, in terms of hose inside diameters, of a 90° and a 180° bend whose relative radii are 12 inches.

Solution: Referring to the "total resistance curve," the equivalent length for a 90° bend is 34.5 hose diameters. The equialent length of a 180° bend is 34.5 diameters for one 90° bend, 18.7 diameters for resistance due to length, and 15.8 ÷ 2 diameters for bend resistance. Adding these 34.5, 18.7, and 15.8 ÷ 2 = 61.1 diameters for a 180° bend.* Note that this loss is less than the sum of losses through two 90° bends separated by tangents.

CHART 3. Fluid Flow Correction Factors

Liquid	Specific Gravity	Viscosity		Correction Factor, R
		Centistokes (CS)	Centipoises (CP)	
Acetic Acid – 100%	1 05	–	1 3	0 975
Acetic Acid – 70%	1 07	–	2 7	0 843
Ammonia (liquid) – 100%	0 66	0 30	–	1 290
Ammonia (liquid) – 26%	0 907	–	1 3	0 943
*Asphalt @ 120°F	1 40	–	300	0 350
*Beer	1 01	1 15	–	0 990
Benzene (Benzol	0 88	744	–	1 08
Brine, Calcium Chloride 25%	1 23	3 80	–	0 78
Brine, Sodium Chloride 25%	1 19	2 07	–	0 88
Butyl Alcohol	0 81	3 64	–	0 783
*Castor Oil	0 96	900	–	0 27
*Crude Petroleum, Typical				
1 Pennsylvania Crude @ 100°F	0 80	–	3	0 78
2 California Crude @ 150°F	0 915	–	9	0 64
3 ±33 API Crude @ 100°F	0 86	7 2	–	0 685
4 Texas Crude @ 150°F	0 875	–	3	0 792
5 Mexican Crude @ 150°F	0 96	–	550	0 287
Decane – n	0 73	1 24	–	0 975
Ethyl Alcohol (100%)	0 794	–	1 25	0 93
Ethyl Alcohol (95%)	0 808	–	1 45	0 904
Ethyl Alcohol (40%)	0 939	–	3 00	0 807
Ethyl Glycol	1 12	–	24 00	0 55
Formic Acid	1 22	–	–	0 94
*Fuel Oils				
No 1 @ 100°F (Sp Gr 82 to 95 Visc 30 to 40 SSU	0 88	2 45	–	0 85
No 2 @ 100°F (Sp Gr 82 to 95 Visc 35 to 50 SSU	0 88	4 50	–	0 752
No 3 @ 100°F (Sp Gr 82 to 95 Visc 55 SSU max	0 88	8 6	–	0 66
No 5 @ 100°F (Sp Gr 82 to 95 Visc 60 to 450 SSU	0 88	55 0	–	0 47
No 6 @ 122°F (Sp Gr 82 to 95 Visc 430 to 2900 SSU)	0 88	38 0	–	0 493
*Gasoline (representative)				
Type #1	74	88	–	1 04
Type #2	72	64	–	1 11
Type #3	68	46	–	1 19
Glycerine (Glycerol) – 100% @ 150°F	1 26	–	75 0	0 45
Glycerine & Water – 50%	1 13	–	6 5	0 717
Heptaine – n	684	0 60	–	1 16
Hexane – n	66	0 49	–	1 21
Hydrochloric Acid – 31 5%	1 16	–	1 92	0 92
Isobutyl Alcohol	0 817	–	3 90	0 745
Isopropyl Alcohol	0 785	–	2 20	0 828
Kerosene	0 80	2 23	–	0 892
Lubricating Oil (Machine Oil)	0 90	–	198	0 35
Lubricating Oil (Automotive)	0 893	–	110	0 39
Methyl Alcohol (Methanol) – 100%	0 79	74	0 60	1 072
Methyl Alcohol – 90%	0 824	–	0 77	1 03
Methyl Alcohol – 40%	0 937	–	2 00	0 863
*Milk	1 03	1 15	–	0 99
Motor Oil	0 893	–	110	0 39
Napthalene	1 15	0 9	–	1 04
Nitric Acid – 95%	1 50	–	1 13	1 07
Nitric Acid – 60%	1 37	–	2 35	0 913
Nonane – n	0 718	97	–	1 02
Octane – n	0 70	77	–	1 068
Olive Oil	0 91	93 0	–	0 41
Pentane – n	0 63	0 37	–	1 24
Propyl Alcohol	0 804	2 8	–	0 828
Rapeseed Oil	0 91	180	–	0 36
Sodium Hydroxide – 50%	1 53	–	95 0	0 443
Soya Bean Oil	0 924	86	–	0 418
Sperm Oil	0 88	21	–	0 55
Sugar Solution – 20%	1 08	1 9	–	0 895
Sugar Solution – 40%	1 18	5 3	–	0 728
Sugar Solution – 60%	1 29	44 0	–	0 475
Sulfuric Acid – 100%	1 83	14 6	–	0 59
Sulfuric Acid – 95%	1 83	14 5	–	0 593
Sulfuric Acid – 60%	1 50	4 4	–	0 755
Toluene	0 866	–	0 6	1 092
Turpentine	0 86	1 83	–	0 90
Water (Fresh)	1 0	1 10	–	1 00
Water (Salt)	1 03	1 10	–	1 00
Xylene (Xylol)	0 87	0 93	–	1 03

*These figures are approximate or averages of those values available.

Static Head Pressure

Static head is the difference in height between the inlet and outlet ends of a hose. Before using Chart 1, it is necessary to correct for static head pressure because the values in Chart 1 are pressure losses due to friction only.

To correct for static head pressure, the difference in height is determined and multiplied by 0.433 to convert the head to an equivalent pressure in PSI (one foot of water exerts 0.433 PSI pressure).

If the inlet is higher than the outlet, the pressure equivalent is added to the pump pressure. If the outlet is higher than the inlet, the pressure equivalent is subtracted from the pump pressure. In both cases, it is assumed that the pump pressure is the pressure available at the inlet end and that the pump is outside of the hose system.

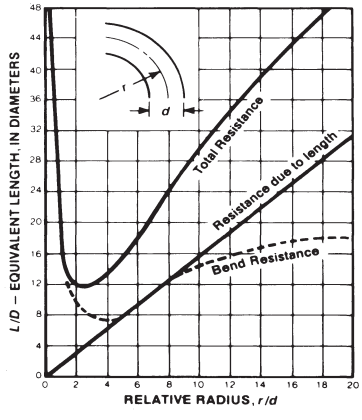
Installation Design

Hose should not be twisted or put in torsion either during the installation or while in service. Sharp or excessive bends may cause the hose to kink or rupture.

Be sure to allow enough slack to provide for changes in length which will occur when pressure is applied. This change in length can vary from +2% to -4%.

Design the installation so the hose assembly is accessible for inspection and easy removal.

CHART 4. Resistance of 90° Bends



*In a continuous bend of 180 degrees the second 90 degree bend produces approximately one-half the resistance of the first bend.

Bend radius is important. A good working rule is that the minimum bend radius should be five or more times the O.D. dimension of the hose.

Hose Selection

These tables alphabetically list commonly used materials of various chemical composition. After each fluid listing you will find the basic hose tube and fitting materials rated according to their chemical resistance to each individual fluid. The chart is intended to be used as a guide only. Consult Eaton Technical Support for further information.

⚠ WARNING

Selection of Hose: Selection of the proper hose for the application is essential to the proper operation and safe use of the hose and related equipment. Inadequate attention to selection of the hose for your application can result in serious bodily injury or property damage from spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from selection of the wrong hose, you should carefully review the information in this catalog.

⚠ WARNING

Proper Selection of Hose Fittings: Selection of the proper fittings for the hose end application is essential to the proper operation and safe use of the hose and related equipment. Inadequate attention to the selection of the fittings for your application can result in serious bodily injury or property damage resulting from spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from selection of the wrong fitting, you should carefully review the information in this catalog.

⚠ WARNING

The following list of chemicals is offered as a guide to the chemical resistance properties of the tube material of the hoses shown. It should be used as a guide only, as the degree of resistance of any elastomer to a particular fluid depends upon such variables as temperature, concentration, pressure conditions, velocity of flow, duration of exposure, aeration, stability of the fluid, etc.

Therefore, when in doubt, it is advisable not to use the hose. If this is not practical, tests should be devised that simulate actual service conditions as nearly as possible. Eaton offers additional technical assistance. Contact your Eaton Customer Support representative for assistance or call Technical Support at 1-888-258-0222.

Chemical Compatibility Chart

FLUID	HOSE MATERIAL											HOSE END FITTINGS		
	PVC	Nitrile	Vinyl Nitrile	Neoprene	PTFE	Nylon/Nylon II	EPDM	Hypalon[2]	Hytrel[1]	Polyurethane	CPE	Brass	Steel	316 Stainless
Acetaldehyde	X	X	X	X	G	G	G	F	X	X	-	X	X	G
Acetic Acid (Concentrated)	X	X	X	X	G	X	G	X	X	X	G	X	X	G
Acetic Acid (Diluted)	F	X	X	F	G	F	G	F	G	X	G	X	X	G
Acetic Anhydride	X	G	G	X	G	X	G	F	X	X	G	X	F	F
Acetone	X	X	X	X	G	G	G	F	F	X	G	G	G	G
Acrylonitrile	G	X	X	X	G	G	X	X	-	X	G	-	G	G
Air□	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Alcohols (Methanol & Ethanol)	X	G	G	G	G	G	G	G	G	X	G	G	F	G
Aluminum Chloride	G	G	G	G	G	X	G	G	G	G	G	X	X	F
Aluminum Fluoride	G	G	G	F	G	X	G	G	-	G	X	X	X	X
Aluminum Hydroxide	G	G	G	G	G	G	G	G	-	G	G	X	F	G
Aluminum Sulfate	G	G	G	G	G	G	G	G	G	G	G	X	X	G
Alums	G	G	G	G	G	F	G	G	X	G	G	X	X	F
Ammonia, Anhydrous	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ammonia Solution (10%)	G	G	G	F	G	G	G	G	X	X	X	X	G	G
Ammonium Chloride	G	G	G	G	G	X	G	G	G	G	G	X	G	F
Ammonium Hydroxide	X	F	F	F	G	G	G	G	X	X	G	X	F	G
Ammonium Nitrate	G	G	G	G	G	G	G	G	G	X	G	-	-	G
Ammonium Phosphate	F	G	G	G	G	G	G	G	G	F	G	X	X	G
Ammonium Sulfate	G	G	G	G	G	G	G	G	G	G	G	X	X	F
Amyl Acetate	X	X	X	X	G	G	F	X	X	X	X	G	F	G
Amyl Alcohol	X	G	G	F	G	G	G	G	G	X	G	G	F	F
Aniline	X	X	X	X	G	X	X	X	X	X	X	X	G	G
Aniline Dyes	X	F	F	F	G	X	G	F	X	X	X	X	X	F
Animal Oils and Fats	G	G	G	X	G	G	F	F	G	X	F	G	G	G
Anti-Freeze (Glycol Base)	G	G	G	G	G	F	G	G	G	X	G	G	G	G
Aqua Regia	X	X	X	X	G	X	X	X	X	X	X	-	X	X
Asphalt	X	G	G	X	G	G	X	X	-	X	F	G	G	G
Barium Chloride	G	G	G	G	G	X	G	G	G	G	G	X	F	G
Barium Hydroxide	G	G	G	G	G	G	G	G	G	X	G	X	G	G
Barium Sulfide	G	G	G	G	G	X	G	G	X	G	G	X	X	G
Beet Sugar Liquors	G	G	G	G	G	G	X	G	G	X	G	X	G	G
Benzaldehyde	X	X	X	X	G	G	F	X	X	X	X	F	F	G
Benzene, Benzol	X	X	X	X	G	G	X	X	X	X	F	G	G	G
Benzoic Acid	X	X	X	G	G	X	X	X	X	X	F	F	X	F
Black Sulfate Liquor	X	F	F	G	G	F	G	F	G	X	F	X	G	G
Borax	G	F	F	G	G	G	G	G	G	G	G	G	G	G
Boric Acid	G	G	G	G	G	G	G	G	G	G	X	X	X	G
Brake Fluid (Glycol Ether Base)	X	X	X	F	G	G	G	X	-	X	G	G	G	G
Brine	G	G	G	G	G	G	G	G	G	X	G	-	X	F
Butane	Use H366 Hose Only													
Butyl Acetate	X	X	X	X	G	G	F	X	F	X	F	G	G	G

CODES:

G Good resistance.
F Fair resistance.
X Incompatible.
– No data available.

□ In all applications, the cover must be pinpricked.

1 Hytrel® is a registered trademarks of E.I. DuPont.

2 Hypalon® is a registered trademarks of E.I. DuPont

NOTE: All data given herein is believed to be accurate and reliable, but presented without guarantee, warranty, or responsibility of any kind, express or implied, on our part. Chemical resistance will vary with the wide diversity of possible mixtures and service conditions. It is therefore not possible to give any guarantee whatsoever in individual cases.

Hose Selection Chart

Chemical Compatibility Chart

FLUID	HOSE MATERIAL											HOSE END FITTINGS		
	PVC	Nitrile	Vinyl Nitrile	Neoprene	PTFE	Nylon/Nylon II	EPDM	Hypalon[2]	Hytrel[1]	Polyurethane	CPE	Brass	Steel	316 Stainless
Butyl Alcohol, Butanol	X	G	G	G	G	G	G	G	G	X	G	G	G	G
Calcium Bisulfite	G	G	G	G	G	F	G	G	X	G	X	X	X	X
Calcium Chloride	G	G	G	G	G	X	G	G	G	G	G	X	F	F
Calcium Hydroxide	G	F	F	G	G	F	G	F	G	X	G	F	G	G
Calcium Hypochlorite	G	F	F	F	G	F	G	F	F	X	G	F	X	F
Cane Sugar Liquors	G	G	G	G	G	G	G	G	G	X	G	F	G	G
Carbon Dioxide (Dry)	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Carbon Dioxide (Wet)	-	G	G	G	G	G	G	G	-	G	-	F	G	G
Carbon Disulfide (Bisulfide)	X	X	X	X	G	X	X	X	X	G	X	G	G	G
Carbon Monoxide (Hot)	X	F	F	F	G	X	F	G	G	F	G	X	F	G
Carbon Tetrachloride	X	X	X	X	G	G	X	X	F	X	X	G	G	G
Carbonic Acid	X	G	G	G	G	X	G	G	X	F	X	X	X	F
Castor Oil	G	G	G	F	G	G	F	G	F	F	G	G	G	G
Cellosolve Acetate	X	X	X	X	G	F	F	F	X	X	X	X	X	G
Chlorinated Solvents	X	X	X	X	G	F	X	X	X	X	X	G	G	F
Chloroacetic Acid	X	X	X	X	G	X	F	X	X	X	X	X	X	F
Chlorobenzene	X	X	X	X	G	G	X	X	X	X	X	F	F	G
Chloroform	X	X	X	X	G	G	X	X	X	X	X	G	G	G
Chlorosulfonic Acid	X	X	X	X	G	X	X	X	X	X	X	X	F	X
Chromic Acid (Under 25%)	F	X	X	X	G	X	G	G	X	X	X	X	X	G
Chromic Acid (Over 25%)	X	X	X	X	G	X	G	G	X	X	X	X	X	F
Citric Acid	G	F	F	G	G	X	G	G	G	X	X	X	X	G
Coke Oven Gas	X	X	X	X	F	X	X	X	-	X	X	F	G	G
Copper Chloride	G	G	G	F	G	G	G	G	G	G	X	X	X	G
Copper Sulfate	G	G	G	G	G	G	G	G	G	G	G	X	X	G
Corn Syrup (non-food)	G	G	G	F	G	G	G	F	G	G	-	-	G	G
Cottonseed Oil	F	G	G	X	G	G	F	F	G	G	G	G	G	G
Creosote	X	F	F	X	G	X	X	F	X	F	F	F	-	G
Cresol	X	X	X	X	G	X	X	X	X	X	G	-	G	G
Dextrose (food grade)	X	X	X	X	G	X	X	X	X	X	X	G	G	G
Diaminoethane	X	X	X	X	G	X	F	X	-	X	-	G	G	G
Dibromoethane	X	X	X	X	G	G	X	X	-	X	-	-	-	-
Dichlorobenzene	X	X	X	X	G	G	X	X	X	X	X	-	-	G
Diesel Fuel	X	G	G	X	G	G	X	F	F	F	G	G	G	G
Diethanolamine	-	F	F	X	G	X	G	X	X	X	G	X	G	G
Diethylenetriamine	-	F	F	X	G	X	G	X	X	X	G	-	-	-
Dowtherm A	X	X	X	X	G	X	X	X	X	X	X	X	F	G
Enamel (Solvent Base)	X	F	F	X	G	G	X	X	X	G	X	G	-	G
Ethanolamine	X	F	F	X	G	X	G	X	-	X	G	X	G	G
Ethers (Ethyl Ether)	X	X	X	X	G	F	X	X	X	F	G	G	G	G
Ethyl Alcohol (To 150°)	F	G	G	G	G	G	G	G	G	G	G	F	G	G
Ethyl Acetate	X	X	X	X	G	G	G	X	F	X	F	G	G	G

FLUID	HOSE MATERIAL											HOSE END FITTINGS		
	PVC	Nitrile	Vinyl Nitrile	Neoprene	PTFE	Nylon/Nylon II	EPDM	Hypalon[2]	Hytrel[1]	Polyurethane	CPE	Brass	Steel	316 Stainless
Ethyl Acrylate	X	X	X	X	G	G	F	X	X	X	F	-	G	G
Ethylamine	X	X	X	X	G	X	F	X	-	X	-	G	-	G
Ethyl Cellulose	-	F	F	F	G	G	F	F	G	F	G	F	G	F
Ethyl Chloride	X	X	X	X	G	G	X	X	X	F	X	F	F	G
Ethylene Dichloride	X	X	X	X	G	G	X	X	X	X	X	G	X	X
Ethylene Glycol	G	G	G	G	G	F	G	G	G	F	G	F	G	G
Ethylene Oxide	X	X	X	X	G	G	X	X	G	X	X	X	F	F
Ethyl Methacrylate	X	X	X	X	G	G	F	X	X	X	F	-	G	G
Fatty Acids	G	F	F	X	G	G	F	X	G	X	F	F	F	G
Ferric Chloride	G	G	G	G	G	G	G	G	G	F	G	X	X	X
Ferric Sulfate	G	G	G	G	G	G	G	G	G	G	G	X	X	F
Fertilizer Solution (Water Base)	G	F	F	F	G	F	G	G	-	-	-	-	-	G
Formaldehyde	X	F	F	F	G	G	G	X	F	X	G	F	X	G
Formic Acid	X	F	F	F	G	X	G	X	X	X	G	F	X	G
Freon 12Δ	X	F	F	F	G	G	X	X	X	X	F	G	G	G
Fuel Oil	F	G	G	F	G	G	X	X	G	F	G	F	G	G
Furfural	X	X	X	X	G	G	F	F	G	X	F	F	G	G
Gasoline (Refined)	X	F	F	X	G	G	X	X	G	F	G	G	G	G
Gasoline (Unleaded)	X	G	G	X	G	G	X	F	X	X	G	G	G	G
Gasoline (10% Ethanol)	X	G	G	X	G	G	X	X	X	X	X	G	G	G
Gasoline (10% Methanol)	X	F	F	X	G	G	X	X	X	X	X	G	G	G
Glycerine, Glycerol	G	G	G	G	G	G	G	G	G	X	G	G	G	G
Greases	G	G	G	F	G	G	X	F	G	G	G	G	G	G
Green Sulfate Liquor	G	F	F	F	G	X	G	G	X	G	X	X	X	G
Heptane	X	G	G	F	G	G	X	F	G	F	G	G	G	G
Hexane	X	G	G	F	G	G	X	F	G	F	G	G	G	G
Houghto Safe 273 to 640	F	G	G	G	G	G	G	-	-	X	G	G	G	G
Houghto Safe 5046, 5047F	G	G	G	G	G	G	X	X	G	X	G	G	G	G
Houghto Safe 1000 Series	X	X	X	X	G	G	G	X	-	X	-	G	G	G
Hydraulic Oils														
Straight Petroleum Base	G	G	G	F	G	G	X	F	G	G	G	G	G	G
Water Petroleum Emulsion	-	G	G	F	G	G	X	F	G	X	G	G	G	G
Water Glycol	-	G	G	G	G	G	G	-	X	X	G	G	G	G
Straight Phosphate Ester	X	X	X	X	G	G	G	X	-	X	G	G	G	G
Phos. Ester/Petroleum Blend	X	X	X	X	G	G	X	X	-	X	-	G	G	G
Polyol Ester	-	G	G	X	G	G	X	-	X	G	G	G	G	G
Hydrobromic Acid	G	X	X	X	G	X	G	G	X	X	G	X	X	X
Hydrochloric Acid	G	X	X	X	G	X	G	G	X	X	G	X	X	X
Hydrocyanic Acid	G	F	F	X	G	X	F	G	X	X	X	X	F	G
Hydrofluoric Acid (Under 50%)	F	X	X	X	G	X	F	G	X	X	X	X	X	G
Hydrofluoric Acid (Over 50%)	X	X	X	X	G	X	X	G	X	X	X	X	X	G
Hydrofluosilicic Acid	G	F	F	X	G	X	G	G	G	X	G	X	X	X
Hydrogen	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hydrogen Peroxide	-	X	X	X	G	X	F	X	X	-	G	X	X	G
Hydrogen Sulfide	-	X	X	X	X	X	X	F	G	-	X	F	F	F
Hydrolube	-	G	G	F	G	G	-	-	G	X	-	G	G	G
Isopropyl Alcohol	G	G	G	G	G	G	G	G	G	X	G	G	G	G
Isopropylamine	X	X	X	F	G	X	F	X	-	-	-	G	-	G
Iso-Octane	X	G	G	F	G	G	X	F	G	X	G	G	G	G
Jet Fuel (Transfer Only)	X	G	G	F	G	G	X	X	-	G	-	G	F	G
Kerosene	X	G	G	F	G	G	X	F	F	G	G	G	G	G
Lacquer	X	X	X	X	G	G	X	X	X	X	F	G	X	G
Lacquer Solvents	G	X	X	X	G	G	X	X	F	X	F	G	X	G
Lactic Acid	G	X	X	G	G	X	F	G	X	X	X	F	F	G
Lime Sulfur	G	X	X	G	G	F	G	F	-	-	-	X	-	G
Lindol	-	X	X	X	G	G	G	X	-	X	-	F	G	G
Linseed Oil	G	G	G	X	G	G	X	F	F	F	G	F	G	G
Lubricating Oils	G	G	G	F	G	G	X	F	G	F	G	G	G	G

CODES:

G Good resistance.
F Fair resistance.
X Incompatible.
– No data available.

Δ Use approved Freon Hose.

▯ In all applications, the cover must be pinpricked.

1 Hytrel® ia a registered trademarks of Dupont.

2 Hypalon® ia a registered trademarks of Dupont

NOTE: All data given herein is believed to be accurate and reliable, but presented without guarantee, warranty, or responsibility of any kind, express or implied, on our part. Chemical resistance will vary with the wide diversity of possible mixtures and service conditions. It is therefore not possible to give any guarantee whatsoever in individual cases..

Hose Selection Chart

Chemical Compatibility Chart

FLUID	HOSE MATERIAL											HOSE END FITTINGS		
	PVC	Nitrile	Vinyl Nitrile	Neoprene	PTFE	Nylon/Nylon III	EPDM	Hypalon[2]	Hytrel[1]	Polyurethane	CPE	Brass	Steel	316 Stainless
Lye	G	F	F	G	G	X	G	G	-	-	G	F	X	G
Magnesium Chloride	G	G	G	G	G	X	G	G	F	G	G	F	F	G
Magnesium Hydroxide	G	F	F	G	G	X	G	F	F	X	G	G	G	G
Magnesium Sulfate	G	G	G	G	G	G	G	G	G	X	G	F	G	G
Mercuric Chloride	F	F	F	G	G	X	G	G	-	G	X	X	X	X
Mercury	F	G	G	G	G	G	G	G	G	G	G	X	G	G
Methanol	X	G	G	G	G	G	G	G	G	F	G	F	G	G
Methyl Acrylate	X	X	X	X	G	X	F	X	X	X	F	G	G	G
Methyl Chloride	X	X	X	X	G	F	X	X	X	X	F	G	G	G
Methylene Chloride	X	X	X	X	G	G*	X	X	X	X	X	G	G	G
Methyl t-Butyl Ether (MTBE)	X	F	F	X	G	G	X	X	-	-	-	-	G	G
Methyl Ethyl Ketone	X	X	X	X	G	G	F	X	G	X	X	G	G	G
Methyl Isobutyl Ketone	X	X	X	X	G	G	F	X	X	X	X	G	G	G
Methyl Isopropyl Ketone	X	X	X	X	G	G	F	X	X	X	X	G	G	G
Methyl Methacrylate	X	X	X	X	G	F	X	X	X	X	-	G	G	G
Mineral Oil	F	G	G	F	G	G	X	F	G	G	G	G	G	G
Mineral Spirits	X	G	G	F	G	G	X	X	G	G	G	G	G	G
Naphtha	X	F	F	F	G	G	X	X	G	F	G	F	G	G
Napthalene	X	X	X	X	G	G	X	X	F	F	G	F	G	G
Nickel Acetate	G	X	X	G	G	G	G	G	-	X	-	-	-	-
Nickel Chloride	G	G	G	F	G	G	G	G	X	X	G	X	X	F
Nitric Acid (Under 35%)	G	X	X	X	G	X	F	F	X	X	X	X	X	G
Nitric Acid (35% to 60%)	F	X	X	X	G	X	X	X	X	X	X	X	X	G
Nitric Acid (Over 60%)	X	X	X	X	G	X	X	X	X	X	X	X	X	G
Nitrobenzene	X	X	X	X	G	G	X	X	X	X	X	F	G	G
Nitrogen Gas	G	G	G	G	G	G	G	-	G	G	X	-	-	-
Nitrous Oxide	X	X	X	X	G	X	X	X	X	X	X	G	G	G
Oleic Acid	F	F	F	X	G	G	F	F	G	F	G	F	F	G
Oleum (Fuming Sulfuric Acid)	X	X	X	X	G	X	X	X	X	X	X	X	F	G
Oxalic Acid	G	X	X	X	G	X	G	X	X	-	G	F	X	G
Paint (Solvent Base)	X	F	F	X	G	G	X	X	-	-	-	G	G	G
Palmitic Acid	F	F	F	F	G	G	F	X	G	X	G	X	F	F
Pentane	X	G	G	F	G	G	X	F	G	G	G	G	G	G
Perchloroethylene	X	X	X	X	G	G	X	X	X	X	X	F	G	G
Petroleum Ether	X	G	F	X	G	G	X	X	G	G	G	G	G	G
Petroleum Oils	G	G	G	F	G	G	X	F	G	G	G	G	G	G
Phenol	X	X	X	X	G	X	X	X	X	X	G	F	X	F
Phosphoric Acid (to 85%)	G	X	X	F	G	X	G	G	X	X	X	X	X	F
Picric Acid (Molten)	X	X	X	X	G	X	X	F	X	X	X	X	X	F
Picric Acid (Solution)	X	F	F	X	G	X	F	G	X	F	X	X	X	F
Potassium Chloride	G	G	G	G	G	G	G	G	G	G	G	F	X	G
Potassium Cyanide	G	G	G	G	G	G	G	G	G	G	G	X	G	G
Potassium Dichromate	G	X	X	X	G	F	G	X	G	G	G	X	G	G
Potassium Hydroxide	G	F	F	F	G	G	G	G	F	X	G	F	X	G
Potassium Sulfate	G	G	G	G	G	G	G	G	G	G	G	F	F	G
Propane Liquid	Use H366 Hose Only										G	G	G	
Propylene Glycol	F	G	F	G	G	G	G	G	-	-	G	F	G	G
Pyridine	X	X	X	X	G	X	F	X	X	X	X	F	G	G
Sea Water	G	G	G	G	G	G	G	G	G	X	G	G	F	G
Skydrol (Transfer Only)	X	X	X	X	G	G	G	X	-	X	G	G	G	G
Soap Solution	G	G	G	F	G	G	G	G	G	G	G	G	G	G
Sodium Bisulfate	G	G	G	G	G	G	G	G	X	G	G	F	F	F
Sodium Carbonate	G	G	G	G	G	G	G	G	G	G	G	X	G	G
Sodium Chloride	G	G	G	G	G	G	G	G	G	G	G	X	F	G
Sodium Cyanide	G	G	G	G	G	G	G	G	G	G	G	X	F	G
Sodium Hydroxide	G	F	F	G	G	X	G	G	F	X	X	F	X	G
Sodium Hypochlorite	G	X	X	X	G	X	G	G	G	X	F	X	X	F
Sodium Nitrate	G	G	G	F	G	G	G	G	G	F	G	F	G	G

FLUID	HOSE MATERIAL											HOSE END FITTINGS		
	PVC	Nitrile	Vinyl Nitrile	Neoprene	PTFE	Nylon/Nylon III	EPDM	Hypalon[2]	Hytrel[1]	Polyurethane	CPE	Brass	Steel	316 Stainless
Sodium Perborate	G	G	G	X	G	G	G	X	G	X	X	F	F	G
Sodium Peroxide	X	F	F	F	G	X	G	F	G	X	X	X	F	G
Sodium Phosphates	G	G	G	F	G	G	G	G	F	G	X	F	F	F
Sodium Silicate	G	G	G	G	G	G	G	G	G	G	G	F	F	G
Sodium Sulfate	G	G	G	G	G	G	G	G	G	G	G	F	F	G
Sodium Sulfide	G	G	G	G	G	G	G	G	G	G	G	X	X	G
Sodium Thiosulfate	G	G	G	G	G	G	G	G	-	G	G	X	X	G
Soybean Oil	F	G	G	F	G	G	F	G	G	G	G	G	G	G
Stannic Chloride	G	G	G	X	G	X	G	G	G	G	X	X	X	X
Steam 450°	X	X	X	X	G	X	G	X	X	X	X	F	F	G
Stearic Acid	F	F	F	F	G	G	F	F	G	G	G	X	X	G
Stoddard Solvent	X	G	G	F	G	G	X	X	G	G	G	G	G	G
Sulfur	F	X	X	X	X	X	X	F	-	-	G	X	X	G
Sulfur Chloride	X	X	X	X	G	F	X	F	X	X	G	X	X	X
Sulfur Dioxide	X	X	X	X	G	X	G	X	X	-	X	X	-	G
Sulfuric Acid (Under 50%)	G	X	X	X	G	X	G	G	X	X	X	X	X	X
Sulfuric Acid (51% to 70%)	G	X	X	X	G	X	F	G	X	X	X	X	X	X
Sulfuric Acid (71% to 95%)	X	X	X	X	G	X	F	F	X	X	X	X	X	X
Sulfuric Acid (96% to 98%)	X	X	X	X	G	X	X	X	X	X	X	X	X	X
Styrene	X	X	X	X	G	G	X	X	X	X	X	G	G	G
Tannic Acid	G	F	F	F	G	X	G	G	G	G	G	F	X	G
Tar	X	F	F	F	G	X	X	X	G	F	G	F	F	G
Tartaric Acid	G	G	G	F	G	X	G	G	G	G	G	F	X	F
Tetrachloroethane	X	X	X	X	G	G	X	X	X	X	X	-	-	G
Tetrahydrofuran (THF)	X	X	X	X	G	G	X	X	-	X	X	-	-	G
Toluene	X	X	X	X	G	G	X	X	X	X	X	G	G	G
Transmission Oil (Petrol. Based)	G	G	G	F	G	G	X	F	G	G	G	G	G	G
Trichloroethane	X	X	X	X	G	G	X	X	X	X	X	G	G	G
Trichloroethylene	X	X	X	X	G	G*	X	X	X	X	X	G	G	G
Tung Oil	-	G	G	F	G	G	X	F	G	X	X	F	G	G
Turpentine	X	F	F	X	G	G	X	X	F	X	F	F	G	G
Urea (Water Solution)	G	X	X	G	G	G	G	G	G	G	G	-	G	G
Varnish	X	X	X	X	G	G	X	X	-	X	F	G	G	G
Vegetable Oil (Non-food)	F	G	G	X	G	G	X	G	-	G	-	G	G	G
Vinyl Acetate	X	X	X	X	G	G	F	X	X	X	-	F	G	G
Water	G	G	G	G	G	G	G	G	G	G	G	F	F	G
Water-Glycol mixture	-	G	G	G	G	G	G	X	G	X	G	F	G	G
Water-Petroleum mixture	-	G	G	F	G	G	X	F	G	X	G	G	F	G
Xylene	X	X	X	X	G	G	X	X	F	X	X	G	G	G
Zinc Chloride	G	G	G	G	G	X	G	G	X	G	X	X	X	X
Zinc Sulfate	G	G	G	G	G	G	G	G	-	G	X	X	X	G

CODES:

G Good resistance.
F Fair resistance.
X Incompatible.
– No data available.

In all applications, the cover must be pinpricked.

1 Hytrel® ia a registered trademarks of Dupont.

2 Hypalon® ia a registered trademarks of Dupont

NOTE: All data given herein is believed to be accurate and reliable, but presented without guarantee, warranty, or responsibility of any kind, express or implied, on our part. Chemical resistance will vary with the wide diversity of possible mixtures and service conditions. It is therefore not possible to give any guarantee whatsoever in individual cases..

*This chemical has some deteriorative effects, but the elastomer is still adequate for moderate service.

For compatibility of fluids not listed with this chart, contact Technical Support at 1-888-258-0222.

Working Pressure - Hose Ends

The maximum dynamic working pressure of a hose assembly is the lesser of the rated working pressure of the hose and the end connection used.

Max Working Pressure (PSI)

HOSE END CONNECTION	CODE LETTER OR NUMBER	HOSE END SIZE									
		-04	-05	-06	-08	-10	-12	-16	-20	-24	-32
Male Pipe (NPTF)	100	5000		4000	4000		4000	4000	3000	2500	2500
Female Pipe (NPTF)	050, 200, 250	5000		4000	4000		2250	2000	1625		
37° JIC seat 3000	C60, 500, 550, 600, 640, 660, 680		5000	5000	4000	4000	4000	4000	4000	3000	3000
SAE Flareless	750	5000	5000	4000	3500	2750	2250	2000	1625		
Ready-Lok*	00S	5000		4000	4000		4000	4000	3000	2500	
FOR-SEAL	A20, A60, E60, J30, L60, S60	6000		6000	6000	6000	6000	6000	4000	4000	
SAE Straight Thread O-Ring Male	P00, R00, R60	5000	5000	5000	4500	4000	4000	4000	3000		
SAE Flange Code 61	G00, G40, G70, H00, H20, H50, H60, H70, H80, H90, K00, K60			5000	3000	5000	5000	4000	3000	3000	
SAE Flange Code 62	D00, D40, D60, N20, N50					5000	5000	5000	5000	5000	
THICK-FLANGE Code 62	K00, K40, K70					5000	5000	5000	5000	5000	

*Rated pressures are for low surge, static type applications.

International Pressure Rating Charts

Maximum Working Pressure (PSI)

HOSE END CONNECTION	CODE LETTER OR NUMBER	HOSE END SIZE									
		-04	-05	-06	-08	-10	-12	-16	-20	-24	-32
Male British Pipe (BSP)	150	5000		4000	4000	3500	4000	3500	2500	2000	2000
Female British Pipe (BSP)	05P, 70P, 350	5000		4000	4000	3500	4000	3500	2500	2000	2000
Female Pipe (JIS)	00L	5000		5000	5000		4000	4000			

Maximum Working Pressure (PSI)

HOSE END CONNECTION	CODE LETTER OR NUMBER	HOSE END SIZE									
		-06	-08	-10	-12	-15	-18	-22	-28	-35	-42
Din Light	00A, 00C, 00D, 50D	3625	3625	3625	3625	3625	2325	2325	1450	1450	1450

Temperature vs. Pressure Table for Reinforced PVC Hose

TEMPERATURE		ALLOWABLE % OF ORIGINAL WORK. PRESSURE		TEMPERATURE		ALLOWABLE % OF ORIGINAL WORK. PRESSURE	
°C	°F	2-Spiral	4-Spiral	°C	°F	2-Spiral	4-Spiral
20	68	100%	100%	50	120	40%	53%
25	77	86%	90%	55	131	33%	47%
30	86	75%	81%	60	140	27%	43%
35	95	65%	73%	65	149	23%	40%
40	104	56%	66%	70	158	20%	38%
45	113	47%	59%	75	167	17%	37%
				80	176	15%	35%

Note:

For additional information on a specific hose, refer to the hose descriptions on pages 36-77.

Numbering Systems

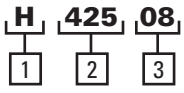
Hose

1. All Weatherhead hose is designated with the letter 'H.'*
2. Each hose is assigned a three digit base number from 001-999, i.e., H069, H425, H470, H1571.
3. The last two digits indicate inside hose diameter (I.D.) in sixteenths of an inch. In the example used above 08 is equal to 8/16" – or 1/2" I.D. hose.

   Exceptions: H059, H069, H166, H169, H213, H229, H239, H366, H429, H569 and H757. The I.D. sizes of these hose deviate somewhat from the above standard. The sizing method used on these hoses is based on deducting twice the wall thickness from the O.D. of the connecting tubing to determine the I.D. of the hose. In other words, match the inside diameters rather than the dash sizes when going from tubing to hose. See example 1.

Table 1 shows standard hose size and H069 type hose sizes and dash numbers. Wherever these hoses are listed in this catalog, the size is listed and the dash number is the last two digits of the Catalog Number.

* GH134W is the only Weatherhead hose that is not designated with the letter "H."



Examples:

	ACTUAL HOSE I.D.	NOMINAL HOSE I.D.	TUBING I.D.	TUBING O.D.
H06906	5/16	3/8	5/16	3/8
H06910	1/2	5/8	1/2	5/8

Table 1 – Catalog Numbers for Hose Sizes

ACTUAL HOSE I.D.	STANDARD CATALOG NUMBERS	H069 TYPE CATALOG NUMBERS
3/16	03	04
1/4	04	05
5/16	05	06
3/8	06	
13/32	08	
7/16	07	
1/2	08	10
5/8	10	12
3/4	12	
7/8		16
1	16	
1-1/8		20
1-1/4	20	
1-3/8		24
1-1/2	24	
1-13/16		32
2	32	
2-3/8		40
3		48

Numbering Systems

Hose Ends

Every type of Weatherhead hose end is designed to fit a certain group of hose with limiting dimensions and tolerances. For your convenience the hoses used on each end style are indicated in the hose end catalog listings.

Crimp

1. The first two digits indicate hose size (I.D.) in sixteenths of an inch.

The exceptions to this are the spiral and truck hose.

Spiral hose ends use the hose base number as a prefix to the size. Example: 47012E.

Truck hose ends use the base number 069 as a prefix to the size. Example: 06908E.

08 U-2 58
① ② ③ ④

Refer to the top of the catalog page where these hose ends are detailed for recommended hose types.

2. Hose end type and material. Refer to Table 2. This letter is always followed by a dash.

3. The first number or letter indicates the style of the end connection. See individual hose end catalog listings or refer to the hose end configuration chart on pages 19-22.

4. The last two digits indicate the size of the end connection in sixteenths of an inch. Refer to individual catalog listing for metric and specialty ends.

425 08 N-2 58
① ② ③ ④ ⑤

Table 2 – Standard Hose End and Material Code

CODE LETTER	COUPLING TYPE	MATERIAL
B	Field Attachable	Brass
C	Crimped	Brass
D	Field Attachable*	Steel*
E	Crimp	Steel
K	Clamp Type	Steel
N	Field Attachable	Steel
P	Crimp	Brass
S	Crimp	Stainless Steel
T	Field Attachable*	Brass
U	Crimp	Steel
Z	Crimp	Steel

*High Flow Hose Assemblies

Field Attachable

1. Description of basic hose.The exceptions are the 247 series and clamp-type ends. These ends are designed for use with a variety of hose types.

Refer to the top of the catalog page where these hose ends are detailed for recommended hose types.

2. Hose size (I.D.) in sixteenths of an inch, or as shown in Table 1.

3. Hose end type and material. Refer to Table 2. This letter is always followed by a dash.

4. The first number or letter indicates the style of the end connection. See individual hose end catalog listings or refer to the hose end configuration chart on pages 19-22.

5. The last two digits indicate the size of the end connection in sixteenths of an inch. Refer to individual catalog listing for metric and specialty ends.

Hose Assemblies

Catalog numbers for hose assemblies are basically the same as hose ends, except both the ends must be specified as well as the overall length. This process is detailed below:

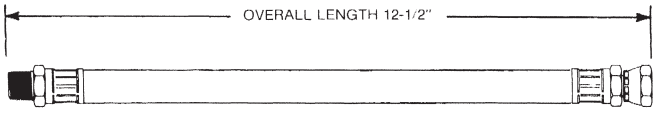
1. Type of desired hose (see hose selection guide pages 5-10 or individual hose listings).

2. Hose size (I.D.) in sixteenths of an inch (04 = 4/16" = 1/4"). Exception: 13/32" I.D. hose.

3. End style and material. Refer to Table 2 (above).

4-5. Style and size of each hose end. Refer to the individual hose end catalog listings or to Hose End Configuration Chart on pages 18-21 for available styles and sizes. Example: P04 Male Straight Thread O-Ring 1/4", 604 SAE 37° Female Swivel 1/4."

6. Length of assembly. The first three digits specify a length in inches. The last two digits are for fractions of an inch expressed in decimal hundreths (01250 = 12 1/2").



425 04 U - P04 604 01250
① ② ③ ④ ⑤ ⑥

Note:

To determine the hose only length when making a hose assembly, subtract each hose end cut-off factor from the overall hose assembly length. Please see the individual hose end listings for cut-off factor information.

To determine Hose Cut-Off Factors reference page 23.

Numbering Systems

The chart below is designed to offer quick identification of Weatherhead hose end series. Included in this chart are: base numbers, descriptions, hose end series, and page number in which the configuration appears.

Catalog numbers may be derived by adding the size in sixteenths of an inch to the base. Example: 100 series 3/4" male pipe rigid. 3/4" = 12/16" thus 100 + 12 = 112.

= Denotes Coll-O-Crimp Hose Ends

Part # Suffix	Hose End	Style	009 'B'	057 'B'	100 'B'	105 'B'	057 'P'	338 'B'	069 'D'	'E'	069 'E'	336 'E'	470 'E'	757 'E'	'K'	039 'K'	104 'N'	213 'N'	247 'N'	425 'N'	436 'N'	229 'P'	265 'P'	338 'P'	'S'	570 'S'	069 'T'	'U'	430 'U'	'Z'
00A	Male DIN (Light)	Rigid																									142		182
00C	Female DIN (Light)	Swivel																									148	161	181
00D	Female DIN 45° (Light)	Swivel																									152		
00E	Female Din 24° 45° Tube Elbow	Swivel																											182
00F	Male DIN (Heavy)	Rigid											110														143		183
00K	Female 30° Flare (Komatsu)	Swivel									115																148	162	184
00L	Female JIS 30° Flare	Swivel								108																	149		184
00P	Female Flat Face BSPP	Swivel																									150		
00S	Ready Lok®	Rigid																									150	162	176
0PW	Pressure Washer	Swivel																											185
30T	Straight Tube-Metric	Rigid																									151		
40P	Brit. Std. 60° Cone Parallel Female Pipe 45°	Swivel											112														154	163	180
50C	Female DIN (Heavy)	Swivel																									148	161	182
50D	Female DIN 90° (Light)	Swivel																									156		
50E	Female DIN 90° (Heavy)	Swivel																									156		183
70P	Brit. Std 60° Cone Parallel Female Pipe 90°	Swivel								108			114														157	166	180
050	Female Straight Pipe	Swivel										106															147		
100	Male Pipe	Rigid	205	206	209	212			218	106	113	104	109		220	221	222	226	230	236	240		156	158	160	180	141	159	170
150	Male Pipe, British Standard Tapered	Rigid																									142		181
200	Female Pipe	Rigid				212						105											156				146		
250	Female Pipe	Swivel			210															237							147		170
300	SAE 45° Male	Rigid		207	209							105		140					231								144		
350	Brit. Std 60° Cone Parallel Female Pipe	Swivel								111			110														149	162	180
380	SAE 45° Male 45° Elbow	Rigid												142															
400	SAE 45° Female	Swivel		211		154			219	108	114	106		141			223	227	233	238	241	155		158			148		173
440	SAE 45° Female 90° Tube Elbow Long	Swivel																	235								155		
460	SAE 45° Female 90° Tube Elbow Short	Swivel								111	116			121				229	235										
480	SAE 45° Female 45° Tube Elbow	Swivel									115		119					228	234								152		
500	JIC 37° Male	Rigid								107	113	105					223	231	237	240							144	160	173

Numbering Systems

= Denotes Coll-O-Crimp Hose Ends

Part # Suffix	Hose End	Style	'009 'B'	'057 'B'	'100 'B'	'105 'B'	'057 'P'	'338 'B'	'069 'D'	'E'	'069 'E'	'336 'E'	'470 'E'	'757 'E'	'K'	'039 'K'	'104 'N'	'213 'N'	'247 'N'	'425 'N'	'436 'N'	'229 'P'	'265 'P'	'338 'P'	'S'	'570 'S'	'069 'T'	'U'	'430 'U'	'Z'
550	JIC 37° Female 90° Tube Elbow	Swivel																										158	
600	JIC 37° Female	Swivel	205		210				181	108	114	98	110			221	223	227	232	237	241				160			147	161	171
640	JIC 37° Female 90° Tube Elbow Long	Swivel								111		99					225		235	239								155	167	173
660	JIC 37° Female 90° Tube Elbow	Swivel								110	116	99	113				224	228	234	239	241							156		172
680	JIC 37° Female 45° Tube Elbow	Swivel								110	115	98	112				224	228	234	238	241							153	164	172
750	Flareless Tube Ermeto®	Rigid								107				140					232									145		
950	Flareless Tube Ermeto® 45°	Rigid																										152		
970	Flareless Tube Ermeto® 90°	Rigid																										156		
A00	Inverted Female	Rigid			210																									
A20	Female For-Seal® 90° Tube Elbow Short	Swivel								112		108	113															157	167	175
A60	Female For-Seal® 90° Tube Elbow Long	Swivel								112																		158	167	176
B00	Inverted Male	Swivel			210				219	107	114							226	231									144		177
B20	Inverted Male Swivel Extended	Swivel																	231											
B40	Inverted Male 45° Tube Elbow	Swivel								109	115																	152		177
B60	Inverted Male 90° Tube Elbow	Swivel		207						110																		154		177
C00	Male Pipe 90° Elbow	Rigid		207	211																									
C30	Female Grease Tap	Rigid																										190		
C60	SAE 37° Female 60° Tube Elbow	Swivel																										146	165	
D00	Flange Straight	Code 62											111												161			163		
D40	Flange 45° Tube Elbow	Code 62											112												161			165		
D70	Flange 90° Tube Elbow	Code 62											114												162			168		
E00	Inverted Male 90° Elbow	Swivel									116							228	234											
E40	Inverted Male 45° Tube Elbow	Swivel																227	233											
E60	Male For-Seal® Straight	Rigid																										143	160	176
G00	Flange Straight	Code 61											111				224			238								150	163	178
G09	Flange Straight (Komatsu)	Special																										150		185
G40	Flange 45° Tube Elbow	Code 61											112				224			238								153	163	178
G69	Flange 45° Tube Elbow (Komatsu)	Special																										154		185

Numbering Systems

= Denotes Coll-O-Crimp Hose Ends

Part # Suffix	Hose End	Style	009 'B'	057 'B'	100 'B'	105 'B'	057 'P'	338 'B'	069 'D'	'E'	069 'E'	336 'E'	470 'E'	757 'E'	'K'	039 'K'	104 'N'	213 'N'	247 'N'	425 'N'	436 'N'	229 'P'	265 'P'	338 'P'	'S'	570 'S'	069 'T'	'U'	430 'U'	'Z'
G70	Flange 90° Tube Elbow	Code 61											115				225			239								158	168	179
G99	Flang 90° Tube Elbow	Special																												185
H00	Flange 22-1/2° Tube Elbow	Code 61																											164	179
H20	Flange 30° Tube Elbow	Code 61																										164		
H50	Flange 60° Tube Elbow	Code 61																										169		
H60	Flange 67.1/2° Tube Elbow	Code 61																										169	179	
H70	Flange 100° Tube Elbow	Code 61																										169		
H80	Flange 110° Tube Elbow	Code 61																										169		
H90	Flange 135° Tube Elbow	Code 61																										169		
J00	Male Pipe	Swivel							92	106		104												158				143	160	171
J33	Female For-Seal® 90° Tube Elbow Med.	Swivel																										157		
J63	Female For-Seal® Straight	Swivel																												
K00	Flange Straight "Thick Flange"	Code 62																							162					
K30	Flange 45° Tube Elbow "Thick Flange"	Code 62																												
K60	Flange 90° Tube Elbow "Thick Flange"	Code 62																								162				
L00	Banjo (Ford Tractor)	Special																										151		
L10	JIC 37° Female 30° Tube Elbow	Swivel																										151		
L40	Male 45° Tube Elbow O-Ring Port	Swivel																										153		
L60	Female 45° For-Seal® Tube Elbow	Swivel								110																		154	164	175
M00	Male Pipe 90° Elbow	Swivel										107																155		
N20	Split Flange 30° Tube Elbow	Code 62											111																	
N50	Split Flange 60° Tube Elbow	Code 62											113																	
N60	Split Flange 67 1/2° Tube Elbow	Code 62											113																	
P00	Male Straight Thread O-Ring	Rigid										105																146	160	174
P50	Male Pipe, Brit. Std. 60° Cone Parallel	Rigid																										142	159	181
R00	Male Straight Thread O-Ring	Swivel																										145		
R60	Male Straight Thread O-Ring 90° Elbow	Swivel																										158		
S60	Female For-Seal® Straight	Swivel								109		106	110															149	162	174
T00	Straight Tube	Rigid																										151		
T50	Straight Tube-Long	Rigid																	233											

Numbering Systems

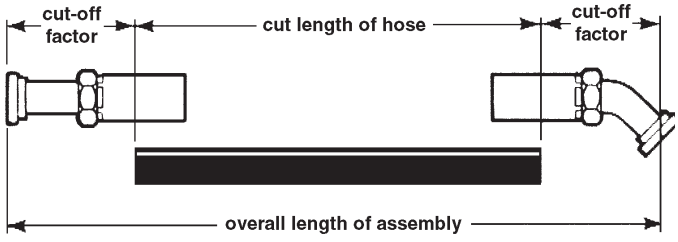
= Denotes Coll-O-Crimp Hose Ends

Part # Suffix	Hose End	Style	009 'B'	057 'B'	100 'B'	105 'B'	057 'P'	338 'B'	069 'D'	'E'	069 'E'	336 'E'	470 'E'	757 'E'	'K'	039 'K'	104 'N'	213 'N'	247 'N'	425 'N'	436 'N'	229 'P'	265 'P'	338 'P'	'S'	570 'S'	069 'T'	'U'	430 'U'	'Z'
W00	BumpedTube O-Ring Male	Rigid												140																
W40	BumpedTube O-Ring Female 45° Tube Elbow	Swivel												142																
W60	BumpedTube O-Ring Male 90° Tube Elbow	Rigid												143																
X00	SAE 45° Flare Male 90° Elbow	Rigid												143																
X20	30° Flare Female (P.T.T. Thread for Diesel Applications	Swivel							219		114							227												
X60	SAE 37° Male 90° Elbow	Rigid																										155		
X80	Compressor Discharge (PTFE Hose)	Flange								109																				
Y00	Hose Mender	Rigid			211			215																						
Y20	Male Connector	Rigid						214																						
Y30	Male Connector w/ Spring Guard	Rigid						214																						
Y33	Hose Splicer	Special												141																
Y50	Air Brake Connection Tube	Rigid								107									232											
Y60	Air Brake Slider	Rigid																						158						
Y70	Air Brake	Swivel						215																159						
Y80	Female Connector	Swivel						215																						
Z00	BumpedTube O-Ring Male	Swivel												140																
Z20	BumpedTube O-Ring 45° Tube Elbow	Swivel												142																
Z40	BumpedTube O-Ring Female	Swivel												141																
Z50	BumpedTube O-Ring Female w/Service Port	Swivel												141																
Z60	BumpedTube O-Ring Male 90° Tube Elbow	Swivel												143																
Z80	BumpedTube O-Ring Female 90° Tube Elbow	Swivel												144																
Z90	BumpedTube O-Ring 90° Tube Elbow w/Service Port	Swivel												144																

Skiving Procedure

Hose Cut-Off Factor

Select the proper hose and ends and cut hose to length. The cut length of the hose is determined by subtracting the cut-off factor for each end from the overall length of the assembly. See individual catalog listings for hose cut-off factors.



Skiving Weatherhead Hose
(When using H470 hose with 470 'E' and 570 'S' series hose ends)

The outer protective covering of wire-wrapped hose must be carefully removed (skived) to the wire to allow proper installation of crimped hose ends and to assure the best possible hose service.

When skiving a hose, it is advisable to skive a practice piece of hose to determine:

- That covering is properly removed and that the hose wire-wrap reinforcements are not displaced, damaged or cut in the process.
- The hose should be checked for correct skive length.
- The hose should be checked for 100% cover removal.

HOSE H470

HOSE I.D.	SKIVE LENGTH	CUTTING HEAD
1/2	1-1/4	T-410-50
3/4	1-13/16	T-410-52
1	2-1/8	T-410-53
1-1/4	2-7/8	T-410-54
1-1/2	3-1/8	T-410-55
2	3-3/8	T-410-56
T-410-36 T-410-37	Handle Replacement cutting blades	

Hand-Tool Method

Skiving heads are shipped preset for proper skive length. Depending on hose cover thickness, the skiving blade may require adjustment. The skiving blade may need periodic adjustment. Directions are packed with the skive tool.

1. Clamp hose in a vise or other suitable holding device. Be sure not to clamp so tight as to damage hose.

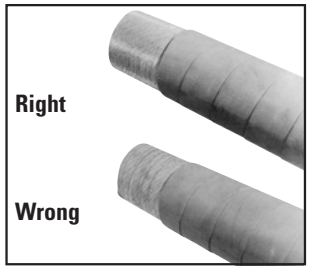
2. Lubricate hose I.D. and skiving tool mandrel with oil/soap solution.

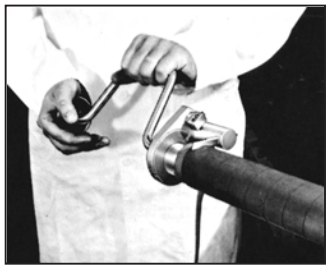
3. Carefully align mandrel with hose I.D.; apply steady pressure and start mandrel into hose.

4. When cutting head contacts hose end, slowly rotate skiving tool clockwise. Cutting head will remove hose covering while threading itself to a preset skive length when bottomed against hose end. Continue to rotate skiving tool clockwise to remove excess rubber from wire wrap while slowly pulling tool from hose. (See illustration to right.)

5. Wire-brush hose end to remove any remaining cover from wire wrap.

6. Inspect skive for 100% cover removal.





⚠ IMPORTANT

Clean hose I.D. by brushing, blowing compressed air, or by flushing. By doing so, contaminants are kept out of operating systems.

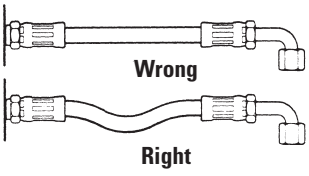
⚠ WARNING

Failure to completely remove the cover may result in serious personal injury or property damage due to hose ends blowing off, hose leakage, and other failures.

Hose Installation

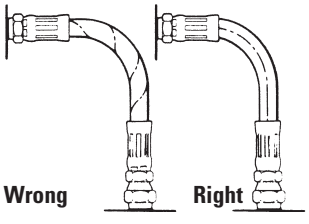
1. Provide for length change.

In straight hose installations, allow enough slack in the hose line to provide for changes in length that will occur when pressure is applied. This change in length can be from +2% to -4%.



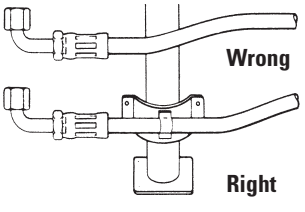
2. Avoid twisting and orient properly.

Do not twist hose during installation. This can be determined by the printed layline on the hose. Pressure applied to a twisted hose can cause hose failure or loosening of connections.



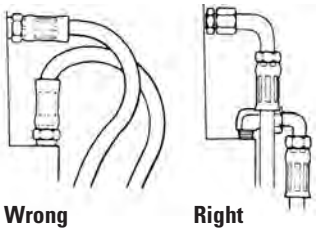
3. Protect from hazardous environment.

Keep hose away from hot parts. High ambient temperature will shorten hose life. If you can not route it away from the heat source, insulate it. (See Spring Guards page 78.)



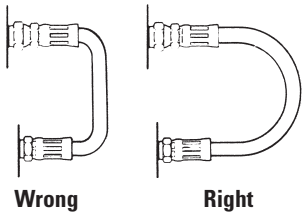
4. Avoid mechanical strain.

Use elbows and adapters in the installation to relieve strain on the assembly and to provide easier and neater installations that are accessible for inspection and maintenance.



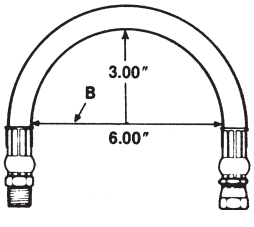
5. Use proper bend radius.

Keep the bend radius of the hose as large as possible to avoid collapsing of the hose and restriction of flow. Follow catalog specs on minimum bend radii.



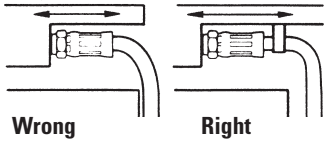
6. Use proper bend radius (cont'd).

Minimum bend radius is measured on the inside bend of the hose. To determine minimum bend, divide the total distance between ends (B length) by 2. For example, B=6, minimum bend radius=3.



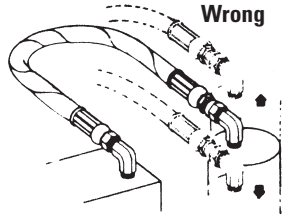
7. Secure for protection.

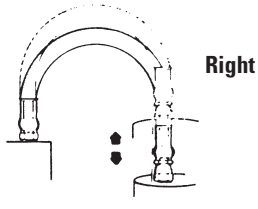
Install hose runs to avoid rubbing or abrasion. Use Weatherhead Hose Clamps to support long runs of hose or to keep hose away from moving parts. It is important that the clamps not allow the hose to move. This movement will cause abrasion and premature hose failure.
See Hose Clamps pages 103-105.



8. Avoid improper hose movement.

Make sure relative motion of the machine components produces bending rather than twisting of the hose. Hose should be routed so that the flex is in the same plane as the equipment movement.





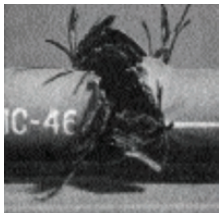
⚠ Refer to safety information regarding Coll-O-Crimp hose installation on page 4.

Hose Failure Analysis

1. **Problem:** Hose has burst. Rusted wire, torn and rotted fibers are present. This was caused by abrasion damage. Exposure to elements will accelerate the deterioration.

Solution: Route the hose so it does not rub against other objects while under pressure. Suggest using clamps and spring guards to protect.

2. **Problem**: Hose has burst on outside bend of hose. This hose has been bent past minimum bend radius. It has also taken a set in a bent position due to a kink in the inner tube or reinforcement.

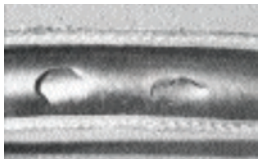


Solution: Check minimum bend radius for hose. Refer to page 24 to determine minimum bend radius. Utilize bend tube elbows if possible.

3. **Problem:** Excessive heat. Hose cover or inner tube is brittle and cracked and is not flexible at room temperature.

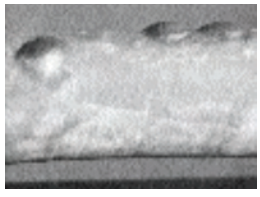
Solution: Use hose with higher temperature rating or protect from heat with shields. Examine entire system for potential heat source. For example: undersized lines, excessively long lines, too many bends and/or fittings, reservoir low on oil.

4. **Problem**: Incompatible fluid. Portions of the inner tube are swollen and/or washed out. Cover may also be swollen.



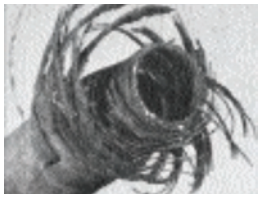
Solution: Make sure hose used is compatible with fluid being used. Refer to chemical compatibility chart.

5. **Problem**: Hose cover blistered and pulling away from carcass. Gas has effused through the tube and become trapped under the cover.



Solution: Use perforated, pin-pricked or fiber cover hose.

6. **Problem:** End fitting blown off. Im-proper assembly procedures, incorrect hose end series, mixing competitor's components and Weatherhead components.



Solution: Refer to hose assembly procedures and Hose End and Tool Selector Chart in this catalog. NEVER intermix components. Refer to page 4 for important safety information.

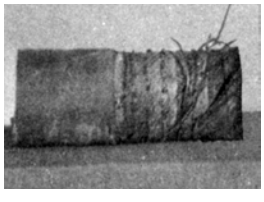
7. **Problem**: Hose has burst cleanly with no random wire breakage and cover abrasion. This condition is caused by excessive pressure.

Solution: Use hose with higher pressure rating. Check pressure relief for damage or improper setting.

8. **Problem**: Hose has burst. Hose is permanently twisted and kinked. Many broken wires in failure area.

Solution: Hose twisting can reduce hose life 90%. Tighten ends properly. Reroute hose to eliminate twist. Route hose to flex in only one plane. Use hose layline for a guide.

9. **Problem**: End fitting blown off. This condition has been caused by improper skiving. Any remaining cover on hose in the crimping area will prohibit proper end retention.



Solution: Make sure hose is properly skived. Refer to page 23 for hose skiving instructions.

10. **Problem**: Hose end appears to have been pinched on one side.

Solution: This is an early sign of collet wear. Replace collet. New Weatherhead collets offer the feature of being rebuildable. See the tool section chart in the back of this catalog.

⚠ WARNING

Selection of Hose: Selection of the proper hose for the application is essential to the proper operation and safe use of the hose and related equipment. Inadequate attention to selection of hose for application can result in serious bodily injury or property damage. In order to avoid serious bodily injury or property damage resulting from selection of the wrong hose, you should carefully review the information in this catalog. Refer to Selection of Hose and Hose Installation (pages 5-10 and page 24) for additional safety information. Hose failures can be caused by conditions such as excessive pressures, fluid incompatibility, extreme temperatures, and many more. Eaton has illustrated above some of the more common failures. If the conditions you are experiencing are not listed, please contact your Eaton representative for further assistance.

Qualified Hoses for Marine Applications

SAE J1942

HOSE NUMBER	APP. CODE	HOSE ID	MAWP (PSI)	HOSE ENDS	FIRE SLEEVE REQUIRED
H009	H	1/4	400	009 'H'	--
H009	H	5/16	400	'E', 009 'H'	--
H009	H	3/8	400	'E', 009 'H'	--
H009	H	1/2	400	'E', 009 'H'	--
H017	H	1/4	1250	'U'	--
H017	H	3/8	1125	'U'	--
H017	H	1/2	1000	'U'	--
H017	H	3/4	750	'U'	--
H017	H	1	560	'U'	--
H017	H	1-1/4	375	'U'	--
H039	H	3/4	300	'U', 'S'	--
H039	H	1	250	'U', 'S'	--
H039	H	1-1/4	200	'U', 'S'	--
H039	H	1-1/2	150	430 'U'	--
H039	H	2	100	430 'U'	--
H059	F	3/16	500	069 'E', 229 'P', 247 'N'	--
H059	F	1/4	500	069 'E', 247 'N'	--
H059	F	5/16	500	069 'E', 229 'P', 247 'N'	--
H059	F	13/32	500	069 'E', 229 'P', 247 'N'	--
H059	F	1/2	500	069 'E', 229 'P', 247 'N'	--
H059	F	5/8	500	069 'E', 247 'N'	--
H059	F	7/8	500	069 'E', 247 'N'	--
H104	H	1/4	2750	'U', 104 'N', 'S', 'Z'	--
H104	H	3/8	2250	'U', 104 'N', 'S', 'Z'	--
H104	H	1/2	2000	'U', 104 'N', 'S', 'Z'	--
H104	H	5/8	1500	'U', 'Z'	--
H104	H	3/4	1250	'U', 104 'N', 'S', 'Z'	--
H104	H	1	1000	'U', 104 'N', 'S', 'Z'	--
H104	H	1-1/4	625	'U', 'S', 'Z'	--
H104*	F	1/4	500	'U', 104 'N', 'S', 'Z'	A6912
H104*	F	3/8	500	'U', 104 'N', 'S', 'Z'	A6914
H104*	F	1/2	500	'U', 104 'N', 'S', 'Z'	A6916
H104	F	5/8	500	'U', 'Z'	--
H104	F	3/4	500	'U', 104 'N', 'S', 'Z'	--
H104	F	1	500	'U', 104 'N', 'S', 'Z'	--
H104	F	1-1/4	500	'U', 'S', 'Z'	--
H145	H	1/4	3000	'U', 'Z', 'S'	--
H145	H	3/8	3000	'U', 'Z', 'S'	--
H145	H	1/2	3000	'U', 'Z', 'S'	--
H145	H	5/8	3000	'U', 'Z'	--
H145	H	3/4	3000	'U', 'S'	--
H145	H	1	3000	430 'U', 'S'	--
H190	H	1/4	3265	'Z'	--
H190	H	3/8	2610	'Z'	--
H190	H	1/2	2320	'Z'	--
H190	H	5/8	1885	'Z'	--
H190	H	3/4	1575	'Z'	--
H190	H	1	1275	'Z'	--
H245	H	1/4	5000	'U', 'S', 'Z'	--
H245	H	3/8	4000	'U', 'S', 'Z'	--
H245	H	1/2	3500	'U', 'S', 'Z'	--
H245	H	5/8	2750	'U', 'Z'	--
H245	H	3/4	2250	'U', 'S', 430 'U', 'Z'	--
H245	H	1	2000	'U', 'S', 430 'U', 'Z'	--
H245	H	1-1/4	1625	'U', 'S', 430 'U', 'Z'	--
H245*	F	1/4	500	'U', 'S', 'Z'	A6912
H245*	F	3/8	500	'U', 'S', 'Z'	A6914
H245*	F	1/2	500	'U', 'S', 'Z'	A6916
H245*	F	5/8	500	'U', 'Z'	A6920
H245*	F	3/4	500	'U', 'S', 'Z'	A6924
H245*	F	1	500	'U', 'S', 'Z'	A6928
H245*	F	1-1/4	500	'U', 'S', 'Z'	A6936
H280	H	1/4	5600	'Z'	--
H280	H	3/8	4800	'Z'	--
H280	H	1/2	4000	'Z'	--
H280	H	5/8	3630	'Z'	--
H280	H	3/4	3120	'Z'	--
H280	H	1	2350	'Z'	--
H290	H	1/4	5800	'Z'	--
H290	H	3/8	4800	'Z'	--
H290	H	1/2	4000	'Z'	--
H290	H	5/8	3630	'Z'	--
H290	H	3/4	3120	'Z'	--
H290	H	1	2350	'Z'	--
H425	H	1/4	5000	'U', 'S', 'Z'	--
H425	H	3/8	4000	'U', 'S', 425 'N', 'Z'	--
H425	H	1/2	3500	'U', 'S', 425 'N', 'Z'	--
H425	H	5/8	2750	'U', 'Z'	--
H425	H	3/4	2250	'U', 'S', 430 'U', 425 'N', 'Z'	--
H425	H	1	2000	'U', 'S', 430 'U', 425 'N', 'Z'	--
H425	H	1-1/4	1625	'U', 'S', 430 'U', 425 'N', 'Z'	--
H425	H	1-1/2	1250	430 'U', 'Z'	--
H425	H	2	1125	430 'U', 425 'N', 'Z'	--
H425*	F	1/4	500	'U', 'S', 425 'N', 'Z'	A6912
H425*	F	3/8	500	'U', 'S', 425 'N', 'Z'	A6916
H425*	F	1/2	500	'U', 'S', 425 'N', 'Z'	A6920
H425*	F	5/8	500	'U', 'Z'	A6920
H425*	F	3/4	500	'U', 'S', 425 'N', 'Z'	A6924
H425*	F	1	500	'U', 'S', 425 'N', 'Z'	A6928
H425*	F	1-1/4	500	'U', 'S', 425 'N', 'Z'	A6936
H430	H	3/4	4000	430 'U'	--
H430	H	1	4000	430 'U'	--
H430	H	1-1/4	3000	430 'U'	--
H430	H	1-1/2	2500	430 'U'	--
H430	H	2	2500	430 'U'	--
H470	H	3/4	5000	470 'E'	--
H470	H	1	5000	470 'E'	--
H470	H	1-1/4	5000	470 'E'	--
H569	H	3/16	3000	069 'E'	--
H569	H	5/16	2250	069 'E', 247 'N'	--
H569	H	13/32	2000	069 'E', 247 'N'	--
H569	H	1/2	1750	069 'E', 247 'N'	--
H569	H	5/8	1500	069 'E', 247 'N'	--
H569	H	7/8	800	069 'E'	--
H569	H	1-1/8	625	069 'E'	--

Application Codes:

MAWP - Maximum Allowable Working Pressure

H - Hydraulic service

F - Fuel and Lube service

*Fire sleeve required for fuel applications

Qualified Hoses for the American Bureau of Shipping

ABS Steel Vessle Rules 2000 (4-6-2/5.7)
Intended Service: Fuel Oil, Hydraulic Fluid and Water Systems for Marine and Offshore Applications

HOSE NUMBER	HOSE ID	MAWP (PSI)	HOSE END SERIES	FIRE SLEEVE
H03912	3/4	300	'U', 'S', 039 'K', 'Z'	A6924
H03916	1	250	'U', 'S', 039 'K', 'Z'	A6928
H03920	1-1/4	200	'U', 'S', 039 'K', 'Z'	A6932
H03924	1-1/2	150	430 'U'	A6936
H03932	2	100	430 'U'	A6948
H05904	3/16	500	247 'N', 229 'P', 069 'E'	--
H05905	1/4	500	247 'N', 069 'E'	--
H05906	5/16	500	247 'N', 229 'P', 069 'E'	--
H05908	13/32	500	247 'N', 229 'P', 069 'E'	--
H05910	1/2	500	247 'N', 229 'P', 069 'E'	--
H05912	5/8	500	247 'N', 069 'E'	--
H05916	7/8	500	229 'P', 069 'E'	--
H06904	3/16	3000	069 'E', 247 'N'	--
H06905	1/4	500	069 'E', 247 'N'	--
H06906	5/16	2250	069 'E', 247 'N'	--
H06908	13/32	2000	069 'E', 247 'N'	--
H06910	1/2	1750	069 'E', 247 'N'	--
H06912	5/8	1500	069 'E', 247 'N'	--
H06916	7/8	800	069 'E', 247 'N', 069 'D'	--
H06920	1-1/8	625	069 'E'	
H06924	1-3/8	500	069 'E'	--
H06932	1-13/16	350	069 'E'	--
H10404	1/4	2750	'U', 'S', 104 'N', 'Z'	--
H10406	3/8	2250	'U', 'S', 104 'N', 'Z'	--
H10408	1/2	2000	'U', 'S', 104 'N', 'Z'	--
H10410	5/8	1500	'U', 'Z'	--
H10412	3/4	1250	'U', 'S', 104 'N', 'Z'	--
H10416	1	1000	'U', 'S', 104 'N', 'Z'	--
H10420	1-1/4	625	'U', 'S', 'Z'	--
H24504	1/4	5000	'U', 'S', 'Z'	--
H24506	3/8	4000	'U', 'S', 'Z'	--
H24508	1/2	3500	'U', 'S', 'Z'	--
H24510	5/8	2750	'U', 'Z'	--
H24512	3/4	2250	'U', 'S', 'Z'	--
H24516	1	2000	'U', 'S', 'Z'	--
H24520	1-1/4	1625	'U', 'S', 'Z'	--

HOSE NUMBER	HOSE ID	MAWP (PSI)	HOSE END SERIES	FIRE SLEEVE
H42504	1/4	5000	'U', 'S', 425 'N', 'Z'	--
H42506	3/8	4000	'U', 'S', 425 'N', 'Z'	--
H42508	1/2	3500	'U', 'S', 425 'N', 'Z'	--
H42510	5/8	2750	'U', 'Z'	--
H42512	3/4	2250	'U', 'S', 425 'N', 'Z'	--
H42516	1	2000	'U', 'S', 425 'N', 'Z'	--
H42520	1-1/4	1625	'U', 'S', 425 'N', 'Z'	A6936
H42524	1-1/2	1250	430 'U', 425 'N', 'Z'	--
H42532	2	1125	430 'U', 425 'N', 'Z'	--
H43008	1/2	4000	430 'U'	--
H43012	3/4	4000	430 'U'	--
H43016	1	4000	430 'U'	--
H43020	1-1/4	3000	430 'U'	--
H43024	1-1/2	2500	430 'U'	--
H43032	2	2500	430 'U'	--
H47012	3/4	5000	570 'S'	--
H47016	1	5000	570 'S'	--
H47020	1-1/4	5000	570 'S'	--
H47024	1-1/2	5000	570 'S'	--
H47032	2	5000	570 'S'	--
H56906	5/16	2250	069 'E'	--
H56908	13/32	2000	069 'E'	--
H56910	1/2	1750	069 'E'	--
H56912	5/8	1500	069 'E'	--
H56916	7/8	800	069 'E'	--
H56920	1-1/8	625	069 'E'	--

MAWP - Maximum Allowable Working Pressure

Note:

Restrictions on taper thread joints in hydraulic systems for steering gear, controllable pitch propellers, or other systems associated with propulsion or propulsion control are applicable.

See SVR 2000 4-6-2/5.5.5.

Split flanges, such as 570 'S' Series, are not permitted in steering gear systems.

Each hose may only utilize end fitting series listed above.

These products/models are covered under ABS Product Design Assessment Certificate #00-HS191306-PDA dated 15/Dec/2000. It will remain valid for five years from date of issue or until rules or specifications used in the assessment are revised (whichever occurs first).

Technical Torque Specifications

JIC 37° and SAE 45° Flare Fittings For Zinc Plated Carbon without Thread Sealant or Lubrication

SIZE	FRACTION	DECIMAL	LB./IN.	LB./FT.	NEWTON METERS	ADDT'L TURNS OF HEX-FLATS**
- 04	1/4"	0.250	130-150	11-12	15-17	2
- 05	5/16"	0.312	165-195	14-16	19-22	2
- 06	3/8"	0.375	235-265	20-22	27-30	1-1/4
- 08	1/2"	0.500	525-575	44-48	59-65	1
- 10	5/8"	0.625	600-700	50-58	68-79	1
- 12	3/4"	0.750	950-1050	79-88	107-119	1
- 16	1"	1.000	1400-1500	117-125	158-170	1
- 20	1-1/4"	1.250	1900-2100	158-175	215-237	1
- 24	1-1/2"	1.500	2250-2550	188-213	254-288	1
- 32	2"	2.000	3000-3400	250-283	339-384	1

** Additional turns of Hex-Flats required after finger tightening.
THIS IS THE RECOMMENDED METHOD OF TIGHTENING BOTH 37˚ SWIVEL and 45˚ FLARE FITTINGS.

Straight Thread O-Ring Fittings For Zinc Plated Steel without Sealant or Lubrication

SIZE	FRACTION	DECIMAL	LB./IN.	LB./FT.	NEWTON METERS
- 04	1/4"	0.250	156-180	13-15	18-20
- 05	5/16"	0.312	204-228	17-19	23-26
- 06	3/8"	0.375	264-288	22-24	30-33
- 08	1/2"	0.500	480-516	40-43	54-58
- 10	5/8"	0.625	516-576	43-48	58-65
- 12	3/4"	0.750	816-900	68-75	92-102
- 16	1"	1.000	1344-1476	112-123	152-167
- 20	1-1/4"	1.250	1752-1932	146-161	198-218
- 24	1-1/2"	1.500	1848-2040	154-170	209-231
- 32	2"	2.000	2616-2880	218-240	296-325

For-Seal® Fittings For Zinc Plated Steel without Thread Sealant or Lubrication

			For-Seal Swivel Nut Fitting			O-Ring Boss Straight Thread O-Ring Locknut		
SIZE	FRACTION	DECIMAL	LB./IN.	LB./FT.	NEWTON METERS	LB./IN.	LB./FT.	NEWTON METERS
- 04	1/4"	0.250	120-144	10-12	14-16	168-192	14-16	19-22
- 06	3/8"	0.375	216-240	18-20	24-27	288-312	24-26	33-35
- 08	1/2"	0.500	384-420	32-35	43-48	600-720	50-60	68-81
- 10	5/8"	0.625	552-600	46-50	62-68	864-960	72-80	98-109
- 12	3/4"	0.750	780-840	65-70	88-95	1500-1620	125-135	170-183
- 16	1"	1.000	1104-1200	92-100	125-136	2400-2640	200-220	271-298
- 20	1-1/4"	1.250	1500-1680	125-140	170-190	2520-3360	210-280	285-380
- 24	1-1/2"	1.500	1800-1980	150-165	203-224	3240-4320	270-360	366-488

TORQUE VALUE CONVERSION CHART

Lb. / Inch	=	Pound Foot (Lb./Ft.) x 12	Lb. / Foot	=	Pound Inch (Lb./In.) x 0.083
Lb. / Inch	=	Newton Meter x 8.850	Lb. / Foot	=	Newton Meter x 0.737
Newton Meter	=	Pound Inch (Lb./In.) x 0.113	Newton Meter	=	Pound Foot (Lb./Ft.) x 1.356

Note: See introduction page of each catalog section for specific ratings.
Please consult Eaton for other material torque ratings.

Tubing Selection

⚠ WARNING
Refer to safety information regarding tubing selection on page 4.

To select tubing for a particular installation, two factors must be determined:

1.) Tubing Type - material and construction and
2.) Size - inside diameter (I.D.) and wall thickness. Information listed below will aid in your tubing selection.

Tubing Types

Commercial tubing is available in a wide variety of materials, types of construction and quality. Each is best suited for certain specific applications.

Steel Tubing - Seamless SAE 1010 fully annealed and SAE welded types suitable for bending and flaring. This is the only tubing material approved without restrictions by SAE standards.

Stainless Steel Tubing - Both seamless *18-8 fully annealed and welded types suitable for bending and flaring. Stainless steel tubing is recommended for use with very high pressures and where large diameter tubing is required. It is also suited for many applications where corrosion is a problem. *(302, 303 and/or 304)

Aluminum Tubing - Seamless annealed is approved by SAE for low pressure applications.

Copper Tubing - Seamless fully annealed coils and fully annealed or quarter-hard straight lengths can be used for systems that do not use petroleum based fluids (copper acts as an oil-oxidation catalyst, causing sludge). Copper also tends to work harden when flared or bent and has poor resistance to vibration. Therefore, the use of copper tubing is limited to low-pressure stationary applications and air circuits.

Special Alloy Tubing - May be required for specific corrosion problems. Information on these applications can be obtained from your tubing supplier or from tubing manufacturers.

Tubing Size

The two variables in tubing size are the inside diameter (ID) and the wall thickness. Each of these is dependent upon a number of factors.

Inside Diameter - The tubing I.D. will determine the flow and velocity of the fluid in the system. Flow is the volume of fluid that is to be moved through the line to perform a given job within a specified time. Flow rate is expressed in gallons per minute (gpm). Velocity is the rate of speed at which the fluid passes through the line. It is expressed in feet per second (fps). With a given flow rate, the velocity will increase as the inside diameter of the tubing decreases. To determine the appropriate tubing I.D. for specific flow rate and velocity, refer to the Velocity vs. Flow chart on page 31.

Wall Thickness - The required wall thickness of the tubing depends upon operating pressure, safety factor, temperatures, and tubing material. Operating Pressure is the pressure of the fluid in the system. It is expressed in pounds per square inch (psi).
Safety Factor is a multiplier applied to the wall thickness that compensates for additional mechanical strains and hydraulic shocks to which the tubing may be subjected during operation. To determine the appropriate wall thickness, refer to the data on pages 32-35.

Pressure Drop

Total pressure supplied to a line must equal usable pressure (or output) plus the pressure that is lost through fluid transmission, which is referred to as pressure drop. These pressure drops cause loss of energy and should be kept to a minimum. Elements which cause pressure drop in the transmission of fluids include sudden enlargements or contractions, bends, fittings and valves. Mathematical analysis of pressure drop, although possible, is not precise because of the interrelationship of factors such as fluid velocity, density, flow area and friction coefficients. Therefore, to obtain optimum efficiency, the system (or the questionable portions of the system) should be mocked-up to obtain empirical pressure drop data.

Tubing Selection

⚠ WARNING
Refer to safety information regarding tubing selection on page 4.

Following is a typical problem that illustrates, step by step, the procedure for determining tube size.

Select 1010 steel tubing with the appropriate I.D. and wall thickness for the following conditions:

Flow	— 5 gpm
Velocity	— not to exceed 10 fps
Pressure	— 2000 psi
Safety Factor	— 4:1

Solution:

1. Using the Flow/Velocity chart on Page 30, follow the horizontal flow line (5 gpm) until it intersects the vertical velocity line (10fps). From this point, follow the diagonal line upward to get the required tube I.D. (.444). If the horizontal flow line and the vertical velocity line intersect between two diagonal lines, normally the larger inside diameter would be selected since it would mean less velocity.

2. Refer to the chart of Standard Size Hydraulic Tubing, at right. Note that .444 I.D. tubing is not listed. If you want to use standard tubing, select one with a larger I.D. Do not select a smaller size since this would increase the velocity to over the 10 fps limit. Therefore, by going to the next largest size, you would select the 5/8" O.D. tubing having an I.D. of .459 and a wall thickness of .083.

3. To determine whether this tubing will meet the pressure and safety factor requirements, refer to the Recommended Wall Thickness data on pages 31-34. For 5/8" O.D. tubing at 2000 psi, the chart for 1010 steel indicates that the minimum wall thickness with a safety factor of 4:1 is .04545. Since you have selected a tubing with a .083 wall, this would easily fulfill the requirements. However, for savings on weight and cost, you can select another tubing with a thinner wall that will still meet the performance requirements. Therefore, refer again to the chart on standard size tubing and select a tubing with a wall thickness closer to the minimum requirements. This would be the 5/8" O.D. tubing with a .527 I.D. and a .049 wall. This tubing will handle the pressure requirements of 2000 psi with a safety factor of 4:1, and also provides the required flow while keeping the velocity within the 10 fps limitation.

Tube O.D.	Tube I.D.	Wall	Tube O.D.	Tube I.D.	Wall
1/8"	.055	.035	3/4"	.584	.083
	.061	.032		.606	.072
	.065	.030		.620	.065
	.069	.028		.634	.058
3/16"	.117	.035		.652	.049
	.123	.032		.680	.035
	.127	.030	7/8"	.657	.109
1/4"	.120	.065		.685	.095
	.134	.058		.709	.083
	.152	.049		.731	.072
	.166	.042		.745	.065
	.180	.035		.759	.058
	.190	.030		.777	.049
5/16"	.182	.065	1"	.760	.120
	.196	.058		.782	.109
	.214	.049		.810	.095
	.228	.042		.834	.083
	.242	.035		.856	.072
	.248	.032		.870	.065
3/8"	.245	.065		.884	.058
	.259	.058		.902	.049
	.277	.049	1-1/4"	.982	.134
	.291	.042		1.010	.120
	.305	.035		1.032	.109
	.311	.032		1.060	.095
1/2"	.310	.095		1.084	.083
	.334	.083		1.106	.072
	.358	.072		1.120	.065
	.370	.065		1.134	.058
	.384	.058		1.152	.049
	.402	.049	1-1/2"	1.232	.134
	.416	.042		1.260	.120
	.430	.035		1.282	.109
	.436	.032		1.310	.095
5/8"	.435	.095		1.334	.083
	.459	.083		1.356	.072
	.481	.072		1.370	.065
	.495	.065	2"	1.732	.134
	.509	.058		1.760	.120
	.527	.049		1.782	.109
	.541	.042		1.810	.095
	.555	.035		1.834	.083
3/4"	.532	.109		1.856	.072
	.560	.095		1.870	.065

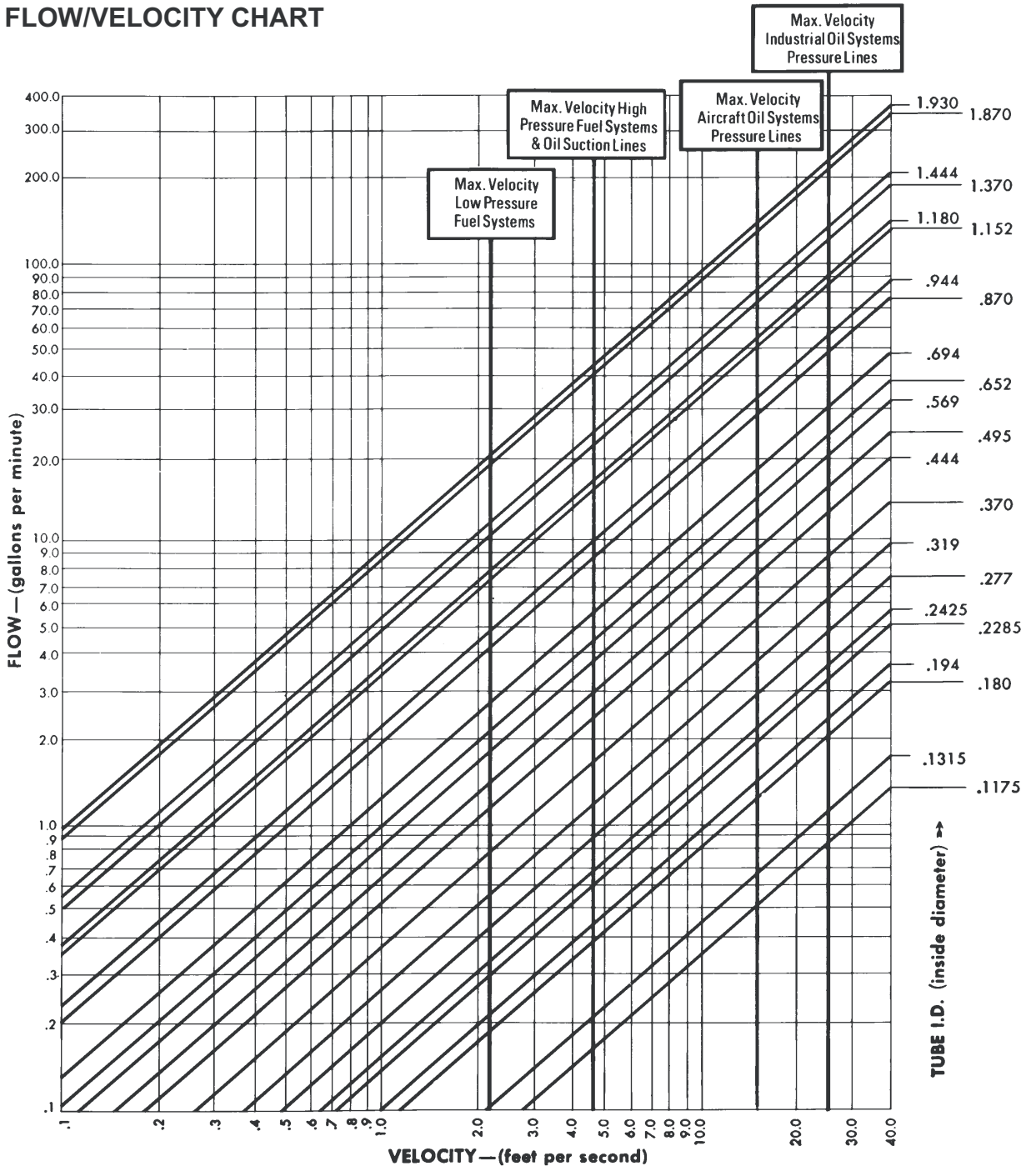
Tubing Selection

To Find the Required Tube I.D. Flow–20 gpm • Velocity–9 fps
Follow horizontal flow line (20 gpm) until it intersects vertical velocity line (9 fps). From this point follow diagonal line to get required Tube I.D. –(.944).

To Find Permissible Flow Velocity–15 fps • Tube I.D.–.495
Follow vertical velocity line (15 fps) until it intersects diagonal line representing .495 tube I.D. Then project this point horizontally to get the permissible flow– (9 gpm).

To Find Velocity of Fluid in System Flow–6 gpm • Tube I.D.–.694
Follow horizontal flow line (6 gpm) until it intersects diagonal line representing .694 tube I.D. Then project this point vertically downward to get the velocity of fluid –(5 fps).

FLOW/VELOCITY CHART



Tubing Selection

⚠ **WARNING** Refer to safety information regarding tubing selection on page 4.

With the following Recommended Wall Thickness tables the tubing wall can be selected that is best suited for a particular application. The data given in these tables are raw figures based on the equation – $t = \frac{Dp(FS)}{2S}$

t–wall thickness (inches)
D–O.D. of tube (inches)
p–pressure (psi)
FS–Safety Factor
S–tensile strength of tubing material

Therefore, many of the wall thicknesses given in these tables are not found on standard tubing, but serve to establish the minimum wall required.

Safety Factor – The standard safety factors indicate three grades of severity of service:
4:1 –mechanical and hydraulic shocks not excessive
6:1 –considerable mechanical strain and hydraulic shock
8:1 –hazardous applications with severe service conditions

The wall thickness shown in these tables are based on ultimate strength of material and a safety factor of 4:1.

To obtain the recommended wall for a specific pressure based on a safety factor of 6:1, multiply the wall thickness indicated in the table by 1.5. For a safety factor of 8:1, multiply by 2:

Temperature – The wall thickness found by using these tables can be corrected for temperature by multiplying the wall thickness by the appropriate correction factor given in the chart below. The table is based on strength reduction due to increased temperature.

Temperature	1010 Steel	Stainless Steel	Copper	Aluminum
+100F.	1.00	1.00	1.00	1.00
+200F.	1.00	1.00	1.08	1.00
+300F.	1.00	1.00	1.22	1.08
+400F.	1.00	1.00	2.30	1.41
+500F.	1.00	1.00	–	2.10
+600F.	1.00	1.00	–	–
+700F.	1.00	1.00	–	–
+800F.	1.08	1.07	–	–
+900F.	1.32	1.13	–	–
+1000F.	1.66	1.22	–	–

RECOMMENDED WALL THICKNESS TABLES

1010 STEEL Based on 55,000#/in.² Strength (F S=4)

TUBE O.D.	working pressure (psi) 1,000	2,000	3,000	4,000	5,000
1/8	.00455	.00909	.01364	.01818	.02273
3/16	.00682	.01364	.02045	.02727	.03409
1/4	.00909	.01818	.02727	.03636	.04545
5/16	.01136	.02273	.03409	.04545	.05682
3/8	.01364	.02727	.04091	.05455	.06818
1/2	.01818	.03636	.05455	.07273	.09091
5/8	.02273	.04545	.06818	.09091	.11364
3/4	.02727	.05455	.08182	.10909	.13636
7/8	.03182	.06364	.09545	.12727	.15909
1	.03636	.07273	.10909	.14545	.18182
1-1/4	.04545	.09091	.13636	.18182	.22727
1-1/2	.05455	.10909	.16364	.21818	.27273
2	.07273	.14545	.21818	.29091	.36364

1020 STEEL Based on 65,000#/in.² Strength (F S=4)

TUBE O.D.	working pressure (psi) 1,000	2,000	3,000	4,000	5,000
1/8	.00385	.00790	.01154	.01538	.01923
3/16	.00577	.01154	.01731	.02308	.02885
1/4	.00769	.01538	.02308	.03077	.03846
5/16	.00962	.01923	.02885	.03846	.04808
3/8	.01154	.02308	.03462	.04615	.05769
1/2	.01538	.03077	.04615	.06154	.07692
5/8	.01923	.03846	.05769	.07692	.09615
3/4	.02308	.04615	.06923	.09231	.11538
7/8	.02692	.05385	.08077	.10769	.13462
1	.03077	.06154	.09231	.12308	.15385
1-1/4	.03846	.07692	.11538	.15385	.19231
1-1/2	.04615	.09231	.13846	.18462	.23077
2	.06154	.12308	.18462	.24615	.30769

4130 STEEL Based on 90,000#/in.² Strength (F S=4)

TUBE O.D.	working pressure (psi) 1,000	2,000	3,000	4,000	5,000
1/8	.00278	.00556	.00833	.01111	.01389
3/16	.00417	.00833	.01250	.01667	.02083
1/4	.00556	.0111	.01667	.02222	.02778
5/16	.00694	.01389	.02083	.02778	.03472
3/8	.00833	.01667	.02499	.03333	.04167
1/2	.01111	.02222	.03333	.04444	.05556
5/8	.01389	.27778	.04167	.05556	.06944
3/4	.01667	.03333	.04999	.06667	.08333
7/8	.01944	.03889	.05833	.07778	.09722
1	.02222	.04444	.06667	.08889	.11111
1-1/4	.02778	.05556	.08333	.11111	.13889
1-1/2	.03333	.06667	.09999	.13333	.16667
2	.04444	.08889	.13333	.17778	.22222

BUNDYWELD Based on 42,000#/in.² Strength (F S=4)

TUBE O.D.	working pressure (psi) 1,000	2,000	3,000	4,000	5,000
1/8	.00595	.01190	.01786	.02381	.02976
3/16	.00893	.01786	.02679	.03571	.04464
1/4	.01190	.02381	.03571	.04762	.05952
5/16	.01488	.02976	.04464	.05952	.07440
3/8	.01786	.03571	.05357	.07143	.08929
1/2	.02381	.04762	.07143	.09524	.11905
5/8	.02976	.05952	.08929	.11905	.14881
3/4					
1					
1-1/4					
1-1/2					
2					

Tubing Selection

⚠ WARNING
Refer to safety information regarding tubing selection on page 4.

TUBE O.D.	STAINLESS STEEL (304) ANNEALED BASED ON 75,000#/IN.² STRENGTH (F.S. –4)					STAINLESS STEEL (304) ANNEALED BASED ON 105,000#/IN.² STRENGTH (F.S. –4)				
	working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.00333	.00666	.00999	.01333	.01666	.00238	.00476	.00714	.00952	.01190
3/16	.00499	.00999	.01498	.01999	.02499	.00357	.00714	.01071	.01429	.01786
1/4	.00666	.01332	.01998	.02667	.03333	.00476	.00952	.01429	.01905	.02381
5/16	.00833	.01665	.02497	.03333	.04165	.00595	.01190	.01786	.02381	.02976
3/8	.0099	.01998	.02997	.03999	.04998	.00714	.01429	.02143	.02857	.03571
1/2	.01332	.02664	.03996	.05333	.06664	.00957	.01904	.02857	.03810	.04762
5/8	.01665	.03333	.04995	.06666	.08330	.01190	.02381	.03571	.04762	.05952
3/4	.01998	.03996	.05994	.07999	.09996	.01429	.02857	.04286	.05714	.07143
7/8	.02331	.04662	.06996	.09333	.11662	.01667	.03333	.05000	.06666	.08333
1	.02664	.05328	.07992	.10666	.13328	.01904	.03810	.05714	.07619	.09524
1-1/4	.03333	.06666	.09999	.13333	.16666	.02381	.04762	.07143	.09524	.11905
1-1/2	.03996	.07992	.11988	.15999	.19992	.02857	.05714	.08371	.11429	.14286
2	.05328	.10656	.15984	.21333	.26666	.03810	.07619	.11428	.15238	.19048

TUBE O.D.	ANNEALED COPPER BASED ON 30,000#/IN.² STRENGTH (F.S. –4)					COPPER (UNS C12200 LIGHT DRAWN) BASED ON 40,000#/IN.² STRENGTH (F.S. –4)				
	working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.00833	.01667	.02500	.03333	.04167	.00625	.01250	.01875	.02500	.03125
3/16	.01250	.02499	.03750	.04999	.06250	.00938	.01875	.02812	.03750	.04688
1/4	.01667	.03333	.05000	.06666	.08333	.01250	.02500	.03750	.05000	.06250
5/16	.02083	.04167	.06250	.08333	.10417	.01562	.03125	.04688	.06250	.07812
3/8	.02499	.04999	.07500	.09999	.12499	.01875	.03750	.05625	.07500	.09375
1/2	.03333	.06667	.10000	.13333	.16667	.02500	.05000	.07500	.10000	.12500
5/8	.04167	.08333	.12500	.16666	.20883	.03125	.06250	.09375	.12500	.15625
3/4	.04999	.09999	.15000	.19999	.24999	.03750	.07500	.11250	.15000	.18750
7/8	.05833	.11667	.17500	.23333	.29166	.04375	.08750	.13125	.17500	.21875
1	.06667	.13333	.20000	.26666	.33333	.05000	.10000	.15000	.20000	.25000
1-1/4	.08333	.16667	.25000	.33333	.41667	.06250	.12500	.18750	.25000	.31250
1-1/2	.09999	.19999	.30000	.39999	.49999	.07500	.15000	.22500	.30000	.37500
2	.13333	.26667	.40000	.53333	.66667	.10000	.20000	.30000	.40000	.50000

TUBE O.D.	ALUMINUM 3003 (H-14) BASED ON 20,000#/IN.² STRENGTH (F.S. –4)					ALUMINUM 5052 (H-32) BASED ON 31,000#/IN.² STRENGTH (F.S. –4)				
	working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.01250	.02500	.3750	.05000		.00806	.01613	.02419	.03226	.04032
3/16	.01875	.03750	.05650	.07500		.01210	.02419	.03629	.04839	.06048
1/4	.02500	.05000	.07500	.10000		.01613	.03226	.04839	.06452	.08065
5/16	.03125	.06250	.09375	.12500		.02016	.04032	.06048	.08065	.10081
3/8	.03750	.07500	.11250	.15000		.02419	.04839	.07258	.09677	.12097
1/2	.05000	.10000	.15000	.20000		.03227	.06452	.09677	.12903	.16129
5/8	.06250	.12500	.18750	.25000		.04032	.08065	.12097	.16129	.20161
3/4	.07500	.15000	.22500	.30000		.04839	.09677	.14516	.19355	.24194
7/8	.08750	.17500	.26250	.35000		.05645	.11290	.16935	.22581	.28226
1	.10000	.20000	.30000	.40000		.06452	.12903	.19355	.25806	.32258
1-1/4	.12500	.25000	.37500	.50000		.08065	.16129	.24194	.32258	.40323
1-1/2	.15000	.30000	.45000	.60000		.09677	.19355	.29032	.38710	.48387
2	.20000	.40000	.60000	.80000		.12903	.25806	.38710	.51613	.64516

TUBE O.D.	CUPRO-NICKEL 30% BASED ON 52,000#/IN.² STRENGTH (F.S. –4)				
	working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000
1/8	.00481	.00962	.01442	.01923	.02404
3/16	.00721	.01442	.02163	.02885	.03606
1/4	.00962	.01923	.02885	.03846	.04808
5/16	.01202	.02404	.03606	.04808	.06010
3/8	.01442	.02885	.04327	.05769	.07212
1/2	.01923	.03846	.05769	.07692	.09615
5/8	.02404	.04808	.07212	.09615	.12019
3/4	.02885	.05769	.08654	.11538	.14423
7/8	.03365	.06731	.10096	.13462	.16827
1	.03846	.07692	.11538	.15385	.19231
1-1/4	.04808	.09615	.14423	.19231	.24038
1-1/2	.05769	.11538	.17308	.23077	.28846
2	.07692	.15385	.23077	.30769	.38462

SHADED AREAS

Tubing wall thickness listed in the shaded areas are generally either too light or too heavy for practical applications, and are listed only to provide data for accurate computation.

Tubing Selection

⚠ WARNING
Refer to safety information regarding tubing selection on page 4.

These tables provide data on required wall thickness for various sizes and pressures, and when to use flared or flareless fittings.

Although heavier wall tubing can be ordered for higher operating pressures, only standard size hydraulic tubing is listed in these tables.

High temperature effects are not considered in these tables.

1010 STEEL TUBING WALL THICKNESS

	4:1 SAFETY FACTOR					6:1 SAFETY FACTOR					8:1 SAFETY FACTOR				
TUBE O.D.	working pressure (psi)					working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.028	.028	.028	.028	.028	.028	.028	.028	.028	.035	.028	.028	.028	.035	–
3/16	.030	.030	.030	.030	.035	.030	.030	.030	–	–	.030	.030	–	–	–
1/4	.030	.030	.030	.042	.049	.030	.030	.042	.058	–	.030	.035	.058	–	–
5/16	.032	.032	.035	.049	.058	.032	.032	.058	.065	–	.032	.049	.065	–	–
3/8	.032	.032	.042	.058	–	.032	.042	.058	–	–	.032	.058	–	–	–
1/2	.032	.042	.058	.072	–	.032	.058	.083	–	–	.042	.072	–	–	–
5/8	.035	.049	.072	.095	–	.035	.072	–	–	–	.049	.095	–	–	–
3/4	.035	.058	.083	.109	–	.049	.083	–	–	–	.058	.109	–	–	–
7/8	.049	.065	.095	–	–	.049	.095	–	–	–	.065	–	–	–	–
1	.049	.072	.109	–	–	.058	.109	–	–	–	.072	–	–	–	–
1-1/4	.049	.095	–	–	–	.072	–	–	–	–	.095	–	–	–	–
1-1/2	.065	.109	–	–	–	.083	–	–	–	–	.109	–	–	–	–
2	.072	–	–	–	–	.109	–	–	–	–	–	–	–	–	–

1020 STEEL TUBING WALL THICKNESS

	4:1 SAFETY FACTOR					6:1 SAFETY FACTOR					8:1 SAFETY FACTOR				
TUBE O.D.	working pressure (psi)					working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.028	.028	.028	.028	.028	.028	.028	.028	.028	.030	.028	.028	.028	.030	–
3/16	.030	.030	.030	.030	.030	.030	.030	.030	.035	–	.030	.030	.035	–	–
1/4	.030	.030	.030	.030	.042	.030	.030	.035	.049	.058	.030	.030	.049	–	–
5/16	.032	.032	.032	.042	.049	.032	.032	.042	.058	–	.032	.042	.058	–	–
3/8	.032	.032	.035	.049	.058	.032	.035	.058	.065	–	.032	.049	–	–	–
1/2	.032	.032	.049	.065	.083	.032	.049	.072	–	–	.032	.065	–	–	–
5/8	.035	.042	.058	.083	–	.035	.058	.095	–	–	.042	.083	–	–	–
3/4	.035	.049	.072	.095	–	.035	.072	.109	–	–	.049	.095	–	–	–
7/8	.049	.058	.083	–	–	.049	.083	–	–	–	.058	.109	–	–	–
1	.049	.065	.095	–	–	.049	.095	–	–	–	.065	–	–	–	–
1-1/4	.049	.083	.120	–	–	.058	.120	–	–	–	.083	–	–	–	–
1-1/2	.065	.095	–	–	–	.072	–	–	–	–	.095	–	–	–	–
2	.065	–	–	–	–	.095	–	–	–	–	.134	–	–	–	–

Both SAE 37° SINGLE FLARE FLARE-TWIN or ERMETO® flareless recommended.

ERMETO® flareless only.

NOTE: Only Weatherhead Ermeto flareless fittings can be used with high pressure, heavy wall tubing which is impractical to flare.

Tubing Selection

⚠ WARNING
Refer to safety information regarding tubing selection on page 4.

These tables provide data on required wall thickness for various sizes and pressures, and when to use flared or flareless fittings.

Although heavier wall tubing can be ordered for higher operating pressures, only standard size hydraulic tubing is listed in these tables.

High temperature effects are not considered in these tables.

STAINLESS STEEL (304) ANNEALED TUBING WALL THICKNESS

	4:1 SAFETY FACTOR					6:1 SAFETY FACTOR					8:1 SAFETY FACTOR				
TUBE O.D.	working pressure (psi)					working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.028	.028	.028	.028	.028	.028	.028	.028	.028	.035	.028	.028	.028	.028	.035
3/16	.030	.030	.030	.030	.030	.030	.030	.030	.030	.035	.030	.030	.030	.035	–
1/4	.030	.030	.030	.030	.035	.030	.030	.030	.042	.058	.030	.030	.035	.058	.065
5/16	.032	.032	.032	.035	.042	.032	.032	.035	.058	.065	.032	.032	.049	.065	–
3/8	.032	.032	.032	.042	.058	.032	.042	.065	.083	–	.032	.042	.058	–	–
1/2	.032	.032	.042	.058	.072	.032	.042	.065	.083	–	.032	.058	.083	–	–
5/8	.035	.035	.058	.072	.083	.035	.058	.083	.095	–	.035	.065	–	–	–
3/4	.035	.049	.065	.083	.109	.035	.065	.095	–	–	.049	.083	–	–	–
7/8	.049	.049	.072	.095	–	.049	.072	.109	–	–	.049	.095	–	–	–
1	.049	.058	.083	.109	–	.049	.083	.120	–	–	.058	.109	–	–	–
1-1/4	.049	.072	.109	–	–	.058	.109	–	–	–	.065	.134	–	–	–
1-1/2	.065	.083	.120	–	–	.065	.120	–	–	–	.083	–	–	–	–
2	.065	.109	–	–	–	.083	–	–	–	–	.109	–	–	–	–

STAINLESS STEEL (304) 1/8 HARD TUBING WALL THICKNESS

	4:1 SAFETY FACTOR					6:1 SAFETY FACTOR					8:1 SAFETY FACTOR				
TUBE O.D.	working pressure (psi)					working pressure (psi)					working pressure (psi)				
	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000	1,000	2,000	3,000	4,000	5,000
1/8	.028	.028	.028	.028	.028	.028	.028	.028	.028	.028	.028	.028	.028	.028	.028
3/16	.030	.030	.030	.030	.030	.030	.030	.030	.030	.030	.030	.030	.030	.030	.035
1/4	.030	.030	.030	.030	.030	.030	.030	.030	.030	.035	.030	.030	.030	.042	.049
5/16	.032	.032	.032	.032	.032	.032	.032	.032	.035	.049	.032	.032	.035	.049	.058
3/8	.032	.032	.032	.032	.042	.032	.032	.032	.042	.058	.032	.032	.042	.058	–
1/2	.032	.032	.032	.042	.049	.032	.032	.042	.058	.072	.032	.042	.058	.083	–
5/8	.035	.035	.042	.049	.065	.035	.035	.058	.072	.095	.035	.049	.072	.095	–
3/4	.035	.035	.049	.058	.072	.035	.049	.065	.095	.109	.035	.058	.095	–	–
7/8	.049	.049	.058	.072	.083	.049	.058	.083	.109	–	.049	.065	.109	–	–
1	.049	.049	.058	.083	.095	.049	.058	.095	–	–	.049	.072	–	–	–
1-1/4	.049	.049	.072	.095	.120	.049	.072	.109	–	–	.049	.095	–	–	–
1-1/2	.065	.065	.095	–	–	.065	.095	–	–	–	.065	–	–	–	–
2	.065	.083	.120	–	–	.065	–	–	–	–	.083	–	–	–	–

Both SAE 37° SINGLE FLARE FLARE-TWIN or ERMETO® flareless recommended.

ERMETO® flareless only.

NOTE: Only Weatherhead Ermeto flareless fittings can be used with high pressure, heavy wall tubing which is impractical to flare.