

Selection, installation and maintenance of hose and assemblies

The following recommendations on selection, installation and maintenance of hose assemblies were established in SAE J1273. Please read these general instructions carefully. More detailed information on many of these subjects is covered in this catalog.

1. Scope

Hose (also includes hose assemblies) has a finite life and there are a number of factors which will reduce its life. This recommended practice is intended as a guide to assist system designers and/or users in the selection, installation, and maintenance of hose.

The designers and users must make a systematic review of each application and then select, install, and maintain the hose to fulfill the requirements of the application. The following are general guidelines and are not necessarily a complete list.

⚠ Warning: improper selection, installation, or maintenance may result in premature failures, bodily injury, or property damage.

2. References

2.1 Applicable documents

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE publications

Available from SAE,
400 Commonwealth Drive,
Warrendale, PA 15096-0001.

J516—Hydraulic hose fittings

J517—Hydraulic hose

3. Selection

The following is a list of factors which must be considered before final hose selection can be made.

3.1 Pressure

After determining the system pressure, hose selection must be made so that the recommended maximum operating pressure is equal to or greater than the system pressure. Surge pressures higher than the maximum operating pressure will shorten hose life and must be taken into account by the hydraulic designer.

3.2 Suction

Hoses used for suction applications must be selected to insure the hose will withstand the negative pressure of the system.

3.3 Temperature

Care must be taken to insure that fluid and ambient temperatures, both static and transient, do not exceed the limitations of the hose. Special care must be taken when routing near hot manifolds.

3.4 Fluid compatibility

Hose selection must assure compatibility of the hose tube, cover and fittings with the fluid used. Additional caution must be observed in hose selection for gaseous applications.

3.5 Size

Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage to the hose due to heat generation or excessive turbulence.

3.6 Routing

Attention must be given to optimum routing to minimize inherent problems.

3.7 Environment

Care must be taken to insure that the hose and fittings are either compatible with or protected from the environment to which they are exposed. Environmental conditions such as ultraviolet light, ozone, salt water, chemicals, and air pollutants can cause degradation and premature failure and, therefore, must be considered.

3.8 Mechanical loads

External forces can significantly reduce hose life. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration.

Use of swivel-type fittings or adapters may be required to insure no twist is put into the hose. Unusual applications may require special testing prior to hose selection.

3.9 Abrasion

While hose is designed with a reasonable level of abrasion resistance, care must be taken to protect the hose from excessive abrasion which can result in erosion, snagging and cutting of the hose cover. Exposure of the reinforcement will significantly accelerate hose failure.

3.10 Proper end fitting

Care must be taken to insure proper compatibility exists between the hose and coupling selected based on the manufacturer's recommendations substantiated by testing to industry standards such as SAE J517. End fitting components from one manufacturer are usually not compatible with end fitting components supplied by another manufacturer (i.e., using a hose fitting nipple from one manufacturer with a hose socket from another manufacturer). It is the responsibility of the fabricator

to consult the manufacturer's written instructions or the manufacturer directly for proper end fitting componentry.

3.11 Length

When establishing proper hose length, motion absorption, hose length changes due to pressure, as well as hose and machine tolerances must be considered.

3.12 Specifications and standards

When selecting hose, government, industry and manufacturers' specifications and recommendations must be reviewed as applicable.

3.13 Hose cleanliness

Hose components vary in cleanliness levels. Care must be taken to insure that the assemblies selected have an adequate level of cleanliness for the application.

3.14 Electrical conductivity

Certain applications require that hose be nonconductive to prevent electrical current flow. Other applications require the hose to be sufficiently conductive to drain off static electricity. Hose and fittings must be chosen with these needs in mind.

4. Installation

After selection of proper hose, the following factors must be considered by the installer.

4.1 Pre-installation inspection

Prior to installation, a careful examination of the hose must be performed. All components must be checked for correct style, size and length. In addition, the hose must be examined for cleanliness, I.D. obstructions, blisters, loose cover, or any other visible defects.

Hose selection

General hose selection information

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Selection, installation and maintenance of hose and assemblies

The following recommendations on selection, installation and maintenance of hose assemblies were established in SAE J1273. Please read these general instructions carefully. More detailed information on many of these subjects is covered in this catalog.

4.2 Follow manufacturers' assembly instructions

Hose assemblies may be fabricated by the manufacturer, an agent for or customer of the manufacturer, or by the user. Fabrication of permanently attached fittings to hydraulic hose requires specialized assembly equipment. Field attachable fittings (screw style and segment clamp style) can usually be assembled without specialized equipment although many manufacturers provide equipment to assist in the operation.

SAE J517 hose from one manufacturer is usually not compatible with SAE J516 fittings supplied by another manufacturer. It is the responsibility of the fabricator to consult the manufacturer's written assembly instructions or the manufacturers directly before intermixing hose and fittings from two manufacturers. Similarly, assembly equipment from one manufacturer is usually not interchangeable with that of another manufacturer. It is the responsibility of the fabricator to consult the manufacturer's written instructions or the manufacturer directly for proper assembly equipment. Always follow the manufacturer's instructions for proper preparation and fabrication of hose assemblies.

4.3 Minimum bend radius

Installation at less than minimum bend radius may significantly reduce hose life. Particular attention must be given to preclude sharp bending at the hose/fitting juncture.

4.4 Twist angle and orientation

Hose installations must be such that relative motion of machine components produces bending of the hose rather than twisting.

4.5 Securement

In many applications, it may be necessary to restrain, protect, or guide the hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

4.6 Proper connection of ports

Proper physical installation of the hose requires a correctly installed port connection while insuring that no twist or torque is put into the hose.

4.7 Avoid external damage

Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated.

4.8 System check out

After completing the installation, all air entrapment must be eliminated and the system pressurized to the maximum system pressure and checked for proper function and freedom from leaks.

Note: Avoid potential hazardous areas while testing.

5. Maintenance

Even with proper selection and installation, hose life may be significantly reduced without a continuing maintenance program. Frequency should be determined by the severity of the application and risk potential. A maintenance program should include the following as a minimum.

5.1 Hose storage

Hose products in storage can be affected adversely by temperature, humidity, ozone, sunlight, oils, solvents, corrosive liquids and fumes, insects, rodents and radioactive materials. Storage areas should be relatively cool and dark and free of dust, dirt, dampness and mildew.

5.2 Visual inspection

Any of the following conditions requires replacement of the hose:

- Leaks at fitting or in hose (leaking fluid is a fire hazard)
- Damaged, cut, or abraded cover (any reinforcement exposed)
- Kinked, crushed, flattened, or twisted hose
- Hard, stiff, heat cracked or charred hose
- Blistered, soft, degraded, or loose cover
- Cracked, damaged, or badly corroded fittings
- Fitting slippage on hose

5.3 Visual inspection

The following items must be tightened, repaired, or replaced as required:

- Leaking port conditions
- Clamps, guards, shields
- Remove excessive dirt buildup
- System fluid level, fluid type, and any air entrapment

5.4 Functional test

Operate the system at maximum operating pressure and check for possible malfunctions and freedom from leaks.

Note: Avoid potential hazardous areas while testing.

5.5 Replacement intervals

Specific replacement intervals must be considered based on previous service life, government or industry recommendations, or when failures could result in unacceptable down time, damage, or injury risk.

Hose selection

Hose Selection chart

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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.

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.

HYDRAULIC HOSE												
	Braided Hose - Premium						Spiral Hose - Premium					
HOSE	H180	H145R	H190H	H280	H290H	H245L	H430	H430R	EC525	H471	EC600	EC810
Page	B-6	B-7	B-8	B-9	B-10	B-11	B-12	B-13	B-14	B-15	B-16	B-17
Usage	Transfer of low to medium pressure hydraulic & water-based fluids	Transfer of medium pressure hyd. & water-based fluids in abrasive applications	Transfer of low to medium pressure, high temp. hydraulic & water-based fluids	Transfer of medium to high pressure hydraulic & water-based fluids	Transfer of medium to high pressure hydraulic & water-based fluids	High pressure Transfer of low temp. hydraulic & water-based fluids	Transfer of very high pressure hydraulic & water-based fluids	Transfer of very high pressure hyd. & water-based fluids in abrasive applications	Transfer of high pressure high temp. hydraulic & water-based fluids	Transfer of super high pressure hydraulic & water-based fluids	Ultra flexible Transfer of super high pressure hydraulic & water-based fluids	Ultra flexible Transfer of high pressure low temp. hydraulic & water-based fluids
Meets	MSHA, EN857 1SC	—	MSHA, EN853 1SN	MSHA, *ABS, *USCG, ISO 1436, EN857 2SC	MSHA, EN853 2SN *USCG	MSHA, EN857 2SC	*ABS, MSHA *USCG, *DNV EN856 R12, DIN856/4SP (-8 to -16)	*ABS, *DNV, EN856 R12	MSHA, *ABS, *USCG, EN856 R12	*ABS, DNV, MSHA, *USCG, EN856 R13, ISO 3862 R13	ISO 18752-DC* MSHA *ABS, *DNV, *USCG	MSHA, EN856 R15
SAE No.	100R1 Type S	100R17	100R1 Type S	J1942, 100R16 Type S	100R2 AT	100R16 Type S	100R12	100R12	100R12	100R13	100R15	100R15
Temp. Range °F	-50°F to +260°F	-40°F to +212°F	-40°F to +302°F	-40°F to +260°F	-40°F to +302°F	-70°F to +212°F	-40°F to +260°F	-40°F to +250°F	-40°F to +300°F (-40°F to +180°F phosphate-ester base fluids)	-40°F to +260°F	-40°F to +250°F	-70°F to +212°F
Inner Tube	Nitrile	Nitrile	CPE	Nitrile	CPE	Low temp. Nitrile	Nitrile	Nitrile	CPE	Nitrile	Nitrile	Low temp. Nitrile
Reinforcement	1 wire braid	1 wire braid (-4 to -8) 2 wire braids (-10 to -16)	1 wire braid	2 wire braids	2 wire braids	2 wire braids	4 wire spiral	4 wire spiral	4 wire spiral	4 wire spiral (-12 to -24), 6 wire spiral (-32)	4 wire spiral (-12, -16) 6 wire spiral (-20)	4 wire spiral (-12, -16) 6 wire spiral (-20 to -32)
Cover	Weather-SHIELD™	UHMWPE	CPE	Weather-SHIELD™	CPE	Weather-SHIELD™	Weather-SHIELD™	UHMWPE	CPE	Nitrile	Weather-SHIELD™	Nitrile
Hose I.D. - Maximum recommended operating pressure - PSI												
3/16												
1/4	3700	3000	3265	6500	5800	6000						
5/16												
3/8	3400	3000	2610	5800	4800	5000	6500	4000				6100
13/32												
7/16												
1/2	3200	3000	2320	5000	4000	4500	6000	4000				6100
5/8	2025	3000	1885	4000	3630	4000	6000	4000				6100
3/4	2000	3000	1525	3500	3120	3500	5500	4000	5000	5076	6100	6100
7/8					2400							
1	1500	3000	1275	3000		2800	5100	4000	5000	5076	6100	6100
1-1/8												
1-1/4	1000		900	2500	2250	2300	4500	3000	3500	5076	6100	6100
1-1/2	750			2000	1750	2000	4000	2500	3500	5076		6100
1-3/8												
1-3/16												
2	600			1600	1500	1500	4000	2500	3250	5076		5100
2-3/8												
2-1/2												
Hose fittings												
Crimp	Z Series	Z Series	Z Series	Z Series	Z Series	Z Series	4S Series	4S/6S Series	4S Series	4S/6S Series	4S/6S Series	4S/6S Series
Field Attach.	—	—	—	—	—	—	—	—	—	—	—	—

* Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

HYDRAULIC HOSE											
	Premium	Braided Hose - Other								Spiral Hose - Other	
HOSE	EC850	H190	H290	H145	H545	H400	H421	EC230	H345	H464	EC910
Page	B-18	B-19	B-20	B-21	B-22	B-23	B-24	B-24	B-25	B-26	B-26
Usage	Transfer of ultra high pressure petroleum and water-glycol based fluids	Transfer of low to medium pressure hydraulic and water-based fluids	Transfer of medium to high pressure hydraulic and water-based fluids	Transfer of medium pressure hydraulic and water-based fluids	Transfer of medium constant pressure hydraulic and water-based fluids	Transfer of high pressure hydraulic and water-based fluids	Hydraulic jacking system	Large bore, high flow transfer of medium pressure hydraulic and water-based fluids	Pressure washer	Transfer of very high pressure hydraulic and water-based fluids	Waterblast service with water, water-soap, and emulsion
Meets	MSHA IC-84, DIN 5510	*ABS, MSHA ISO 1436-1 1SN EN853 1SN	MSHA ISO 1436-1 2SN EN853 2SN	MSHA	—	—	—	—	MSHA	EN856 4SH	ISO 7751 EN1829-2
SAE No.	100R15	J1942 100R1 Type S	100R2 Type S	100R17, J1942/1 (hyd. only)	—	100R19	—	100R2 Type S	—	—	—
Temp. Range °F	-40°F to +212°F	-40°F to +260°F (petro-based hyd. fluids), -40°F to +158°F (water-based hyd. fluids), +32°F to +158°F (water)	-40°F to +260°F (petro-based hyd. fluids), -40°F to +159°F (water-based hyd. fluids)	-40°F to +250°F (for -4 to -8), -40°F to +212°F (for -10 to -16)	-40°F to +250°F	-40°F - +212°F	-40°F to +212°F	-40°F to +212°F	0°F to +200°F Press. washer -40°F to +250°F Hyd. service	-40°F to +212°F	-40°F to +200°F -14°F to +176°F (continuous service temp. range)
Inner Tube	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile
Reinforcement	4 spiral wire (-10, -12, -16) 6 spiral wire (-20)	1 wire braid	2 wire braids	1 wire braid (-4 to -8), 2 wire braids (-10 to -16)	1 wire braid (-4 to -8), 2 wire braids (-10 to -16)	2 wire braids	2 wire braids	2 wire braid	1 wire braid	4 spiral wire plies	Heavy 4 spiral wire
Cover	Nitrile	Weather-SHIELD™	Weather-SHIELD™	Neoprene	Abrasion resistant woven nylon	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile cover labeled per WJTA
Hose I.D. - Maximum recommended operating pressure - PSI											
3/16											
1/4		3700	6500	3045	3000	4000	10000		3000		
5/16											
3/8		3400	5300	3045	3000	4000	10000		3000		
13/32											
7/16											
1/2		2900	4500	3045	3000	4000			3000		16000
5/8	7250	1885	4000	3045	3000	4000					
3/4	7250	2000	3500	3045	3000	4000				6090	14500
7/8											
1	7250	1500	3000	3045	3000					5510	10200
1-1/8											
1-1/4	7250	1000	2500							5075	
1-1/2		750	2000							4350	
1-3/8											
1-3/16											
2		600	1600							3625	
2-3/8											
2-1/2								1150			
Hose fittings											
Crimp	1W Series	Z Series	Z Series	Z Series	Z Series	Z Series	Z Series	E-HOBR-BB001-E	Z Series	4S Series	Contact Eaton
Field Attach.	—	—	—	—	—	—	—	—	—	—	—

* Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

Hose selection

Hose selection chart

For complete information on any hose refer to hose catalog page number.

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HYDRAULIC HOSE										
	Suction Hose - Specialty		Thermoplastic							
HOSE	H039	H039H	3130	3740	37AL	3R80	3E80	30CT	3V10	3VE0
Page	B-27	B-28	B-29	B-30	B-31	B-32	B-32	B-33	B-34	B-35
Usage	Hydraulic suction hose	Hydraulic suction hose	Material handling; forklifts; chemical transfer; marine steering	Aerial equipment; mobile hydraulics; rescue apparatus and tools	Electric utility trucks; hydraulic systems; mobile equipment	Hydraulic tools; mobile equipment; high-pressure chemical transfer	Aerial equipment; mobile hydraulics; rescue tools	Forklifts; material handling; freezer applications	High pressure test equipment and hydraulic tools; rescue equipment and tools	High voltage; rescue equipment and tools; mobile machinery; aerial equipment
Meets	MSHA *ABS	—	—	—	ANSI A92.2	—	—	—	—	—
SAE No.	100R4, J1942/1 (hyd. only)	100R4	100R7	100R7, J517 non-conductive hose construction	100R7, J517 non-conductive hose construction	100R8	100R8, J517 non-conductive hose construction	100R18	—	J517 non-conductive hose construction
Temp. Range °F	-40°F to +275°F	-40°F to +302°F	-40°F to +212°F; -40°F to +150°F with water-based or fire-resistant fluids	-40°F to +212°F; -40°F to +150°F with water-based or fire-resistant fluids	-40°F to +212°F; -40°F to +140°F with water-based or fire-resistant fluids	-40°F to +212°F; -40°F to +150°F with water-based or fire-resistant fluids	-65°F to +212°F; -40°F to +150°F with water-based or fire-resistant fluids	-65°F to +200°F; -65°F to +150°F with water-based or fire-resistant fluids	-40°F to +150°F	-40°F to +150°F
Inner Tube	CPE	CPE	Nylon-lined	Nylon-lined	Polyester	Nylon	Nylon	Polyester	Nylon-lined	Nylon-lined
Reinforcement	1 helical wire between two textile layers, 1 fiber braid	1 helical wire between two textile layers, 1 fiber braid	Spiral or braided synthetic fiber	Braided synthetic fiber reinforcement (-08)	Braided synthetic fiber	Braided, synthetic fiber	Braided synthetic fiber	Braided synthetic fiber	Spiral, high tensile aramid fiber	Spiral, high tensile aramid fiber
Cover	Neoprene	CPE	Black perforated polyurethane	Orange non-perforated polyurethane	Orange, non-perforated, non-stick polyurethane	Black perforated polyurethane	Orange, non-perforated polyurethane	Black perforated, non-stick polyester	Black, perforated polyurethane	Orange, non-perforated polyurethane
Hose I.D. - Maximum recommended operating pressure - PSI										
3/16			2500							
1/4			3050		3000	5100	5100	3050	10153	10153
5/16			3000	2800	3000 / 2750	5100	5100	3050	10153	10153
3/8			2550		3000 / 2500			3050		
13/32			2300	2300	3000 / 2250	4050	4050	3050	8000	8000
7/16										
1/2										
5/8			2050	2050	3000 / 2250	3550	3550	3050		
3/4	305	305						3050		
7/8			1250	1250		2300	2300			
1	247	247								
1-1/8			1000	1000		2050	2050			
1-1/4	203	203								
1-1/2	152	152								
1-3/8										
1-3/16										
2	102	102								
2-3/8										
2-1/2										
Hose fittings										
Crimp	Z Series	Z Series	Refer to Synflex® catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E	Refer to Synflex catalog E-H00V-MC001-E
Field Attach.	—	—	—	—	902 Series	—	—	—	—	—

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

HOSE	GENERAL PURPOSE HOSE							INDUSTRIAL HOSE				
	General Purpose Hose							Air and Multipurpose Hose				
	H009	H017	H100	H101	H201	H275	H332	H6009	EHA500	H9949	H1776 H1777	H201
Page	C-3	C-4	C-5	C-6	C-7	C-8	C-8	D-2	D-2	D-2	D-2	D-2
Usage	Air, petroleum, water based hydraulic fluid	Low pressure fuel and oil lines; hydraulic return lines	Air, lubricating oil, water, diesel fuel	Air, petroleum, water based hydraulic fluid, diesel fuel	Air, petroleum, water based hydraulic fluid, diesel fuel	Air and water	Air, lubricating oil, water, diesel fuel	Air-operated construction equipment	High-pressure air service	Air and water transfer	Air and water transfer, air tools	Air and water transfer, pneumatic tools, air tools
Meets	100R6	MSHA, 100R3	—	MSHA	MSHA	—	—	—	—	—	—	MSHA (red, green & black only)
SAE No.	J1942/1	J1942/1/1 (Hyd. only)	—	—	—	—	—	—	—	—	—	—
Temp. Range °F	-40°F to +212°F	-40°F to +212°F	-40°F to +212°F	-40°F to +212°F	-40°F to +200°F	-10°F to +150°F	-40°F to +302°F	-40°F to +250°F	-40°F to +200°F	-40°F to +180°F	-40°F to +180°F	-40°F to +212°F (Air/ water) -40°F to +260°F (Oil)
Inner Tube	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	PVC	CPE	Nitrile (RMA Class A)	Oil-resistant Nitrile Blend	Non-Conductive Nitrile	Nitrile (RMA Class A)	Vinyl Nitrile (RMA Class A)
Reinforcement	1 textile braid	2 textile braids	1 textile braid	1 textile braid	1 textile braid	Textile: 2 spirals	1 textile braid	1"-1.25" 1-wire braid, 1.5"-3" 2-wire braid, 4" 3-wire braid	High-tensile steel wire	2-fiber braids	1-fiber braid (H1777); 2-fiber braid (H1776)	1-fiber braid
Cover	Neoprene	Neoprene	Textile braid (black)	Neoprene	Neoprene (black), Vinyl Nitrile (colors)	PVC/ Pinpricked	CPE (black)	Pin-Pricked Carboxylated Nitrile	Pin-pricked, Abrasion/ Ozone/ Weather Resistant Nitrile	Non-Conductive Vinyl Nitrile	Vinyl Nitrile	Neoprene (black), Vinyl Nitrile (colors)
Hose I.D. - Maximum Recommended Operating Pressure - PSI												
3/16												
1/4	400	1250	350	350	300	250	250			275	325	300
5/16	400		350	350							325	
3/8	400	1125	350	350	300	250	250			275	325	300
13/32												
7/16												
1/2	400	1000	350	350	300	250	250		600	275	325	300
5/8			350	350	300		250				325	300
3/4		750	350	350	300	250	250		600	275	325	300
7/8												
1		565				200		1000	600	275	325	300
1-1/8												
1-1/4		375				200		800	600		325	
1-1/2						200		600	600		325	
1-3/8												
1-13/16												
2						125		600	600			
2-3/8												
2-1/2								600				
3								600	600			
Hose Fittings												
Crimp	E Series	—	—	—	—	E Series, 265 P Series, Z Series	—	Z Series	—	Z Series	Z Series	B Series
Field Attach.	009 B Series	—	100 B Series	100 B Series	100 B Series	—	100 B Series	—	—	—	—	100 B Series

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

Hose selection

Hose selection chart

For complete information on any hose refer to hose catalog page number.

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INDUSTRIAL HOSE (continued)											
Air and Multipurpose Hose (continued)							Chemical Hose				
HOSE	H275	H1812	H1981	H1982	H0105	H0106	H0523	H0599	H0554	H0378	H0345
Page	D-2	D-2	D-2	D-2	D-2	D-2	D-3	D-3	D-3	D-3	D-3
Usage	Air and water transfer, air tools, lubricated air	Air and water transfer, pneumatic tools, water-based fertilizers and pesticides	Air and water transfer	Air and water transfer	Air and water transfer	Air and water applications	Transfer of acids, chemicals, solvents, and petroleum products; food transfer; portable water	Transfer of acids, chemicals, solvents, and petroleum products; loading and unloading, pumping, suction, or gravity flow discharge, portable water	Transfer of acids, chemicals, solvents, and petroleum products; loading and unloading, pumping, suction, or gravity flow discharge	Transfer of acids, chemicals, solvents, and petroleum products; loading and unloading, pumping, suction, or gravity flow discharge	Transfer of acids, chemicals, solvents, and petroleum products; loading and unloading, pumping, suction, or gravity flow discharge
Meets	—	—	—	—	—	—	FDA	FDA	FDA	—	—
SAE No.	—	—	—	—	—	—	—	—	—	—	—
Temp. Range °F	-10°F to +150°F	-40°F to +180°F	-40°F to +180°F	-40°F to +180°F	-40°F to +180°F	-40°F to +180°F	-40°F to +250°F	-40°F to +250°F	-40°F to +250°F	-45°F to +150°F	-45°F to +180°F
Inner Tube	PVC	EPDM rubber	Nitrile blend	Nitrile blend	EPDM	EPDM	UHMW-PE	UHMW-PE	UHMW-PE	XLPE	EPDM
Reinforcement	2-spiral fiber	2-fiber braid	2- or 4-fiber spiral	2- or 4-fiber spiral	4-fiber spiral, 2-fiber braid (-20 & -24)	2-spiral fiber	2-ply fiber with dual helical wires	2-ply fiber with dual helical wire	2-wire braid, dual stainless steel anti-static wire, 3.00" and 4.00" helical wire	2-ply fiber with helical wire	2-ply fiber with helical wire
Cover	Pin-pricked PVC	EPDM rubber	Pin-pricked Nitrile blend	Pin-pricked Nitrile blend	EPDM	EPDM	EPDM	Corrugated EPDM	EPDM	EPDM	EPDM
Hose I.D. - Maximum recommended operating pressure - PSI											
3/16											
1/4	300	275	200	300	300	200					
5/16											
3/8	300	275	200	300	300	200					
13/32											
7/16											
1/2	300	250	200	300	300	200					
5/8	300	250		300	300	200					
3/4	300	250	225	300	225	300	300		500		
7/8											
1	250	250		300	200		300	300	500	250	
1-1/8											
1-1/4	150	250			200		300	300	500	250	
1-1/2	150	250			200		300	300	500	250	150
1-3/8											
1-3/16											
2	125						300	300	500	250	150
2-3/8											
2-1/2							300				
3							250	250	500	175	150
Hose fittings											
Crimp	E Series, Z Series, P Series	Z Series	Z Series	Z Series	Z Series	Z Series	—	—	—	—	—
Field Attach.	—	—	—	—	—	—	—	—	—	—	—

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

INDUSTRIAL HOSE (continued)											
HOSE	Chemical Hose (continued)			Food and Beverage Hose						Liquefied Petroleum Gas	
	H0346	H1941	H1942	H0350	H285	PT200	H1066	H9673	H9610	H900	EH920
Page	D-3	D-3	D-3	D-4	D-4	D-4	D-4	D-4	D-4	D-5	D-5
Usage	Transfer of acids, chemicals, solvents, and petroleum products; loading and unloading, pumping, suction, or gravity flow discharge	Spraying pesticides and fertilizers; paint spray	Spraying pesticides and fertilizers; paint spray	Suction and discharge of non-dairy food products	Food and beverage dispensing; spraying and conveying fertilizer and pesticides	Food and beverage dispensing; spraying and conveying fertilizer and pesticides; low pressure laboratory, industrial, agricultural, or domestic application	Washdown of food processing facilities and equipment	Washdown of food processing facilities and equipment	Washdown of food processing facilities and equipment	Transfer and delivery of propane and butane; transfer of natural gas in open, well ventilated areas	Transfer and delivery of propane and butane; transfer of natural gas in open, well ventilated areas
Meets	—	—	—	FDA	NSF-51, FDA	NSF-51, FDA	—	—	—	—	—
SAE No.	—	—	—	—	—	—	—	—	—	—	—
Temp. Range °F	-45°F to +180°F	-30°F to +160°F	-30°F to +160°F	-40°F to +180°F	-15°F to +150°F	-5°F to +105°F	-40°F to +180°F	-40°F to +180°F	-40°F to +180°F	-40°F to +140°F	-40°F to +140°F
Inner Tube	EPDM	Nylon	Nylon	Vinyl Nitrile	Clear PVC	Clear PVC	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile
Reinforcement	2-Ply fiber	1-Fiber braid	2-Fiber braid	2-Ply fiber with helical wire	2-Spiral fiber	—	2-Braid fiber	1- And 2-braid fiber	1-Braid fiber	Textile braid	Textile braids and stainless steel anti-static wire
Cover	EPDM	Neoprene (BK); Vinyl Nitrile and RMA Class B oil resistant (RD)	Neoprene (BK); Vinyl Nitrile and RMA Class B oil resistant (RD)	Vinyl Nitrile	Clear PVC	Clear PVC	Pin-Pricked Vinyl Nitrile	Vinyl Nitrile	Vinyl Nitrile	Pin-pricked Vinyl Nitrile	Pin-pricked Neoprene
Hose I.D. - Maximum recommended operating pressure - PSI											
3/16					250						
1/4		500			250	65				350	
5/16		500			250	55					
3/8		500			225	55		1250	1000	350	
13/32											
7/16											
1/2		500	750		200	45		1250	1000	350	
5/8					200	30					
3/4			750		150	40	200	1250	1000	350	
7/8											
1			500		125	35				350	
1-1/8											
1-1/4					100						
1-1/2	150				100						
1-3/8											
1-3/16											
2	150			250	75						350
2-3/8											
2-1/2											
3	100			250							
Hose fittings											
Crimp	—	E Series	—	—	E Series, 265 P Series	—	—	—	Z Series	—	—
Field Attach.	—	—	—	—	—	—	—	—	—	—	—

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

Hose selection

Hose selection chart

For complete information on any hose refer to hose catalog page number.

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INDUSTRIAL HOSE (continued)										
Material Handling								Oil and Gas Exploration		Petroleum
HOSE	H0347	H0319	H0521	H0349	H0034	EHK006	EHK007	H0377	EHP009	H6009
Page	D-6	D-6	D-6	D-6	D-6	D-6	D-6	D-7	D-7	D-7
Usage	Transfer of dry bulk; discharge or abrasive material; Transfer of bottle caps; Transfer of cleaning agents	Transfer of dry bulk; discharge or abrasive material; Transfer of bottle caps; Transfer of cleaning agents	Transfer of dry bulk; discharge or abrasive material; Transfer of bottle caps; Transfer of cleaning agents	Hot air blower hose; hot, dry, non-oily applications	Conveys sand or shot for cleaning purposes	High pressure concrete pumping	High pressure concrete pumping; Heavy duty construction for applications needing long lasting durability	Rotary drilling	Transfer applications	Air-operated construction equipment
Meets	—	—	—	—	—	ASME B30.27-2014	ASME B30.27-2014	—	—	—
SAE No.	—	—	—	—	—	—	—	—	—	—
Temp. Range °F	-10°F to +160°F	-40°F to +158°F	-40°F to +158°F	-30°F to +300°F	-40°F to +158°F	-40°F to +158°F	-40°F to +158°F	-40°F to +158°F	-22°F to +176°F	-40°F to +250°F
Inner Tube	Static dissipating natural rubber/SBR	3/16" Tube thickness natural rubber blend	1/4" Tube thickness natural rubber blend	EPDM	Natural rubber	Natural rubber	Natural and CBR blend	Nitrile/Hypalon ¹ blend	Nitrile blend	Nitrile (RMA Class A)
Reinforcement	2-Ply fiber with dual helical wires	2-Ply textile and conductive copper anti-static wire	2-Ply textile and conductive copper anti-static wire	Textile with dual helical wires	4-Ply textile	High tensile synthetic textile and antistatic copper wire	High tensile steel cords	4-Spiral wire	High-tensile synthetic textile with dual steel helical wires	1"-1.25" 1-wire braid, 1.5"-3" 2-wire braid, 4" 3-wire braid
Cover	SBR	NR Blend	SBR	Pin-pricked EPDM	SBR	Pin-pricked synthetic rubber	Pin-pricked synthetic rubber	Neoprene	Corrugated SBR blend	Pin-Pricked Carboxylated Nitrile
Hose I.D. - Maximum recommended operating pressure - PSI										
3/16										
1/4										
5/16										
3/8										
13/32										
7/16										
1/2					150					
5/8										
3/4					150					
7/8										
1					150	1233				1000
1-1/8										
1-1/4					125	1233				800
1-1/2					100	1233			150	600
1-3/8										
1-3/16										
2					100	1233	1233	3000	150	600
2-3/8										
2-1/2						1233	1233		150	600
3	100			150		1233	1233		150	600
Hose fittings										
Crimp	—	—	—	—	—	—	—	—	—	Z Series
Field Attach.	—	—	—	—	—	—	—	—	—	—

¹ Hypalon® is a registered trademark of E.I. du Pont.

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

INDUSTRIAL HOSE (continued)												
HOSE	Petroleum Hose				Specialty					Steam Hose		
	H1193	H0363	EHP150	H901	H0372	H0616	H9603	H9690	H8811	EH084	H0084	H9568
Page	D-7	D-7	D-7	D-7	D-8	D-8	D-8	D-8	D-8	D-9	D-9	D-9
Usage	Transfer of petroleum products; B20 biodiesel applications	Suction and discharge of petroleum products	Suction and discharge of petroleum products	Fuel oil transfer	Suction and discharge of tar and asphalt	Suction and discharge of tar and asphalt	Hot tar projects	Hydrocarbon drain service	Transfer of nitrogen at ambient temperatures	Transfer of steam for processing products and cleaning equipment	Transfer of steam for processing products and cleaning equipment	Transfer of steam for processing products and cleaning equipment
Meets	—	—	—	—	—	—	—	—	—	—	—	—
SAE No.	—	—	—	—	—	—	—	—	—	—	—	—
Temp. Range °F	-20°F to +180°F	-40°F to +180°F	-31°F to +158°F	-40°F to +180°F	+350°F Intermittent	+350°F Intermittent	+350°F Intermittent	-40°F to +350°F	-40°F to +180°F	-40°F to +407°F	Maximum Operating +450°F	Maximum Operating +450°F
Inner Tube	Nitrile Blend	Vinyl Nitrile Blend	NBR Blend (RMA Class A)	Nitrile Rubber (RMA Class A)	Nitrile	Nitrile	Nitrile (RMA Class A)	Nitrile (RMA Class A)	Nitrile	Special Chlorobutyl Blend	Special Chlorobutyl Blend	EPDM
Reinforcement	100% Polyester and helical wire	2- or 4-ply fiber with dual helical wires and anti-static copper wire	High-tensile synthetic textile, single steel helical and anti-static copper wire	Double fiber braid	2-Ply fiberglass with helical wire	2-Ply fiberglass with helical wire	2-Wire braid	2-Wire braid	4-Spiral fiber	2-Wire braid	2-Wire braid with stainless steel anti-static wire	2-Wire braid
Cover	Nitrile blend	Vinyl Nitrile blend	Abrasion and Weather Resistant NBR blend (RMA Class A)	Vinyl Nitrile rubber	Neoprene	Corrugated Neoprene	Pin-pricked CPE	Pin-pricked Chlorinated Polyethylene	Pin-pricked Neoprene	Pin-pricked EPDM	Pin-pricked EPDM	Pin-pricked EPDM
Hose I.D. - Maximum recommended operating pressure - PSI												
3/16												
1/4												
5/16												
3/8												
13/32												
7/16												
1/2										250		250
5/8												
3/4		150	150					300	300	250		250
7/8												
1		150	150	250			250			250		250
1-1/8												
1-1/4		150	150	250							250	
1-1/2	300	150	150	250							250	
1-3/8												
1-3/16												
2	300	150	150		200	200					250	
2-3/8												
2-1/2												
3	250	150	150		200							
Hose fittings												
Crimp	—	—	—	—	—	—	—	EJ Series	NA	EJ Series	—	EJ Series
Field Attach.	—	—	—	—	—	—	—	—	—	—	—	—

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

Hose selection

Hose selection chart

For complete information on any hose refer to hose catalog page number.

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HOSE	INDUSTRIAL HOSE (continued)							AC & REFRIGERATION			TRANSPORTATION	
	Water							AC			Synflex Air Brake	
	H1196	H0364	EHW150	EHW028	EHW029	FC701	FC702	GH001	FC800	H757	15CA	3SCE
Page	D-10	D-10	D-10	D-10	D-10	D-10	D-10	E-3	E-5	E-4	F-5	F-5
Usage	Transfer of water, liquid, diluted fertilizers, and pesticides	Pumping, suction, and discharge of water, mud, and slurries; diluted agricultural fertilizers; water apps	Pumping, suction, and discharge of water, mud, and slurries; diluted agricultural fertilizers; water apps	High pressure air in mines	Water discharge	High-pressure sewer cleaning	High-pressure sewer cleaning	Air cond. R134a, R1234yf, R404a, R407C, R410	Air cond. R134a, R1234yf, R407C, R22	Air cond. R12, R134a	Eclipse® Air brake line systems	Air brake line systems
Meets	MSHA	—	—	—	—	—	—	—	—	—	DOT-FMVSS 106	DOT-FMVSS 106
SAE No.	—	—	—	—	—	—	—	J2064 Type E	J2064	J2064 Type C Class 1	J844 Type B	J844 Type B
Temp. Range °F	-20°F to +180°F	-40°F to +248°F	-13°F to +158°F	-31°F to +212°F	-40°F to +248°F	-40°F to +150°F	-40°F to +150°F	-40°F to +284°F	-40°F to +257°F	-22°F to +248°F (for R12) -22°F to +257°F (for R134a)	-65°F to +200°F	-65°F to +200°F
Inner Tube	Thermoplastic Vinyl Nitrile	EPDM	Synthetic rubber	Oil-mist resistant NBR blend	EPDM	Blue Elastomer tube	Blue Elastomer tube	Dual extrusion technology polyamide Type E veneer	Chloroprene (CR)	Rubber	Eclipse® 100% Polyamide	Eclipse® 100% Polyamide
Reinforcement	100% Polyester and helical wire	High-tensile synthetic textile and steel helical wire	Textile and a single steel helical wire	High-tensile steel wire	High-tensile synthetic textile	Single braid, high strength textile	Single braid, high strength textile	Textile braid	1 wire braid	1 textile braid	Polyester yarn	Polyester yarn
Cover	Thermoplastic Vinyl Nitrile	EPDM	Oil Resistant NBR blend (RMA Class A)	MSHA Pin-pricked Neoprene blend	EPDM	Orange Ether-Based Polyurethane	Blue Ether-Based Polyurethane	Blended EPDM	EPDM	Butyl perforated	—	—
Hose I.D. - Maximum Recommended Operating Pressure - PSI												
3/16												
1/4												300
5/16								500		400		
3/8								500				
13/32										400		
7/16												
1/2				1000				500		350	238	
5/8								500		350		
3/4				1000		2500	3000	500	500			
7/8												
1				1000		2500	3000	500	500			
1-1/8												
1-1/4		150	150	1000	150	2500			500			
1-1/2	300	150	150	1000	150				500			
1-3/8												
1-13/16												
2	300	150	150	1000	150							
2-3/8												
2-1/2												
3	250	150	150		150							
Hose Fittings												
Crimp	—	—	—	—	—	—	—	E Series	—	757 E Series	—	—
Field Attach.	—	—	—	—	—	—	—	E-Z Clip	FC800	—	—	—

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

TRANSPORTATION (continued)												
	Synflex Air Brake Tubing (cont.)			Synflex Diesel Fuel Tubing			Engine and Air Brake Hose					
HOSE	4245	4247	3270	4294	4297	4KGEN	EC038	H069	H166	H169	H213	H229
Page	F-6	F-7	F-8	F-9	F-10	F-11	F-12	F-13	F-15	F-15	F-16	F-17
Usage	Truck and trailer air brake systems; auxiliary air systems	Truck and trailer air brake systems; auxiliary air systems	Truck and trailer air brake systems; auxiliary air systems	Diesel fuel applications	Diesel fuel applications	Modification or repair of OEM fuel systems using Synflex 4294 or 4297 series fuel tubing	Air brake	Truck and hydraulic	High temperature truck	Hydraulic	High temperature truck	Air and hydraulic
Meets	DOT-FMVSS 106	DOT-FMVSS 106	DOT-FMVSS 106	ASTM D471, 0624, 0638, D648, 0709, 0746, 0742, 02240	ASTM D471, 0624, 0638, D648, 0709, 0746, 0742, 02240	—	DOT/FMVSS 106 Type All	DOT All	DOT All	—	DOT All	DOT All
SAE No.	J844 Type A, J1131, J2494-3	J844 Type A, J1131, J2494-3	J844 Type B, J1131, J2494-3	J844, J1131, J1394	J844, J1131, J1394	—	J1402	100R5, J1402 Type II	J1402 Type All	—	J1402 Type All	J1402 Type All
Temp. Range °F	-65°F to +200°F	-65°F to +200°F	-65°F to +200°F	-40°F to +200°F	-50°F to +250°F	—	-40°F to +212°F	-40°F to +212°F (Hyd.) -40°F to +200°F (Air brake) -40°F to +250°F (Hot oil)	-40°F to +250°F (Hyd.) -40°F to +200°F (Air brake)	-40°F to +212°F	-40°F to +200°F (Air brake) -50°F to +302°F (Hot oil)	-40°F to +212°F (Hyd.) -40°F to +212°F (Air brake)
Inner Tube	Eclipse® 100% Polyamide	Solstice® 100% Polyamide	Eclipse® 100% Polyamide	Nylon 12	Nylon 11	—	EPDM	Nitrile	Nitrile	Nitrile	CPE	Nitrile
Reinforcement	Polyester yarn	Polyester yarn	Polyester yarn	Thermoplastic	Thermoplastic Elastomer	—	1 textile braid	1 textile & 1 single wire braid	1 textile & 1 S.S. braid	1 textile & 1 single wire braid	1 single wire braid	1 textile braid
Cover	—	—	—	—	—	—	EPDM	Textile braid	Textile braid	Neoprene	Textile braid	Textile braid
Hose I.D. - Maximum Recommended Operating Pressure - PSI												
3/16								3000	1500	3000	2000	225
1/4	300	300					225	3000	500	3000	1500	
5/16	250							2250	500	2250	1500	225
3/8			350	75	50		225					
13/32								2000	500	2000	1250	225
7/16												
1/2			238	75	50		225	1750	450	1750	1000	225
5/8			225	75	50			1500	450	1500	750	225
3/4			200									
7/8								800	250	800	400	225
1												
1-1/8								625	250	625		
1-1/4												
1-1/2												
1-3/8								500		500		
1-13/16								350		350		
2												
2-3/8								350				
Hose Fittings												
Crimp	—	—	—	—	—	—	—	069 E Series	069 E Series	069 E Series	069 E Series, 229 P Series	069 E Series, 229 P Series
Field Attach.	Brass	Brass	—	—	—	—	—	069 D Series, 247 N Series	069 D Series, 247 N Series	069 D Series, 247 N Series	213 N Series	069 D Series, 247 N Series

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

Hose selection

Hose selection chart

A

TRANSPORTATION											
	Engine and Air Brake Hose (Continued)			Diesel and Biodiesel Hose		Fuel Line Hose			Silicone Hose		
HOSE	H239	H429	H569	GH100	GH101	H057	H059	35FH	EH225	EH226	EH227
Page	F-18	F-18	F-19	F-20	F-21	F-22	F-23	F-23	F-24	F-25	F-26
Usage	Transmission oil cooler, diesel fuel, air brake	Transmission oil cooler, fuel and diesel lines	A/B and hydraulic	Diesel and biodiesel; low pressure oil applications	Diesel and biodiesel; low pressure oil applications	Fuel and oil	Fuel oil/Lube	Fuel	Engine	Engine	Engine
Meets	DOT All	—	DOT All *ABS	ASTM D380, ASTM D6751, EN412, EN2240	ASTM D380, ASTM D6751, EN412, EN2240	—	NMMA, *USCG	EPA/CARB, Recreational Craft Directive, 94/25/EC	—	—	—
SAE No.	J1402 Type All	J1019	100R5 J1942/1 J1402 Type All	—	—	30R7	J1942/1	J1527B1-15, J30R6, J30R9, 30R11	J20R3 Class A	J20R1 Class A	J20R1 Class A
Temp. Range °F	-40°F to +302°F (Hot oil) -40°F to +200°F (Air brake)	-55°F to +302°F	-55°F to +302°F (Hyd. fluid) -40°F to +200°F (Air brake) -40°F to +212°F (Air)	-40°F to +302°F (Up to B20); -40°F to +257°F (Up to B100); -40°F to +320°F (Oil-Transmission)	-40°F to +302°F (Up to B20); -40°F to +257°F (Up to B100); -40°F to +257°F (Up to B100)	-40°F to +275°F	-40°F to +212°F	-40°F to +160°F	-65°F to +350°F	-65°F to +350°F	-65°F to +500°F
Inner Tube	CPE	CPE	CPE	Eaton Developed HNBR	Eaton Developed HNBR	Nitrile	Special blended Nitrile	PVDF	Silicone	Silicone	Silicone
Reinforcement	1 textile braid	1 wire braid	1 textile & 1 single wire braid	Aramid braid	Aramid braid	1 textile braid	1 single wire & Nomex ² braid	1 polyester & 1 wire braid	1-ply Polyester	4-ply Polyester	4-ply Aramid
Cover	Black textile braid	Textile braid	Blue textile braid	Textile braid	CPE	Hypalon ¹	CPE	Black PVC alloy	Silicone	Silicone	Silicone
Hose I.D. - Maximum Recommended Operating Pressure - PSI											
3/16	225		3000			50	500				
1/4			3000	400	400	50	500	175	400		
5/16			2250			50	500	175	300	1080	
3/8				400	400	50		175	250	1060	
13/32	225	250	2000				500				
7/16						35					
1/2	225	250	1750	400	400		500		250	872	
5/8	225		1500	350	350		500		250	797	
3/4				350					200	754	
7/8	225		800						200	732	
1							500		175	699	
1-1/8	225		625							658	
1-1/4										617	
1-1/2										521	
1-3/8										550	
1-13/16											
2										442	
2-3/8										400	
3										317	
Hose Fittings											
Crimp	069 E Series, 229 P Series	757 E Series, 057 P Series	069 E Series	327 E Series	327 E Series	—	069 E Series, 229 P Series	—	—	—	—
Field Attach.	—	—	247 N Series	—	—	057 B Series	247 N Series	Socketless	—	—	—

¹ Hypalon® is a registered trademark of E.I. du Pont.

² Nomex is a trademark of The Chemours Company FC, LLC.

*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

HOSE	TRANSPORTATION					TEFLON HOSE						
	Power Steering	LPG Hose		CNG Hose		Full Bore		Everflex Reduced Bore			Convuluted	
	H324	H366	H900	NG-TW	35NG	H243	H277	S-Series	SC-Series	HI-PSI Series	8000 Series	8500 Series
Page	F-27	F-28	F-28	F-29	F-30	G-3	G-4	G-5	G-6	G-7	G-8	G-8
Usage	Passenger car/light truck power steering hose	Medium pressure LP gas service	Transfer and delivery of propane and butane	Low pressure CNG applications on equipment or vehicles	CNG Transfer & refueling dispenser lines, high press. on-vehicle lines	Hyd, air, steam, compressor discharge, chemical transfer, marine	Hyd, air, steam, compressor discharge, chemical transfer, marine	Hyd, air, steam, compressor discharge, chemical transfer, marine	Hyd, air, steam, compressor discharge, chemical transfer, marine	Hyd, air, steam, compressor discharge, chemical transfer, marine	Hyd, air, steam, compressor discharge, chemical transfer, marine, presses, RO	Hyd, air, steam, compressor discharge, chemical transfer, marine, presses, RO
Meets		MH 6776, ULMH 10198	UL 21	ANSI/CSA NGV4.2-2014, CSA 12.52-2014, ANSI/CSA NGV 3.1-2014/CSA 12.3-2014, ECE R110	ANSI/CSA NGV4.2-2014, CSA 12.52-2014, ANSI/CSA NGV 3.1-2014/CSA 12.3-2014	FDA	FDA	FDA	FDA	FDA	—	—
SAE No.	—	—	—	—	—	—	—	100R14 Type A	100R14 Type B	100R14 Type B	100R14 Type A	100R14 Type B
Temp. Range °F	-40°F to +250°F	-40°F to +300°F	-40°F to +140°F	-40°F to +248°F	-40°F to +185°F	-65°F to +450°F	-65°F to +450°F	-65°F to +450°F	-65°F to +450°F	-65°F to +450°F	-65°F to +400°F	-65°F to +400°F
Inner Tube	Nitrile	Nitrile	Nitrile	Static-dissipating Teflon	Conductive nylon core	Non-conductive Teflon	Conductive black Teflon	Non-conductive Teflon	Conductive black Teflon	Heavy wall conductive black Teflon	Convuluted non-conductive Teflon	Convuluted conductive black Teflon
Reinforcement	2 textile braids	1 textile braid, 1 stainless steel braid	Textile braid (1" has 2 stainless steel static wires)	304 stainless steel wire braid	Synthetic fiber	1-layer stainless braid (-16 only)	1-layer stainless braid (-16 only)	—	—	1-layer stainless braid (-12 through -24)	—	—
Cover	Neoprene	Textile braid	Vinyl Nitrile, Pin-pricked	Fire resistant black/Polyester blend cover, blue tracer	Black perforated polyurethane	1-layer stainless braid	1-layer stainless braid	304 or 316 stainless braid	1-layer stainless braid	1 or 2 layers of 304 stainless braid	304 stainless braid	304 stainless braid
Hose I.D. - Maximum Recommended Operating Pressure - PSI												
3/16						3000	3000	3500	3500			
1/4			350		5000	3000	3000	3000	3000	5000		
5/16						2500	2500	3000	3000			
3/8	1125	350	350	435	5000	2000	2000	2500	2500	5000		
13/32												
7/16												
1/2		350	350	435	5000	1750	1750	2000	2000	5000	1500	1500
5/8				435				1750	1750	5000		
3/4			350			1000	1000	1500	1500	5000	1250	1250
7/8												
1			350			1000	1000	1000	1000	5000	900	900
1-1/8												
1-1/4								1000		5000	900	900
1-1/2										4000	750	750
1-3/8												
1-13/16												
2											500	500
Hose Fittings												
Crimp	—	069 E Series	—	Must be TUV certified to crimp assemblies	Must be TUV certified to crimp assemblies	E Series	E Series	Everswage	Everswage	Factory Crimp only	Conv-O-Crimp	Conv-O-Crimp
Field Attach.	—	069 O Series, 247 N Series	—	E-HOTH-TT001-E for fitting and certification information	E-HOTH-TT001-E for fitting and certification information	—	—	—	—	—	—	—

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*Listing may vary by hose style and size, some hoses may require firesleeve or special procedures depending on specific applications. Contact Eaton for details.

Hose selection

Flow rate

A

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 fittings
- 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).

Hose Fittings and Fluid Conveyed

In most cases, the end fitting openings are slightly smaller than the hose itself. However, this varies widely with hose fitting 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 described 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



WARNING

Refer to safety information regarding tubing selection on pages A-2.

CHART 1. Hose Flow Rate vs. Pressure Drop

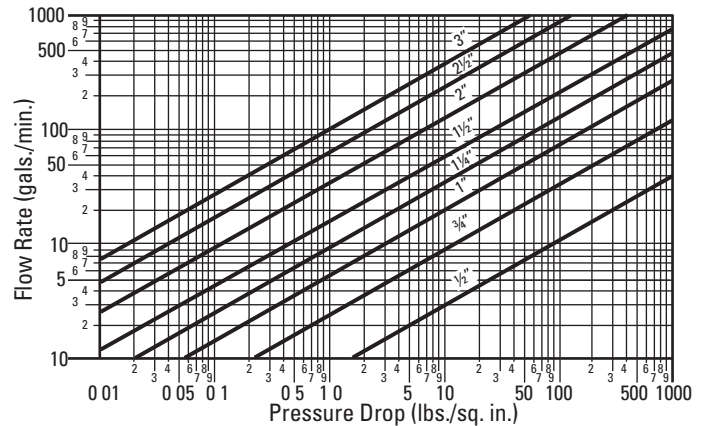
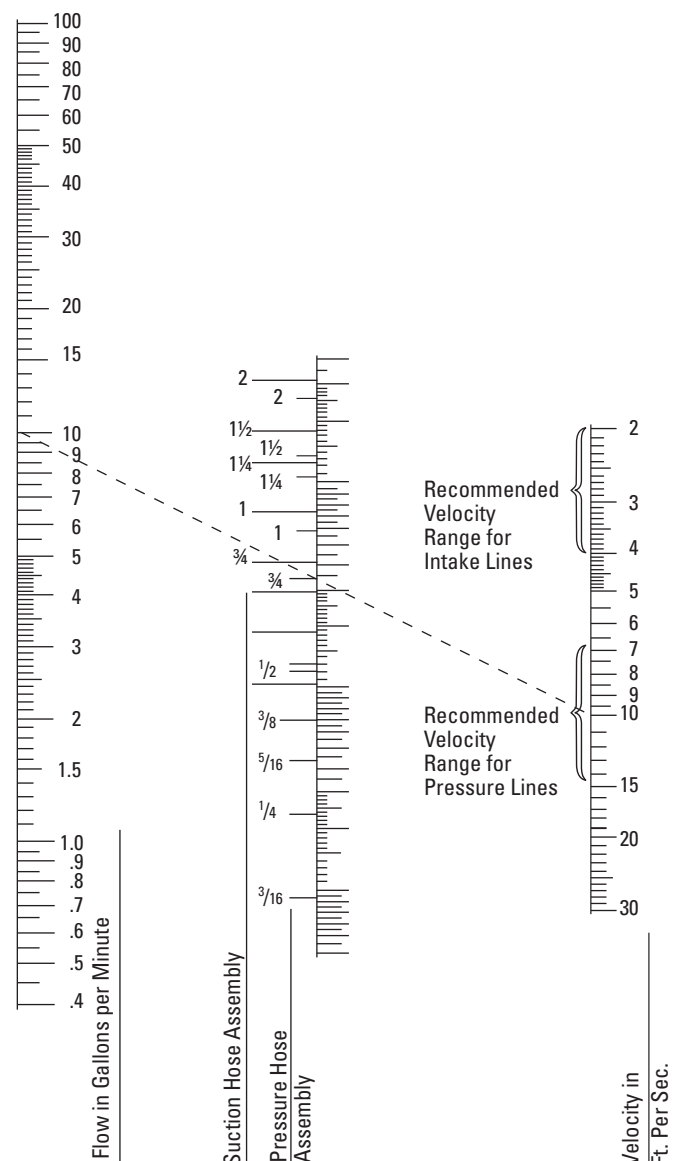


CHART 2. Hose Flow Capacity



⚠ WARNING

Refer to safety information regarding tubing selection on pages A-2.

CHART 3. Fluid Flow Correction Factors

Liquid	Specific Gravity	Viscosity Centistokes	Viscosity Centipoises	Correction Factor R.
	CS	CP	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	0.350
Beer*	1.01	1.15	–	0.990
Benzene Benzol	0.88	0.744	–	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	900.00	–	0.27
Crude Petroleum Typical*				
1. Pennsylvania Crude@100°F	0.80	–	3.0	0.78
2. California Crude @ 150°F	0.915	–	9.0	0.64
3. #33 API Crude @ 100°F	0.86	7.2	–	0.685
4. Texas Crude @ 150°F	0.875	–	3.0	0.792
5. Mexican Crude @ 150°F	0.96	–	550.0	0.287
Decane - n	0.73	1.24	–	0.975
Ethyl Alcohol @ 100°F	0.794	–	1.25	0.93
Ethyl Alcohol @ 95°F	0.808	–	1.45	0.904
Ethyl Alcohol @ 40°F	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 82-95 Visc 30 to 40 SSU	0.88	2.45	–	0.85
No. 2 @ 100°F Sp Gr 82-95 Visc 35 to 50 SSU	0.88	4.50	–	0.752
No. 3 @ 100°F Sp Gr 82-95 Visc 55 SSU max	0.88	8.6	–	0.66
No. 5 @ 100°F Sp Gr 82-95 Visc 60 to 450 SSU	0.88	55.0	–	0.47
No. 6 @ 122°F Sp Gr 82-95 Visc 430 to 2900 SSU	0.88	38.0	–	0.493
Gasoline (representative)*				
Type #1	0.74	0.88	–	1.04
Type #2	0.72	0.64	–	1.11
Type #3	0.68	0.46	–	1.19
Glycerine (Glycerol) – 100% @ 150°F	1.26	–	75.0	0.45

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

Liquid	Specific Gravity	Viscosity Centistokes	Viscosity Centipoises	Correction Factor R.
	CS	CP	CP	
Glycerine & Water – 50%	1.13	–	6.5	0.717
Heptane – 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	0.35
Lubricating Oil (Automotive)	0.893	–	110.0	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	0.39
Naphthalene	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	–	0.36
Sodium Hydroxide – 50%	1.53	–	95.0	0.443
Soya Bean Oil	0.924	86.0	–	0.418
Sperm Oil	0.88	21.0	–	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

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.

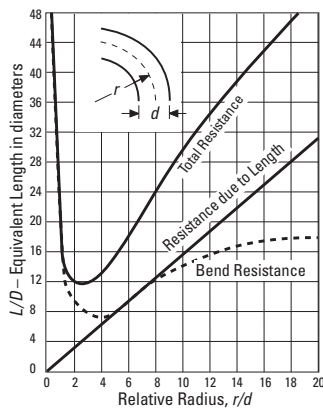
Installation design

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. 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.

**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.

CHART 4. Resistance of 90° bends



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 equivalent 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.