

# Seven Easy Steps for Selecting the Proper Hose

An effective way to remember hose selection criteria is to remember the word...

## STAMPED

- S** = Size
- T** = Temperature
- A** = Application
- M** = Material to be conveyed
- P** = Pressure
- E** = Ends or couplings
- D** = Delivery (volume and velocity)

### 1. Hose Size (Dash Numbers)

The inside diameter of the hose must be adequate to keep pressure loss to a minimum and avoid damage to the hose due to heat generation or excessive turbulence. See hose sizing Nomographic Chart.

To determine the replacement hose size, read the layline printed on the side of the original hose. If the original hose layline is painted over or worn off, the original hose must be cut and the inside diameter measured for size.

**NOTE: Before cutting an original hose assembly, measure the overall assembly length and fitting orientation. These measurements will be required to build the replacement assembly.**

The hydraulics industry has adopted a measuring system called Dash Numbers to indicate hose and coupling size. The number which precedes the hose or coupling description is the dash size (see table). This industry standard number denotes hose I.D. in sixteenths of an inch. (The exception to this is the SAE100R5 hoses C5C, C5D, C5E, C5M as well as, C14 and AC134a, where dash sizes denote hose I.D. equal to equivalent tube O.D.) See chart to the right.

Dash No.	Hose I.D. (Inches)			
	All Except C5 Series, C14 and AC134a		C5 Series, C14 and AC134a	
	Inches	Millimeters	Inches	Millimeters
-2	1/8	3.2	--	--
-3	3/16	4.8	--	--
-4	1/4	6.4	3/16	4.8
-5	5/16	7.9	1/4	6.4
-6	3/8	9.5	5/16	7.9
-8	1/2	12.7	13/32	10.3
-10	5/8	15.9	1/2	12.7
-12	3/4	19.0	5/8	15.9
-14	7/8	22.2	--	--
-16	1	25.4	7/8	22.2
-20	1-1/4	31.8	1-1/8	28.6
-24	1-1/2	38.1	1-3/8	34.9
-32	2	50.8	1-13/16	46.0
-36	2-1/4	57.6	--	--
-40	2-1/2	63.5	2-3/8	60.3
-48	3	76.2	--	--
-56	3-1/2	88.9	--	--
-64	4	101.6	--	--
-72	4-1/2	115.2	--	--

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGSSURELOK AIR  
BRAKE  
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## Selecting the Proper Hose — con't.

Hose O.D. can be a critical factor when hose routing clamps are used or hoses are routed through bulkheads. Check individual hose specification tables for O.D.'s.

### 2. Temperature

When selecting a replacement assembly, two areas of temperature must be considered. These are fluid temperature and ambient temperature. The hose selected must be capable of withstanding the minimum and maximum temperature seen by the system. Care must be taken when routing near hot manifolds and in extreme cases a heat shield may be advisable.

See the Gates Hydraulic Hose Selection Guide; Hose Specification Pages; and/or the Additional Temperature Limits for Gates Hydraulic Hoses Chart for temperature ranges and limits for water, water/oil emulsions and water/glycol solutions.

### 3. Application

Determine where or how the replacement hose or assembly is to be used. Most often only a duplicate of the original hose will have to be made. To fulfill the requirements of the application, additional questions may need to be answered, such as:

- Where Will Hose be Used?
- Fluid and/or Ambient Temperature?
- Hose Construction?
- Equipment Type?
- Fluid Compatibility?
- Thread End Connection Type?
- Working and Surge Pressures?
- Environmental Conditions?
- Permanent or Field Attachable Couplings?
- Suction Application?
- Routing Requirements?
- Thread Type?
- Government and Industry Standards Being Met?
- Unusual Mechanical Loads?
- Minimum Bend Radius?
- Non-Conductive Hose Required?
- Excessive Abrasion?

### 4. Material to be Conveyed

Some applications require specialized oils or chemicals to be conveyed through the system. Hose selection must ensure compatibility of the hose tube, cover, couplings and O-rings with the fluid used. Additional caution must be exercised in hose selection for gaseous applications such as refrigerants and LPG.

NOTE: All block type couplings contain nitrile O-rings which must be compatible with the fluids being used.

### 5. Pressure

Most important in the hose selection process is knowing system pressure, including pressure spikes. Published working pressures must be equal to or greater than the system pressure. Pressure spikes greater than the published working pressure will shorten hose life and must be taken into consideration. Gates DOES NOT recommend using hoses on applications having pressure spikes greater than published working pressures of the hose.

### 6. Ends of Couplings

Identify end connections using Gates coupling templates and measuring tools or Coupling Identification section. Once thread ends have been identified, consult the appropriate section of the catalog for specific part number selection.

### 7. Delivery (Volume and Velocity)

If the same I.D. of the original hose is used, assume the system is properly sized to efficiently transport fluid. If the system is new or altered, determine the hose I.D. needed to transport required fluid volume flow by using the Nomographic Chart.



# Agency Specifications and Hose Selection Guide

## INDUSTRY AGENCIES

**ABS** — American Bureau of Shipping

**AS** — Australia Standard

**DIN** — Deutsch Industry Norm, German

**DNV** — Det Norske Veritas for North Sea Floating Vessels

**EN** — European Norm/Standard

**GL** — Germanischer Lloyds

**IJS** — Industrial Jack Specifications

**RCCC** — Regular Common Carrier Conference for Fleet Truck and Bus

**SAE** — Society of Automotive Engineers

## GOVERNMENT AGENCIES

**DOT/FMVSS** — U.S. Department of Transportation/ Federal Motor Vehicle Safety Standard

**MSHA** — U.S. Mine Safety and Health Administration

**USCG** — U.S. Coast Guard

## Meets These Agency Specifications

Hose Type	ABS	AS	DIN	DNV	EN	GL	IJS	RCCC	SAE	DOT/ FMVSS	MSHA	USCG J1942	
												Fuel Oil	Power
EFG6K, G6K	X	X	20023 4SH/4SP	X	EN 856 4SH/4SP	X			100R15		X		X
EFG5K, G5K	X	X	20023 4SH/4SP	X	EN 856 4SH/4SP	X			100R13		X		X
EFG4K, G4K	X	X	20023 4SP	X	EN 856 4SP	X			100R12		X		X
EFG3K, G3K	X		20023 4SP		EN 856 4SP	X			100R12		X		X
M5K		X		X		X							
M4K+	X	X		X		X			100R19		X		X
M4KH	X					X			100R19		X		X
G2XH									100R2 Type AT		X		X
G2AT-HMP									100R2 Type AT		X		X*
M2T®	X	X		X	EN 853 2SN				100R16		X		X
M2T® Plus					EN 853 2SN				100R16		X		
CM2T				X	EN 857 2CS	X			100R16		X		
G2		X	20022 2SN	X	EN 853 2SN	X			100R2 Type AT		X		X
G2H		X		X	EN 853 2SN				100R2 Type AT		X	X	X
J2AT							X				X		
M3K	X	X		X	EN 857	X			100R17		X		X
M3K -12, -16	X	X		X	EN 857	X			100R17, 100R9		X	X	X
G1		X	20022 1SN	X	EN 853 1SN	X			100R1 Type AT		X		X
G1H				X	EN 853 1SN				100R1 Type AT		X	X	
MegaTech™									J1402, J1405	106-74 (-4 to -10)			
TR500									J1402	106-74			
NABT									J844				
C5C								RP305(B)	100R5	106-74 Type All (-4 to -10)			
C5E									J1405	106-74 Type All			
C5D									J1405	106-74 Type All			
C5M	X								J30R2, J1527		X	X	
G3H					EN 854 R3				100R3				
GTH, GTHX					EN 854 R6				100R6				
GMV	X®	X							100R4		X		X
LOL											X		
THERMOPLASTIC TH7, TH7NC*** TH8, TH8NC TH18, TH18NC									100R7 100R8 100R18				
C14									100R14				
REFRIGERANT PolarSeal® AC134a									J51 Type 2, J2064				
POWER STEERING PS188									2050				

\* Except 1/4"

\*\* Except 3/8" & 1/2"

\*\*\* TH7NC meets ANSI A92.2 for vehicle mounted aerial devices (-3 to -8)

@ to be used with a fire sleeve

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## Characteristics of Hose Stock Types

The characteristics shown below are for the normal or usual range of these specific stocks. Stocks can be changed somewhat through different compounding to meet the requirements of specialized applications.

Tube and cover stocks may occasionally be upgraded to take advantage of improved materials and technology.

For detailed information on a specific hose tube or cover stock, check the Chemical Resistance Table and also the specific hose page.

Characteristics							
	Neoprene (Poly- Chloroprene) Type A	Nitrile (Acrylonitrile and Butadiene) Type C	Nylon Type Z	Hypalon* (Chlorosulfonated Polyethylene) Type M	EPDM (Ethylene Propylene Diene) Type P	CPE (Chlorinated Polyethylene) Type J	PTFE (Poly- tetrafluoro- ethylene) Type T
Flame Resistance	Very Good	Poor	Good	Good	Poor	Good	Good
Petroleum Base Oils	Good	Excellent	Good to Excellent	Good	Poor	Very Good	Excellent
Diesel Fuel	Fair to Good	Good to Excellent	Good to Excellent	Good	Poor	Good	Excellent
Resistance to Gas Permeation	Good	Good	Good To Excellent	Good to Excellent	Fair to Good	Good	Good to Excellent
Weather	Good to Excellent	Poor	Excellent	Very Good	Excellent	Good	Excellent
Ozone	Good to Excellent	Poor for Tube; Good For Cover	Excellent	Very Good	Outstanding	Good	Excellent
Heat	Good	Good	Good	Very Good	Excellent	Excellent	Excellent
Low Temperature	Fair to Good	Poor to Fair	Excellent	Poor	Good to Excellent	Good	Excellent
Water-Oil Emulsions	Excellent	Excellent	Good to Excellent	Good	Poor	Excellent	Excellent
Water/Glycol Emulsions	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Diesters	Poor	Poor	Excellent	Fair	Excellent	Very Good	Excellent
Phosphate Esters	Fair (For Cover)	Poor	Excellent	Fair	Very Good	Very Good	Excellent
Phosphate Ester Base Emulsions	Fair (For Cover)	Poor	Excellent	Fair	Very Good	Very Good	Excellent

\*Registered trademark of DuPont.

## Cover Abrasion Resistance

These comparisons are based on test results per ISO 6945 abrasion testing. The table shows the expected number of times of extended cover service life as compared to a standard cover.

	Modified Nitrile (Standard cover)	Nylon Sleeve	XtraTuff™	MegaTuff®
Relative Abrasion Resistance	1	15 X Standard Cover	25 X Standard Cover	300 X Standard Cover



## Gates Hydraulic Hose Selection Guide

Standard Industry Specification	Gates Description	Construction (Reinforcement)	Use	Stock			
				Tube		Cover	
				Name	Type	Name	Type
Gates Proprietary Design	G8K	6-spiral, wire	Extremely High Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils	Neoprene	A	Neoprene	A
ISO 3862 R15 SAE 100R15 EN 856 TYPE 4SP/4SH	EFG6K	4&6-spiral, wire	Extremely High Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	Neoprene	A
	EFG6K-MTF	4&6-spiral, wire	Extremely High Abrasion Resistant, Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
ISO 3862 R13 SAE 100R13 EN 856 TYPE 4SP/4SH	EFG5K	4&6-spiral, wire	Extremely High Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	Neoprene	A
	EFG5K-MTF	4&6-spiral, wire	Extremely High Abrasion Resistant, Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
ISO 3862 R12 SAE 100R12 EN 856 Type 4SP ++	EFG4K	4&6-spiral, wire	Extremely High Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	Neoprene	A
	EFG4K-MTF	4&6-spiral, wire	Extremely High Abrasion Resistant, Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
ISO 3862 R12 SAE 100R12 EN 856 Type 4SP	EFG3K	4-spiral, wire	Extremely High Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	Neoprene	A
	EFG3K-MTF	4-spiral, wire	Extremely High Abrasion Resistant, Pressure & Impulse Cycle Life, High Temperature, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
Gates Proprietary Design	M-XP	2-braid, wire	Extremely High Pressure & Impulse Cycle Life, High Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
Gates Proprietary Design	M6K	2-braid, wire	High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
Gates Proprietary Design	M5K	2-braid, wire	High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
Gates Proprietary Design	M5K-XTF	2-braid, wire	High Abrasion Resistant, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	XtraTuff	Nitrile/PVC
Gates Proprietary Design	M5K-MTF	2-braid, wire	Extremely High Abrasion Resistant, High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
ISO 11237 R19 SAE 100R19	M4K	2-braid, wire	High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
	M4K-XTF	2-braid, wire	High Abrasion Resistant, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	XtraTuff	Nitrile/PVC
	M4K-MTF	2-braid, wire	Extremely High Abrasion Resistant, High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
	M4KH	2-braid, wire	High Temperature, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Chloroprene	CR
	M4KH-MTF	2-braid, wire	Extremely High Abrasion Resistant, High Temperature, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
ISO 11237 R17 SAE 100R17	M3K	1 & 2-braid, wire	High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
	M3K-XTF	1 & 2-braid, wire	High Abrasion Resistant, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	XtraTuff	Nitrile/PVC
	M3K-MTF	1 & 2-braid, wire	Extremely High Abrasion Resistant, High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
	M3KH	1 & 2-braid, wire	High Temperature, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Chloroprene	CR
	M3KH-MTF	1 & 2-braid, wire	Extremely High Abrasion Resistant, High Temperature, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	-
ISO 11237 2SC R16 EN 857 2SC SAE 100R16	M2T®	2-braid, wire	High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
	M2T®-XTF	2-braid, wire	High Abrasion Resistant, Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	XtraTuff	Nitrile/PVC
	M2T®-MTF	2-braid, wire	Extremely High Abrasion Resistant, High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	MegaTuff	UHMWPE
Exceeds ISO 1436 2SC R16 SAE 100R16, EN 857 2SC	CM2TDL	2-braid, wire	High Pressure, Impulse Cycle Life & Flexibility, Tight Bend Radius, Petroleum Oils, Environmental Fluids	Nitrile	C	Nitrile	C2
ISO 1436 2SN R2 SAE 100R2 Type AT EN 853 Type 2SN	G2	2-braid, wire	High Pressure, Petroleum Oils & Environmental Fluids	Nitrile	C	NBR/PVC	C2
	G2L	2-braid, wire	High Pressure, Low Temperature, Petroleum Oils & Environmental Fluids	Nitrile	C	Neoprene	A
	G2H	2-braid, wire	High Pressure, Temperature, Petroleum Oils & Environmental Fluids	Nitrile	C	Hypalon+	M
	G2XH	2-braid, wire	Extremely High Heat, High Pressure, Petroleum Oils & Environmental Fluids	CPE	J	Hypalon+	(BLUE)
IJ100	J2AT	2-braid, wire	Industrial Jack Hose Applications	Nitrile	C	Nitrile	C2
IJ100	J2AT-MTF	2-braid, wire	Industrial Jack Hose Applications	Nitrile	C	MegaTuff	-
ISO 1436 1SN R1 SAE 100R1 Type AT EN 853 Type 1SN	G1	1-braid, wire	Medium Pressure, Petroleum Oils & Environmental Fluids	Nitrile	C	Nitrile	C2
SAE 100R1 Type AT EN 853 Type 1SN	G1H	1-braid, wire	High Temperature, Medium Pressure, Petroleum Oils & Environmental Fluids	Nitrile	C	Hypalon+	M
Gates Proprietary Design	RFS	1-braid, wire	Low Pressure, Powder Fire Suppressant Applications	Nitrile	C	Nitrile (RED)	C2

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## Gates Hydraulic Hose Selection Guide (cont.)

Standard Industry Specification	Gates Description	Construction (Reinforcement)	Use	Stock			
				Tube		Cover	
				Name	Type	Name	Type
SAE J1405 SAE J1402/DOT*** SAE100R2****	MegaTech™ G5TB	1 & 2-braid, wire, textile	Extremely High Heat, Hot Oil Pressure & Return Lines, High Temperature Rotary Oil/Air, Air Compressor, Petroleum Oils	CPE	J	Textile	-
	MegaTech™ II	2-braid, wire, textile	Extremely High Heat, Hot Oil Pressure & Return Lines, High Temperature Rotary Oil/Air, Air Compressor, Petroleum Oils	CPE	J	Textile (Blue)	-
	MegaTech™ 1000	1-braid, wire, textile	Extremely High Heat, Hot Oil Pressure & Return Lines, High Temperature Rotary Oil/Air, Air Compressor, Petroleum Oils, Air Brake	CPE	J	Textile	-
	MegaTech™ 500	1-braid, wire, textile	Extremely High Heat, Hot Oil Pressure & Return Lines, High Temperature Rotary Oil/Air, Air Compressor, Petroleum Oils	CPE	J	Textile	-
	MegaTech™ 250	1-braid, wire, textile	Extremely High Heat, Hot Oil Pressure & Return Lines, High Temperature Rotary Oil/Air, Air Compressor, Petroleum Oils, Transmission Oil Cooler	CPE	J	Textile	-
	MegaTech™ LOC	1-braid, textile	Extremely High Heat, Hot Oil Pressure & Return Lines, High Temperature Rotary Oil/Air, Air Compressor, Petroleum Oils, Transmission Oil Cooler	CPE	J	Textile	-
SAE 100R3 EN 854 TYPE R3	G3H	2-braid, textile	Petrol. Oils, Antifreeze, Water, High Temperature	Nitrile	C	Neoprene	A
SAE 100R6 EN 854 TYPE R6	GTH,	1-braid, textile	Petrol. Oils, Antifreeze, Water, High Temperature	Nitrile	C	Neoprene	A
SAE 100R6 EN 854 TYPE R6	GTHX	1-spiral, textile	Petrol. Oils, Antifreeze, Water, High Temperature	Nitrile	C	Neoprene	A
SAE 100R4	G4H	2-spiral, textile, helical wire	Return & Suction High Temperature	Nitrile	C	Neoprene	A
SAE 100R4	GMV	2-spiral, textile, helical wire	Return & Suction High Temperature	Nitrile	C	Neoprene	A
SAE 30R2 Type 1 & 2, B20 Biodiesel	RLA	1-braid, textile	Return & Suction Low Pressure, Biodiesel up to 125°F	Nitrile	C	Nitrile	C2
Gates Proprietary Design	RLC	3-braid, textile	Return & Low Pressure	Nitrile	C	Nitrile	C2
SAE 30R2, SAE 30R6, SAE 30R7 and B20 Biodiesel	LOC	1-braid, textile	Petrol, Oils, Antifreeze, Water, Air & Biodiesel up to 125°F	Nitrile	C	Textile	-
Gates Proprietary Design	LOL	1-braid, textile	Petrol, Oils, Antifreeze, Water & Air	Nitrile	C	***	A/C2
SAE J1402, DOT FMVSS106-74	TR500	2-braid, wire, textile	Petrol & Syn. Fluids, Air Brakes	Nitrile	C	Textile	—
SAE 100R5, DOT FMVSS106-74, Type AII	*C5C	3-braid, T-W-T	Petr. Oil, Air Brake, Power Steering	*Nitrile	C	Textile	—
SAE J1402, DOT FMVSS106-74, Type AII	C5D	3-braid, T-W-T	Petrol & Syn. Fluids, Air Brakes	CPE	J	Textile	—
SAE J1527, SAE J1942, ISO 7840	C5M	1-braid, wire	Marine Fuel & Oil	Nitrile	C	NBR/PVC	C2
DOTFMVSS106-74, Type AI	C5E	3-braid, T-W-T	Air Brake, Power Steering, Lube	Nitrile	C	Textile	—
PTFE							
SAE 100R14	C14	1-braid, stainless steel	High Temperature, Multi Fluid, Nonconductive	PTFE	—	Stainless Steel	—
SAE 100R14	C14CT	1-braid, stainless steel	High Temperature, Multi Fluid, Conductive	PTFE	—	Stainless Steel	—
Thermoplastic							
SAE 100R7	TH7	1-braid, polyester	Petroleum & Synthetic Fluids	Nylon	Z	Urethane	U
SAE 100R7	TH7NC/TH7NCDL	1-braid, polyester	Non-conductive	Nylon	Z	Urethane	U
SAE 100R7	TH7DL	1-braid, polyester	Petroleum & Synthetic Fluids, Dual Line	Nylon	Z	Urethane	U
SAE 100R7	TH7NCDL	1-braid, polyester	Non-conductive, Dual Line	Nylon	Z	Urethane	U
SAE 100R8	TH8	2-braid, Polyester	Petroleum & Synthetic Fluids	Nylon	Z	Urethane	U
SAE 100R8	TH8NC	2-braid, Polyester	Non-conductive	Nylon	Z	Urethane	U
SAE 100R18	TH18	1-braid, Synthetic Fiber	Petroleum & Synthetic Fluids	Nylon	Z	Polyester	U
SAE 100R18	TH18NC	2-braid, Synthetic Fiber	Non-conductive	Nylon	Z	Polyester	U
Refrigerant							
SAE J51 Type AII Dimensions/ Type D PerformanceJ2064, Type C, Class II Performance	PolarSeal® AC134a	Nylon barrier, 2-spiral, Polyester	Air Conditioning (R12 and R134a)	Chloroprene	A	EPDM	P
SAE J2064 Type C, Class1	PolarSeal® ACC-PSII		Reduced Barrier Construction, Air Conditioning (R12, R13A and R22)	Elastomeric/ Nylon	-	Elastomeric	-

\* -4 and -5 sizes have a Neoprene tube, \*\* Nitrile or Neoprene, \*\*\*MegaTech1000 sizes -4, 6, -8, -10, \*\*\*\*MegaTech II, ++ -16 & -20 EFG4K, † Registered trademark of DuPont





## Gates Hydraulic Hose Selection Guide

Description	Temp. Range (°F)	Dash Size vs. Rated Working Pressure (psi)															
		-2	-3	-4	-5	-6	-8	-10	-12	-16	-20	-24	-32	-40	-48	-56	-64
G8K	-40 +250								8,000	8,000							
EFG6K	-40 +250					6,000	6,000	6,000	6,000	6,000	6,000	6,000					
EFG5K	-40 +250					5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000				
EFG4K	-40 +250					4,000	4,000	4,000	4,000	4,000	4,000						
EFG3K	-40 +250										3,000	3,000	3,000				
M-XP	-40 +212			4,000		4,000	4,000	4,000	4,000								
M2T®	-40 +212			6,000	5,500	5,000	4,300	3,800	3,500	2,500							
CM2TDL	-40 +212			4,800		4,000											
M6K	-40 +212			6,000													
M5K	-40 +212			5,000	5,000	5,000	5,000										
M4K	-40 +212			4,000	4,000	4,000	4,000	4,000	4,000	4,000							
M4KH	-40 +250			4,000	4,000	4,000	4,000	4,000	4,000								
M3K	-40 +212		3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250							
M3KH	-40 +250		3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000							
G2	-40 +212		6,000	5,800		4,800	4,000	3,625	3,100	2,400	1,825	1,300	1,175				
G2H	-40 +275										1,650	1,300	1,175				
G2XH	-40 +300			6,000		5,000	4,250	3,625	3,100	2,500	2,250						
G2L	-70 +212			5,800		4,800	4,000	3,625	3,100	2,400	1,825	1,300					
J2AT	-40 +120			10,000		10,000											
G1	-40 +212		3,625	3,275	3,125	2,600	2,325	1,900	1,525	1,275	925	725	600				
G1H	-40 +275			2,750		2,250	2,000	1,500	1,250	1,000	625	725	600				
G3H	-40 +275			1,250		1,125	1,000	750	565	375							
GTH	-40 +275		500	400	400	400	400	350	300								
GTHX	-40 +275					400											
G4H	-40 +275								300	250	200						
GMV	-40 +275								300	250	200	162	112	68	62	56	56
RLA	-40 +212		250	250	250	250	200	200	200	160							
RLC	-40 +275									200	200	200	200	150	150	150	
LOC	-40 +250			300		300	300	300	300								
LOL	-40 +212		300	300	300	300	300	300	300								
TR500	-40 +250			500		500	500	500	500	500	500						
MegaTech™ II	-40 +300										2,250	1,500	1,300				
MegaTech™ G5TB	-40 +300			3,000		3,000	3,000	1,000	1,000	1,000	1,000	500	500	500	500		
MegaTech™ 3000	-40 +300			3,000		3,000	3,000										
MegaTech™ 1000	-40 +300			1,000		1,000	1,000	1,000	1,000	1,000	1,000						
MegaTech™ 500	-40 +300											500	500	500	500		
MegaTech™ 250	-40 +300			250		250	250	250	250	250	250						
MegaTech™ LOC	-40 +300			300		300	300	300	300	300							
C5C	-40 +212			3,000	3,000	2,250	2,000	1,750	1,500	800	625	500	350	350			
C5D	-40 +300•			1,500	1,500	1,500	1,250	1,250	750	400							
C5M	-40 +212				500	500	500	500	500	500							
C5E	-40 +300•			1,500	1,500	1,500	1,250	1,250	750	400	300						
C14	***			1,500	1,500	1,500	1,000	800	800	800							
C14 (Static)	-62 +72			3,000	3,000	2,500	2,000	1,500	1,200	1,000							
C14CT	***					1,500	1,000										
C14CT (Static)	72					2,500	2,000										
<b>Thermoplastic</b>																	
TH7	-65 +200	2,500	3,000	2,750	2,500	2,250	2,000		1,250	1,000							
TH7NC	-65 +200	2,500	3,000	2,750	2,500	2,250	2,000		1,250	1,000							
TH7DL	-65 +200			2,750	2,500	2,250	2,000										
TH7NCDL	-65 +200			2,750		2,250	2,000										
TH8	-65 +200		5,000	5,000		4,000	3,500		2,250	2,000							
TH8NC	-65 +200			5,000		4,000	3,500										
TH18	-67 +212			3,000	3,000	3,000	3,000	3,000									
TH18NC	-67 +212			3,000	3,000	3,000	3,000	3,000									
<b>Refrigerant</b>																	
PolarSeal® AC134a	-22 +257					500	500	500	500								
PolarSeal® ACC-PSII	-22 +257					350	350	350	350	350							

\*\*\* Dynamic temperatures -65 +400; Static temperatures +73 +450      • All purpose fleet application service — 40°F to +300°F (-40°C to +149°C), air to +250°F

EQUIPMENT

HOSE/CPLG.  
SELECTION

G8K  
COUPLINGS

GLOBALSPIRAL  
COUPLINGS

PCM/PCS  
FERRULES

MEGACRIMP  
COUPLINGS

STAINLESS  
STEEL

POWER  
CRIMP  
COUPLINGS

LOC, GL AND  
GLP  
COUPLINGS

POLARSEAL  
COUPLINGS

POLARSEAL II  
COUPLINGS

C14  
COUPLINGS

PCTS  
THERMO-  
PLASTIC  
COUPLINGS

FIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGS

FIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGS

SURELOK AIR  
BRAKE  
COUPLINGS

ADAPTERS

QUICK  
DISCONNECT  
COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT  
AND PARTS



Powering Progress.

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C7



EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
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C5 AND C5E  
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BALL VALVES

ACCESSORIES

EQUIPMENT  
AND PARTS

## Additional Temperature Limits for Gates Hydraulic Hoses

**Caution:** Water, water/oil emulsions and water/glycol solutions must be kept below the temperatures listed in the table below, relative to line pressures.

### Maximum Temperature Limits for Water, Water/Oil Emulsions and Water/Glycol Solutions

Hose	Pressure Lines	Return Lines
G8K, EFG6K, EFG5K, EFG4K, EFG3K, G2, G2L, M2T®, M6K, M5K, M4K, M3K, RFS, RLA, C5C, C5E, LOC, LOL	+200°F (+93°C)	+180°F (+82°C)
G2H, G1H, MegaTech® Line, G2XH, C5D, G3H, GTH, G4H, GMV, RLC, TR500, M3KH, M4KH	+225°F (+107°C)	+180°F (+82°C)

**Caution:** The fluid manufacturer's recommended maximum operating temperature for any given fluid must not be exceeded. If different than the above listed hose temperatures, the lower limit must take precedence. Actual service life at temperatures approaching the recommended limit will depend on the particular application and the fluid being used in the hose. Intermittent (up to 10 percent of operating time) refers to momentary temperature surges. Detrimental effects increase with increased exposure to elevated temperatures.

**Do NOT** expose hose to maximum temperature and maximum rated working pressure at the same time.





# SAE Recommended Practices for Hydraulic Hose Assemblies

## A summary of SAE J1273 FEB2009

### Scope

This summary provides guidelines for safety, selection, routing, fabrication, installation, replacement, maintenance, and storage of hose and hose assemblies. These are the recommended practices for hydraulic hoses, but are also appropriate for many other hoses and systems.

### Safety

Safety should be a paramount concern whenever working with a hydraulic system. The fluids conveyed are often at high temperatures and extremely high pressures which present unique dangers.

Hydraulic fluid injuries are generally very severe and may come in several forms. Fluid injections wounds may occur any time there is a leak in a hydraulic system. Never check for leaks or damage to a hydraulic system by feel, the best case scenario with a fluid injection wound is months of painful treatment to recover, addition risks include amputation and death. Due to the high temperatures any time a user is exposed to hydraulic fluids severe burns may result, this exposure may be a result of an assembly failure or even oil released during maintenance. Additionally there is a danger of fire or explosion if a hose fails around a hot engine or exhaust manifold, or if a static discharge takes place in a fluid spray.

Unconstrained hoses may whip on pressurization or in the event of failure and are extremely dangerous. Additionally during the release of pressure on the hydraulic system improperly secured booms or other cylinder supported components may drop suddenly.

A sometimes less recognized risk is that of electrical shock. Any equipment used to work around live electrical lines (such as lifts, etc) should be equipped with hydraulic hoses rated as non-conductive. This is because most hydraulic hoses have wire reinforcement and are inherently conductive. Also even with non-conductive hoses are used it is important to recognize that hydraulic fluids may also act as conductors.

### Hose Selection

The Gates STAMED process is the industry accepted standard for hose selection, this process involves determining the following properties:

#### Size

- Internal diameter requirements will affect fluid velocity and outside diameter may also sometime be concern for routing purposes. When in doubt match existing specifications.

### Temperature

- The maximum recommended hose temperature should never be exceeded, either in the fluid conveyed or on the exterior of the hose. Similarly special hoses are available which will maintain flexibility at very low temperatures, always follow manufacturer guidelines.

### Application

- Environmental conditions such as ultraviolet light, salt water, air pollutants, temperature, ozone, chemicals, electricity, abrasion and paint application will all negatively impact hose assembly life
- Static Discharge can become an issue when non-polar liquids or mixtures including non-polar liquids are conveyed in non-conductive hose. A static charge will build and on discharge perforate the hose tube, to avoid this use conductive tube products when conveying non-polar, or mixtures of non-polar, liquids.
- Electrical Conductivity of hydraulic hoses or conveyed fluids is an issue with equipment used to work around electrical lines. If hydraulic equipment is to be used around electrical lines, always use hydraulic hoses rated as non-conductive.
- The cleanliness requirements of a final hose assembly will be determined by the system it is to be applied too. Always follow the equipment manufacturer's recommended cleanliness standard.
- Be sure to select products which will meet any regulatory standards required in the application. Examples of these standards would include: SAE, USCG, EN/DIN, ABS, etc
- Never place hoses in a position where they are pulled on. Hoses are designed to hold pressure and convey fluids, exposing them to axial loads will cause premature failure.
- Any special or unusual applications should always be approved by the hose manufacturer, otherwise additional independent testing may be required.

### Materials

- Permeation, or effusion, is the movement of a substance through the hose tube walls which may degrade the hose tube, cause cover blistering, or other undesired effects, and must be considered especially when conveying compressed gasses.
- Be sure to select a hose which is compatible and approved by the manufacturer for the fluid conveyed. Concentration, pressure, temperature and other factors may impact the compatibility of the hose and fluid.

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
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PCM/PCS FERRULES
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## Pressure

- The maximum working pressure of a hose assembly is the lowest working pressure of any component of the assembly.
- Hose should be sized with a working pressure equal to or above the maximum pressure encountered in a system. High frequency electronic transducers will be necessary to determine the maximum surge, or impulse, pressure in a system.
- If a hose assembly will be exposed to suction, be sure it is rated to hold the maximum suction and pressure in that portion of the system.
- Any time a hose assembly is to be exposed to external pressures, which may exceed the internal hose pressures, be sure to consult the hose manufacturer for recommendations.

## Ends

- Always use manufacture approved couplings for hose assemblies. Be sure to select the appropriate end termination for a system working pressure and other requirements such as vibration resistance.

## Delivery

- Always follow manufacture recommendations for maximum fluid velocity within a hose. Excessive fluid velocity may cause excessive pressure loss, heat generation, hose movement or whipping, system noise, and hammer effects.

## Hose Routing

Proper attention to good hose routing and application practices will ensure reliable function of hose assemblies. The following is a short list of factors to consider when routing hose.

- Vibration: Consider vibration requirements when selecting hose and predicting service life. Clamps, dampers, and other mechanisms may be necessary to reduce vibration.
- Cover protection: Protect the hose cover from abrasion, erosion, snagging, and cutting. Special abrasion-resistant hoses and hose guards are available for additional protection. Route the hose to reduce abrasion from hose rubbing other hose or objects that may abrade it.
- External Physical Abuse: Route hose to avoid tensile (pulling) loads, side loads, flattening, thread damage, kinking, damage to sealing surfaces, abrasion and twisting.
- Swivel Adapters: Swivel-type fittings or adapters do not transfer torque to hose while being tightened. Use these as needed to prevent twisting during installation.
- Live Swivels: If two components in the system are rotating in relation to each other, live swivels may be necessary. These connectors reduce the torque transmitted to the hose.
- Slings and Clamps: Use slings and clamps to support heavy or long hose and to keep it away from moving parts.

Use clamps that prevent hose movement that will cause abrasion. Care shall be taken to prevent the sling clamp from abraiding the hose. Avoid over tightening of slings or clamps.

- MBR: Routing during assembly and use at less than minimum bend radius may reduce hose life. Sharp bending at the hose/fitting juncture may result in leaking, hose rupturing, or the hose assembly blowing apart. A minimum straight length of 1.5 times the hose's outside diameter shall be allowed between the hose fitting and the point at which the bend starts.
- Elbows and Adapters: Use elbows or adapters to relieve hose strain due to routing.
- Lengths: Unnecessarily long hose can increase pressure drop and affect system performance. When pressurized, hose that is too short may pull loose from its fittings, or stress the hose fitting connections, causing premature metallic or seal failures.
- Motion Absorption: Provide adequate hose length to distribute movement and prevent bends smaller than the minimum bend radius.
- Hose Movement and Bending (multi plane bending): Hose allows relative motion between system components. Analyze this motion when designing hose systems. The number of cycles per day may significantly affect hose life. Also avoid multiple planes of motion and twisting motion.
- Hose and machine tolerances: Design hose to allow for changes in length due to machine motion and tolerances.
- Hose length change due to pressure: Design hose to accommodate length changes from changing pressures. Do not cross or clamp together high- and low-pressure hoses. The difference in length changes could wear the hose covers.

## Hose Assembly Fabrication

- Component inspection: Before creating an assembly be sure to inspect all components to be sure they are the correct product, cut correctly, and do not have any visually identifiable defects.
- Couplings (compatibility): Hose fitting components from one manufacturer are not usually compatible with fitting components supplied by another manufacturer. Never mix and match hose and couplings from different manufactures, unless approved by both parties.
- Hose assembly equipment (crimpers): Hoses and fittings from one manufacturer should not generally be assembled with the equipment of another manufacturer.
- Safety Equipment: During fabrication, use proper safety equipment, including eye protection, respiratory protection, and adequate ventilation.



- Reuse of Hose and Fittings: Damaged hose and fittings shall not be used.
  - Never reuse: Field-attachable fittings that have blown or pulled off hose
  - Never reuse: Any part of hose fittings that were permanently crimped or swaged to hose
  - Never reuse: Hose that has been in service
- Cleanliness: Hose assemblies may be contaminated during fabrication. Clean hoses to specified cleanliness levels.
- Temperature: The fabrication of hose assemblies should be performed at an ambient temperature over 0 °C.
- Assembly inspection: After assembly, hose assemblies shall be inspected for visible defects and interior obstructions.
- Marking: Hose assemblies shall be marked in accordance with any relevant standards.

## Hose Assembly Installation and Replacement

- Before installation inspect the hose assembly for:
  - Hose length and routing for compliance with original design
  - Correct style, size, length, and visible nonconformities
  - Coupling sealing surfaces for burrs, nicks, or other damage
- Handling during installation: Handle hose with care during installation. Kinking hose, or bending at less than minimum bend radius may reduce hose life. Avoid sharp bending at the hose/fitting juncture. Before and during installation, hose assemblies should be at a temperature above 0 °C.
- Twist angle and orientation: To avoid twisting, which shortens hose life, the hose layline can be used as a reference. Twisting can also be avoided through the use of two wrenches during the installation of swivel connectors.

Securement and protection: Install necessary restraints and protective devices. Determine that such devices do not create additional stress or wear points.

Assembly Torque: Always follow the manufacturer recommended coupling installation practices, and torque or flats values. Improper installation may result in a leaking connection.

System Checkouts: In hydraulic or other liquid systems, eliminate all air entrapment after completing the installation. Follow manufacturers' instructions to test the system for possible malfunctions and leaks.

## Maintenance Inspection

As part of regular equipment maintenance, hose assemblies should always be checked for deterioration

Frequency: Evaluate factors such as the nature and severity

of the application, past history, and manufacturers' information to establish the frequency of inspections.

Visual Inspection: Only visually inspect for leaks. NEVER attempt to feel a leak, which could cause a fluid injection wound. Look for leaks, weeping, hose cracking, deformation, hardening or softening, rust, noise, smells, and any other defect which indicates a hose assembly may require replacement.

## Hose Storage

Age control: Store hose in a manner that facilitates age control and first-in, first-out usage based on manufacturing date on hose or hose assembly. Any hose or assembly in storage for more than two years should be visually inspected and proof pressure tested.

Storage Conditions will greatly affect hose shelf life, always store hoses in the manufacturers' original packaging. Avoid high temperatures, ozone, solvents and their vapors, corrosive (acid or basic) liquids and fumes, rodents, extremes in humidity, ultraviolet light, insects, radiation, strong, electro-magnetic fields, molds, and fungi.

Basic Testing for Usability:

Flex the hose to the minimum bend radius and compare it with new hose. After flexing, examine the cover and tube for cracks. If any appear, no matter how small, reject the hose.

If the hose is wire reinforced, and the hose is unusually stiff, or a cracking sound is heard during flexing, check for corrosion by cutting away a section of the cover from a sample. Corrosion would be another reason for rejection.

If doubt still persists, contact hose assembler to conduct proof-pressure tests or any other tests needed to verify hose quality.

## References

All of the material presented here may be explored in more detail by obtaining the original standards from the appropriate regulatory agency.

### Society of Automotive Engineers (SAE)

SAE J343 Test and Test Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies  
SAE J514 Hydraulic Tube Fittings  
SAE J517 Hydraulic Hose

### International Standards Organization (ISO)

ISO 3457 Earth moving machinery—Guards and shields—Definitions and specifications  
ISO 2230 Rubber products—Guidelines for storage  
ISO 8331 Rubber and plastics hoses and hose assemblies—Guide to selection, storage, use and maintenance

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LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGSSURELOK AIR  
BRAKE  
COUPLINGS

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DISCONNECT  
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## BALL VALVES

## ACCESSORIES

EQUIPMENT  
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## DOT FMVSS 106-74

## MOTOR VEHICLE SAFETY STANDARD FOR BRAKE HOSES

Gates has received an increasing number of inquiries about the Department of Transportation (DOT) regulation FMVSS-106 regarding air brake hose. The requirements of the standard were issued by the National Highway Traffic Safety Administration and are published in the Federal Register, 49 Code of Federal Regulations, Part 571 MVSS 106 Brake Hoses.

**NOTE:** *Anyone making brake assemblies must be registered with the Department of Transportation.*

**What is FMVSS-106?**

The standard is written with specifics on labeling, performance tests, tests procedures, and registration. It is not a standard for design specifications for motor vehicle brake hose, brake hose assemblies, or brake hose end fittings. The Standard No. 106 will ensure that each user of brake hose will be supplied only the highest quality of hose. DOT will conduct random performance testing in accordance with the test procedures to ensure that the hoses, couplings, and assemblies meet FMVSS 106.

"The purpose of the standard is to reduce deaths and injuries occurring as a result of brake system failure from pressure or vacuum loss due to hose or hose assembly rupture." The regulations will apply to all over-the-road vehicles including trailers and motorcycles. Off-the-road vehicles will not be regulated if they are designed to operate on those other than public roads.

**Basic Provisions of FMVSS-106.**

1. Three types of brake hose are covered (hydraulic, air, and vacuum brake) together with couplings and hose assemblies. At this point, we will only focus on air brake hose and assemblies.
2. Performance level for brake hose is established instead of design specifications.
3. Permanent as well as reusable fittings are permissible with air brake hose. Inside and outside diameters standards for air brake hose intended for use with field attachable couplings have been established. These hoses are identified as Type I and Type II.

**Gates Customer/Assembler with Regard to FMVSS-106.**

1. Test (dimensional and pressure) each assembly or per customer's requirements before it is packaged and delivered to the customer.
2. Two of every 100 air brake hose assemblies produced or per customer's requirements are subjected to hydrostatic pressure testing and tensile strength (destructive) testing.

**Labeling of Air Brake Hose.**

Any customer crimping air brake assemblies must be registered with the National Traffic Safety Administration (NHTSA).

**The National Highway Traffic Safety Administration (NHTSA) requires:**

1. Product DOT CERTIFICATION. (Gates Corporation responsibility. The Gates logo is our DOT registration.)
2. Registration of the assembler. (Customer/Distributor responsibility.)\*
3. Permanent assembly identification. (Customer/Distributor responsibility.) Refer to Gates frosted air brake hose labels below.

\* To begin the registration process, please complete the BRAKE HOSE REGISTRATION application form on the following page. You can mail or fax the completed form to the address and number listed on the form.

**Frosted Air Brake Hose Labels**

**Product Number:** 7484-0023

To assist you in complying with the NHTSA requirement for identifying brake hose assemblies, Gates now offers mylar hose labels.

- Self-adhesive
- 1" wide by 3-3/4" long, with a 1-1/2" by 1" white area on one end for printed information
- Format suitable for typewriters, computer printers or hand writing
- Accepts 9-10 typed characters per row, 4 or 5 on a row
- Wrap-around label resists damage from elements

**Label application procedure:**

1. Print appropriate information on label.
2. Wrap tag around hose assembly, printed end first.
3. Cover printed end with clear mylar tail of label.

Comes in 500 labels per pack.



# Brake Hose Registration Application

"PLEASE TYPE or PRINT CLEARLY" AND SUBMIT BRAKE HOSE APPLICATION TO: JEANETTE GREENFIELD  
AT THE FOLLOWING NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA) ADDRESS:

**Jeanette Greenfield**  
**Office of Vehicle Safety Compliance**  
**400 Seventh Street, S.W. NSA-32**  
**Washington, DC 20590**  
**Phone (202) 366-5317**  
**Fax (202) 366-1024**  
[www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

DATE: \_\_\_\_\_

BRAKE HOSE MANUFACTURER'S ADDRESS

Plant Name: \_\_\_\_\_

Post Office Box No.: \_\_\_\_\_

Street: \_\_\_\_\_

City: \_\_\_\_\_

\* DESIGNATION SYMBOL(s): \_\_\_\_\_

State (Province): \_\_\_\_\_

Country: \_\_\_\_\_

Zip Code: \_\_\_\_\_

Plant Contact Person: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

\*\* (COMPLETE ONLY IF THIS IS A FOREIGN MANUFACTURER) BRAKE HOSE MANUFACTURER'S US AGENT

Agent Name: \_\_\_\_\_

Post Office Box No.: \_\_\_\_\_

Street: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Country: \_\_\_\_\_

Zip Code: \_\_\_\_\_

Agent Contact Person: \_\_\_\_\_

Agent Fax Number: \_\_\_\_\_

Agent Phone Number: \_\_\_\_\_

\* DESIGNATION SYMBOL(s): May consist of block capital letters, numerals or a symbol.

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
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POLARSEAL COUPLINGS
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FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



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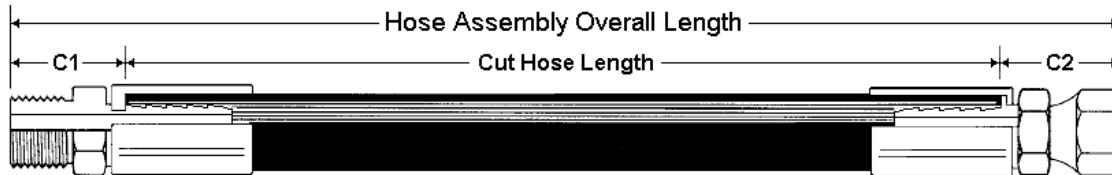
C13



## How to Make Hose Assemblies of Specific Lengths

### Overall Assembly Length – C1 – C2 = Hose Cut Length

The “C” length for each coupling is listed in the catalog, as shown below.



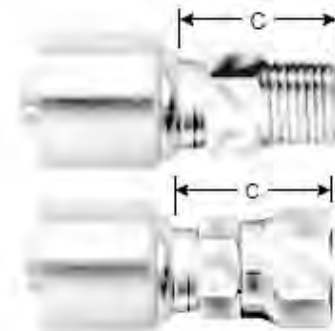
**For the Gates Assembly 6M3K-8FJX-8MP-12.5**

$$12.5'' - 1.38'' - 1.42'' = 9.7'' \text{ (Cut Hose Length)}$$

Descr.	Prod. No.		C		
			m	in	mm
6G-8MP	7100-10095	3	4.0	1.42	36.1

Descr.	Prod. No.		C		
			m	in	mm
6GE-8FJX	7100-10955	3	3.1	1.38	35.1



To meet SAE quality requirements: the final assembly must meet the dimensional requirements shown in the table on the right; the hose cut must be within 5° of perpendicular, on Ø 1" hose this is less than 3/32"; and coupling orientation must be within 2° of specification, orientation which is off as little as one percent can half the life of a hose assembly.

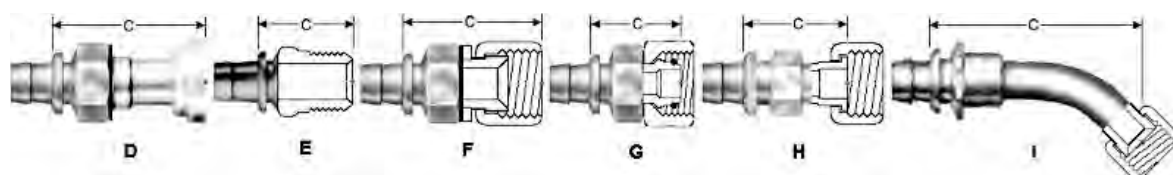
Best practice to achieve these requirements is to begin by dry fitting all components of the assembly, then measure from one end of a coupling to the opposite end of the cut hose, crimp the coupling and measure the change in length. This will give a good estimate of change in hose length due to the crimping process, and allow for compensation. The use of witness marks to verify orientation and coupling insertion depth is also encouraged.

Assembly OAL (in)	Tolerance (in)
≤ 12	±0.125
12 < L ≤ 18	±0.1875
18 < L ≤ 36	±0.25
> 36	+ 1%*

\*to the nearest 0.125 inches

Assembly length tolerance (SAE J517)

When measuring a hose assembly, the point at which the ends of the assembly are measured will depend on the style and construction of the couplings. A summary of measurement points is shown below. More detailed information is available in the tech note “Overall Length of Hose Assemblies.”



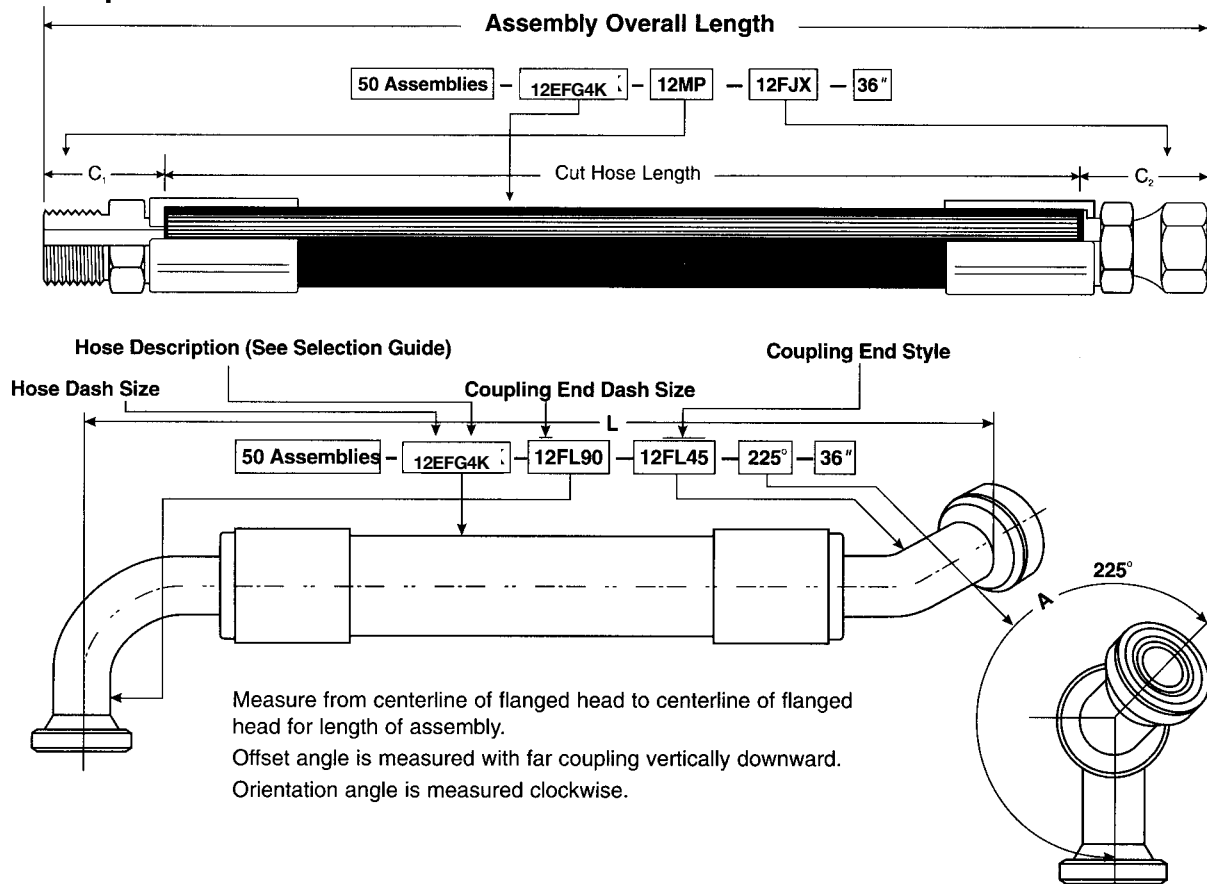
Coupling termination measurement points, from left to right: D) flange, E) straight male, F) US spec (SAE, JIC, NPSM), G) International spec (DIN, BSP, GAZ), H) FFOR and I) bent (elbow) couplings

# How to Describe Gates Hydraulic Hose Assemblies

When you order hydraulic assemblies, be sure the following information is included as shown in the illustrations below:

1. Quantity of assemblies required.
2. Hose catalog description (dash size and type).
3. First coupling dash size and end style.
4. Second coupling dash size and end style.
5. Offset angle or orientation of couplings must be specified if both couplings contain bent tube ends.
6. Assembly overall length.

## Example:



## Caution:

**Rated working pressure** of the application should always determine selection of hose. Used up to the recommended **rated working pressure**, the hose will provide normal service life before replacement is required.

When new, the hose described in this catalog will meet or exceed the **minimum burst pressure** listed in the hose specification tables. However—as with any hose in the industry—after the hose has been impulsed for a length of time, **minimum burst pressure** will decrease from the figure shown in the specification tables.

Temperature ranges specified for specific hoses refer to recommended temperature limits of fluids being conveyed or ambient temperatures. Exceeding these limits will cause degradation of material compounds and reduce hose service life.

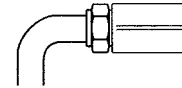
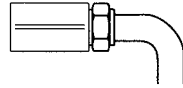
EQUIPMENT
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BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS







## How to Describe Gates Hydraulic Hose Assemblies – con't.



## Coupling A Information

☐ Male ☐ FemaleAngle \_\_\_\_° Drop: ☐S ☐M ☐L ☐XL  
or Drop Length \_\_\_\_ (mm)

## Thread

☐ JIC (37° Flare) \_\_\_\_\_☐ NPTF \_\_\_\_\_☐ O-Ring Boss \_\_\_\_\_☐ Flat-Face O-Ring  
(ORFS) \_\_\_\_\_☐ Code 61 \_\_\_\_\_☐ Code 62 \_\_\_\_\_☐ BSPP \_\_\_\_\_☐ DIN (Light/Heavy) \_\_\_\_\_☐ Other \_\_\_\_\_

## Hose Type

Gates \_\_\_\_\_ I.D. \_\_\_\_\_  
or

SAE 100R \_\_\_\_\_

## Dash Size:

☐2 ☐3 ☐4 ☐5 ☐6  
☐8 ☐10 ☐12 ☐16 ☐20  
☐24 ☐32 ☐40 ☐48 ☐56  
☐64

Temperature \_\_\_\_\_°

## Working Pressure (psi):

☐100 ☐101-250  
☐250-499 ☐500-1000  
☐1001-2999 ☐3000-3999  
☐4000-5999 ☐6000

## Application

☐Return Line ☐Pressure Line  
☐Intake Line ☐High Pressure Line  
☐Special Fluid \_\_\_\_\_

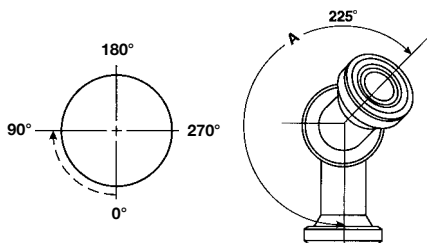
## Coupling B Information

☐ Male ☐ FemaleAngle \_\_\_\_° Drop: ☐S ☐M ☐L ☐XL  
or Drop Length \_\_\_\_ (mm)

## Thread

☐ JIC (37° Flare) \_\_\_\_\_☐ NPTF \_\_\_\_\_☐ O-Ring Boss \_\_\_\_\_☐ Flat-Face O-Ring  
(ORFS) \_\_\_\_\_☐ Code 61 \_\_\_\_\_☐ Code 62 \_\_\_\_\_☐ BSPP \_\_\_\_\_☐ DIN (Light/Heavy) \_\_\_\_\_☐ Other \_\_\_\_\_Overall Length \_\_\_\_\_ ☐In. ☐mm

Coupling Orientation: \_\_\_\_\_°



Measure from centerline of flanged head to centerline of flanged head for length of assembly.

Offset angle is measured with far coupling vertically downward.

Orientation angle is measured clockwise.

## Hose Guards

## LifeGuard™ Sleeve

☐

\_\_\_\_\_

\_\_\_\_\_

## Wire Spring

☐

\_\_\_\_\_

\_\_\_\_\_

## Flat Armor Spring

☐

\_\_\_\_\_

\_\_\_\_\_

## Nylon Sleeve

☐

\_\_\_\_\_

\_\_\_\_\_

## Plastic Coil Sleeve

☐

\_\_\_\_\_

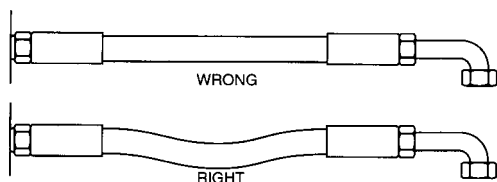
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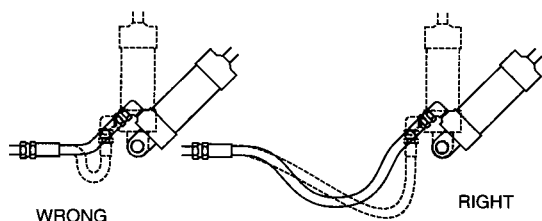
## Hose Assembly Routing Tips

Proper hose installation is essential for satisfactory performance. If hose length is excessive, the appearance of the installation will be unsatisfactory and unnecessary cost of equipment will be involved. If hose assemblies are too short to permit adequate flexing and changes in length due to expansion or contraction, hose service life will be reduced.

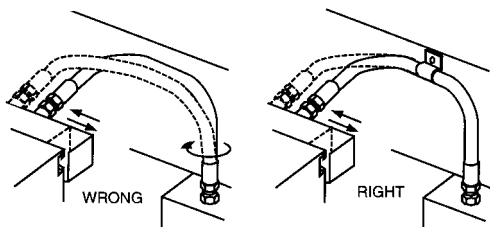
The following diagrams show proper hose installations which provide maximum performance and cost savings. Consider these examples in determining length of a specific assembly.



When hose installation is straight, allow enough slack in hose line to provide for length changes which will occur when pressure is applied.



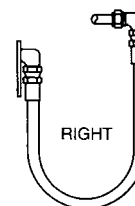
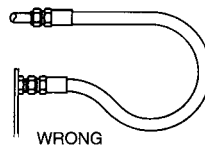
Adequate hose length is necessary to distribute movement on flexing applications and to avoid abrasion.



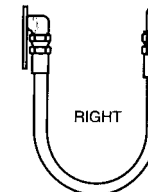
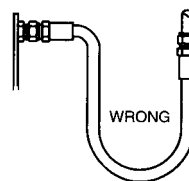
Avoid twisting of hose lines bent in two planes by clamping hose at change of plane.



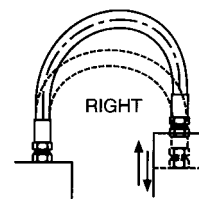
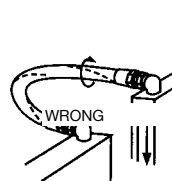
Reduce number of pipe thread joints by using hydraulic adapters instead of pipe fittings.



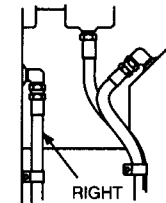
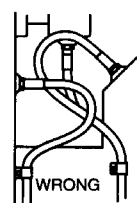
When radius is below the required minimum, use an angle adapter to avoid sharp bends.



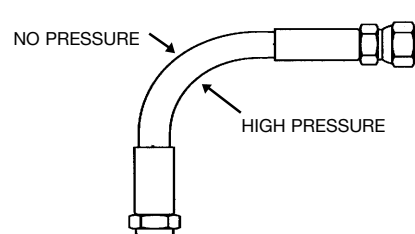
Use proper angle adapters to avoid tight bend in hose.



Prevent twisting and distortion by bending hose in same plane as the motion of the port to which hose is connected.



Route hose directly by using 45° and/or 90° adapter and fittings. Avoid excessive hose length to improve appearance.



Note: To allow for length changes when hose is pressurized, do not clamp at bends so that curves will absorb changes. Do not clamp high and low pressure lines together.

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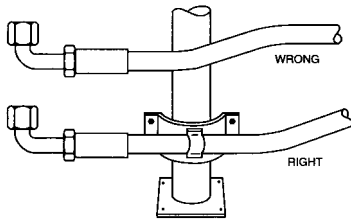


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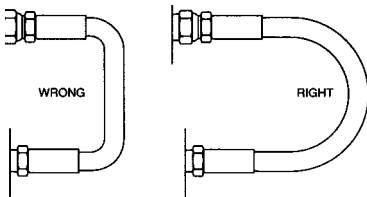
[gates.com/hydraulics](http://gates.com/hydraulics)

C17

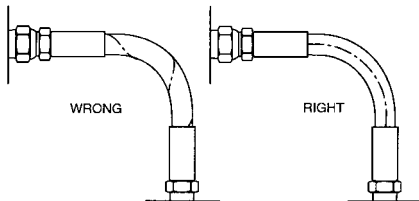
## Hose Assembly Routing Tips – con’t.



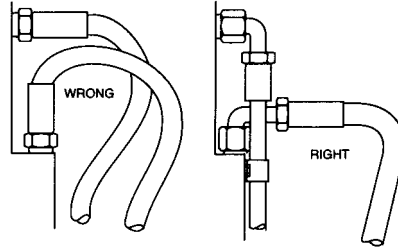
High ambient temperatures shorten hose life, so make sure hose is kept away from hot parts. If this is not possible, insulate hose.



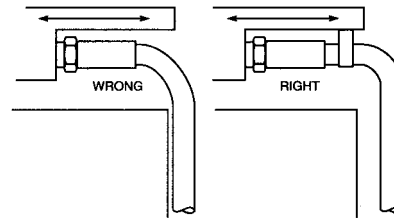
To avoid hose collapse and flow restriction, keep hose bend radius as large as possible. Refer to hose specification tables for minimum bend radius.



When installing hose, make sure it is not twisted. Pressure applied to a twisted hose can result in hose failure or loosening of connections.



Elbows and adapters should be used to relieve strain on the assembly, and to provide neater installations which will be more accessible for inspection and maintenance.



Run hose in the installation so that it avoids rubbing and abrasion. Often, clamps are required to support long hose runs or to keep hose away from moving parts. Use clamps of the correct size. A clamp too large allows hose to move inside the clamp and causes abrasion.

## Hydraulic Flareless Assembly Procedure (per SAE J514 6.1.3 & 6.1.4)

1. Bottom the tube in the coupling, and tighten the nut until the ferrule just grips the tube. With a little experience, the technician can determine this point by feel. If the couplings are bench assembled, the gripping action can be determined by rotating the tube by hand as the nut is drawn down. When the tube can no longer be turned by hand, the ferrule has started to grip the tube.
2. After the ferrule grips the tube, tighten the nut one full turn. This may vary slightly with different tubing materials, but for general practice, it is a good rule for the technician to follow.

## Gates Field Attachable Coupling Installation

1. Cut the hose end square with fine-tooth hacksaw or cut-off saw, the cut must be within 5° of perpendicular.
2. At a minimum be sure to blow out the hose to remove any rubber or metal dust, if higher levels of cleanliness are required utilize the MegaClean system or see the “Hose Assembly Cleanliness” tech note.

3. Be sure to thoroughly oil the stem and the inside of the hose. This is critical to ensure that



the ferrule and stem are easily placed onto the hose, without removing tube or cover material.

4. Secure the ferrule in a vise or adjustable wrench, then using a clockwise motion, thread the hose into the socket until it bottoms out on the inside shoulder of the socket. Once fully inserted, using a counter-clockwise motion, turn the hose back one half turn.



5. With the hose and ferrule secured, thread the stem into the hose and socket in a clockwise motion until the stem hex contacts the ferrule. For production environments, a Gates field attachable coupling machine will speed up this installation.



6. Final clean the assembly to ensure that the desired cleanliness levels are achieved. Follow the same procedure as in step 2.

# Installation of LifeGuard™ Line-of-Sight Sleeving

## 1. Determine LifeGuard sleeve length using the following guidelines:

Sleeve length should exceed the length of free hose (distance between clamps that hold sleeve on) by the following amount:

**LifeGuard Sleeve Length = Free Hose Length (in) x 1.05**

All the decimals are rounded **up** to a full inch

**For example:** 11 ¾" free hose length x 1.05 = 12.34" ~ 13" LifeGuard sleeve length

**Note:** A minimum of ¾" of sleeve must extend beyond the clamps to properly clamp the sleeve. Sleeve cannot extend over the hex part of the fitting.

2. A hot knife is recommended to cut the sleeve as it will seal the ends as it cuts and keep the sleeving from unraveling. Gates also sells a guide table which keeps the sleeving in the correct, slightly open position to help simplify this process. Failure to use the guide table with the hot knife could result in both edges of the sleeve being melted together, which in turn makes hose insertion impossible.

If a hot knife is not available, cut sleeve with sharp scissors, and seal the edges of the sleeve to prevent unraveling and to strengthen it. Use flame torch to seal the inside white lining to the black outer sheath. Make sure sleeve end is spread apart before sealing ends with flame.

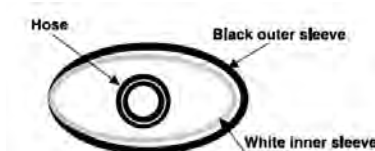


3. Before inserting the stems and crimping, verify whether the LifeGuard sleeve and collars can be installed after the couplings are crimped or must be installed prior to crimping the couplings.

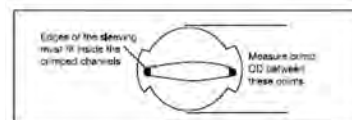
a. If the collars will fit over at least one of the couplings and also clear the backup hex nut, then the sleeve and collars can be assembled after the hose assembly is completely crimped.

b. If the collars will not freely clear the termination and backup hex of at least one of the stems, then the sleeve and collars must be slid over the hose before crimping. In certain cases it may be desirable to do this anyway, even if the collars will fit. (An example would be when an assembly that uses long drop 90° couplings at both ends.)

4. The LifeGuard line-of-sight sleeve consists of two sleeves woven one inside the other. When inserting the hose, it is critical that the hose is positioned inside the white inner sleeve. Be careful not to snag the inside lining of the sleeve while inserting hose. If hose does not glide in easily, use hose insertion tool.



6. The aluminum collars must be free of burrs, sharp edges, gash marks and surface cracks/indentations. Embossing of these collars is permissible. The crimp OD for the aluminum collars depends on the hose type and ferrule used. Look up the proper crimp OD in eCrimp (<http://www.gates.com/ecrimp>). The collars are listed numerically by product number. Match the collar product number to the hose type and ferrule product number being used. The collar crimp OD is listed in the table, directly to the right of the ferrule product number for each combination.



**Note:** Use PC707 LifeGuard die plate when making assemblies.

**Note:** The crimp OD tolerance for all aluminum collars used to hold LifeGuard line-of-sight nylon sleeving on hose assemblies is ±.005".

**WARNING:** Extra care must be taken when aligning the back-up hex of the coupling with the crimp dies during crimping of the LifeGuard assembly. Improperly positioned back-up hex can damage the die face.

8. Install proper die sets by first positioning the die plate in such manner as to let the notches rest against the back locator pins on the PC707 crimper. Then install the recommended die set taking extra care that the two die pins fit inside the two holes in the die plate.

9. Dial in crimp setting and crimp sleeve onto one end of the hose assembly.

10. To take the slack out of the sleeve, roll or twist the hose. This will take-up the excess in the sleeve, and help with crimping the other end of the assembly.

11. Pull back any remaining excess of the sleeve. Hold it in place and crimp the other end of the assembly.

12. LifeGuard crimp collars require specialized dies for their installation, since the final form of the collar is very different from a standard crimp. When crimping LifeGuard with the GC32-XD or FP120 crimper, use eCrimp to determine the appropriate die and setting based on the hose and coupling to which it is to be attached. Once the die has been selected, care must be taken to ensure the die fingers are installed correctly. When using the LifeGuard die set, the fingers are properly aligned when the colored stripe forms a straight line across the die.



CG32-XD



FP-120

13. Your LifeGuard assembly is now ready to go.



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## EQUIPMENT

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COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
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## Coupling Selection

## End Configuration Selection

It is important to keep in mind that the hose assembly (coupling and hose) is only one component of the system. In choosing the correct end terminations for the couplings attached to the hose, formal design standards and sound engineering judgement should be used.

In the absence of formal design standards, consider the following factors in choosing the proper end termination:

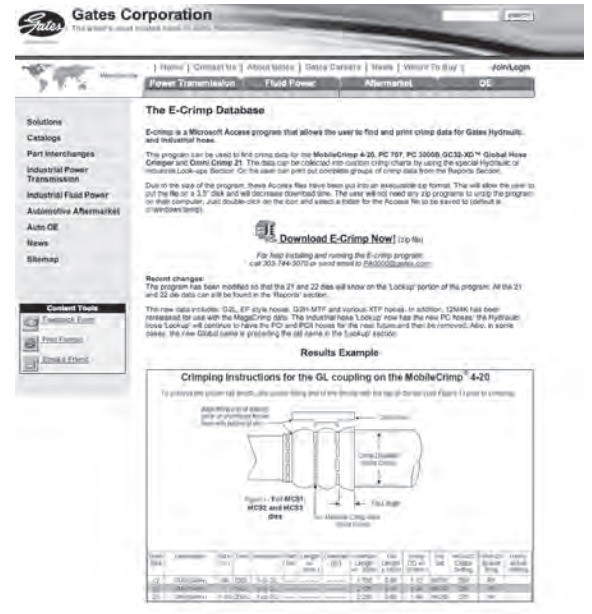
- Pressure
- Impulse frequency, amplitude and wave form
- Vibration
- Corrosion
- Dissimilar metals (galvanic corrosion)
- Maintenance procedures and frequency
- Installation reliability
- Connection's risk in the system
- Exposure to the elements
- Operator's and/or bystander's exposure to the connection
- Installation, operation and service activities and practices that affect safety

If there are any questions as to what end fittings should be used, Gates recommends that you consult your field sales representative or the Gates Hose and Connector Product Application Group for assistance.

## Stem and Ferrule Selection

Choosing the proper stem and ferrule depends on the specific hose and termination to be used in the assembly. Check the Gates Crimp Data Manual to ensure proper hose assembly components and crimp specifications.

Gates also offers eCrimp™, an online crimp database that can be accessed at [www.gates.com/ecrimp](http://www.gates.com/ecrimp).

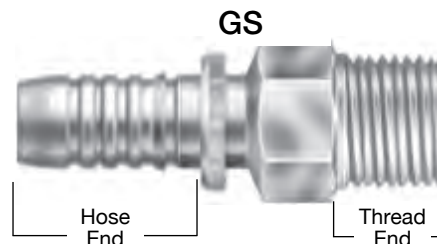


After determining the proper coupling components, refer to the Table of Contents in this catalog to find the proper coupling section. The ferrules are at the end of each coupling section.

## Stem Selection

Different hoses may require different coupling styles. To make your selection, determine the correct stem to be used. There are two functional ends of the stem to consider:

1. the hose end for hose attachment;
2. the thread end for port attachment.



References to the coupling type(s) recommended for a specific hose are listed on the individual hose data pages; for example, EFG5K hose specifies GS couplings.

The thread end of a coupling (or adapter) can be identified by comparing the coupling being replaced or by measuring the port or thread end to which it is to be attached.

See thread end identification nomenclature.



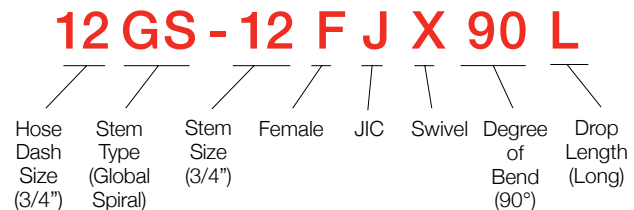


## Coupling Selection – con't.

### Coupling and Adapter End Style Nomenclature

Gates couplings feature a meaningful description by combining end-style codes shown below that make thread end identification fast and easy. Always refer to Gates Crimp Data Manual when selecting hose and coupling combinations.

In the following example, the Gates description 12GS-12FJX90L identifies a GlobalSpiral™ Female JIC Swivel 90° Bend Long Drop coupling for -12 (3/4") hose size and -12 (3/4") stem size.



Code	Description
A	Adapterless
AB	Air Brake
API	API Unions
B	Brass
BBDS	British Bonded Seal
BJ	Banjo
BKHD	Bulkhead
BL	Block
BS	Bite Sleeve
BSPP	British Standard Pipe Parallel
BSPT	British Standard Pipe Tapered
C	Caterpillar Flang
CC	Clamping Collar
DH	DIN Heavy
DL	DIN Light
F	Female
FABX	Female Air Brake Swivel
FBFFOR	Female British Flat-Face O-Ring
FBO	Female Braze-on Stem
FF	Flat-Face
FFGX	Female French GAZ Swivel (Female Kobelco)
FFN	Female Flareless Nut
FOR	Flat-Face O-Ring
FFS	Female Flareless Sleeve
FG	Female Grease Thread
FKX	Female Komatsu Style Swivel
FL	Code 61 O-Ring Flange
FLC	Caterpillar Style O-Ring Flange
FLH	Code 62 O-Ring Flange Heavy
FLOS	Flange O-Ring Special
FT	Female SAE Tube
HLE	Hose Length Extender
HLEC	Hose Length Extender (Caterpillar)
HM	Hose Mender
HU	Hammer Union
I	Inverted Flare
J	JIC (37° Flare)
JIS	Japanese Industrial Standard
K	Komatsu Style (Japanese 30° Seat)

Code	Description
LH	Long Hex
LN	Lock Nut
M	Male
MB	Male Boss
MBAX	Male Boss Adapterless Swivel
MBDS	Metric Bonded Seal
MFA	Male Flareless Assembly (Ermeto)
MFG	Male French GAZ
MKB	Metric Kobelco
MM	Metric Male
MN	Metric Nut
MPG	Male Special Grease Fitting
MPLN	Male Pipe Long Nose
MLSP	Metric Light Stand Pipe
MSP	Metric Stand Pipe
NASP	North American Stand Pipe
OR	O-Ring
P	Pipe Thread (NPTF or NPSM)
PL	Press Lok®
PT	Port
PWX	Pressure Washer Swivel
QLD	Quick-Lok® Direct
QHD	Quick-Lok® High
R	Field Attachable
S	SAE (45° Flare)
SP	Special
SS	Stainless Steel
TS	Tube Sleeve
TSN	Tube Sleeve Nut
X	Swivel
Z	Parker Triple Thread
22	22-1/2° Bent Tube Angle
30	30° Bent Tube Angle
45	45° Bent Tube Angle
60	60° Bent Tube Angle
67	67-1/2° Bent Tube Angle
90	90° Bent Tube Angle
110	110° Bent Tube Angle
135	135° Bent Tube Angle

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGSSURELOK AIR  
BRAKE  
COUPLINGS

## ADAPTERS

QUICK  
DISCONNECT  
COUPLERS

## LIVE SWIVEL

## BALL VALVES

## ACCESSORIES

EQUIPMENT  
AND PARTS

## Coupling Selection – continued

### Thread End Dash Sizes, Descriptions and Dimensions

#### Coupling Dash Size and End Style

Coupling dash size is a shorthand method of denoting the size of a particular end fitting (see Thread Chart).

EXAMPLE: 12MP denotes a 3/4" male pipe thread end fitting. The corresponding thread description for a 3/4" pipe thread is 3/4 -14 NPTF solid male.

EXAMPLE: 12FJX denotes a 3/4" female JIC swivel (37° seat) end fitting. The corresponding thread description for a 3/4" JIC thread is 1-1/16 – 12 JIC 37° flare swivel female.

EXAMPLE: 12FL denotes a 3/4" SAE standard pressure (Code 61) flange fitting. This is the standard fitting description for a 3/4" SAE standard pressure flange.

#### Termination Drop Lengths

Bent tube couplings carry a suffix designation that specifies the degree of bend and the length of the drop.

For example, a **12FJX90S** is a female JIC swivel with a 90 degree bend. The "S" designates an SAE J516 short drop length. The short and long drops are specified in SAE J516. Flat-face and metric couplings meet ISO-12151-1 drop length specifications. Medium drops are not specified and can vary from manufacturer to manufacturer.

**S** – Short Drop

**M** – Medium Drop

**L** – Long Drop

**XL** – Extra Long Drop

Special, non-industry standard drop lengths are designated with a numerical suffix instead of the S, M, L code. For example, a **12FJX90-075** designates a 75mm drop.

#### SAE J516 Drop Length Specifications

JIC 37°, Code 61, Code 62

Hose Size	Short Drop (mm)	Long Drop (mm)
-4	17.3	45.7
-6	21.6	55.4
-8	27.7	61.7
-10	31.2	65.3
-12	46.2	94.7
-16	54.4	110.0

#### ISO Drop Length Specifications

ISO 12151-S JIC and ISO 12151-3 Code 61 & Code 62

Hose Size	Short Drop (mm)	Medium Drop (mm)	Long Drop (mm)
-4	21	32	46
-6	23	38	54
-8	29	41	64
-10	32	47	80
-12	48	58	86
-16	56	71	114
-20	64	78	129
-24	69	76	129

#### Thread End Catalog Descriptions

Gates coupling ends shown on the following pages are accepted as industry standards. See detailed catalog listings for availability of specific hose/coupling combinations, detailed descriptions, thread end configurations such as swivels, bent tubes and special ends.





# Sealing Types for Hydraulic Couplings

When identifying hydraulic couplings, it is important to identify the type of seal made. There are three major types of coupling interfaces used in hydraulics today: Thread Interface, O-Rings and Mated Angle or Mechanical Joint. These three interfaces have developed differently in different parts of the world. In the following pages, country of origin and the coupling styles found in each country are identified. Brief descriptions and dimensional data help identify your particular coupling style.

## Identifying couplings is as easy as 1-2-3!

### 1. Determine Seal Type.

- Thread Interference
- O-Ring
- Mated Angle or Mechanical Joint
- Mated Angle with O-Ring

**Thread Interference.** A characteristic of this thread is that the male is thinner at the front than it is at the back. As the male is threaded into the female, the edges of the thread distort by flattening out. This distortion creates the seal.

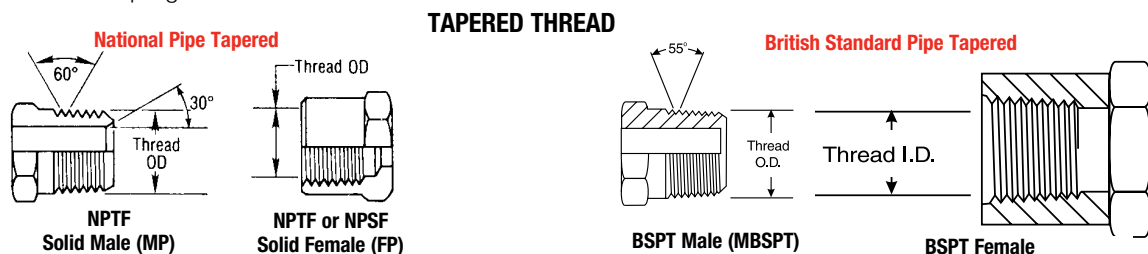
**O-Ring.** The O-ring on the male being compressed against the corresponding female makes this seal. This type of seal is excellent for high-pressure applications. The threads pull the fitting against the port, trap the O-ring and flatten it to form a tight seal.

**Mated Angle or Mechanical Joint.** Different angles are used to create the seal. The seal takes place where the two angles meet and are wedged into one another. These can be cut with the angle either being inverted or standard. Standard seat couplings have the nose angle of the male on the outer surface of the coupling. Inverted seat couplings contain the nose angle of the male on the inside bore of the coupling.

**Mated Angle with O-Ring.** These couplings are a hybrid, which use both the mated angle and the O-ring to make the seal.

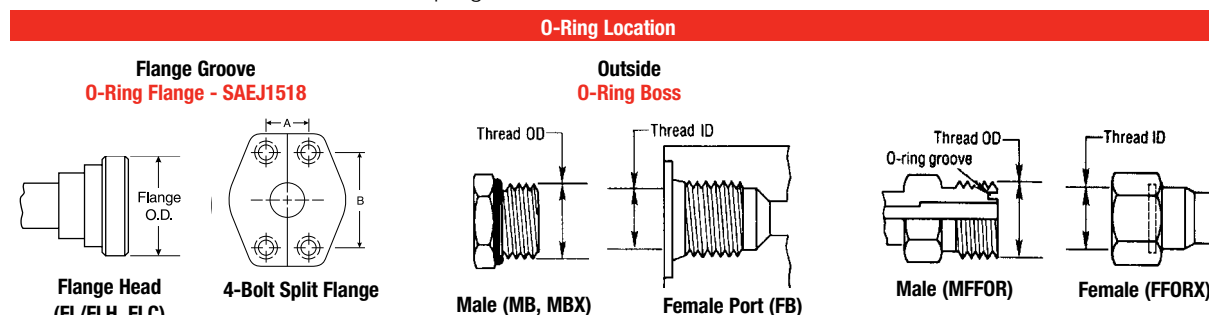
### 2. Visual Identification.

**Thread Interference.** These are the easiest because the only factor here is whether the termination is male or female. Couplings that use this seal are:



**O-Ring.** Two determinations are needed:

- O-Ring Location – Flange Groove, Outside, or on the Nose Seat
- Coupling Termination – Male or Female



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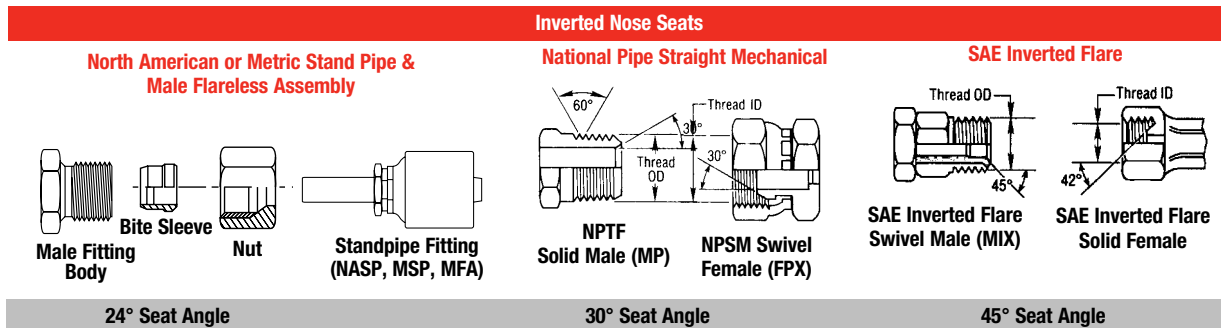
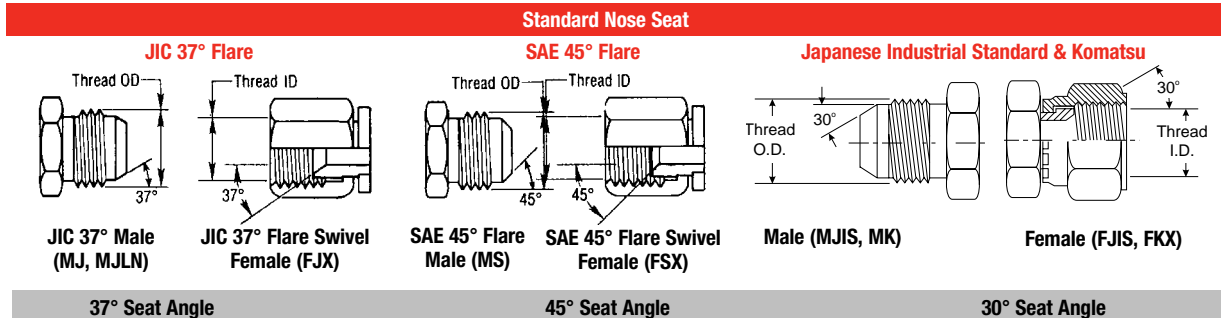
EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
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ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS

## Sealing Types for Hydraulic Couplings – Continued

### 2. Visual Identification - Continued

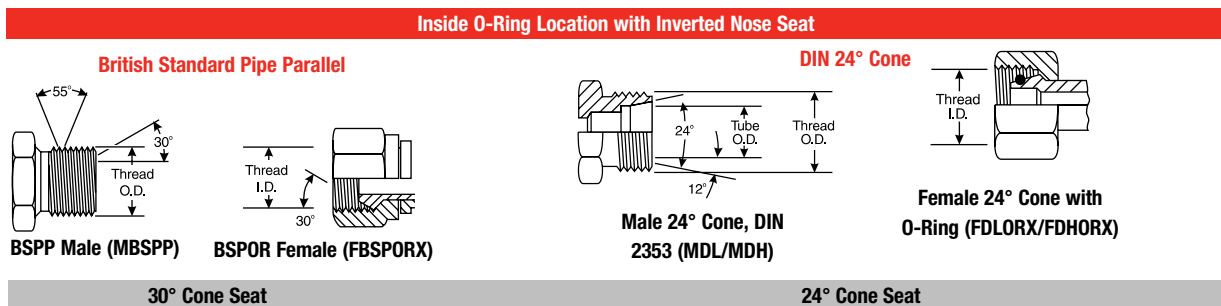
**Mated Angle or Mechanical Joint.** Determine:

- Nose Seat – Standard or Inverted
- Seat Angle (See Measuring Seat Angles)
- Coupling Termination



**Mated Angle with O-Ring.** Determine:

- O-Ring Location
- Nose Seat
- Seat Angle (See Measuring Seat Angles)
- Coupling Termination



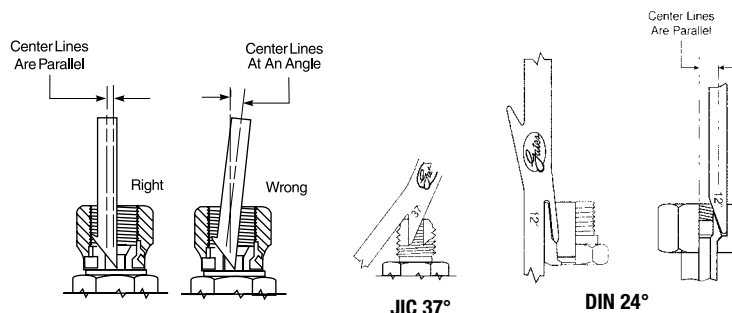
For a wall poster representation of this information, order literature form number 35040.

## Sealing Types for Hydraulic Couplings – Continued

### Measuring Seat Angles

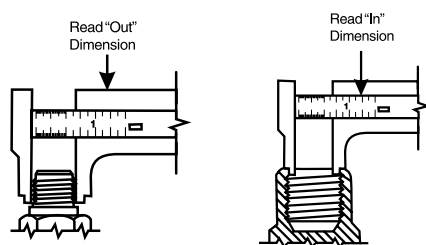
Using the seat gauge, determine the angle of the seat, as illustrated. When the centerline of the seat gauge extends parallel with the projected longitudinal axis of the coupling, then the angles of the gauge and seat match.

NOTE: Thread binding will occur when different thread configurations are used. DO NOT mix thread configurations.

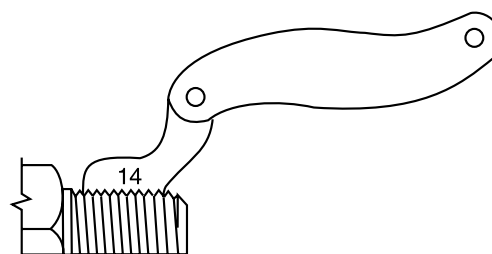


### 3. Measure Threads.

Because some couplings have very similar characteristics, the only way to determine the correct identification is by measuring the thread. Follow the procedure below when measuring coupling threads:



With the caliper measure the thread diameter of the largest point. (Outside diameter (O.D.) of male threads—Inside Diameter (I.D.) of female threads.)



Using the thread gauge, determine the number of threads per inch. Comparison of gauge and coupling threads against a lighted background will ensure an accurate reading.

Match the measurements taken above against those in the following tables that appear to be similar to the coupling under consideration.

*Gates provides many useful tools to assist you in identifying the right coupling!*

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
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SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGSSURELOK AIR  
BRAKE  
COUPLINGS

ADAPTERS

QUICK  
DISCONNECT  
COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT  
AND PARTS

## Coupling/Thread Identification Tools

## Hydraulic Coupling Templates

**Industrial Advertising Number:** 39549

These templates provide a fast and easy way to measure North American threads, International threads, flange ends, seat angles (37° and 45°) and hose I.D.



## Stainless Steel Digital Caliper

**Product Number:** 7369-0322

Caliper features an easy-to-read LCD screen clearly displaying the crimp diameter digitally. Capable of four-way measurement: inside, outside, depth and step. Constructed of hardened stainless steel and comes in a handy, protective carrying case.



## International Thread Identification Kit

**Product Number:** 7369-0319

A sturdy, attractive carrying case suitable for counter display and field sales calls. Contains male metric and BSP plugs for identifying thread size, pocket thread I.D. kit, and flow chart with step-by-step instructions. For female thread identification, simply couple with the mating male.



## Pocket Thread Identification Kit

**Product Number:** 7369-4318

To properly identify the correct replacement couplings, the measuring tools shown here should be used.

**Contents:** Calipers  
Seat Gauges (English)  
Seat Gauges (Metric)  
Thread Gauges  
Thread I.D. Guide.



EQUIPMENT	HOSE/CPLG. SELECTION	G8K COUPLINGS	GLOBALSPIRAL COUPLINGS	PCM/PCS FERRULES	MEGACRIMP COUPLINGS	STAINLESS STEEL	POWER CRIMP COUPLINGS	LOC, GL AND GLP COUPLINGS	POLARSEAL COUPLINGS	POLARSEAL II COUPLINGS	C14 COUPLINGS	PCTS THERMO-PLASTIC COUPLINGS	FIELD ATTACHABLE G1 AND G2 COUPLINGS	FIELD ATTACHABLE C5 AND C5E COUPLINGS	SURELOK AIR BRAKE COUPLINGS	ADAPTERS	QUICK DISCONNECT COUPLERS	LIVE SWIVEL	BALL VALVES	ACCESSORIES	EQUIPMENT AND PARTS
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# Thread Chart

For All Hose I.D.'s Except C5 Series, C14 and AC134a.

DASH SIZE	2	3	4	5	6	7	8	10	12	14	16	20	24	32	40	48
NPTF Pipe Thread	1/2-27		1/2-18		3/4-18		1/2-14		3/4-14		1-1 1/2		1 1/4-1 1/2		1 1/2-1 1/2	2-1 1/2
NPSM Swivel Thread		1/2-27		1/2-18		3/4-18		1/2-14		3/4-14		1-1 1/2		1 1/4-1 1/2		2-1 1/2
JIC 37° Flare Thread		3/4-24		7/16-20		1/2-20		9/16-18		3/4-16		7/8-14		1 1/16-12		1 5/8-12
SAE 45° Flare Thread		3/16-24		3/8-24		7/16-20		1/2-20		9/16-18		1 1/16-16		3/4-16		7/8-14
SAE O-Ring Thread		3/16-24		3/8-24		7/16-20		1/2-20		9/16-18		3/4-16		7/8-14		1 1/16-12
Flat-Face Thread				9/16-18				1 1/16-16		13/16-16		1-14		1 9/16-12		1 7/8-12
Inverted Flare Thread		5/16-28		3/8-24		7/16-24		1/2-20		5/8-18		1 1/16-18		3/4-18		7/8-18
Compression Thread		5/16-24		3/8-24		7/16-24		1/2-24		9/16-24		5/8-24		1 1/16-20		1 3/8-18
Code 61 Flange Head O.D.								1.19		1.335		1.50		1.75		2.00
Code 62 Flange Head O.D.								1.25		1.62		1.88		2.12		2.50
BSPF Thread		1/2-28		1/4-19		3/8-19		1/2-14		5/8-14		3/4-14		1-11		1 1/4-11
BSPT Thread		1/2-28		1/4-19		3/8-19		1/2-14		5/8-14		3/4-14		1-11		1 1/4-11
Japanese Pipe Tapered Thread		1/2-28		1/4-19		3/8-19		1/2-14		5/8-14		3/4-14		1-11		1 1/4-11
Japanese Flare Thread		1/2-28		1/4-19		3/8-19		1/2-14		5/8-14		3/4-14		1-11		1 1/4-11
Copper/Nylon Air Brake Thread				7/16-24		1 7/8-24		1 1/16-20		1 3/8-18		1-18				
Metric (mm)	6	8	10	12	13	14	15	16	17	18	20	21	22	24	25	27
MDL	M12X1.5	M14X1.5	M16X1.5	M18X1.5		M20X1.5	M22X1.5			M26X1.5		M30X2.0		M36X2.0		M45X2.0
MDH		M16X1.5	M18X1.5	M20X1.5		M22X1.5		M24X1.5			M30X2.0		M36X2.0		M42X1.5	
Komatsu	M18X1.5	M22X1.5	M24X1.5	M30X1.5			M33X1.5				M36X1.5			M42X1.5		
GAZ*					M20X1.5				M24X1.5			M30X1.5			M36X1.5	
															M45X1.5	
																M52X1.5

\* GAZ sizes are for catalog reference purposes, actual tube sizes are 13,25, 16,75, 21,25, 26,75, 33,5, 42,25



EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
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LIVE SWIVEL
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EQUIPMENT AND PARTS

## Coupling Identification

There are five coupling systems generally used for hydraulic connections today. They are identified geographically or by country as:

**North American**  
**British**  
**French**  
**German**  
**Japanese**

This section lists the origin and coupling style found in each country. Brief descriptions and dimensional data follows each coupling style.

## North American Thread Types

### Iron Pipe Thread Abbreviations

**N** National

**S** Straight Thread

**F** Fuels

**P** Pipe

**T** Tapered Thread

**M** Mechanical Joint

### NPTF

National Pipe Tapered thread for Fuel is a dryseal thread. It is used for both male and female ends.

The NPTF male will mate with the NPTF, NPSF, or NPSM female.

The NPTF male has tapered threads and a 30° inverted seat. The NPTF female has tapered threads and no seat. The seal takes place by deformation of the threads. The NPSM female has straight threads and a 30° inverted seat. The seal takes place on the 30° seat.

The NPTF connector is similar to, but not interchangeable with, the BSPT connector. The thread pitch is different in most sizes. Also, the thread angle is 60° instead of the 55° angle found on BSPT threads.

### NPSF

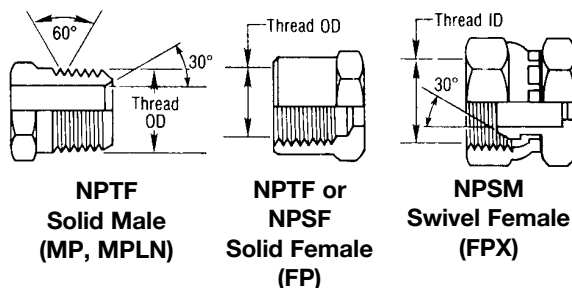
National Pipe Straight thread for Fuels is sometimes used for female ends and properly mates with the NPTF male end. However, SAE recommends the NPTF thread in preference to the NPSF for female ends.

### NPSM

National Pipe Straight thread for Mechanical Joint is used on the female swivel nut of iron pipe swivel adapters. The leak-resistant joint is not made by the sealing fit of threads, but by a tapered seat in the coupling end.

Dash Size	Nominal Size (In.)	No. Threads per Inch	Female Thread I.D. (In.)	Male Thread O.D. (In.)	Max. Torque Recommendation for Dry NPTF* (Ft. Lbs.)
-2	1/8	27	23/64	13/32	20
-4	1/4	18	15/32	35/64	25
-6	3/8	18	19/32	43/64	35
-8	1/2	14	3/4	27/32	45
-12	3/4	14	61/64	1-1/16	55
-16	1	11-1/2	1-13/64	1-5/16	65
-20	1-1/4	11-1/2	1-17/32	1-43/64	80
-24	1-1/2	11-1/2	1-25/32	1-29/32	95
-32	2	11-1/2	2-1/4	2-3/8	120

### NPT Pipe Thread



#### \*NOTES:

1. Torque values can vary considerably depending on thread condition. Use only enough torque to achieve adequate sealing.
2. With female straight or parallel pipe threads (NPSM), maximum values are 50 percent of those listed in the table.
3. If thread sealant is used, maximum values shown should be decreased by 25 percent.



# Coupling Identification

## North American Thread Types (con't.)

### \*JIC (37° Flare)

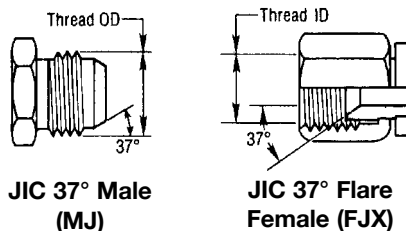
The Society of Automotive Engineers (SAE) specifies a 37° angle flare or seat be used with high pressure hydraulic tubing. These are commonly called JIC couplings.

The JIC 37° flare male will mate with a JIC female only.\* The JIC male has straight threads and a 37° flare seat. The JIC female has straight threads and a 37° flare seat. The seal is made on the 37° flare seat.

Some sizes have the same threads as the SAE 45° flare. Carefully measure the seat angle to differentiate.

**\*Note:** Some C5, C5E and Lock-On couplings may have dual machined seats (both 37° and 45° seats).

#### JIC 37° Flare



Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread	Steel Torque Recommendation (Ft. Lbs.)	
			I.D. (In.)	O.D. (In.)	Min.	Max.
-2	1/8	5/16 - 24	17/64	5/16	—	—
-3	3/16	3/8 - 24	21/64	3/8	—	—
-4	1/4	7/16 - 20	25/64	7/16	10	11
-5	5/16	1/2 - 20	29/64	1/2	13	15
-6	3/8	9/16 - 18	1/2	9/16	17	19
-8	1/2	3/4 - 16	11/16	3/4	34	38
-10	5/8	7/8 - 14	13/16	7/8	50	56
-12	3/4	1-1/16 - 12	31/32	1-1/16	70	78
-14	7/8	1-3/16 - 12	1-7/64	1-3/16	—	—
-16	1	1-5/16 - 12	1-15/64	1-5/16	94	104
-20	1-1/4	1-5/8 - 12	1-35/64	1-5/8	124	138
-24	1-1/2	1-7/8 - 12	1-51/64	1-7/8	156	173
-32	2	2-1/2 - 12	2-27/64	2-1/2	219	243

### \*SAE (45° Flare)

A term usually applied to fittings having a 45° angle flare or seat. Soft copper tubing is generally used in such applications as it is easily flared to the 45° angle. These are for low-pressure applications—such as for fuel lines and refrigerant lines.

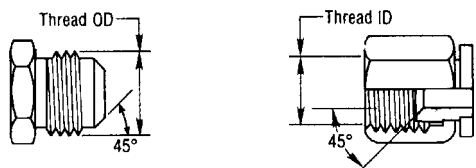
The SAE 45° flare male will mate with an SAE 45° flare female only or a dual seat JIC/SAE 45°.\*

The SAE male has straight threads and a 45° flare seat. The SAE female has straight threads and a 45° flare seat. The seal is made on the 45° flare seat.

Some sizes have the same threads as the SAE 37° flare. Carefully measure the seat angle to differentiate.

**\*Note:** Some C5, C5E and Lock-On couplings may have dual machined seats (both 37° and 45° seats).

#### SAE 45° Flare



SAE 45° Flare Male (MS)

SAE 45° Flare Swivel Female (FSX)

Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread	Steel Torque Recommendation (Ft. Lbs.)	
			I.D. (In.)	O.D. (In.)	Min.	Max.
-2	1/8	5/16 - 24	17/64	5/16	—	—
-3	3/16	3/8 - 24	21/64	3/8	—	—
-4	1/4	7/16 - 20	25/64	7/16	10	11
-5	5/16	1/2 - 20	29/64	1/2	13	15
-6	3/8	5/8 - 18	9/16	5/8	17	19
-7	7/16	11/16 - 16	5/8	11/16	—	—
-8	1/2	3/4 - 16	11/16	3/4	34	38
-10	5/8	7/8 - 14	13/16	7/8	50	56
-12	3/4	1-1/16 - 14	63/64	1-1/16	70	78

#### Special Power Steering Thread End

Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread
			I.D. (In.)	O.D. (In.)
-6	3/8	11/16 - 18	5/8	11/16

EQUIPMENT

HOSE/CPLG. SELECTION

G8K COUPLINGS

GLOBALSPIRAL COUPLINGS

PCM/PCS FERRULES

MEGACRIMP COUPLINGS

STAINLESS STEEL

POWER CRIMP COUPLINGS

LOC, GL AND GLP COUPLINGS

POLARSEAL COUPLINGS

POLARSEAL II COUPLINGS

C14 COUPLINGS

PCTS THERMO-PLASTIC COUPLINGS

FIELD ATTACHABLE G1 AND G2 COUPLINGS

FIELD ATTACHABLE C5 AND C5E COUPLINGS

SURELOK AIR BRAKE COUPLINGS

ADAPTERS

QUICK DISCONNECT COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT AND PARTS



Powering Progress.

[gates.com/hydraulics](http://gates.com/hydraulics)

C29



# Coupling Identification

## North American Thread Types (con't.)

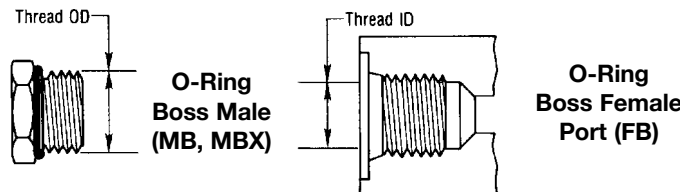
### O-Ring Boss

The O-ring boss male will mate with an O-ring boss female only. The female is generally found on ports.

The male has straight threads, a sealing face and an O-ring. The female has straight threads and a sealing face. The seal is made at the O-ring on the male and the sealing face on the female.

Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread	O-Ring		Steel Torque Recommendations (Ft. Lbs)			
							Below 4,000 psi Working Pressure		Above 4,000 psi Working Pressure	
			I.D. (In.)	O.D. (In.)	I.D. (In.)	DESCR	Min.	Max.	Min.	Max.
-2	1/8	5/16 – 24	17/64	5/16	0.239	–	–	–	–	–
-3	3/16	3/8 – 24	21/64	3/8	0.301	30R	–	–	8	10
-4	1/4	7/16 – 20	25/64	7/16	0.351	40R	14	16	14	16
-5	5/16	1/2 – 20	29/64	1/2	0.414	50R	–	–	18	20
-6	3/8	9/16 – 18	1/2	9/16	0.468	60R	24	26	24	26
-8	1/2	3/4 – 16	11/16	3/4	0.644	80R	37	44	50	60
-10	5/8	7/8 – 14	13/16	7/8	0.755	100R	50	60	72	80
-12	3/4	1-1/16 – 12	31/32	1-1/16	0.924	120R	75	83	125	135
-14	7/8	1-3/16 – 12	1-7/64	1-3/16	1.048	140R	–	–	160	180
-16	1	1-5/16 – 12	1-15/64	1-5/16	1.171	160R	111	125	200	220
-20	1-1/4	1-5/8 – 12	1-35/64	1-5/8	1.475	200R	133	152	210	280
-24	1-1/2	1-7/8 – 12	1-51/64	1-7/8	1.720	–	156	184	270	360
-32	2	2-1/2 – 12	2-27/64	2-1/2	2.337	–	–	–	–	–

### SAE Straight Thread O-Ring Boss



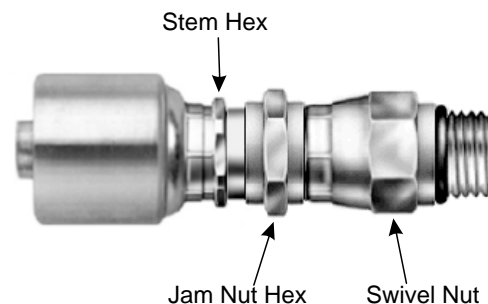
## Gates Adapterless—MBAX

The Gates Adapterless coupling is designed for use in OEM assembly line applications. It eliminates the need for an adapter by directly connecting into the port, which reduces the number of possible leak points and reduces installation labor. It allows easy installation and eliminates the troubles of alignment on bent tube assemblies. It eliminates the performance limitations of the traditional male swivel. A jam nut locks the coupling into place.

Assemblies using the Gates Adapterless coupling can be serviced by replacing the assembly with an MB adapter in the port and a standard end termination (for example, an MB-MJ adapter and FJX couplings).

**WARNING:** The tightening of the jam nut is **absolutely critical** to performance so that the Adapterless coupling does not become a "live swivel". A live swiveling condition can cause wearing of the internal seals and result in leaks.

The Gates Adapterless coupling uses SAE O-Ring Boss threads. See the table above. The installation torque values are the same as SAE O-Ring Boss.



# Coupling Identification

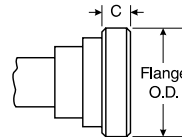
## North American Thread Types (con't.)

### O-Ring Flange—SAE J518

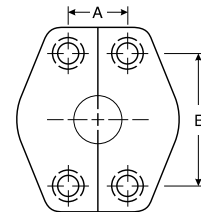
The SAE Code 61 and Code 62 4-bolt split flange is used worldwide, usually as a connection on pumps and motors. There are three exceptions.

1. The -10 size, which is common outside of North America, is not an SAE standard size (generally found on Komatsu equipment). All Komatsu flanges are the same as SAE code 61 except for the -10 size.
2. Caterpillar flanges, which are the same flange O.D. as SAE Code 62, have a thicker flange head ("C" dimension in Table).
3. Poclain flanges, which are completely different from SAE flanges.

SAE Code 61 and Code 62



Flange Head (FL/  
FLH, FLC)



4-Bolt Split Flange Bolt  
Hose Dimensions

Dash Size	Nominal Flange Size (In.)	Code 61 (FL)				Code 62 (FLH)				Caterpillar Code 62 (FLC)			
		Flange O.D. (In.)	A (In.)	B (In.)	C (In.)	Flange O.D. (In.)	A (In.)	B (In.)	C (In.)	Flange O.D. (In.)	A (In.)	B (In.)	C (In.)
-8	1/2	1.188	.688	1.500	.265	1.250	.718	1.594	.305	—	—	—	—
-10	5/8	1.345	—	—	.265	—	—	—	—	—	—	—	—
-12	3/4	1.500	.875	1.875	.265	1.625	.937	2.000	.345	1.625	.938	2.000	.560
-16	1	1.750	1.031	2.062	.315	1.875	1.093	2.250	.375	1.875	1.094	2.250	.560
-20	1-1/4	2.000	1.188	2.312	.315	2.125	1.250	2.625	.405	2.125	1.250	2.625	.560
-24	1-1/2	2.375	1.406	2.750	.315	2.500	1.437	3.125	.495	2.500	1.438	3.125	.560
-32	2	2.812	1.688	3.062	.375	3.125	1.750	3.812	.495	3.125	1.750	3.812	.560
-40	2-1/2	3.312	2.000	3.500	.375	—	—	—	—	—	—	—	—
-48	3	4.000	2.438	4.188	.375	—	—	—	—	—	—	—	—
-56	3-1/2	4.500	2.750	4.750	.422	—	—	—	—	—	—	—	—
-64	4	5.000	3.062	5.125	.442	—	—	—	—	—	—	—	—
-80	5	6.000	3.625	6.000	.442	—	—	—	—	—	—	—	—

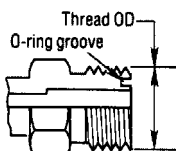
### O-Ring Face Seal (ORFS)—SAE J1453

A seal is made when the O-ring in the male contacts the flat face on the female. Couplings are intended for hydraulic systems where elastomeric seals are acceptable to overcome leakage and leak resistance is crucial.

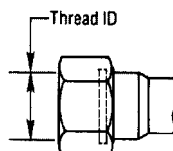
The solid male O-ring face seal fitting will mate with a swivel female O-ring face seal SAE J1453 fitting only.

An O-ring rests in the O-ring groove in the male.

O-Ring Face Seal



Male Flat-Face O-Ring (MFFOR)



Female Flat-Face O-Ring Swivel (FFORX)

Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread	O-Ring Size
			I.D. (In.)	O.D. (In.)	
-4	1/4	9/16 - 18	1/2	9/16	-011
-6	3/8	11/16 - 16	5/8	11/16	-012
-8	1/2	13/16 - 16	3/4	13/16	-014
-10	5/8	1 - 14	15/16	1	-016
-12	3/4	1-3/16 - 12	1-1/8	1-3/16	-018
-16	1	1-7/16 - 12	1-11/32	1-7/16	-021
-20	1-1/4	1-11/16 - 12	1-19/32	1-11/16	-025
-24	1-1/2	2 - 12	1-29/32	2	-029



EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
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SURELOK AIR BRAKE COUPLINGS
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QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS

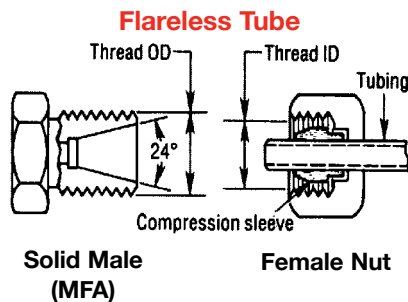
## Coupling Identification

### North American Thread Types (con't.)

#### Flareless Tube

The flareless solid male will mate with a female flareless nut and compression sleeve only.

The male has straight threads and a 24° seat. The female has straight threads and has a compression sleeve for a sealing surface. The seal is made between the compression sleeve and the 24° seat on the male, and between the compression sleeve and the tubing on the female.

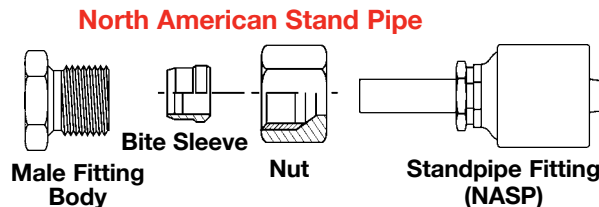


Dash Size	Tube Size (In.)	Nominal Size (In.)	Thread Size	Female Thread	Male Thread
				I.D. (In.)	O.D. (In.)
-2	1/8	5/16	5/16 - 24	17/64	5/16
-3	3/16	3/8	3/8 - 24	21/64	3/8
-4	1/4	7/16	7/16 - 20	25/64	7/16
-5	5/16	1/2	1/2 - 20	29/64	1/2
-6	3/8	9/16	9/16 - 18	1/2	9/16
-8	1/2	3/4	3/4 - 16	11/16	3/4
-10	5/8	7/8	7/8 - 14	13/16	7/8
-12	3/4	1-1/16	1-1/16 - 12	31/32	1-1/16
-14	7/8	1-3/16	1-3/16 - 12	1-7/64	1-3/16
-16	1	1-5/16	1-5/16 - 12	1-15/64	1-5/16
-20	1-1/4	1-5/8	1-5/8 - 12	1-35/64	1-5/8
-24	1-1/2	1-7/8	1-7/8 - 12	1-51/64	1-7/8
-32	2	2-1/2	2-1/2 - 12	2-27/64	2-1/2

### North American Stand Pipe (NASP)

A stand pipe assembly is comprised of three components attached to a male fitting. The components are a Stand Pipe Tube, Bite Sleeve and Nut. The Nut is placed over the Stand Pipe, followed by the Bite Sleeve (see illustration below). The Bite Sleeve and Stand Pipe are selected on the basis of tube O.D. required.

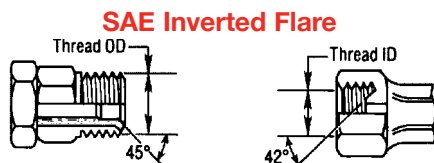
Dash Size	Tube O.D. (In.)	Tube Length (In.)
-4	0.25	0.88
-6	0.38	0.88
-8	0.50	1.00
-12	0.75	1.16
-16	1.00	1.12



### SAE Inverted Flare

The SAE 45° inverted flare male will mate with an SAE 42° inverted flare female only.

The male has straight threads and a 45° inverted flare. The female has straight threads and a 42° inverted flare. The seal is made on the 45° flare seat on the male and the 42° flare seat on the female.



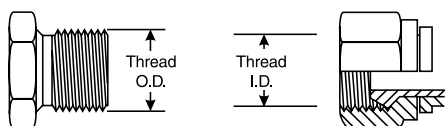
Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread
			I.D. (In.)	O.D. (In.)
-2	1/8	5/16 - 28	9/32	5/16
-3	3/16	3/8 - 24	21/64	3/8
-4	1/4	7/16 - 24	25/64	7/16
-5	5/16	1/2 - 20	29/64	1/2
-6	3/8	5/8 - 18	37/64	5/8
-7	7/16	11/16 - 18	5/8	11/16
-8	1/2	3/4 - 18	45/64	3/4
-10	5/8	7/8 - 18	13/16	7/8
-12	3/4	1-1/16 - 16	1	1-1/16

# Coupling Identification

## Air Brake Fittings

Female air brake swivels are designed to work exclusively with a male air brake adapter. Federal law requires only this combination to be used on air brake lines from the valve to the air brake diaphragm chamber.

The male has straight threads and an inverted seat. The female has straight threads and a corresponding inverted flare. The seal is made on the flare seats of both the male and female.

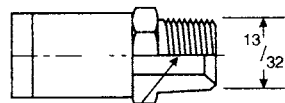


Male Air Brake      Female Air Brake Swivel

Dash Size	Thread Size	Female Thread I.D. (In.)	Male Thread O.D. (In.)
-6	3/4 - 20	23/32	3/4
-8	7/8 - 20	27/32	7/8

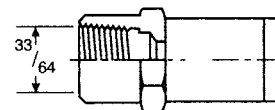
## Grease Fittings

### Special Male Grease Fitting



1/8-27 Pipe Thread

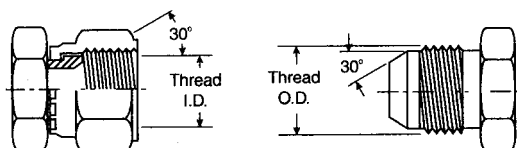
### Special Female Grease Fitting



1/2-27 Tapered Thread

## Parker Triple Thread Flare Fittings

### Parker Triple Thread Flare Fittings



Swivel Female (FZX)

Solid Male (MZ)

Dash Size	Nominal Size (In.)	Thread Size	Female Thread	Male Thread
			I.D. (In.)	O.D. (In.)
-16	1-5/16	1-5/16 - 14	1-1/4	1-5/16

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
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ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS

## Coupling Identification

### Foreign Thread Types

#### Identifying Foreign Couplings

If you can identify the country of origin of the equipment you are working with, it is easy to identify the coupling style. Simply find the appropriate country in the following pages and locate the particular coupling in the table that follows.

### British

It is a common misconception that all foreign threads are metric. This is not always the case. There are two common thread forms: Metric and Whitworth (BSP). The country of origin and the proper nomenclature for each is listed below.

#### British Standard Pipe Parallel

Popular couplings have British Standard Pipe (BSP) threads, also known as Whitworth threads. These can be parallel threads (BSPP) with a 30° inverted flare or tapered threads (BSPT), with a 30° inverted flare. Port connections are usually made with BSPP threads and a soft metal cutting ring for sealing.

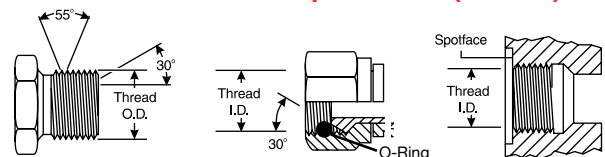
The BSPP (parallel) male will mate with a BSPOR (parallel) female or a female port.

The BSPP male has straight threads and a 30° seat. The BSPOR female has straight threads, a 30° seat, and O-ring. The female port has straight threads and a spotface. The seal on the port is made with an O-ring or soft metal washer on the male.

The BSPP (parallel) connector is similar to, but not interchangeable with, the NPSM connector. The thread pitch is different in most sizes, and the thread angle is 55° instead of the 60° angle found on NPSM threads.

Dash Size	Nominal Size (In.)	Thread Size	Female Parallel Thread	Male Parallel Thread	Torque Recommendation (Ft. Lbs.)	
			I.D. (In.)	O.D. (In.)	Min.	Max.
-2	1/8	1/8 - 28	11/32	3/8	7	9
-4	1/4	1/4 - 19	15/32	17/32	11	18
-6	3/8	3/8 - 19	19/32	21/32	19	28
-8	1/2	1/2 - 14	3/4	13/16	30	36
-10	5/8	5/8 - 14	13/16	29/32	37	44
-12	3/4	3/4 - 14	31/32	1-1/32	50	60
-16	1	1 - 11	1-7/32	1-11/32	79	95
-20	1-1/4	1-1/4 - 11	1-17/32	1-21/32	127	152
-24	1-1/2	1-1/2 - 11	1-25/32	1-7/8	167	190
-32	2	2 - 11	2-7/32	2-11/32	262	314

#### British Standard Pipe Parallel (BSPOR)



**BSPP Male (MBSPP)**

**BSPOR Female (FBSPORX)**

**BSPOR Female Port**

#### British Standard Pipe Tapered

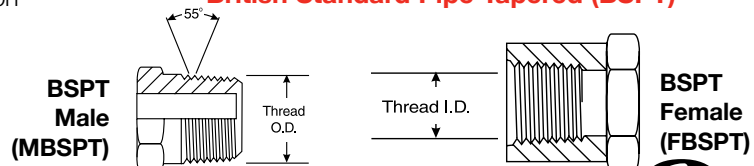
The BSPT (tapered) male will mate with a BSPT (tapered) female, or a BSPOR (parallel) female.

The BSPT male has tapered threads. When mating with either the BSPT (tapered) female or the BSPOR (parallel) female port, the seal is made on the threads.

The BSPT connector is similar to, but not interchangeable with, the NPTF connector. The thread pitch is different in most cases, and the thread angle is 55° instead of the 60° angle found on NPTF threads.

Dash Size	Nominal Size (In.)	Thread Size	Female Parallel Thread	Male Parallel Thread	Torque Recommendation (Ft. Lbs.)	
			I.D. (In.)	O.D. (In.)	Min.	Max.
-2	1/8	1/8 - 28	11/32	3/8	7	9
-4	1/4	1/4 - 19	15/32	17/32	11	18
-6	3/8	3/8 - 19	19/32	21/32	19	28
-8	1/2	1/2 - 14	3/4	13/16	30	36
-10	5/8	5/8 - 14	13/16	29/32	37	44
-12	3/4	3/4 - 14	31/32	1-1/32	50	60
-16	1	1 - 11	1-7/32	1-11/32	79	95
-20	1-1/4	1-1/4 - 11	1-17/32	1-21/32	127	152
-24	1-1/2	1-1/2 - 11	1-25/32	1-7/8	167	190
-32	2	2 - 11	2-7/32	2-11/32	262	314

#### British Standard Pipe Tapered (BSPT)



**BSPT Male (MBSPT)**

**BSPT Female (FBSPT)**

# Coupling Identification

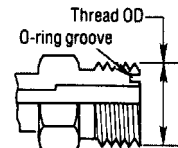
## Foreign Thread Types – British (con't.)

### British Flat-Face Seal

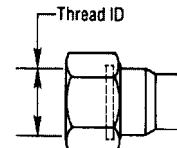
A seal is made when the O-ring in the male contacts the flat face on the female. These couplings are intended for hydraulic systems where elastomeric seals are acceptable to overcome leakage and leak resistance is crucial.

The solid male British O-ring face seal fitting will mate with a swivel female British O-ring face seal fitting only. An O-ring rests in the O-ring groove in the male.

Dash Size	Nominal Size (In.)	Thread Size	Female Parallel Thread	Male Parallel Thread	Torque Recommendation (Ft. Lbs.)	
			I.D. (In.)	O.D. (In.)	Min.	Max.
-6	3/8	3/8-19	19/32	21/32	18	20
-8	1/2	1/2-14	3/4	13/16	32	40
-12	3/4	3/4-14	31/32	1 1/32	65	80



Male British Flat-Face (MBFF)



Female British Flat-Face (FBFF)

## French

Popular couplings are French GAZ. These have a 24° seat and metric threads. These are similar to German DIN couplings, but the threads are different in some sizes. Although both are metric threads, the French use fine threads in all sizes and German DIN couplings use coarse threads in larger sizes. Most port connections are flange connections. French flanges are different than SAE—they have a lip that protrudes from the flange face. These are called Poclain-style flanges.

### GAZ 24°

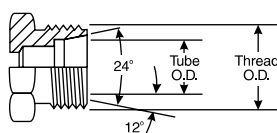
The French Metric (GAZ) male will mate with the female 24° cone or the female tube fitting.

**The male has a 24° seat and straight metric threads. The female has a 24° seat or a tubing sleeve and straight metric threads and is interchangeable with female Kobelco.**

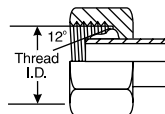
When measuring the flare angle with the seat angle gauge, use the 12° gauge. The seat angle gauge measures the angle from the connector centerline.

Metric Thread Size	Female Thread I.D. (mm)	Male Thread O.D. (mm)	Tube O.D. (mm)
M20x1.5	18.5	20.0	13.25
M24x1.5	22.5	24.0	16.75
M30x1.5	28.5	30.0	21.25
M36x1.5	34.5	36.0	26.75
M45x1.5	43.5	45.0	33.50
M52x1.5	50.5	52.0	42.25

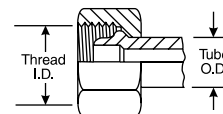
### French Metric (GAZ)



Male 24° Cone



Female 24° Cone



Female Tube Fitting





## Coupling Identification

### Foreign Thread Types – French (con't.)

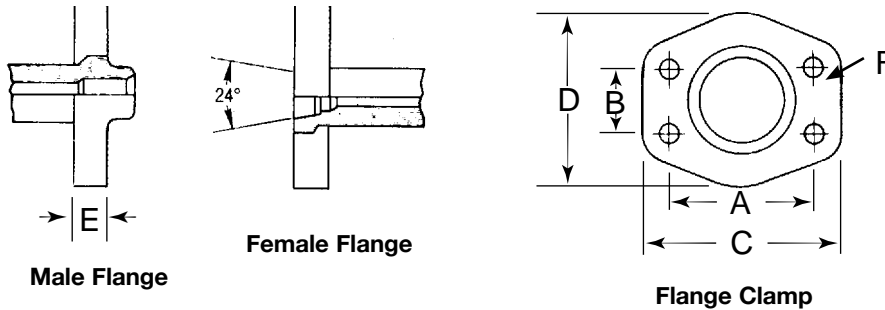
#### GAZ Poclain 24° Flange

The Poclain (French GAZ) 24° high pressure flange is usually found on Poclain equipment.

The male flange will mate with a female flange or port. The seal is made on the 24° seat.

Nominal Size (In.)	A (In.)	B (In.)	C (In.)	D (In.)	E (In.)	F (In.)
1/2	1.57	.72	2.20	1.89	.55	.35
5/8	1.57	.72	2.20	1.89	.55	.35
3/4	2.00	.94	2.75	2.38	.71	.43

#### Poclain (French GAZ)



### German DIN (Deutsche Industrial Norme)

Popular couplings are German DIN (Deutsche Industrial Norme). A coupling referred to as “metric” usually means a DIN coupling.

#### DIN 24° Cone

The DIN 24° cone male will mate with any of the females shown.

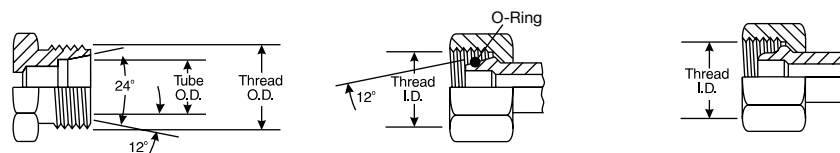
The male has a 24° seat, straight metric threads, and a recessed counterbore which matches the tube O.D. of the coupling used with it. The mating female is a 24° cone with O-ring, a metric tube fitting or a universal 24° and 60° cone.

There is a light and heavy series DIN coupling. Proper identification is made by measuring both the thread size and the tube O.D. (The heavy series has a smaller tube O.D. but a thicker wall section than the light.)

When measuring the flare angle with the seat angle gauge, use the 12° gauge. The seat angle gauge measures the angle from the connector centerline.

Metric Thread Size	Female Thread	Male Thread	Tube O.D.		Torque Recommendation (Ft. Lbs.)	
	I.D. (mm)	O.D. (mm)	Light Series (mm)	Heavy Series (mm)	Min.	Max.
M12x1.5	10.5	12.0	6	—	7	15
M14x1.5	12.5	14.0	8	—	15	26
M16x1.5	14.5	16.0	10	8	18	30
M18x1.5	16.5	18.0	12	10	22	33
M20x1.5	18.5	20.0	14	12	26	37
M22x1.5	20.5	22.0	15	14	30	52
M24x1.5	22.5	24.0	—	16	30	52
M26x1.5	24.5	26.0	18	—	44	74
M30x2.0	28.0	30.0	22	20	59	89
M36x2.0	34.0	36.0	28	25	74	111
M42x2.0	40.0	42.0	—	30	74	162
M45x2.0	43.0	45.0	35	—	133	184
M52x2.0	50.0	52.0	42	38	148	221

#### DIN 24° Male and Mating Females



**Male 24° Cone, DIN 2353 (MDL/MDH)**

**Female 24° Cone with O-Ring (FDLORX/FDHORX)**

**Female Universal 24° and 60° Cone (FDLX/FDHX)**

Gates Corporation



# Coupling Identification

## Foreign Thread Types – German DIN (con't.)

### DIN 60° Cone

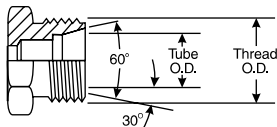
The DIN 60° cone male will mate with the female universal 24° or 60° cone connector only.

The male has a 60° seat and straight metric threads. The female has a 24° and 60° universal seat and straight metric threads.

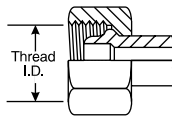
When measuring the flare angle with the seat angle gauge, use the 30° gauge. The seat angle gauge measures the angle from the connector centerline.

Metric Thread Size	Female Thread	Male Thread	Tube O.D.	Torque Recommendation (Ft. Lbs.)	
	I.D. (mm)	O.D. (mm)	(mm)	Min.	Max.
M14x1.5	12.5	14.0	8	15	26
M16x1.5	14.5	16.0	10	18	30
M18x1.5	16.5	18.0	12	22	33
M22x1.5	20.5	22.0	15	30	52
M26x1.5	24.5	26.0	18	44	74
M30x1.5	28.5	30.0	22	59	59
M38x1.5	36.5	38.0	28	74	111
M45x1.5	43.5	45.0	35	133	184
M52x2.0	50.5	52.0	42	148	221

#### DIN 60° Male and Mating Female



**Male**  
**60° Cone, DIN 6711**



**Female**  
**Universal 24° and 60° Cone**

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POLARSEAL II COUPLINGS
C14 COUPLINGS
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FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## Coupling Identification

### Foreign Thread Types – German DIN (con't.)

#### DIN 3852 Couplings Type A & B (Parallel Threads)

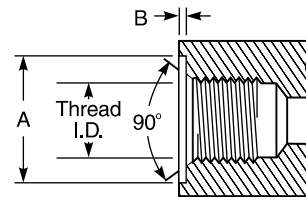
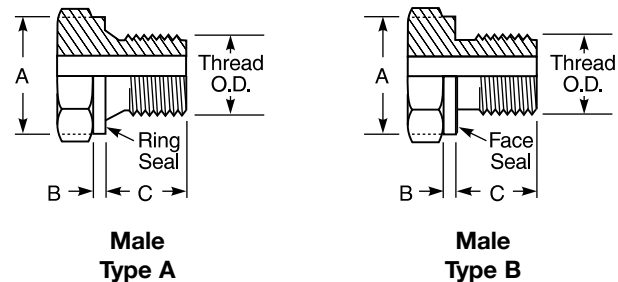
The male DIN 3852 Type A & B couplings will mate with the female DIN coupling shown below. Gates offers this thread as an adapter.

The male and female type A & B couplings have straight threads. The seal occurs when the ring seal (Type A) or the face seal (Type B) mates with the face of the female port.

There are two series of DIN 3852 Type A & B couplings, the light (L) and the heavy (S) series.

Note: Commonly used threads on male metric adapters.

#### DIN 3852 Couplings Type A & B (Parallel Threads)



Female Types A & B

Series	Tube  O.D.  (mm)	Metric Thread Parallel								Whitworth Thread Parallel							
		Thread Size	Female			Male				Thread Size	Female (BSPOR)			Male (BSPP)			
			Thread I.D. (mm)	A (mm)	B (mm)	Thread O.D. (mm)	A (mm)	B (mm)	C (mm)		Thread I.D. (In.)	A (mm)	B (mm)	Thread O.D. (In.)	A (mm)	B (mm)	C (mm)
L Light	6	10x1.0	8.5	15	1.0	10	14	1.5	8	1/8-28	11/32	15	1.0	3/8	14	1.5	8
	8	12x1.5	10.5	18	1.5	12	17	2.0	12	1/4-19	15/32	19	1.5	1/2	17	2.0	12
	10	14x1.5	12.5	20	1.5	14	19	2.0	12	1/4-19	15/32	19	1.5	1/2	19	2.0	12
	12	16x1.5	14.5	22	1.5	16	21	2.5	12	3/8-19	19/32	23	2.0	21/32	21	2.5	12
	15	18x1.5	16.5	24	2.0	18	23	2.5	12	1/2-14	3/4	27	2.5	13/16	23	2.5	12
	18	22x1.5	20.5	28	2.5	22	27	3.0	14	1/2-14	3/4	27	2.5	13/16	27	3.0	14
	22	26x1.5	24.5	32	2.5	26	31	3.0	16	3/4-14	31/32	33	2.5	1-1/32	31	3.0	16
	28	33x2.0	31.5	40	2.5	33	39	3.0	18	1-11	1-7/32	40	2.5	1-5/16	39	3.0	18
	35	42x2.0	40.5	50	2.5	42	49	3.0	20	1-1/4-11	1-17/32	50	2.5	1-21/32	49	3.0	20
	42	48x2.0	46.5	56	2.5	48	55	3.0	22	1-1/2-11	1-25/32	56	2.5	1-7/8	55	3.0	22
S Heavy	6	12x1.5	10.5	18	1.5	12	17	2.0	12	1/4-19	15/32	19	1.5	1/2	17	2.0	12
	8	14x1.5	12.5	20	1.5	14	19	2.0	12	1/4-19	15/32	19	1.5	1/2	19	2.0	12
	10	16x1.5	14.5	22	1.5	16	21	2.5	12	3/8-19	19/32	23	2.0	21/32	21	2.5	12
	12	18x1.5	16.5	24	2.0	18	23	2.5	12	3/8-19	19/32	23	2.0	21/32	23	2.5	12
	14	20x1.5	18.5	26	2.0	20	25	3.0	14	1/2-14	3/4	27	2.5	13/16	25	3.0	14
	16	22x1.5	20.5	28	2.5	22	27	3.0	14	1/2-14	3/4	27	2.5	13/16	27	3.0	14
	20	27x2.0	25.5	33	2.5	27	32	3.0	16	3/4-14	31/32	33	2.5	1-1/32	32	3.0	16
	25	33x2.0	31.5	40	2.5	33	39	3.0	18	1-11	1-7/32	40	2.5	1-5/16	39	3.0	18
	30	42x2.0	40.5	50	2.5	42	49	3.0	20	1-1/4-11	1-17/32	50	2.5	1-21/32	49	3.0	20
	38	48x2.0	46.5	56	2.5	48	55	3.0	22	1-1/2-11	1-25/32	56	2.5	1-7/8	55	3.0	22

# Coupling Identification

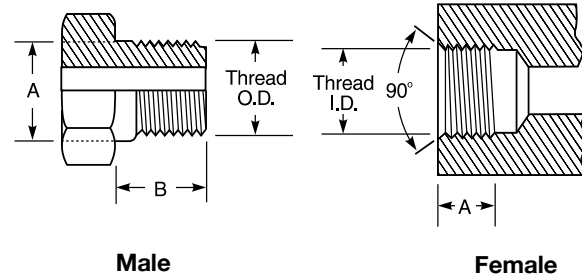
## Foreign Thread Types – German DIN (con't.)

### DIN 3852 Type C Metric and Whitworth Tapered (BSPT) Thread Connectors

The DIN 3852 Type C couplings are available with either metric or Whitworth British thread. The male will mate only with the female as shown.

The male and female couplings have tapered threads. The seal takes place on the threads. There are three series of DIN 3852 Type C Couplings: extra light (LL), light (L) and heavy (S).

#### DIN 3852 Type C Metric and Whitworth Tapered Thread Connectors

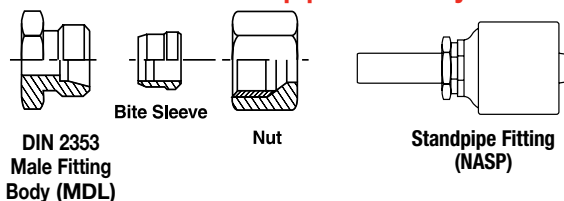


Series	Tube O.D. (mm)	Metric Tapered Threads						Whitworth Tapered Threads					
		Thread Size	Female		Male			Thread Size	Female		Male		
			Thread I.D. (mm)	A (mm)	Thread O.D. (mm)	A (mm)	B (mm)		Thread I.D. (In.)	A (mm)	Thread O.D. (In.)	A (mm)	B (mm)
LL Extra Light	4	8x1.0	6.5	5.5	8	8.40	8	1/8-28	11/32	5.5	1/8	.392	8
	5	8x1.0	6.5	5.5	8	8.40	8	1/8-28	11/32	5.5	1/8	.392	8
	6	10x1.0	8.5	5.5	10	10.40	8	1/8-28	11/32	5.5	1/8	.392	8
	8	10x1.0	8.5	5.5	10	10.40	8	1/8-28	11/32	5.5	1/8	.392	8
L Light	6	10x1.0	8.5	5.5	10	10.40	8	1/8-28	11/32	5.5	1/8	.392	8
	8	12x1.5	10.5	8.5	12	12.53	12	1/4-19	15/32	8.5	1/4	.532	12
	10	14x1.5	12.5	8.5	14	14.53	12	1/4-19	15/32	8.5	1/4	.532	12
	12	16x1.5	14.5	8.5	16	16.53	12	3/8-19	19/32	8.5	3/8	.670	12
	15	18x1.5	16.5	8.5	18	18.53	12	1/2-14	3/4	8.5	1/2	.839	14
S Heavy	18	22x1.5	20.5	10.5	22	22.65	14	1/2-14	3/4	10.5	1/2	.839	14
	6	12x1.5	10.5	8.5	12	12.53	12	1/4-19	15/32	8.5	1/4	.532	12
	8	14x1.5	12.5	8.5	14	14.53	12	1/4-19	15/32	8.5	1/4	.532	12
	10	16x1.5	14.5	8.5	16	16.53	12	3/8-19	19/32	8.5	3/8	.670	12
	12	18x1.5	16.5	8.5	18	18.53	12	3/8-19	19/32	8.5	3/8	.670	12
	14	20x1.5	18.5	10.5	20	20.65	14	1/2-14	3/4	10.5	1/2	.839	14
	16	22x1.5	20.5	10.5	22	22.65	14	1/2-14	3/4	10.5	1/2	.839	14

## Metric Stand Pipe Assembly

A metric stand pipe assembly is comprised of three components attached to a male fitting. The components are: a Stand Pipe Tube, Bite Sleeve and Metric Nut. The nut is placed over the Stand Pipe, followed by the Bite Sleeve (see illustration below). For DIN light assemblies, a DIN light metric nut is used. For DIN heavy assemblies, a DIN heavy metric nut is used. The Bite Sleeve and Stand Pipe are selected on the basis of tube O.D.

#### Metric Standpipe Assembly



Metric Stand Pipe DIN Tube O.D. (mm)	Bite Sleeve DIN Tube O.D. (mm)	Metric Nut Thread	
		Light	Heavy
6	6	M12x1.5	—
8	8	M14x1.5	M16x1.5
10	10	M16x1.5	M18x1.5
12	12	M18x1.5	M20x1.5
15	15	M22x1.5	—
16	16	—	M24x1.5
18	18	M26x1.5	—
20	20	—	M30x2.0
22	22	M30x2.0	—
25	25	—	M36x2.0
28	28	M36x2.0	—
30	30	—	M42x2.0
35	35	M45x2.0	—
38	38	—	M52x2.0
42	42	M52x2.0	—



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POLARSEAL COUPLINGS

POLARSEAL II COUPLINGS

C14 COUPLINGS

PCTS THERMO-PLASTIC COUPLINGS

FIELD ATTACHABLE G1 AND G2 COUPLINGS

FIELD ATTACHABLE C5 AND C5E COUPLINGS

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## Coupling Identification

### Foreign Thread Types (con't.)

### Japanese

There are two popular types of coupling styles in Japan, Japanese Industrial Standard and Komatsu. These couplings look similar to Male JIC and Female JIC Swivel couplings. However there are two major differences: The threads are BSP and the seat angle is only 30° instead of 37° for JIC.

1. **Japanese Industrial Standard.** Most Japanese equipment uses this type of coupling with a 30° seat and British Standard Pipe Parallel threads. **They are not interchangeable with British couplings, since the flare is not inverted.**
2. **Komatsu.** All Komatsu equipment uses couplings with a 30° seat and metric fine threads. All flanges are Code 61 or Code 62, except -10 which utilizes a special Komatsu-style flange that does not conform to SAE standard sizing.

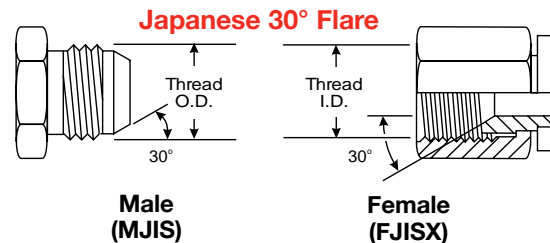
### Japanese 30° Flare Parallel Threads

The Japanese 30° flare male connector will mate with a Japanese 30° flare female only.

The male and female have straight threads and a 30° seat. The seal is made on the 30° seat.

The threads on the Japanese 30° flare connector conform to JIS B 0202, which are the same as the BSPOR threads. Both the British and Japanese connectors have a 30° seat, but they are not interchangeable because the British seat is inverted.

Dash Size	Nominal Size (In.)	Thread Size	Female Thread I.D. (In.)	Male Thread O.D. (In.)
-2	1/8	1/8 - 28	11/32	3/8
-4	1/4	1/4 - 19	7/16	17/32
-6	3/8	3/8 - 19	19/32	21/32
-8	1/2	1/2 - 14	3/4	13/16
-10	5/8	5/8 - 14	13/16	29/32
-12	3/4	3/4 - 14	15/16	1-1/32
-16	1	1 - 11	1-13/16	1-15/16
-20	1-1/4	1-1/4 - 11	1-17/32	1-21/32
-24	1-1/2	1-1/2 - 11	1-25/32	1-7/8
-32	2	2 - 11	2-7/32	2-11/32



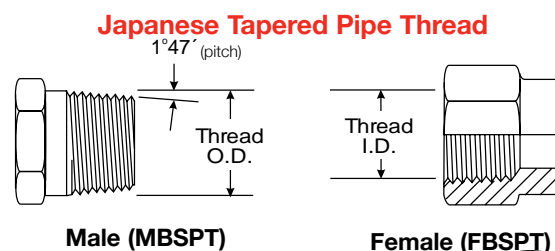
### Japanese Tapered Pipe Thread

The Japanese tapered pipe thread connector is identical to and fully interchangeable with the BSPT (tapered) connector. **The Japanese connector does not have a 30° flare and will not mate with the BSPOR female.**

The threads conform to JIS B 0203, which are the same as BSPT threads.

The seal on the Japanese tapered pipe thread connector is made on the threads.

Dash Size	Nominal Size (In.)	Thread Size	Female Parallel Thread I.D. (In.)	Male Parallel Thread O.D. (In.)
-2	1/8	1/8 - 28	11/32	3/8
-4	1/4	1/4 - 19	7/16	17/32
-6	3/8	3/8 - 19	19/32	21/32
-8	1/2	1/2 - 14	3/4	13/16
-12	3/4	3/4 - 14	15/16	1-1/32
-16	1	1 - 11	1-13/16	1-15/16
-20	1-1/4	1-1/4 - 11	1-17/32	1-21/32
-24	1-1/2	1-1/2 - 11	1-25/32	1-7/8
-32	2	2 - 11	2-7/32	2-11/32



# Coupling Identification

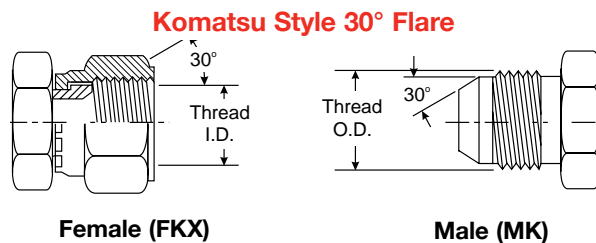
## Foreign Thread Types – Japanese (con't.)

### Komatsu Style 30° Flare Parallel Threads

The Komatsu style 30° flare parallel thread connector is identical to the Japanese 30° flare parallel thread connector except for the threads. The Komatsu style connector uses metric fine threads which conform to JIS B 0207. Gates identifies these as Komatsu-style by marking the hex nuts with two small notches.

Dash Size	Nominal Size		Thread Size	Female Thread I.D. (mm)	Male Thread (O.D.) (mm)
	(In.)	(mm)			
-4	1/4	6.5	M14x1.5	12.5	14
-6	3/8	9.5	M18x1.5	16.5	18
-8	1/2	13	M22x1.5	20.5	22
-10	5/8	16	M24x1.5	22.5	24
-12	3/4	19	M30x1.5	28.5	30
-16	1	25	M33x1.5	31.5	33
-20	1-1/4	32	M36x1.5	34.5	36
-24	1-1/2	38	M42x1.5	40.5	42

The Komatsu style connector seals on the 30° flare.

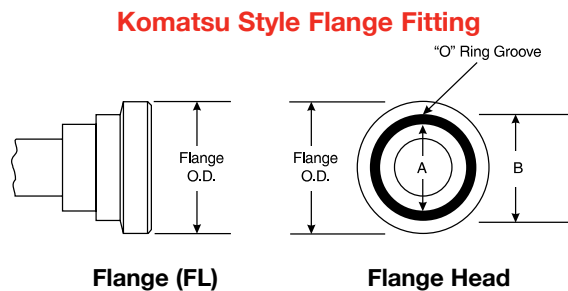


### Komatsu Style Flange Fitting

The Komatsu style flange fitting is nearly identical to and fully interchangeable with the SAE Code 61 flange fitting. In all sizes the O-ring dimensions are different. When replacing a Komatsu style flange with an SAE style flange, an SAE style O-ring must always be used.

Dash Size	Nominal Size		Flange O.D. (In.)	A (In.)	B (In.)
	(In.)	(mm)			
-8	1/2	12.7	1.188	.728	.984
-10*	5/8	15.9	1.345	.728	1.102
-12	3/4	19.1	1.500	.846	1.220
-16	1	25.4	1.750	1.122	1.496
-20	1-1/4	31.8	2.000	1.358	1.732
-24	1-1/2	38.1	2.375	1.750	2.125
-32	2	50.8	2.812	2.225	2.559

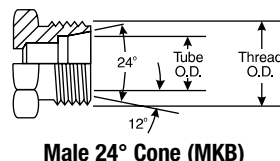
\*(-10 is a non-SAE size flange)



### Metric Kobelco Metric Bite Sleeve

These are similar to the German DIN 24° cone, but the DIN style uses coarser threads. Therefore, the Kobelco and German DIN are not interchangeable for female Kobelco (see French GAZ 24° swivel).

Dash Size	Metric Thread Size	Female Thread I.D. (mm)	Male Thread O.D. (mm)
-22	M30X1.5	28	30
-28	M36X1.5	34	36
-35	M45X1.5	43	45



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MEGACRIMP COUPLINGS

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## Gates Global Part Numbering System

Gates couplings feature a meaningful part number that makes coupling identification fast and easy. Always refer to Gates Crimp Data Manual when selecting hose and coupling combinations.

In the following example, the Global Part Number G25100-0808 identifies a MegaCrimp® Male Pipe (MP) coupling with -8 (1/2") stem size and -8 (1/2") thread size.

# G25100-0808

Series  
Stem Style  
(see below)

Thread  
Configuration  
(see following  
pages)

Stem  
Size

Thread Size

### Series Stem Styles:

**G20**—GlobalSpiral™  
**G21**—GlobalSpiral One-Piece Couplings  
           for MobileCrimp® Crimpers  
**G22**—GlobalSpiral Plus (GSP)  
**G24**—GlobalSpiral High (GSH)  
**G25**—MegaCrimp®  
**G27**—Field Attachable "Type T" for G1 Hose  
**G28**—Field Attachable "Type T" for G2 Hose

**G34**—Field Attachable for C5, C5D, C5M  
**G35**—Field Attachable for C5E  
**G36**—Brass Push-on for Lock-on Hose

**G40**—Couplings for C14 Hose  
**G43**—GL Couplings  
**G45**—PolarSeal™ Couplings  
**G50**—Power Steering  
**G51**—PCTS Thermoplastic

### Other Non-Stem Series Styles:

**G30**—Copper Tubing  
**G31**—SureLock™ Fittings for Nylon Air Brake Tubing  
**G32**—Compression Fittings  
**G33**—Air Brake Fittings for Rubber Hose

**G37**—Single Bead Brass Couplings

**G38**—Barbed Stem  
**G42**—GLP Coupling  
**G49**—Automotive Adapters  
**G52**—Clamping Collars  
**G55**—Copper Tubing Industrial  
**G56**—SureLok™ Industrial  
**G57**—Mini Barb  
**G58**—Compression PVC  
**G60**—SAE to SAE Adapters  
**G62**—British to SAE Adapters  
**G63**—Metric Conversion Adapters  
**G64**—International to International Adapters  
**G65**—Japanese Conversion Adapters  
**G80**—Hose Bend Restrictors  
**G81**—Hose Guards  
**G82 & 83**—Springs Guards  
**G94 & 95**—Quick Disconnects

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO- PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





# Gates Global Part Numbering System

## Thread Configurations for Stem Styles

These three-digit numbers identify the various coupling thread configurations

<b>100</b> — MP	Male Pipe (NPTF - 30° Cone Seat)	<b>177</b> — FJX60	Female JIC 37° Flare Swivel - 60° Bent Tube
<b>101</b> — MPLN	Male Pipe Long Nose	<b>178</b> — FJX60L	Female JIC 37° Flare Swivel - 60° Bent Tube Long Drop
<b>102</b> — MPAPI	Male Pipe for API Unions	<b>179</b> — FJX90S	Female JIC 37° Flare Swivel - 90° Bent Tube Short Drop
<b>103</b> — MPLH	Male Pipe Long Hex	<b>180</b> — FJX90M	Female JIC 37° Flare Swivel - 90° Bent Tube
<b>105</b> — MPX	Male Pipe Swivel (NPTF - Without 30° Cone Seat)	<b>181</b> — FJX90L	Female JIC 37° Flare Swivel - 90° Bent Tube Long Drop
<b>106</b> — MPX90	Male Pipe Swivel - 90° Block (NPTF - Without 30° Cone Seat)	<b>182</b> — FJX90XL	Female JIC 37° Flare Swivel - 90° Bent Tube Extra Long Drop
<b>107</b> — MPX90L	Male Pipe Swivel - 90° Block Long (NPTF - Without 30° Cone Seat)	<b>183</b> — FJX90-000	Female JIC 37° Flare Swivel - 90° Bent Tube Non-ISO Drop (mm)
<b>110</b> — FP	Female Pipe (NPTF - Without 30° Cone Seat)	<b>185</b> — FJXP	Female JIC 37° Flare Swivel Under Pressure
<b>111</b> — FPX	Female Pipe Swivel (NPSM - 30° Cone Seat)	<b>187</b> — FJX90BLK	Female JIC 37° Flare Swivel - 90° Block
<b>112</b> — FPXT	Female Pipe Swivel Tapered Threads (NPTF)	<b>195</b> — MS	Male SAE 45° Flare
<b>120</b> — MB	Male O-Ring Boss	<b>196</b> — MS45	Male SAE 45° Flare - 45° Bent Tube
<b>121</b> — MBX	Male O-Ring Boss Swivel	<b>197</b> — MS90	Male SAE 45° Flare - 90° Bent Tube
<b>122</b> — MBX45	Male O-Ring Boss Swivel - 45° Block	<b>199</b> — MS90BLK	Male SAE 45° Flare - 90° Block
<b>123</b> — MBX90	Male O-Ring Boss Swivel - 90° Block	<b>200</b> — FSX	Female SAE 45° Flare Swivel
<b>124</b> — MBX90L	Male O-Ring Boss Swivel - 90° Block Long	<b>201</b> — FSXLT	Female SAE 45° Flare Swivel Long Tube
<b>130</b> — MBAX	Male O-Ring Boss Adapterless Swivel	<b>202</b> — FSX45	Female SAE 45° Flare Swivel - 45° Bent Tube
<b>133</b> — MBAX45	Male O-Ring Boss Adapterless Swivel - 45° Bent Tube	<b>203</b> — FSX45L	Female SAE 45° Flare Swivel - 45° Bent Tube Long Drop
<b>134</b> — MBAX90M	Male O-Ring Boss Adapterless Swivel - 90° Bent Tube Medium Drop	<b>204</b> — FSX90S	Female SAE 45° Flare Swivel - 90° Bent Tube Short Drop
<b>135</b> — MBAX90S	Male O-Ring Boss Adapterless Swivel - 90° Bent Tube Short Drop	<b>205</b> — FSX90	Female SAE 45° Flare Swivel - 90° Bent Tube
<b>136</b> — MBAX90L	Male O-Ring Boss Adapterless Swivel - 90° Bent Tube Long Drop	<b>206</b> — FSX90L	Female SAE 45° Flare Swivel - 90° Bent Tube Long Drop
<b>140</b> — FMX	Female MegaSeal® Swivel	<b>207</b> — FSX90XL	Female SAE 45° Flare Swivel - 90° Bent Tube Extra Long Drop
<b>141</b> — FMXL	Female MegaSeal Swivel Long	<b>210</b> — FJSX	Dual Seat Female JIC 37°/SAE 45° Flare Swivel
<b>142</b> — FMX30	Female MegaSeal Swivel - 30° Bent Tube	<b>211</b> — FJSX45	Dual Seat Female JIC 37°/SAE 45° Flare Swivel - 45° Bent Tube
<b>143</b> — FMX30L	Female MegaSeal Swivel - 30° Bent Tube Long Drop	<b>212</b> — FJSX90	Dual Seat Female JIC 37°/SAE 45° Flare Swivel - 90° Bent Tube
<b>144</b> — FMX45S	Female MegaSeal Swivel - 45° Bent Tube Short Drop	<b>213</b> — FJSX90L	Dual Seat Female JIC 37°/SAE 45° Flare Swivel - 90° Bent Tube Long Drop
<b>145</b> — FMX45	Female MegaSeal Swivel - 45° Bent Tube	<b>225</b> — MFFOR	Male Flat-Face O-Ring
<b>146</b> — FMX45L	Female MegaSeal Swivel - 45° Bent Tube Long Drop	<b>226</b> — MFFORBKHDNLN	Male Flat-Face O-Ring Bulkhead Long Nose
<b>147</b> — FMX60	Female MegaSeal Swivel - 60° Bent Tube	<b>229</b> — FFORXS	Female Flat-Face O-Ring Swivel Short
<b>148</b> — FMX60L	Female MegaSeal Swivel - 60° Bent Tube Long Drop	<b>230</b> — FFORX	Female Flat-Face O-Ring Swivel
<b>149</b> — FMX90S	Female MegaSeal Swivel - 90° Bent Tube Short Drop	<b>231</b> — FFORXL	Female Flat-Face O-Ring Swivel Long
<b>150</b> — FMX90	Female MegaSeal Swivel - 90° Bent Tube	<b>234</b> — FFORX45S	Female Flat-Face Swivel - 45° Bent Tube Short Drop
<b>151</b> — FMX90L	Female MegaSeal Swivel - 90° Bent Tube Long Drop	<b>235</b> — FFORX45	Female Flat-Face Swivel - 45° Bent Tube
<b>152</b> — FMX90XL	Female MegaSeal Swivel - 90° Bent Tube Extra Long Drop	<b>239</b> — FFORX90S	Female Flat-Face Swivel - 90° Bent Tube Short Drop
<b>165</b> — MJ	Male JIC 37° Flare	<b>240</b> — FFORX90M	Female Flat-Face Swivel - 90° Bent Tube
<b>166</b> — MJL	Male JIC 37° Flare Long	<b>241</b> — FFORX90L	Female Flat-Face Swivel - 90° Bent Tube Long Drop
<b>167</b> — MJ90BLK	Male JIC 37° Flare - 90° Block	<b>242</b> — FFORX90XL	Female Flat-Face Swivel - 90° Bent Tube Extra Long Drop
<b>170</b> — FJX	Female JIC 37° Flare Swivel	<b>248</b> — FFORX135	Female Flat-Face Swivel - 135° Bent Tube
<b>171</b> — FJXL	Female JIC 37° Flare Swivel Long	<b>300</b> — FL	Code 61 O-Ring Flange
<b>172</b> — FJX30	Female JIC 37° Flare Swivel - 30° Bent Tube	<b>301</b> — FLL	Code 61 O-Ring Flange Long
<b>173</b> — FJX30L	Female JIC 37° Flare Swivel - 30° Bent Tube Long Drop	<b>302</b> — FL22	Code 61 O-Ring Flange - 22-1/2° Bent Tube
<b>174</b> — FJX45S	Female JIC 37° Flare Swivel - 45° Bent Tube Short Drop	<b>304</b> — FL30	Code 61 O-Ring Flange - 30° Bent Tube
<b>175</b> — FJX45	Female JIC 37° Flare Swivel - 45° Bent Tube	<b>305</b> — FL30L	Code 61 O-Ring Flange - 30° Bent Tube Long Drop
<b>176</b> — FJX45L	Female JIC 37° Flare Swivel - 45° Bent Tube Long Drop		



Powering Progress.

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POWER CRIMP COUPLINGS
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POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



# Gates Global Part Numbering System

## Thread Configurations – continued

EQUIPMENT					
HOSE/CPLG. SELECTION					
G8K COUPLINGS	<b>306</b> —FL45S	Code 61 O-Ring Flange - 45° Bent Tube Short Drop	<b>452</b> —TBFL45	Two Bolt Flange (Code 61) - 45° Bent Tube	
GLOBALSPIRAL COUPLINGS	<b>307</b> —FL45	Code 61 O-Ring Flange - 45° Bent Tube	<b>454</b> —TBFL90	Two Bolt Flange (Code 61) - 90° Bent Tube	
PCM/PCS FERRULES	<b>309</b> —FL60	Code 61 O-Ring Flange - 60° Bent Tube	<b>460</b> —ABC	Air Brake Compression	
MEGACRIMP COUPLINGS	<b>310</b> —FL60L	Code 61 O-Ring Flange - 60° Bent Tube Long Drop	<b>461</b> —STA	Straight Tube Assembly	
STAINLESS STEEL	<b>311</b> —FL67	Code 61 O-Ring Flange - 67-1/2° Bent Tube	<b>470</b> —FPFL	French Poclain Flange	
POWER CRIMP COUPLINGS	<b>312</b> —FL67L	Code 61 O-Ring Flange - 67-1/2° Bent Tube Long Drop	<b>500</b> —MIX	SAE Male Inverted Swivel	
LOC, GL AND GLP COUPLINGS	<b>313</b> —FL90XS	Code 61 O-Ring Flange - 90° Bent Tube Extra Short Drop	<b>501</b> —MIXL	SAE Male Inverted Swivel Long	
POLARSEAL COUPLINGS	<b>314</b> —FL90S	Code 61 O-Ring Flange - 90° Bent Tube Short Drop	<b>502</b> —MIX45	SAE Male Inverted Swivel - 45° Bent Tube	
POLARSEAL II COUPLINGS	<b>315</b> —FL90	Code 61 O-Ring Flange - 90° Bent Tube	<b>504</b> —MIX90	SAE Male Inverted Swivel - 90° Bent Tube	
C14 COUPLINGS	<b>316</b> —FL90L	Code 61 O-Ring Flange - 90° Bent Tube Long Drop	<b>506</b> —MIX120	SAE Male Inverted Swivel - 120° Bent Tube	
PCTS THERMO-PLASTIC COUPLINGS	<b>317</b> —FL90XL	Code 61 O-Ring Flange - 90° Bent Tube Extra Long Drop	<b>508</b> —FI	Female Inverted	
FIELD ATTACHABLE G1 AND G2 COUPLINGS	<b>318</b> —FL90XXL	Code 61 O-Ring Flange - 90° Bent Tube Extra Extra Long Drop	<b>510</b> —MFA	SAE Male Flareless Assembly	
FIELD ATTACHABLE C5 AND C5E COUPLINGS	<b>323</b> —FL100	Code 61 O-Ring Flange - 100° Bent Tube	<b>511</b> —MFA90	SAE Male Flareless - 90° Bent Tube	
SURELOK AIR BRAKE COUPLINGS	<b>325</b> —FL110	Code 61 O-Ring Flange - 110° Bent Tube	<b>520</b> —SP	Stand Pipe	
ADAPTERS	<b>327</b> —FL120	Code 61 O-Ring Flange - 120° Bent Tube	<b>521</b> —SPL	Stand Pipe Long	
QUICK DISCONNECT COUPLERS	<b>329</b> —FL125	Code 61 O-Ring Flange - 125° Bent Tube	<b>522</b> —SP45	Stand Pipe - 45° Bent Tube	
LIVE SWIVEL	<b>331</b> —FL135	Code 61 O-Ring Flange - 135° Bent Tube	<b>524</b> —SP90	Stand Pipe - 90° Bent Tube	
BALL VALVES	<b>332</b> —RFL90S	Reuseable Flange - 90° Special	<b>527</b> —FBO	Female Braze-On Stems	
ACCESSORIES	<b>342</b> —RFL90S	Reuseable Flange - 90° Special	<b>530</b> —PL	Male Press-Loc Stems	
EQUIPMENT AND PARTS	<b>350</b> —FLH	Code 62 O-Ring Flange Heavy	<b>531</b> —PL45	Male Press-Loc Stems - 45° Bent Tube	
	<b>351</b> —FLHL	Code 62 O-Ring Flange Heavy Long	<b>532</b> —PL90	Male Press-Loc Stems - 90° Bent Tube	
	<b>352</b> —FLH22	Code 62 O-Ring Flange Heavy - 22-1/2° Bent Tube	<b>535</b> —HLE	Hose Length Extender	
	<b>354</b> —FLH30	Code 62 O-Ring Flange Heavy - 30° Bent Tube	<b>536</b> —HLE45	Hose Length Extender - 45° Bent Tube	
	<b>357</b> —FLH45	Code 62 O-Ring Flange Heavy - 45° Bent Tube	<b>537</b> —HLE 90	Hose Length Extender - 90° Bent Tube	
	<b>358</b> —FLH45L	Code 62 O-Ring Flange Heavy - 45° Bent Tube Long Drop	<b>538</b> —HLESG	Hose Length Extender - Sight Glass	
	<b>359</b> —FLH60	Code 62 O-Ring Flange Heavy - 60° Bent Tube	<b>539</b> —HLET	Hose Length Extender - Tee	
	<b>361</b> —FLH67	Code 62 O-Ring Flange Heavy - 67-1/2° Bent Tube	<b>540</b> —FABX	Female Air Brake Swivel	
	<b>364</b> —FLH90S	Code 62 O-Ring Flange Heavy - 90° Bent Tube Short Drop	<b>541</b> —HLE180	Hose Length Extender - 180° Bent Tube	
	<b>365</b> —FLH90	Code 62 O-Ring Flange Heavy - 90° Bent Tube	<b>543</b> —TBFLX	Two Bolt Flange Swivel	
	<b>366</b> —FLH90L	Code 62 O-Ring Flange Heavy - 90° Bent Tube Long Drop	<b>560</b> —MPG	Male Special Grease Fitting	
	<b>367</b> —FLH90XL	Code 62 O-Ring Flange Heavy - 90° Bent Tube Extra Long Drop	<b>561</b> —FG	Female Special Grease Fitting	
	<b>370</b> —FLFF	Flange Without O-Ring Groove (Code 62)	<b>562</b> —FZX	Parker Triple Thread Female Swivel	
	<b>400</b> —FLC	Caterpillar Style O-Ring Flange (Code 62)	<b>563</b> —PWX	Pressure Washer Swivel (Karcher)	
	<b>401</b> —FLCL	Caterpillar Style O-Ring Flange (Code 62) Long	<b>564</b> —BJF	Banjo (Ford Tractor)	
	<b>402</b> —FLC22	Caterpillar Style O-Ring Flange (Code 62) - 22-1/2° Bent Tube	<b>570</b> —MST	Male SAE 45° Flare - Straight Tube	
	<b>404</b> —FLC30	Caterpillar Style O-Ring Flange (Code 62) - 30° Bent Tube	<b>571</b> —MST45	Male SAE 45° Flare - 45° Bent Tube	
	<b>407</b> —FLC45	Caterpillar Style O-Ring Flange (Code 62) - 45° Bent Tube	<b>572</b> —MST90	Male SAE 45° Flare - 90° Bent Tube	
	<b>409</b> —FLC60	Caterpillar Style O-Ring Flange (Code 62) - 60° Bent Tube	<b>579</b> —FTON134SP45	Female SAE Tube O-Ring Nut Swivel w/R134A Service Port - 45° Bent Tube	
	<b>411</b> —FLC67	Caterpillar Style O-Ring Flange (Code 62) - 67-1/2° Bent Tube	<b>580</b> —MTON134SP	Male SAE Tube O-Ring Nut w/R134a Service Port	
	<b>415</b> —FLC90	Caterpillar Style O-Ring Flange (Code 62) - 90° Bent Tube	<b>581</b> — MTON134SP45	Male SAE Tube O-Ring Nut w/R134a Service Port - 45° Bent Tube	
	<b>416</b> —FLC90L	Caterpillar Style O-Ring Flange (Code 62) - 90° Bent Tube Long Drop	<b>582</b> — MTON134SP90	Male SAE Tube O-Ring Nut w/R134a Service Port - 90° Bent Tube	
	<b>450</b> —TBFL	Two Bolt Flange (Code 61)	<b>583</b> — MTON	Male SAE Tube O-Ring Nut	
			<b>584</b> — MTON45	Male SAE Tube O-Ring Nut - 45° Bent Tube	
			<b>585</b> — MTON90	Male SAE Tube O-Ring Nut - 90° Bent Tube	
			<b>586</b> — FTONR12SP	Female SAE Tube O-Ring Nut Swivel w/R12 Service Port	
			<b>587</b> — FTONR12SP90	Female SAE Tube O-Ring Nut Swivel w/R12 Service Port- 90° Bent Tube	
			<b>588</b> —FTON134SP	Female SAE Tube O-Ring Nut Swivel w/R134a Service Port	
			<b>589</b> —FTON134SP90	Female SAE Tube O-Ring Nut Swivel - 90° Bent Tube w/R134a Service Port	
			<b>590</b> —FTON	Female SAE Tube O-Ring Nut Swivel	
			<b>591</b> —FTON45	Female SAE Tube O-Ring Nut Swivel - 45° Bent Tube	



# Gates Global Part Numbering System

## Thread Configurations – continued

<b>592</b> —FTON90	Female SAE Tube O-Ring Nut Swivel - 90° Bent Tube	<b>800</b> —FBSPT	Japanese Tapered Thread
<b>593</b> —FTOMN	Female SAE Tube O-Ring Metric Nut Swivel		Female British Standard Pipe Tapered / Japanese Tapered Thread
<b>594</b> —FTOMN45	Female SAE Tube O-Ring Metric Nut Swivel - 45° Bent Tube	<b>810</b> —MBSPP	Male British Standard Pipe Parallel
<b>595</b> —FTOMN90	Female SAE Tube O-Ring Metric Nut Swivel - 90° Bent Tube	<b>811</b> —MBSPPLN	Male British Standard Pipe Parallel Long Nose
<b>596</b> —FTON90BL Block	Female SAE Tube O-Ring Nut Swivel - 90° Bent Tube	<b>830</b> —FBSPORX	Female British Standard Parallel Pipe O-Ring Swivel
<b>597</b> —MIO	Male Inverted O-Ring	<b>831</b> —FBSPORX45	Female British Standard Parallel Pipe O-Ring Swivel - 45° Bent Tube
<b>598</b> —MIO45	Male Inverted O-Ring - 45° Bent Tube	<b>832</b> —FBSPORX90	Female British Standard Parallel Pipe O-Ring Swivel - 90° Bent Tube
<b>599</b> —MIO90	Male Inverted O-Ring - 90° Bent Tube	<b>845</b> —FBSPORX90BL	Female British Standard Parallel Pipe O-Ring Swivel - 90° Block
<b>600</b> —MIOBKHD	Male Inverted O-Ring Bulkhead	<b>847</b> —FBX90BLK	Female British Standard Pipe Parallel - 90° Block
<b>601</b> —MIOBKHD45	Male Inverted O-Ring Bulkhead - 45° Bent Tube	<b>850</b> —BSPBJ	BSPP Banjo
<b>602</b> —MIOBKHD90	Male Inverted O-Ring Bulkhead - 90° Bent Tube	<b>855</b> —FBFFX	Female British Flat-Face Swivel
<b>604</b> —FTDON	Female Tube Dual O-Ring Nut Swivel	<b>904</b> —MK	Male Komatsu
<b>605</b> —FTDON45	Female Tube Dual O-Ring Nut Swivel - 45° Bent Tube	<b>910</b> —FKX	Female Komatsu Style Japanese Metric Swivel
<b>606</b> —FTDON90	Female Tube Dual O-Ring Nut Swivel - 90° Bent Tube	<b>911</b> —FKX45	Female Komatsu Style Japanese Metric Swivel - 45° Bent Tube
<b>607</b> —FTDOMN	Female Tube Dual O-Ring Metric Nut Swivel	<b>913</b> —FKX90	Female Komatsu Style Japanese Metric Swivel - 90° Bent Tube
<b>608</b> —FTDOMN45	Female Tube Dual O-Ring Metric Nut Swivel - 45° Bent Tube	<b>930</b> —FJISX	Female Japanese Industrial Standard Swivel
<b>609</b> —FTDOMN90	Female Tube Dual O-Ring Metric Nut Swivel - 90° Bent Tube	<b>935</b> —MMFA	Male Metric Flareless Assembly
<b>610</b> —FTON180	Female Tube O-Ring Nut Swivel 180°	<b>947</b> —FSLTORSP	Female (Ford) Spring Lock "T" O-Ring Splicer
<b>611</b> —MIO134SP	Male Inverted O-Ring w/R134a Service Port	<b>948</b> —FSLSP	Female (Ford) Spring Lock Liquid Line Splicer
<b>612</b> —MIO134SP45	Male Inverted O-Ring Bulkhead w/R134a Service Port - 45° Bent Tube	<b>949</b> —MSL45	Male (Ford) Spring Lock - 45° Bent Tube
<b>613</b> —MIO134SP90	Male Inverted O-Ring w/R134a Service Port - 90° Bent Tube	<b>950</b> —MSL	Male (Ford) Spring Lock
<b>614</b> —TORSP	Universal T-Splitters English Threads	<b>951</b> —MSL90	Male (Ford) Spring Lock - 90° Bent Tube
<b>615</b> —MDL	Male DIN Light Series 24° Inverted Cone	<b>952</b> —FSL	Female (Ford) Spring Lock
<b>645</b> —FDLORX	Female DIN Light Series O-Ring Swivel 24° Cone	<b>953</b> —FSL90	Female (Ford) Spring Lock - 90° Bent Tube
<b>650</b> —FDLORX45	Female DIN Light Series O-Ring Swivel 24° Cone - 45° Bent Tube	<b>954</b> —R12SP Port	Hose Splicer w/R12 7/16-20 Thread Service Port
<b>655</b> —FDLORX90	Female DIN Light Series O-Ring Swivel 24° Cone - 90° Bent Tube	<b>955</b> —FSL45	Female (Ford) Spring Lock - 45° Bent Tube
<b>670</b> —FDFFX	Female DIN Flat-Face Swivel	<b>956</b> —R134SP	Hose Splicer w/R134A Service Port
<b>675</b> —MFG	Male French GAZ	<b>957</b> —R134SPRL	Female Rotalok w/R134a Service Port - 90° Block
<b>680</b> —FFGX	Female French GAZ Swivel	<b>958</b> —CFTON90	Compressor Female Tube O-Ring Nut - 90° Bent Tube
<b>685</b> —FFGX45	Female French GAZ Swivel - 45° Bent Tube	<b>959</b> —CFTON90BL	Compressor Female Tube O-Ring Nut - 90° Block
<b>690</b> —FFGX90	Female French GAZ Swivel - 90° Bent Tube	<b>960</b> —CFTON134SP90BL	Compressor Female Tube O-Ring Nut w/ R134A Service Port - 90° Block
<b>715</b> —MDH	Male DIN Heavy Series 24° Inverted Cone	<b>961</b> —CBSR12SP90	Compressor Pad Block - Single With Switch or Service Port
<b>720</b> —FDHORX	Female DIN Heavy Series O-Ring Swivel 24° Cone	<b>962</b> —CBSRR12SP90	Compressor Pad Block - Single Reversed With Switch or Service Port
<b>725</b> —FDHORX45	Female DIN Heavy Series O-Ring Swivel 24° Cone - 45° Bent Tube		
<b>730</b> —FDHORX90	Female DIN Heavy Series O-Ring Swivel 24° Cone - 90° Bent Tube		
<b>735</b> —MKB	Metric Kobelco		
<b>750</b> —MSP	Metric Stand Pipe		
<b>751</b> —MSP45	Metric Stand Pipe - 45° Bent Tube		
<b>752</b> —MSP90	Metric Stand Pipe - 90° Bent Tube		
<b>795</b> —MBSPT	Male British Standard Pipe Tapered /		

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PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



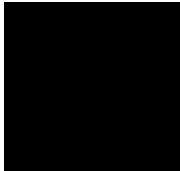


# Gates Global Part Numbering System

## Air Brake

In the following example, the Global Part Number G31100-0808 identifies a SureLok™ Male Pipe (MP) coupling with -8 (1/2") tube size and -8 (1/2") thread size.

# G 31 1 0 0 - 0 8 0 8



Thread Size (1/2")

Stem Size (1/2")

Thread Configuration (see below)

Series Stem Style (see below)

### Series Stem Styles:

**G31** — SureLok™ Fittings (Description = AB)

**G32** — Compression Fittings (Description = ABC)

**G33** — Air Brake Fittings for Rubber Hose (Description = ABR)

### Thread Configurations

*These three-digit numbers identify the various coupling thread configurations*

021 — MP-ATDV	Air Tank Drain Valve	302 — AB-AB-BKHDL	Air Brake Bulkhead – Long
027 — MP-CV	One Way Check Valve	350 — AB-MFA-BKHD	Air Brake to Male Flareless Assembly Bulkhead
030 — MAB-MP	Air Brake Adapter	360 — AB-FP-BKHD	Air Brake to Female Pipe Bulkhead
031 — GH	Glad Hand	377 — AB-GH-BKHD	Air Brake to Glad Hand Bulkhead
032 — GHS	Gladhand Seal	400 — AB-AB	Air Brake Union
040 — TSI-AB	Tube Sleeve Insert	404 — AB-AB90	Air Brake Union - 90°
050 — TS-AB	Tube Sleeve	450 — AB-AB-AB	Air Brake Union - Tee
060 — TSN-AB	Tube Sleeve Nut	451 — AB-AB-AB	Air Brake Union - Tee Jump UP
061 — SGN-ABR	Spring Guard Nut	452 — AB-AB-AB	Air Brake Union - Tee Jump DOWN
100 — AB-MP	Air Brake to Male Pipe (NPTF - 30° Cone Seat)	453 — AB-AB-AB	Air Brake Union - Tee with Bracket
102 — AB-MP45	Air Brake to Male Pipe - 45°	601 — AB-MP-TV	Air Brake to Male Pipe Truck Valve - 90°
104 — AB-MP90	Air Brake to Male Pipe - 90°	602 — MP-ABC-TV	Male Pipe to Air Brake Truck Valve - 90°
105 — AB-MP-Port90	Air Brake to Male Pipe - 90° with Port	610 — MP-MS90-TV	Male Pipe to Male SAE 45° Flare Truck Valve - 90°
110 — ABRSG-MP	Air Brake to Male Pipe with Spring Guard	612 — MS-MP90-TV	Male SAE 45° Flare to Male Pipe Truck Valve - 90°
111 — ABRI-MP	Air Brake to Male Pipe without Nut	620 — SB-MP90-TV	Single Bead Male Pipe Truck Valve - 90°
112 — SGABR	Air Brake Spring Guard	622 — SB-MP90-TVP	Single Bead Male Pipe Truck Valve with Pin Handle - 90°
122 — AB-MPX45	Air Brake to Male Pipe Swivel - 45°	630 — FP-MP90-TV	Female Pipe to Male Pipe Truck Valve - 90°
124 — AB-MPX90	Air Brake to Male Pipe Swivel - 90°	650 — MP-FP-FP3WTV	3-Way Truck Valve
130 — MP-AB-AB	Male Pipe to Air Brake - Tee	655 — FP-FP-FP4WTV	4-Way Truck Valve – Short Handle
131 — MP-AB-AB	Male Pipe to Air Brake - Tee Jump UP	656 — FP-FP-FP4WTV-L	4-Way Truck Valve – Long Handle
132 — MP-AB-AB	Male Pipe to Air Brake - Tee Jump DOWN	701 — MFA-MFASC	Male Flareless Assembly to Male Flareless Assembly Shut-Off Cock
134 — AB-AB-MP	Air Brake to Male Pipe - Tee		Male Flareless Assembly to Male Pipe Shut-Off Cock
135 — AB-AB-MP	Air Brake to Male Pipe - Tee Jump UP	705 — MFA-MPSC	Male Pipe to Female Pipe Shut-Off Cock
136 — AB-AB-MP	Air Brake to Male Pipe - Tee Jump DOWN	710 — MP-FPSC	Female Pipe to Female Pipe Shut-Off Cock
138 — AB-AB-MP45	Air Brake to Male Pipe - Tee - 45°	715 — FP-FPSC	Male SAE 45° Flare to Male Pipe Shut-Off Cock
140 — MPX-AB-AB	Male Pipe Swivel to Air Brake - Tee	720 — MS-MPSC	Male SAE 45° Flare to Male SAE 45° Flare Shut-Off Cock
142 — AB-AB-MPX	Air Brake to Male Pipe Swivel - Tee	730 — MS-MSSC	
150 — AB-FP	Air Brake to Female Pipe		
151 — ABR-FP	Air Brake to Female Pipe with Adapter	801 — MP-ADC	Male Pipe Air Drain Cock
154 — AB-FP90	Air Brake to Female Pipe - 90°	805 — FP-MPADC	Female Pipe to Male Pipe Air Drain Cock
160 — AB-AB-FP	Air Brake to Female Pipe - Tee	832 — MP-ADCBN	Male Pipe Air Drain Cock – Bibb Nose
167 — MP-AB-FP	Male Pipe to Air Brake to Female Pipe - Tee	850 — ATNKV	Air Tank Valve
300 — AB-AB-BKHD	Air Brake Bulkhead	970 — AB-MAN	6-Port Manifold
301 — AB-AB-BKHDS	Air Brake Bulkhead – Short		





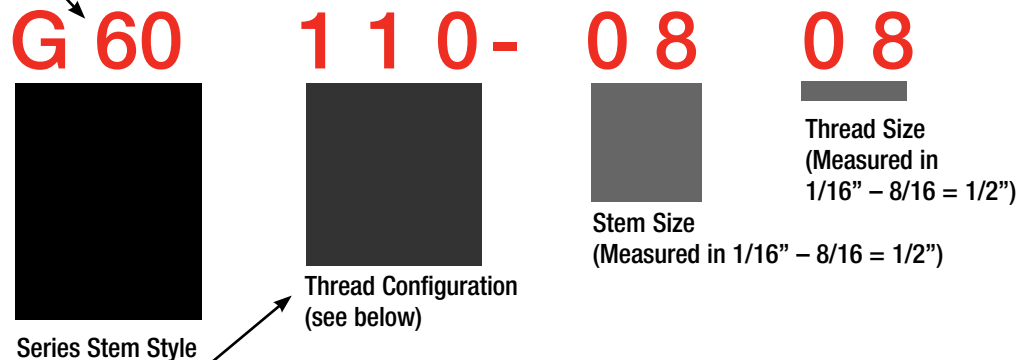
# Gates Global Part Numbering System

## Adapters

In the following example, the Global Part Number G60110-0808 identifies a Male Pipe NPTF (MP) to Male Pipe NPTF (MP) adapter with -8 (1/2") pipe thread and -8 (1/2") pipe thread size. **Meets SAE100R2 working pressures except where noted.**

### Series Stem Styles:

G60—SAE to SAE    G62—British to SAE    G63—Metric to SAE    G64—International to International    G65—Japanese Conversion



### Thread Configurations

These three-digit numbers identify the various coupling thread configurations

#### SAE to SAE

<b>60050</b> —FFN	Female Flareless Nut
<b>60051</b> —FFS	Female Flareless Sleeve
<b>60102</b> —MP-PLUG	Male Pipe NPTF Plug
<b>60110</b> —MP-MP	Male Pipe NPTF to Male Pipe NPTF
<b>60115</b> —MP-MP90	Male Pipe NPTF to Male Pipe NPTF - 90°
<b>60130</b> —MP-FPS	Male Pipe NPTF to Female Pipe NPTF Reducer Bushing - Short
<b>60132</b> —MP-FPL	Male Pipe NPTF to Female Pipe NPTF Increasing Bushing - Long
<b>60136</b> —MP-FP90	Male Pipe NPTF to Female Pipe NPTF - 90°
<b>60140</b> —MP-FPX	Male Pipe NPTF to Female Pipe Swivel NPSM
<b>60142</b> —MP-FPX45	Male Pipe NPTF to Female Pipe Swivel NPSM - 45°
<b>60144</b> —MP-FPX90	Male Pipe NPTF to Female Pipe Swivel NPSM - 90°
<b>60152</b> —FP-FP	Female Pipe NPTF to Female Pipe NPTF
<b>60156</b> —FP-FP90	Female Pipe NPTF to Female Pipe NPTF - 90°
<b>60160</b> —FP-FPX	Female Pipe NPTF to Female Pipe Swivel NPSM
<b>60162</b> —FP-FPX45	Female Pipe NPTF to Female Pipe Swivel NPSM - 45°
<b>60164</b> —FP-FPX90	Female Pipe NPTF to Female Pipe Swivel NPSM - 90°
<b>60181</b> —FP-FP-FP	Female Pipe NPTF - Tee
<b>60183</b> —FP-FP-MP	Female Pipe NPTF on Run to Male Pipe NPTF - Tee
<b>60184</b> —FPX-FPX-FPX	Female Pipe Swivel NPSM - Tee
<b>60186</b> —FPX-FPX-MP	Female Pipe Swivel NPSM on Run to Male Pipe NPTF - Tee
<b>60248</b> —OR	O-Rings for Straight Thread Boss Fittings
<b>60250</b> —MB-PLUG	Male O-Ring Boss Plug
<b>60275</b> —MB-FP	Male O-Ring Boss to Female Pipe NPTF
<b>60285</b> —MB-FPX	Male O-Ring Boss to Female Pipe Swivel NPTF
<b>60287</b> —MB-FPX45	Male O-Ring Boss to Female Pipe Swivel NPTF - 45°
<b>60289</b> —MB-FPX90	Male O-Ring Boss to Female Pipe Swivel NPTF - 90°
<b>60291</b> —FB-MP	Female O-Ring Boss to Male Pipe NPTF
<b>60301</b> —MB-MJ	Male O-Ring Boss to Male JIC 37° Flare
<b>60308</b> —MB-MJ45	Male O-Ring Boss to Male JIC 37° Flare - 45°
<b>60312</b> —MB-MJ90	Male O-Ring Boss to Male JIC 37° Flare - 90°
<b>60350</b> —MJ-MJ-MB	Male JIC 37° Flare on Run to Male O-Ring Boss - Tee
<b>60352</b> —MB-MJ-MJ	Male O-Ring Boss to Male JIC 37° Flare to Male JIC 37° Flare - Tee
<b>60394</b> —TS	Tube Sleeve
<b>60395</b> —TSN	Tube Sleeve Nut
<b>60399</b> —LN	Locknuts for Bulkhead Fittings
<b>60401</b> —FJ-CAP	Female JIC 37° Flare Cap
<b>60402</b> —MJ-PLUG	Male JIC 37° Flare Plug
<b>60405</b> —MJ-FBO	Male JIC 37° Flare to Female Braze-On

<b>60410</b> —MJ-MJ	Male JIC 37° Flare to Male JIC 37° Flare
<b>60420</b> —MJ-FJ	Male JIC 37° Flare to Female JIC 37° Flare
<b>60422</b> —MJ-FJX	Male JIC 37° Flare to Female JIC 37° Flare Swivel
<b>60424</b> —MJ-FJX45	Male JIC 37° Flare to Female JIC 37° Flare - 45°
<b>60445</b> —MJ-BKHD	Male JIC 37° Flare to Male JIC 37° Flare Bulkhead
<b>60446</b> —MJ-BKHD45	Male JIC 37° Flare to Male JIC 37° Flare Bulkhead - 45°
<b>60447</b> —MJ-BKHD90	Male JIC 37° Flare to Male JIC 37° Flare Bulkhead - 90°
<b>60469</b> —MJ-MJ-MJ	Male JIC 37° Flare - Tee
<b>60470</b> —MJ-MJ-FJX	Male JIC 37° Flare on Run to Female JIC 37° Flare Swivel - Tee
<b>60471</b> —MJ-MJ-MJBKHD	Male JIC 37° Flare on Run to Male JIC 37° Flare Bulkhead - Tee
<b>60472</b> —MJ-MJBKHD-MJ	Male JIC 37° Flare to Male JIC 37° Flare Bulkhead to Male JIC 37° Flare - Tee
<b>60473</b> —MJ-FJX-MJ	Male JIC 37° Flare to Female JIC 37° Flare Swivel to Male JIC 37° Flare - Tee
<b>60490</b> —MJ-MP	Male JIC 37° Flare to Male Pipe NPTF
<b>60497</b> —MJ-MP45	Male JIC 37° Flare to Male Pipe NPTF - 45°
<b>60499</b> —MJ-MP90	Male JIC 37° Flare to Male Pipe NPTF - 90°
<b>60510</b> —MJ-FP	Male JIC 37° Flare to Female Pipe NPTF
<b>60514</b> —MJ-FP90	Male JIC 37° Flare to Female Pipe NPTF - 90°
<b>60520</b> —FJX-MP	Female JIC 37° Flare Swivel to Male Pipe NPTF
<b>60524</b> —FJX-MP90	Female JIC 37° Flare Swivel to Male Pipe NPTF - 90°
<b>60530</b> —FJX-FP	Female JIC 37° Flare Swivel to Female Pipe NPTF
<b>60541</b> —MJBKHD-MP	Male JIC 37° Flare Bulkhead to Male Pipe NPTF
<b>60551</b> —MJ-MJ-MP	Male JIC 37° Flare on Run to Male Pipe NPTF - Tee
<b>60650</b> —MS-MP	Male SAE 45° Flare to Male Pipe NPTF - Brass
<b>60654</b> —MS-MP90	Male SAE 45° Flare to Male Pipe NPTF - Brass - 90°
<b>60660</b> —MS-FP	Male SAE 45° Flare to Female Pipe NPTF - Brass
<b>60664</b> —MS-FP90	Male SAE 45° Flare to Female Pipe NPTF - Brass - 90°
<b>60698</b> —ORFF	O-Rings for Flat Face Fittings
<b>60701</b> —FF-CAP	Female Flat-Face O-Ring Cap
<b>60702</b> —MFFOR-PLUG	Male Flat-Face O-Ring Plug
<b>60724</b> —MFFOR-MFFORX90	Male Flat-Face O-Ring to Female Flat-Face Swivel - 90°
<b>60742</b> —MFFOR-MFFOR-FFORX	Male Flat-Face O-Ring on Run to Female Flat-Face Swivel - Tee
<b>60770</b> —MFFOR-MP	Male Flat-Face O-Ring to Male Pipe NPTF
<b>60800</b> —MFFOR-MB	Male Flat-Face O-Ring to Male O-Ring Boss
<b>60801</b> —MFFOR-MBL	Male Flat-Face O-Ring to Male O-Ring Boss - Long
<b>60805</b> —MFFOR-MB45	Male Flat-Face O-Ring to Male O-Ring Boss - 45°

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## Gates Global Part Numbering System — Adapters (Continued)

## Thread Configurations (Continued)

<b>60810</b> — MFFOR-MB90	Male Flat-Face O-Ring to Male O-Ring Boss — 90°
<b>60820</b> — MFFOR-MFFOR-MB	Male Flat-Face O-Ring on Run to Male O-Ring Boss — Tee
<b>60821</b> — MFFOR-MB-MFFOR	Male Flat-Face O-Ring to Male O-Ring Boss to Male Flat-Face O-Ring — Tee
<b>60880</b> — FFORX-MJ	Female Flat-Face O-Ring Swivel to Male JIC 37° Flare
<b>60897</b> — FL-CAP	Code 61 O-Ring Flange Cap
<b>60898</b> — FLOR	O-Rings for Code 61, Code 62 and Caterpillar-Style Flange Fittings
<b>60899</b> — CFHS	Flange Half Set (Code 61 — SAE J518)
<b>60900</b> — FL-MJ	Code 61 O-Ring Flange to Male JIC 37° Flare
<b>60901</b> — FL4K-MJ / FL5K-MJ	Code 61 O-Ring Flange to Male JIC 37° Flare High Pressure
<b>60905</b> — FL-MJ45	Code 61 O-Ring Flange to Male JIC 37° Flare—45°
<b>60906</b> — FL4K-MJ45 / FL5K-MJ45	Code 61 O-Ring Flange to Male JIC 37° Flare High Pressure — 45°
<b>60910</b> — FL-MJ90	Code 61 O-Ring Flange to Male JIC 37° Flare—90°
<b>60911</b> — FL4K-MJ90 / FL5K-MJ90	Code 61 O-Ring Flange to Male JIC 37° Flare High Pressure — 90°
<b>60915</b> — FL4K-MFFOR / FL5K-MFFOR	Code 61 O-Ring Flange to Male Flat-Face O-Ring High Pressure
<b>60920</b> — FL4K-MFFOR45 / FL5K-MFFOR45	Code 61 O-Ring Flange to Male Flat-Face O-Ring High Pressure— 45°
<b>60925</b> — FL4K-MFFOR90 / FL5K-MFFOR90	Code 61 O-Ring Flange to Male Flat-Face O-Ring High Pressure— 90°
<b>60927</b> — FLH-CAP	Code 62 O-Ring Flange Cap
<b>60929</b> — FHHS	Flange Half Set (Code 62 — SAE J518)
<b>60930</b> — FLH6K-MJ	Code 62 O-Ring Flange Heavy to Male JIC 37° Flare (6,000 PSI)
<b>60935</b> — FLH6K-MJ45	Code 62 O-Ring Flange Heavy to Male JIC 37° Flare — 45° (6,000 PSI)
<b>60940</b> — FLH6K-MJ90	Code 62 O-Ring Flange Heavy to Male JIC 37° Flare - 90° (6,000 PSI)
<b>60945</b> — FLH6K-MFFOR / FLH6K-MFFOR	Code 62 O-Ring Flange Heavy to Male Flat-Face O-Ring (6,000 PSI)
<b>60950</b> — FLH4K-MFFOR45 / FLH6K-MFFOR45	Code 62 O-Ring Flange Heavy to Male Flat-Face O-Ring - 45° (6,000 PSI)
<b>60955</b> — FLH4K-MFFOR90 / FLH6K-MFFOR90	Code 62 O-Ring Flange Heavy to Male Flat-Face O-Ring - 90° (6,000 PSI)
<b>60959</b> — CATFHS	Caterpillar-Style Flange Halve Sets

## British Conversion to SAE

<b>62150</b> — MBSPT-MJ	Male British Standard Pipe Tapered Thread to Male JIC 37° Flare
<b>62153</b> — MBSPT-MJ45	Male British Standard Pipe Tapered Thread to Male JIC 37° Flare — 45°
<b>62155</b> — MBSPT-MJ90	Male British Standard Pipe Tapered Thread to Male JIC 37° Flare — 90°
<b>62200</b> — MBSPP-MP	Male British Standard Pipe Parallel to Male Pipe NPTF
<b>62220</b> — MBSPP-FP	Male British Standard Pipe Parallel to Female Pipe NPTF
<b>62300</b> — MBSPP-MJ	Male British Standard Pipe Parallel to Male JIC 37° Flare
<b>62305</b> — MBSPP-MJ45	Male British Standard Pipe Parallel to Male JIC 37° Flare — 45°
<b>62310</b> — MBSPP-MJ90	Male British Standard Pipe Parallel to Male JIC 37° Flare — 90°
<b>62320</b> — MBSPP-FJX	Male British Standard Pipe Parallel to Female JIC 37° Flare Swivel
<b>62450</b> — MBSPPOR-MJ	Male British Standard Pipe Parallel with O-Ring to Male JIC 37° Flare
<b>62460</b> — MBSPPOR-MJ90	Male British Standard Pipe Parallel with O-Ring to Male JIC 37° Flare — 90°
<b>62470</b> — MBSPPOR-MFFOR	Male British Standard Pipe Parallel with O-Ring to Male Flat-Face O-Ring

**62473** — MBSPPOR-MFFOR45

Male British Standard Pipe Parallel with O-Ring to Male Flat-Face O-Ring — 45°

**62475** — MBSPPOR-MFFOR90

Male British Standard Pipe Parallel with O-Ring to Male Flat-Face O-Ring — 90°

**62500** — FBSPP-MP

Female British Standard Pipe Parallel to Male Pipe NPTF

**62520** — FBSPP-FP

Female British Standard Pipe Parallel to Female Pipe NPTF

**62550** — FBSPP-MJ

Female British Standard Pipe Parallel to Male JIC 37° Flare

**62605** — FBSPPX-MP90

Female British Standard Pipe Parallel Swivel to Male Pipe NPTF — 90°

**62650** — FBSPPX-MJ

Female British Standard Pipe Parallel Swivel to Male JIC 37° Flare

**62660** — FBSPPX-FJX

Female British Standard Pipe Parallel Swivel to Female JIC 37° Flare Swivel

**62750** — FBSPPX-MJ

Female British Standard Pipe Parallel Swivel to Male JIC 37° Flare

**62801** — FBFFOR-MJ

Female British Flat-Face O-Ring to Male JIC 37° Flare

## Metric Conversion

**63099** — MM-PLUG

Male Metric O-Ring Plug

**63120** — MM-FP

Male Metric with O-Ring to Female Pipe NPTF

**63150** — MM-MJ

Male Metric with O-Ring to Male JIC 37° Flare

**63160** — MM-MJ90

Male Metric with O-Ring to Male JIC 37° Flare—90°

**63350** — MDL-MJ

Male DIN 24° Cone — Light Series to

Male JIC 37° Flare  
Female DIN 24° Cone Swivel — Light Series to Male JIC 37° Flare

**63450** — FDLX-MJ

Male DIN 24° Cone — Heavy Series to Male JIC 37° Flare

**63650** — MDH-MJ

Female DIN 24° Cone Swivel — Heavy Series to Male JIC 37° Flare

**63750** — FDHX-MJ

Male Kobelco Plug

**63980** — MKB-PLUG

Male Kobelco to Male JIC 37° Flare

**63990** — MKB-MJ

## International to International

**64075** — BBDS

British Bonded Seal

**64094** — MBSPPOR-PLUG

Male British Standard Pipe Parallel with O-Ring Plug

**64095** — ORFBSPP

O-Rings for British Standard Parallel Pipe (BSPP Couplings)

**64097** — FBSPP-CAP

Female British Standard Pipe Parallel Cap

**64098** — MBSPT-PLUG

Male British Standard Pipe Tapered Plug

**64099** — MBSPP-PLUG

Male British Standard Pipe Parallel Plug

**64350** — MBSPP-FBSPPX

Male British Standard Pipe Parallel to Female British Standard Pipe Parallel Swivel

**64775** — MBDS

Metric Bonded Seal

**64780** — ORDINL

O-Rings for DIN Light Series (MegaCrimp® and GlobalSpiral™ Couplings)

**64781** — ORDINH

O-Rings for DIN Heavy Series (MegaCrimp® and GlobalSpiral™ Couplings)

**64782** — ORDIN

O-Rings for DIN Heavy Series (PC, PCM & PCS Couplings)

**64787** — BS

Metric Bite Sleeve

**64788** — MNL

Metric Bite Nut — Light

**64789** — MNH

Metric Bite Nut — Heavy

**64790** — MM-PLUG

Male Metric Plug

**64792** — MDL-PLUG

Male DIN 24° Cone — Light Series Plug

**64793** — FDL-CAP

Female DIN 24° Cone — Light Series Cap

**64794** — MDH-PLUG

Male DIN 24° Cone — Heavy Series Plug

**64795** — FDH-CAP

Female DIN 24° Cone — Heavy Series Cap

## Japanese Conversion

**65097** — FJIS-CAP

Female Japanese Industrial Standard Cap

**65099** — MJIS-PLUG

Male Japanese Industrial Standard Plug

**65100** — FJIS-MJ

Female Japanese Industrial Standard to Male 37° Flare

**65597** — FK-CAP

Female Komatsu Cap

**65599** — MK-PLUG

Male Komatsu Plug

**65600** — FK-MJ

Female Komatsu to Male JIC 37° Flare

**65700** — MK-MK

Male Komatsu to Male Komatsu

**65750** — MK-MJ

Male Komatsu to Male JIC 37° Flare

**65800** — MK-FK90

Male Komatsu to Female Komatsu — 90°

**65950** — MK-FK-MK

Male Komatsu to Female Komatsu to Male Komatsu — Tee





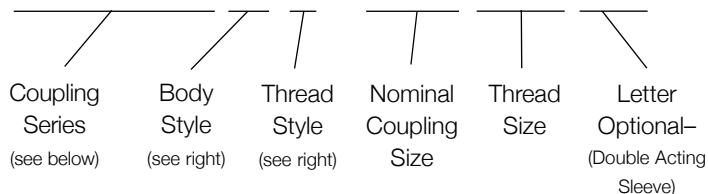
# Gates Global Part Numbering System

## Quick Disconnect Couplers

Gates Quick Disconnect couplers feature a meaningful part number that makes coupling identification fast and easy. Always refer to Gates Cross Reference Charts when selecting a quick disconnect coupler for a competitive interchange.

### G940 Series - Agricultural Standard—Ball Valve

**G94021-0808 D**



#### Body Style Identification

- 0 Assembly
- 1 Male Tip (Nipple)
- 2 Female Coupler
- 3 Repair Kit
- 5 O-Ring
- 6 Backup Ring
- 8 Dust Plug
- 9 Dust Cap

#### Thread Style

- 0 Not Applicable
- 1 Female Pipe
- 2 Female O-Ring Boss
- 3 Bulkhead Mounts
- 4 Female British Parallel Pipe

#### Miscellaneous

- D Double-Acting Sleeve
- P Connect-Under-Pressure Option

## Coupling Series Identification

- MQBA Male Quick Disconnect Ball Agricultural
- FQBA(DA) Female Quick Disconnect Ball Agricultural (Double Acting Sleeve)

### G941 Series - Agricultural Standard—Poppet Valve

- MQPA Male Quick Poppet Agricultural
- FQPA Female Quick Poppet Agricultural

### G942 Series - John Deere Old Style

- MQBAJD Male Quick Ball Agricultural John Deere
- FQBAJD Female Quick Ball Agricultural John Deere

### G943 Series - International Harvester Old Style

- MQBAIHC Male Quick Ball Agricultural International Harvester

### G944 Series - J.I. Case Old Style

- MQBAJIC Male Quick Ball Agricultural J.I. Case

### G945 Series - Industrial ISO 7241-1—Series B

- MQPI Male Quick Poppet Industrial
- FQPI Female Quick Poppet Industrial

### G949 Series - Flush Face, HTMA

- MQFF Male Quick Flush Face
- CPMQFF Male Quick Disconnect Flush Face (Connect-Under-Pressure)
- FQFF Female Quick Flush Face
- CPFQFF Female Quick Disconnect Flush Face (Connect-Under-Pressure)

### G950 Series - High Pressure Flush Face

- MQFFH Male Quick Flush Face (High Pressure)
- FQFFH Female Quick Flush Face (High Pressure)

### G951 Series - Wing Nut

- MQW Male Quick Wing
- FQW Female Quick Wing

### G952 Series - High Pressure Wing Nut

- MQWH Male Quick Wing (High Pressure)
- FQWH Female Quick Wing (High Pressure)

### G953 Series - Very High Pressure Flush Face

- MQFFVH Male Quick Flush Face (Very High Pressure)
- FQFFVH Female Quick Flush Face (Very High Pressure)

### G956 Series - Industrial ISO 7241-1—Series A

- MQP Male Quick Poppet
- FQP Female Quick Poppet

### G959 Series - Agricultural Adapters

- MJD John Deere Old Style
- MISO ISO Style
- MIHC International Harvester Style

#### Miscellaneous

- DA Double Acting Sleeve
- ISO Industrial Standards Organization
- DP Dust Plug
- DC Dust Cap
- DSO Double Shut Off
- FP Female Pipe
- FB Female O-Ring Boss
- QDAOR G940 Series O-Ring for Female Coupler
- QDIBR G945 Series Backup Ring for Female Coupler
- QDIOR G945 Series O-Ring for Female Coupler
- QDOR G956 Series O-Ring for Female Coupler
- QDBR G956 Series Backup Ring for Female Coupler

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



Powering Progress.

[gates.com/hydraulics](http://gates.com/hydraulics)

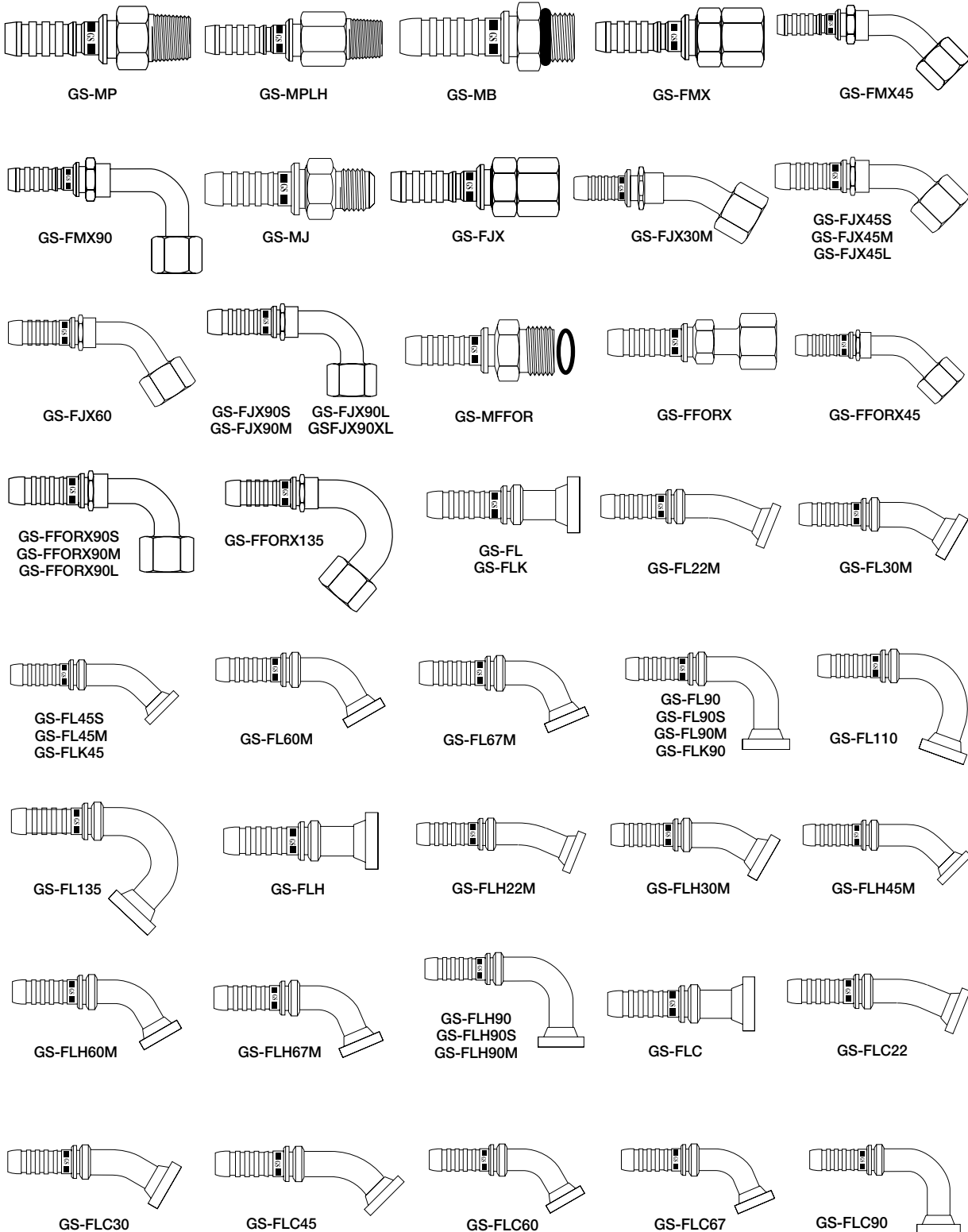
C49



## Coupling/Thread Configurations

### GlobalSpiral™ (GS) Couplings

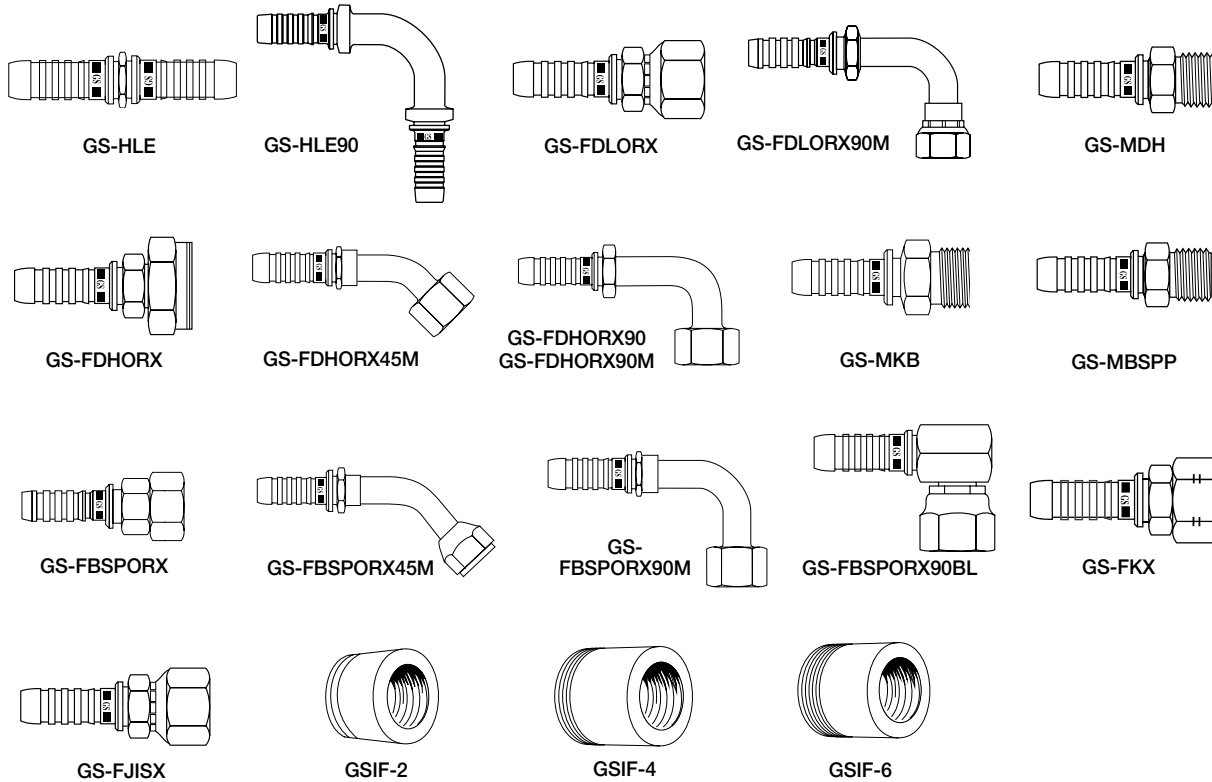
for EFG6K, G6K, EFG5K, G5K, EFG4K, G4K, EFG3K, and G3K Hose



# Coupling/Thread Configurations

## GlobalSpiral™ (GS) Couplings

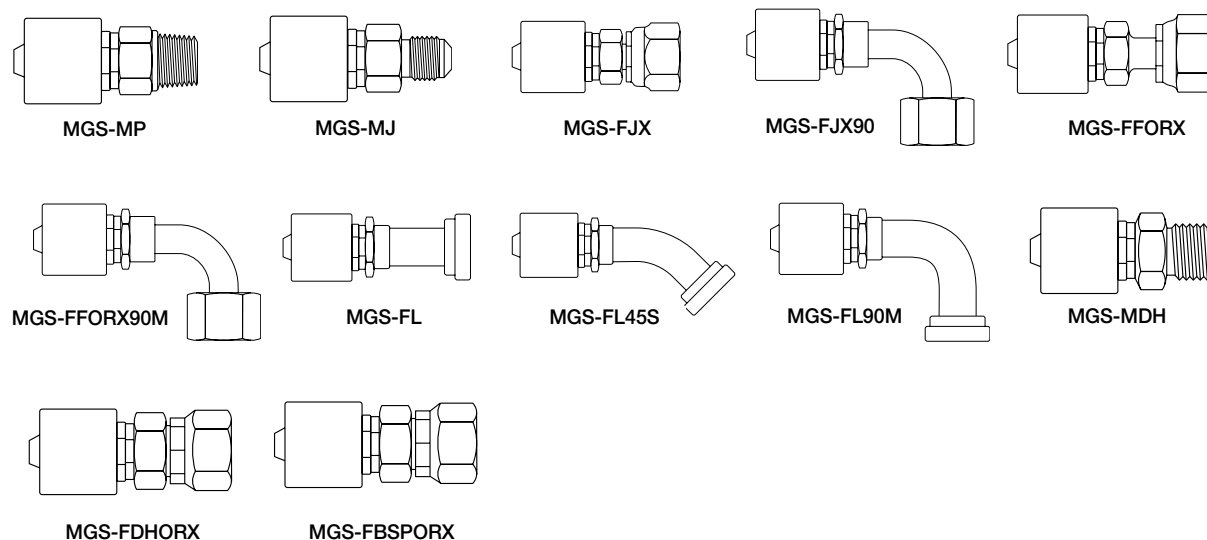
for EFG6K, G6K, EFG5K, G5K, EFG4K, G4K, EFG3K and G3K Hose (Continued)



## GlobalSpiral™ (GS) Couplings –

### One-Piece Couplings for Use with MobileCrimp® Crimpers

for EFG6K, G6K, EFG5K, G5K, EFG4K, G4K, EFG3K and G3K Hose



EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



Powering Progress.

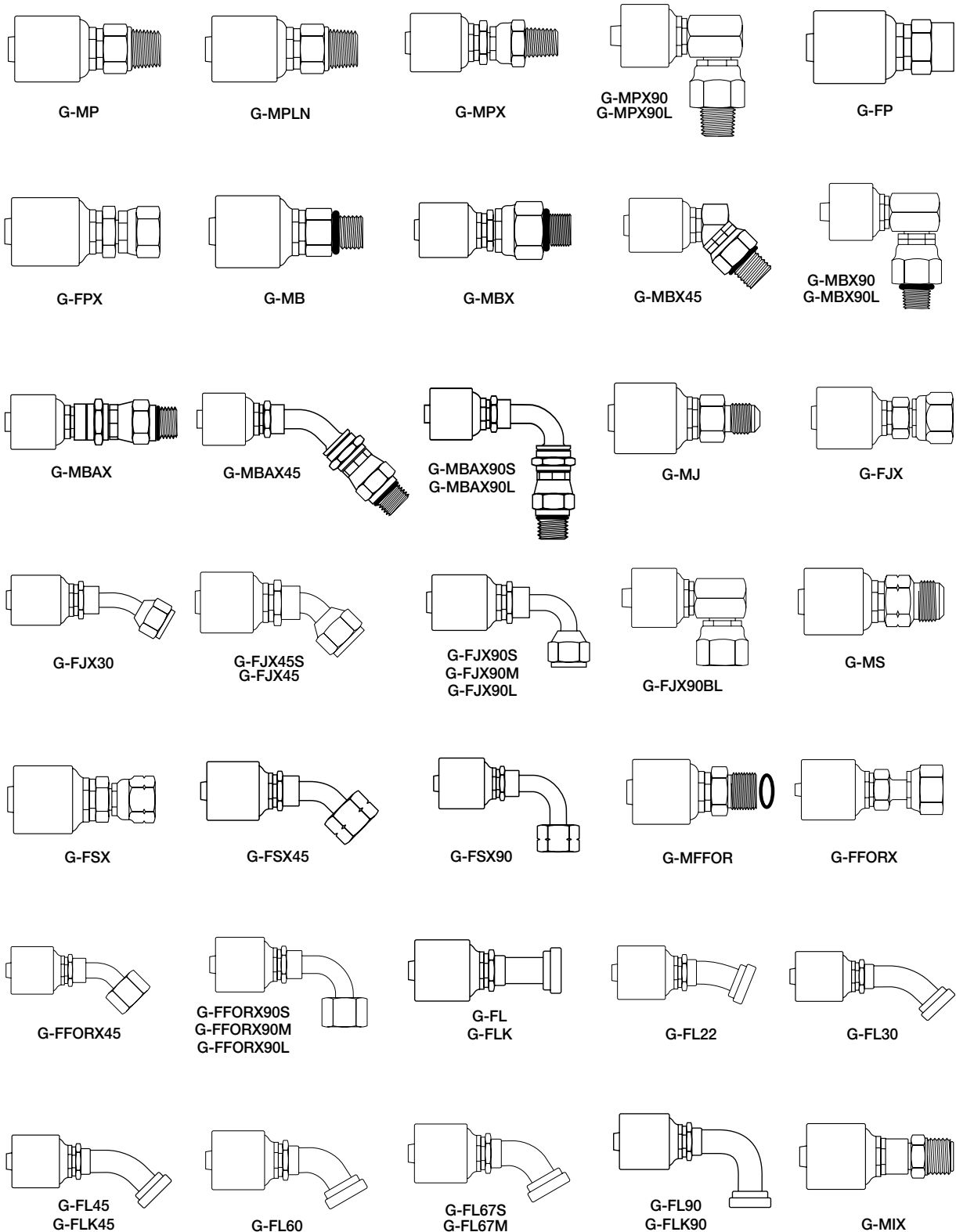
[gates.com/hydraulics](http://gates.com/hydraulics)

C51



## MegaCrimp® Couplings for High and Medium Pressure Hoses

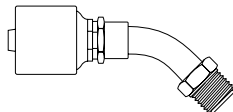
EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
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C14 COUPLINGS
PCTS THERMO- PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



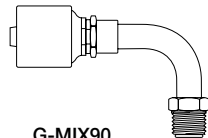
# Coupling/Thread Configurations

## MegaCrimp® Couplings

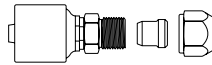
for High and Medium Pressure Hoses (Continued)



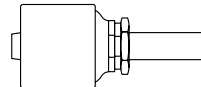
G-MIX45



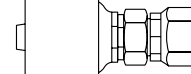
G-MIX90



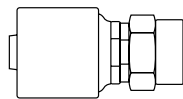
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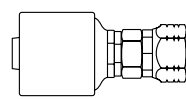
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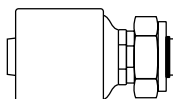
G-FABX



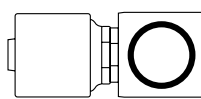
G-FG



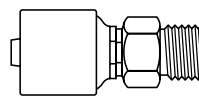
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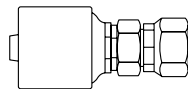
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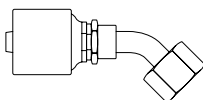
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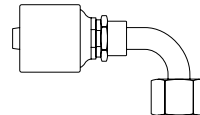
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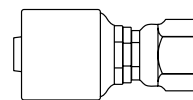
G-FDLORX



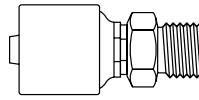
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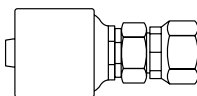
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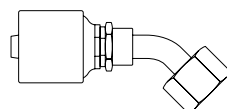
G-FFGX



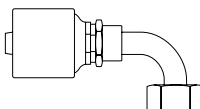
G-MDH



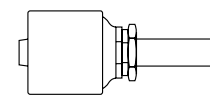
G-FDHORX



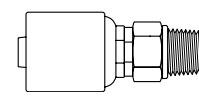
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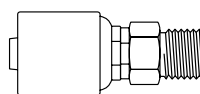
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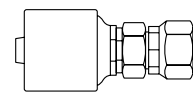
G-MLSP



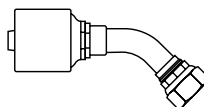
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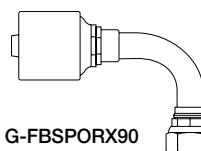
G-MBSPP



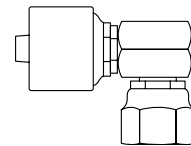
G-FBSPORX



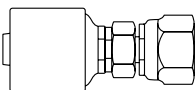
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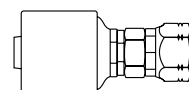
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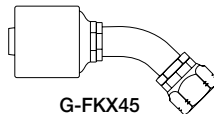
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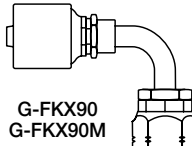
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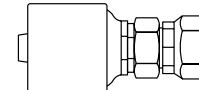
G-FKX



G-FKX45  
G-FKX45M



G-FKX90  
G-FKX90M



G-FJISX

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EQUIPMENT
HOSE/CPLG. SELECTION
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GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
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## Chemical Resistance Ratings for Gates Hose Polymers, Couplings and Adapter Materials

The Chemical Resistance Table lists the relative resistance of hose and coupling materials to more common chemicals. These ratings do not cover all possible variations of all factors, such as temperature, concentration, degradation or fluid contamination, etc. Testing under actual conditions is the best way to ensure chemical compatibility for critical applications.

*For specific information, contact Gates Hose/Connector Product Application, Denver, Colorado.*

### Rating Scale

- "1"** Excellent resistance
- "2"** Good resistance
- "X"** Not recommended
- "—"** Testing recommended

### How to Use the Chemical Resistance Table

1. Chemicals are listed alphabetically.
2. Find the hose, coupling and adapter material type that has a resistance rating of "1" or "2" (See Rating Scale).
3. Find hose(s) with compatible polymer(s) in the Gates Hydraulic Hose Selection Guide.
4. Look for compatible couplings for the selected hose(s) by following the hose page references in the Selection Guide.

**NOTE:** O-rings used with couplings also must be considered for chemical compatibility with the fluid to be conveyed. This includes couplings containing internal O-rings; for example, MPX (Male Pipe Swivel). Gates standard O-ring is made of Nitrile. If O-rings other than Nitrile are required, contact Gates Hose/Connector Product Application at 303-744-5070.





# Chemical Resistance Table

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters				
	Trade Names						Carbon Steel Stainless Steel 304 Stainless Steel 316 Aluminum Brass				
	A	C	C <sub>2</sub>	J	Z						
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)					
Chemical Name											
<b>A</b>											
Absorption Oil	2	1	2	1	2	-	1	1	-	-	-
Acetaldehyde	X	X	X	-	X	1	1	2	1	1	1
Acetamide	1	2	-	-	X	1	-	-	-	-	-
Acetic Acid, 5-20%	2	X	2	1	2	X	1	1	X	2	2
Acetic Acid, 25%	2	X	2	1	2	-	1	X	X	2	2
Acetic Acid, 30%	2	X	-	1	-	-	1	2	X	2	1
Acetic Acid, 50%	2	X	2	1	-	-	1	2	X	2	2
Acetic Acid, 50% Boiling	X	X	-	-	-	1	X	X	X	2	-
Acetic Acid, 80%	X	X	-	-	-	1	X	X	2	2	X
Acetic Acid, 80% Boiling	X	X	-	-	-	1	X	X	2	X	X
Acetic Acid, 100%	X	X	-	-	-	1	X	X	2	2	X
Acetic Acid, 100% Boiling	X	X	-	-	-	X	1	X	X	2	-
Acetic Acid, 100% (Hot) Vapors	2	2	-	-	-	-	X	X	2	2	X
Acetic Acid, Air Free	-	-	-	-	-	1	-	X	X	X	-
Acetic Acid, Anhydride	X	X	X	1	2	-	1	X	X	2	2
Acetic Acid, Areated	-	-	-	-	-	1	-	X	X	X	-
Acetic Acid, Crude	X	X	-	-	-	1	1	X	2	1	2
Acetic Acid, Glacial	X	X	X	1	X	X	1	X	X	2	2
Acetone (Dimethylketone)	X	X	X	1	X	X	1	1	1	1	1
Acetonitrile (Methyl Cyanide)	2	X	2	1	2	-	-	-	-	-	-
Acetylene	2	2	1	1	-	-	1	1	1	1	2
Acrylonitrile (Vinyl Cyanide)	X	X	X	1	X	-	-	1	1	2	1
Aero Lubriplate	1	1	-	-	-	-	-	1	1	1	1
Aero-Safe 2300	X	X	-	-	-	X	-	1	1	1	1
Aeroshell Type 1A, 1AC, 4	2	1	-	-	-	1	-	-	-	-	-
Aeroshell 7AGrease	2	1	-	-	-	X	-	1	1	1	1
Aeroshell 17 Grease	2	1	-	-	-	X	-	1	1	1	-
Aeroshell 750	X	2	-	-	-	X	-	1	1	1	-
Air, Ambient	1	1	1	1	1	1	1	1	1	1	1
Air, 150°F	1	1	1	1	1	1	1	1	1	1	1
Air, 180°F	2	2	2	1	2	2	1	1	1	1	1
Air, 200°F	X	X	X	1	X	2	1	2	1	1	1
Aircraft Hyd. Oil AA	-	1	-	-	-	-	-	1	1	1	1
Alcohol	1	1	-	-	-	1	-	1	1	1	1
Alcohol, Amyl	2	2	-	-	-	1	1	-	2	1	-
Alcohol, Benzyl	X	X	-	1	2	2	1	-	1	1	-
Alcohol, Butyl	2	X	2	-	2	1	1	1	1	1	1
Alcohol, Denatured	1	1	-	-	1	-	1	1	1	1	1
Alcohol, Diacetone	-	X	-	-	2	-	1	-	1	1	1
Alcohol, Ethyl (Ethanol)	1	1	1	1	1	2	1	1	1	1	2
Alcohol, Furfural	2	X	X	1	2	-	1	-	2	1	1
Alcohol, Hexyl (Hexanol)	2	1	-	-	X	-	1	-	1	1	2
Alcohol, Isobutyl	2	2	-	-	1	-	1	1	1	1	2
Alcohol, Isopropyl (Isopropanol)	2	2	2	-	2	2	1	1	1	1	2
Alcohol, Methyl (100%) (Methanol)	1	1	1	1	1	-	1	1	1	1	2
Alcohol, Methyl (6%)	1	1	1	-	1	-	1	1	1	1	2
Alcohol, Octyl	2	2	-	-	-	1	1	1	1	1	-
Alcohol, Propyl	1	1	-	-	-	1	X	2	1	1	1
Alkylene	X	X	X	-	X	X	-	1	1	-	-
Aluminum Chloride	1	1	1	1	1	2	1	X	2	2	X
Aluminum Fluoride	1	1	1	1	1	2	1	X	2	2	X
Aluminum Hydroxide	1	1	1	1	1	-	1	1	-	1	-
Aluminum Hydroxide, Saturated	1	1	-	-	-	1	-	1	-	1	-
Aluminum Nitrate	1	1	1	1	1	2	1	-	X	1	2
Aluminum Sulfate	1	1	1	1	1	X	1	1	X	2	X
Alums (Ammonium or Potassium)	1	1	1	1	1	-	1	-	X	2	X
Ammonia, Aqueous	1	2	1	-	1	-	1	1	-	1	-
Ammonium Carbonate	2	X	-	-	-	-	-	1	1	1	-
Ammonium Chloride, 1%	X	2	1	1	1	1	1	X	2	2	X

○ Cover stock rating only; Rating for tube stock "X"

\*Use Gates fuel hose or contact Denver Product Applications Department.

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters				
	Trade Names						Carbon Steel Stainless Steel 304 Stainless Steel 316 Aluminum Brass				
	A	C	C <sub>2</sub>	J	Z						
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)					
Chemical Name											
Ammonium Chloride, 10% Boiling	X	X	-	-	-	1	X	X	2	2	X
Ammonium Chloride, 28% Boiling	X	X	-	-	-	1	X	X	2	2	X
Ammonium Chloride, 50% Boiling	X	X	-	-	-	1	X	X	2	2	X
Ammonium Hydroxide	2	2	2	1	1	X	1	2	1	1	-
Ammonium Hydroxide, 3 Molar	1	X	-	-	-	2	1	-	X	2	2
Ammonium Hydroxide, Concentrated	1	X	-	1	-	X	1	1	X	2	2
Ammonium Metaphosphate	2	2	2	-	2	-	1	-	1	1	1
Ammonium Nitrate, Fertilizer	1	2	1	1	1	1	1	X	1	1	2
Ammonium Nitrite	1	1	-	-	-	-	1	2	1	1	X
Ammonium Persulfate	X	X	X	1	-	X	-	X	X	2	2
Ammonium Persulfate, 5%	1	X	-	-	-	-	X	X	2	2	X
Ammonium Persulfate, 10%	1	X	-	-	-	X	-	X	X	2	2
Ammonium Phosphate (Mono, Di, Tri, Basic)	1	1	1	1	1	1	1	2	X	2	2
Ammonium Sulfate	1	2	1	1	1	1	1	X	X	2	X
Ammonium Thiocyanate	1	1	-	1	1	-	1	-	1	1	-
Amyl Acetate	X	X	X	2	X	2	1	1	X	1	1
Amyl Alcohol	2	2	2	1	-	-	1	1	1	1	1
Amyl Borate	2	2	2	-	-	-	-	-	-	-	-
Amyl Chloride	X	-	X	2	X	-	1	2	-	1	1
Amyl Chloronaphthalene	X	X	X	-	X	-	1	-	-	1	1
Amyl Naphthalene	X	X	X	-	X	-	1	-	-	1	1
Amyl Phenol	-	-	-	-	-	1	-	-	1	1	-
AN-0-3 Grade M	1	1	-	-	-	-	-	-	-	-	-
AN-0-6	1	1	-	-	-	-	-	-	-	-	-
AN-0-366	1	1	-	-	-	-	-	-	-	-	-
Anderol, L-774 (Diester)	X	2	-	-	-	-	1	X	-	-	-
Anderol, L-826 (Diester)	X	2	-	-	-	-	1	X	-	-	-
Anderol, L-829 (Diester)	X	2	-	-	-	-	1	X	-	-	-
ANG-25 (Glycerol Ester)	2	2	-	-	-	1	2	-	-	-	-
ANG-25 (Diester Base, TG749)	X	2	-	-	-	-	1	X	1	1	1
Aniline	X	X	X	2	X	X	1	2	2	1	X
Aniline Dyes	X	X	-	2	-	-	1	X	2	1	2
Aniline Hydrochloride	X	X	-	2	-	-	1	-	X	1	1
Animal Gelatin	1	1	-	1	-	-	1	-	-	1	-
Animal Fats	2	1	-	1	-	-	1	1	1	1	1
Animal Oil (Lard Oil)	2	1	-	1	-	-	1	-	1	1	1
Antifreeze, Alcohol Base	2	2	2	2	2	-	-	-	1	1	1
Antifreeze, Glycol Base	2	1	1	1	1	-	1	1	1	1	1
Antimony Chloride, 50%	-	1	-	-	-	-	1	X	X	X	-
AN-VV-0-366B Hydraulic Fluid	1	-	-	-	-	-	2	-	-	-	-
Aqua Regia (Concentrated)	X	X	X	2	X	X	1	X	X	X	X
Arco A.T.F. Dexron	-	1	-	-	-	-	-	-	-	-	-
Arco C2, 100	-	1	-	-	-	-	-	-	-	-	-
Aromatic Fuel 30%, Mil.	-	-	-	-	-	-	1	-	-	-	-
Aromatic Fuel 50%	X	2	-	-	-	-	1	-	-	-	-
Aromatic Hydrocarbons	X	X	-	-	X	2	1	-	2	1	2
Arsenic Acid	-	-	-	1	-	-	1	-	2	-	1
Askarel, Transformer Oil	X	X	X	-	X	-	1	-	1	1	1
Asphalt, Under 180°F	2	2	2	X	X	1	1	-	1	1	1
Asphalt, Cut Back	X	2	2	-	X	1	1	1	1	1	2
Asphalt, Topping	1	X	-	-	-	-	1	-	1	1	-
ASTM Oil No.	1	1	1	1	1	2	1	1	1	1	1
ASTM Oil No. 3	2	2	1	-	2	-	1	1	1	1	1
ASTM Oil No. 4	X	1	X	X	X	-	1	1	1	1	1
ASTM Reference Fuel A	②	1	①	1	1	-	1	1	1	1	1
ASTM Reference Fuel B	②	1	②	2	X	-	1	-	1	1	1
ASTM Reference Fuel C	X	2	X	2	X	-	1	-	1	1	1
ATL-857	X	2	-	-	-	-	-	-	-	-	-
Atlantic Dominion F	2	1	-	-	-	-	-	-	-	-	-

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



Powering Progress.

gates.com/hydraulics

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## Chemical Resistance Table

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
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BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters	
	Trade Names						Carbon Steel	Stainless Steel 304
	A	C	C <sub>2</sub>	J	Z			
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	Aluminum	Brass
Chemical Name	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	Aluminum	Brass
Aurex 903R (Mobil)	2	1	-	-	-	-	-	-
Automatic Brake Fluid	2	X	-	-	-	1	1	1
Automatic Transmission Fluid - ATF	2	1	-	1	-	1	1	1
Aviation Gasoline, MIL	-	2	-	-	-	-	1	1
<b>B</b>								
Baltic Types 100, 150, 200, 300, 500	-	1	-	-	-	1	-	-
Barvel, Concentrated (Ag Spray)	-	-	-	-	-	1	-	-
Bardol B	X	X	X	-	X	-	1	1
Barium Carbonate	1	1	1	1	1	-	2	1
Barium Chloride	X	1	1	1	1	1	X	2
Barium Chloride, 5%	X	1	-	-	-	-	2	1
Barium Chloride, Aqueous	X	1	-	-	-	-	2	2
Solution (Hot)	1	1	1	1	1	X	1	1
Barium Hydroxide	1	1	1	1	1	X	1	1
Barium Sulfate	1	1	-	1	2	-	2	2
Barium Sulfate, Aqueous	X	-	-	-	-	-	2	2
Solution (Hot)	2	1	1	1	1	-	X	1
Barium Sulfide	-	1	-	-	-	-	-	-
Bayol D	-	1	-	-	-	-	-	-
Bayol 35	X	1	1	1	1	X	2	2
Beet Sugar Liquors	-	1	-	-	-	2	-	-
Bellows 80-20 Hydraulic Oil	X	X	X	2	X	1	1	1
Benzaldehyde	X	X	X	X	X	2	1	1
Benzene, Benzol	X	-	-	-	-	-	X	2
Benzene Sulfonic Acid	X	2	X	1	-	2	1	1
Benzine, Petroleum Ether	X	X	X	1	-	-	1	1
Benzoic Acid 21°C (70°F)	X	X	X	1	-	-	1	1
Benzol	X	X	X	X	-	-	1	1
Benzyl Alcohol	X	X	-	1	-	-	1	1
Benzyl Benzoate	-	-	-	-	-	-	1	1
Benzyl Chloride	X	X	X	X	-	1	2	-
Biodiesel**	-	-	-	-	-	-	1	1
Bismuth Carbonate	X	-	-	-	-	-	1	1
Black Point 77	-	1	-	-	-	-	-	-
Black Sulfate Liquor	2	2	2	2	-	1	1	1
Blast Furnace Gas	X	X	X	-	X	X	1	1
Borax, Sodium Borate	X	2	2	1	1	1	X	2
Bordeaux Mixture	2	2	2	-	-	1	1	X
Boric Acid	1	1	1	-	1	1	X	2
Boron Fuels, HEF	X	X	-	-	-	-	-	-
Brake Fluid, Petroleum Base	2	1	2	1	X	-	1	1
Brake Fluid, Synthetic Base	X	X	X	1	X	-	1	1
Bray GG - 130	X	2	-	-	-	-	-	-
Brayco 719-r (VV-H-910)	2	X	-	-	-	-	-	-
Brayco 885 (MIL-L-6085A)	X	2	-	-	-	-	-	-
Brayco 910	2	2	-	-	-	-	-	-
Brine	1	1	1	1	-	-	2	1
Brom-113	X	2	-	-	-	-	-	-
Brom-114	2	2	-	-	-	-	-	-
Bromine, Dry	X	X	X	-	-	-	X	X
Bunker Oil	X	2	2	-	X	2	1	1
Butadiene	X	2	-	-	-	-	1	1
Butane	X	X	X	-	X	X	1	1
Butter Oil	2	-	-	-	-	-	1	1
Butyric Acid	X	-	-	1	-	-	X	1
Butyl Acetate	X	X	X	2	X	-	1	1
Butyl Alcohol	1	1	1	1	-	-	1	1
Butyl Amine	-	-	-	-	-	-	1	1
Butyl Carbitol	2	2	-	1	-	-	1	1
Butyl Mercaptan	-	-	-	-	-	-	1	1
Butyl Stearate	X	2	2	2	-	-	1	1
Butyraldehyde	X	X	-	2	-	-	-	-

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters	
	Trade Names						Carbon Steel	Stainless Steel 304
	A	C	C <sub>2</sub>	J	Z			
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	Aluminum	Brass
Chemical Name	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	Aluminum	Brass
<b>C</b>								
Calcium Acetate	X	X	X	1	X	-	1	1
Calcium Arsenate	-	-	-	-	-	1	1	1
Calcium Bisulfate	1	1	2	1	1	-	-	2
Calcium Bisulfide	1	1	2	1	1	1	-	2
Calcium Bisulfite	1	1	1	1	1	-	1	1
Calcium Carbonate	1	1	1	1	1	1	1	1
Calcium Chlorate	1	1	1	-	1	-	2	1
Calcium Chloride	1	1	1	1	1	1	1	1
Calcium Hydroxide	1	2	2	1	1	X	1	1
Calcium Hydroxide, 10% Boiling	-	2	-	-	-	-	1	1
Calcium Hydroxide, 20% Boiling	-	-	-	-	-	-	1	1
Calcium Hydroxide, 50% Boiling	-	-	-	-	-	-	1	1
Calcium Hypochlorite, 5% (Under 100°F)	X	2	X	1	2	-	1	1
Calcium Hypochlorite, 15% (Under 100°F)	X	-	X	1	2	-	1	1
Calcium Nitrate	1	1	1	1	1	-	1	1
Calcium Silicate	-	2	-	1	2	-	1	1
Calcium Sulfate	1	1	1	1	1	-	2	1
Calcium Sulfide	1	2	-	1	-	-	2	1
Caliche Liquors	1	2	-	1	1	1	1	1
Cane Sugar Liquors	1	1	2	1	-	-	1	1
Carbolic Acid, Phenol	X	X	X	1	X	X	1	1
Carbon Dioxide, Dry	2	1	1	1	1	1	-	1
Carbon Dioxide, Wet	2	1	1	1	1	-	1	1
Carbon Disulfide	X	X	-	2	X	2	1	1
Carbon Monoxide, Under 150°F (Hot)	2	2	2	1	1	-	1	1
Carbon Tetrachloride, 5%-10%	-	-	-	-	-	-	-	-
Carbon Tetrachloride, Pure	X	X	X	2	X	X	1	1
Carbonic Acid	1	1	1	1	1	X	1	1
Castor Oil	2	2	2	1	2	2	1	1
Caustic Soda, 20%	2	X	X	1	1	X	1	1
Caustic Soda, 50%	2	X	X	1	1	X	1	1
Cellosolve Acetate, Under 100°F	X	X	X	2	X	-	1	1
Cellosolve, Butyl, Under 100°F	X	X	X	-	X	-	1	1
Cellosolve, Union Carbide, Under 100°F	X	X	-	-	-	-	1	1
Cellugard, Cellugard 200	1	1	-	-	-	-	1	1
Cellulube 90, 150, 220, 300, 550	X	X	X	-	X	-	1	1
Cellulube 1000, 220A, ST220, A60	X	X	X	-	X	-	1	1
Cellutherm 2505A	X	2	-	-	-	-	-	-
Chevron Fr-10, 13, 20.8	-	-	-	-	-	-	1	1
Chlordane	X	X	X	-	X	-	1	1
Chlorinate Paraffin & Petroleum Oil	-	-	-	-	-	-	1	1
Chlorine Gas, Dry	N/A	X	N/A	N/A	-	-	1	1
Chlorine Gas, Wet	N/A	X	N/A	N/A	-	-	1	1
Chlorine Trifluoride	X	X	-	-	-	-	1	1
Chlorine Water, 3% Chlorine	X	X	X	-	-	-	1	1
Chlorine Water, 25% Chlorine	X	X	X	-	2	2	1	1
Chloroacetic Acid (Under 100°F)	X	X	X	-	2	-	1	1
Chlorobenzene	X	X	X	X	X	-	1	1
Chlorobromo Methane	X	X	X	-	X	-	1	1
Chloroform	X	X	X	X	X	-	1	1
O-Chloronaphthalene	X	X	X	-	-	-	1	1
Chlorosulfonic Acid	2	X	X	X	-	-	1	1
Chlorotoluene	X	X	X	X	X	X	1	1
Chlorox, Bleach	2	2	-	1	2	-	1	1
Chromic Acid, 5%	X	X	-	-	-	-	1	1
Chromic Acid, 10%	X	X	X	1	2	X	1	1

○ Cover stock rating only; Rating for tube stock "X"

\*Use Gates fuel hose or contact Denver Product Applications Department.

\*\*Nitrile 150°F or less, no constant contact.



# Chemical Resistance Table

Rating Scale:	Gates Hose Polymers						Couplings & Adapters					
	A	C	C <sub>2</sub>	J	Z		Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass	
	Trade Names											
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)						
Chemical Name												
Chromic Acid, 25%	X	X	X	1	2	X	1	X	X	X	X	X
Chromic Acid, 50%	X	X	X	1	2	X	1	X	X	X	2	1
Chromic Acid, 100%	-	-	-	-	-	X	1	-	X	X	2	-
Circo Light Process Oil	1	1	-	-	-	1	-	1	1	1	1	-
Citgo FR Fluids	-	X	-	X	-	2	1	-	1	1	1	-
Citgo Glycol FR-20XD	-	1	-	-	-	2	1	-	1	1	1	-
Citgo Sentry (Under 100°F)	2	2	1	-	X	2	1	-	1	1	1	-
Citgo Tractor Hydraulic Fluid	-	1	-	-	-	2	1	-	1	1	1	-
Citric Acid, 5%	-	2	-	-	-	-	1	X	1	1	1	X
Citric Acid, 5% @150°F	-	2	-	-	-	-	1	X	X	X	1	2
Citric Acid, 15%	1	2	-	-	-	-	1	X	X	X	1	-
Citric Acid, 15% Boiling	1	2	-	-	-	-	1	X	X	2	1	X
Citric Acid, Concentrated Boiling	1	X	1	-	1	2	1	X	X	X	1	X
Coal Gas	1	X	-	1	-	1	1	-	-	-	-	-
Coal Tars	X	2	X	2	2	-	1	X	1	1	1	1
Cod Liver Oil	1	1	1	-	-	-	1	-	1	1	1	1
Coke Oven Gas (Under 100°F)	X	2	X	-	2	-	1	-	1	1	1	1
Condor 1000,1002,1004, 1006,1008	-	2	-	-	-	-	-	-	-	-	-	-
Condor 1008,1010,1012, 1014,1016	-	2	-	-	-	-	-	-	-	-	-	-
Convelex 10	X	X	-	-	-	-	-	-	-	-	-	-
Copper Arsenate, Cupric Arsenate	-	-	-	2	-	1	-	1	1	1	-	-
Copper Chloride, 1%	1	1	-	-	-	-	1	X	X	X	1	-
Copper Chloride, 5%	1	1	-	-	-	-	1	X	X	X	1	-
Copper Chloride, Cupric Chloride	2	2	2	2	2	1	2	X	X	1	-	X
Copper Cyanide, Cupric Cyanide	2	2	2	-	2	-	1	X	1	1	1	-
Copper Nitrate, 1% & 5%	1	1	-	-	-	-	1	X	1	1	X	X
Copper Nitrate, Cupric Nitrate	1	1	1	1	1	-	1	-	1	1	1	-
Copper Sulfate, Cupric Sulfate	1	1	1	1	1	1	1	X	1	1	X	X
Copper Sulfate, 10%	1	1	-	-	-	-	1	-	X	2	2	X
Copper Sulfate, 50%	1	1	-	-	-	-	1	-	-	2	2	-
Corn Oil	X	2	2	2	X	X	1	-	1	1	1	-
Corn Syrup	2	2	-	2	-	-	1	-	1	1	1	-
Cottonseed Oil	2	2	1	2	2	X	1	2	1	1	1	1
Creosote, Wood Or Coal Tar (Under 100°F)	X	2	X	-	X	X	1	X	2	1	1	X
Cresol, Cresylic Acid (Under 100°F)	X	X	X	1	X	-	1	X	2	1	1	2
Cyessylic Acid	X	X	-	-	-	-	1	X	1	1	1	-
Crude Petroleum Oil (Under 100°F)	X	X	2	2	2	2	1	-	X	X	2	1
Cutting Oil, Water Soluble	X	1	-	-	-	-	1	-	1	1	1	-
Cutting Oil, Sulfur Base	X	1	-	-	-	-	1	-	1	1	1	1
Cutting Oil	2	1	2	1	X	-	1	-	1	1	1	1
Cyclohexane	X	2	-	1	X	1	1	1	1	1	1	1
Cyclohexanone	X	X	X	2	X	1	1	1	-	1	1	2
Cymene	X	X	X	X	X	-	1	-	1	1	1	1
<b>D</b>												
Dasco FR150, FR200, FR200B, FR310	-	1	-	-	-	-	1	1	1	1	1	1
Dasco IFR	-	1	-	-	-	-	1	1	1	1	1	1
DC200, DC510, DC550, DC560	-	1	-	-	-	-	1	-	1	1	1	1
Decalin	X	2	-	2	X	-	1	1	-	-	-	1
Dectol R&O Oils	X	1	-	-	-	2	-	-	-	-	-	-
Denatured Alcohol	1	1	1	1	-	-	1	1	1	1	1	1
Developing Fluids, Photo	1	1	-	1	-	-	-	X	X	2	-	-
Developing Solutions, Hypos	2	-	-	1	2	-	1	-	-	1	1	-
Diacetone	X	X	X	1	X	-	1	1	1	1	1	1
Diacetone Alcohol	-	X	-	1	-	-	1	1	1	1	1	1
Dibenzyl Ether	X	X	-	2	-	-	1	-	1	1	1	1
Dibutyl Ether	X	X	-	1	-	-	1	-	1	1	1	1

\*\*Nitrile 150°F or less, no constant contact.

Rating Scale:	Gates Hose Polymers						Couplings & Adapters					
	A	C	C <sub>2</sub>	J	Z		Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass	
	Trade Names											
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)						
Chemical Name												
Dibutyl Phthalate (Under 120°F)	X	X	X	2	X	2	1	-	1	1	1	1
Dibutyl Sebacate	X	X	X	2	-	-	1	-	-	-	-	1
Dichlorobenzene	X	X	X	X	X	X	1	1	-	1	1	-
Dichloroethane	X	X	X	X	-	-	1	X	-	X	X	X
Diesel, Biodiesel**	-	-	-	-	-	-	1	1	-	1	1	-
Diesel Oil, Fuel ASTM #2	②	1	②	2	X	1	1	1	1	1	1	1
Diester Lubricant MIL-I-7808	X	2	-	-	-	-	1	-	1	1	1	-
Diester Synthetic Lubricants	X	2	-	-	-	-	1	-	1	1	1	-
Diethylamine (Under 120°F)	2	2	-	2	X	-	1	1	1	1	1	1
Diethylene Glycol	1	1	1	1	1	1	1	1	1	1	1	1
Diethyl Ether	X	X	-	1	-	-	1	-	1	1	1	1
Diethyl Phthalate	-	X	-	2	-	-	1	-	-	1	1	-
Diethyl Sebacate	X	X	X	2	-	-	1	-	-	1	1	-
Diisobutylene	X	2	-	1	X	-	1	-	2	1	1	2
Diisobutyl Ketone	X	X	X	2	X	-	1	1	1	1	1	1
Diisopropyl Ketone	X	X	X	2	X	-	1	1	-	1	1	-
Dimethyl Aniline	X	X	X	2	X	-	1	-	-	-	-	1
Dimethyl Formamide (Under 120°F)	X	X	X	-	-	-	1	-	1	1	1	-
Dimethyl Phthalate	X	X	X	1	X	-	1	-	-	-	-	1
Dioctyl Phthalate	X	X	X	2	X	-	1	-	1	1	1	1
Dioctyl Sebacate	X	X	X	X	X	-	1	-	1	1	1	-
Dioxane	X	X	X	2	-	-	1	1	1	1	1	1
Dipentene	X	X	-	2	-	-	1	-	1	1	1	1
Dinco Oils	-	1	-	-	-	-	1	1	1	1	1	1
Dispersing Oil #10	X	X	-	-	-	-	1	-	1	1	1	-
Dowtherm A	X	X	X	2	X	X	1	-	1	1	1	1
Dowtherm E	X	X	-	2	-	-	1	-	1	1	1	1
DP47, 200 Flow - DOW	-	1	-	-	-	-	1	1	1	1	1	1
Duro FR-HD	-	1	-	-	-	X	1	1	1	1	1	1
Duro Oils	-	1	-	-	-	-	1	1	1	1	1	1
<b>E</b>												
Elco 28-EP Lubricant	X	1	-	-	-	-	-	1	1	1	1	-
Enamels	-	-	-	-	-	-	1	1	-	-	-	1
Energol HL68	-	1	-	-	-	-	-	-	1	1	1	1
Energol HLPC 68	-	1	-	-	-	-	-	-	1	1	1	1
EPHydraulic Oils, Chevron	-	1	-	-	-	-	-	-	1	1	1	1
Epichlorohydrin (Under 120°F)	X	X	-	-	-	-	1	-	1	2	1	-
Esam-6 Fluid	2	-	-	-	-	-	-	-	-	-	-	-
Ethanol	1	1	-	1	-	X	1	1	X	1	1	-
Ethanolamine, Aminoethanol	2	2	-	1	X	X	1	1	1	1	1	1
Ethers (Under 120°F)	X	2	X	1	2	2	1	1	1	1	1	1
Ethyl Acetate	X	X	X	2	X	2	1	1	1	1	1	2
Ethyl Acetoacetate	X	X	X	1	X	X	1	-	1	1	1	1
Ethyl Acrylate	X	X	X	2	X	X	1	-	1	1	1	-
Ethyl Alcohol	1	1	1	1	-	-	1	1	1	1	1	2
Ethyl Amine, Monoethylamine	X	X	X	1	X	X	1	-	2	1	1	2
Ethyl Benzene	X	X	X	2	X	1	1	-	1	1	1	1
Ethyl Bromide, Di	X	X	X	2	X	-	1	-	1	1	1	1
Ethyl Butyrate	X	X	X	-	-	-	1	-	-	1	1	-
Ethyl Cellulose	-	-	-	1	-	-	1	-	1	1	1	-
Ethyl Chloride	X	X	X	-	-	X	1	-	2	1	1	2
Ethyl Ether	X	X	X	-	-	1	-	-	2	1	1	1
Ethyl Mercaptan	X	X	X	-	X	X	1	-	2	-	-	-
Ethyl Oxalate	X	X	-	1	X	X	1	-	-	-	-	-
Ethyl Pentachlorobenzene	-	X	-	X	-	-	1	1	-	2	1	-
Ethyl Silicate	1	1	1	1	-	-	1	1	1	1	1	1
Ethylene Chloride	X	X	X	X	-	-	1	1	X	2	1	-
Ethylene Chlorohydrin, Under 100°F	X	X	X	-	-	X	1	X	1	1	2	X
Ethylene Diamine (Under 100°F)	2	2	2	1	X	X	1	-	-	-	-	1
Ethylene Dichloride	X	X	-	2	-	-	1	1	-	1	1	X
Ethylene Glycol	1	1	1	1	1	1	1	1	2	1	1	1

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



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## Chemical Resistance Table

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
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ACCESSORIES
EQUIPMENT AND PARTS

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters			
	Trade Names									
	A	C	C <sub>2</sub>	J	Z					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon	Carbon Steel	Stainless Steel 304
Chemical Name									Stainless Steel 316	Aluminum
										Brass
<b>F</b>										
Factovis 52	-	1	-	-	-	-	-	1	1	1
Fatty Acids	2	2	2	2	X	1	1	1	1	2
Ferric Chloride	-	-	-	1	2	-	1	1	X	X
Ferric Chloride, 1%	1	1	-	-	-	-	1	1	X	2
Ferric Chloride, 1% Boiling	-	2	-	-	-	-	1	1	X	X
Ferric Chloride, 5% Still	2	1	-	-	-	-	1	1	X	X
Ferric Chloride, 5% Agitated or Aerated	2	2	-	-	-	-	1	1	X	X
Ferric Chloride, 10%	2	1	-	-	-	-	1	1	X	X
Ferric Sulfate	2	2	2	1	2	-	1	1	X	1
Ferrous Chloride	1	1	-	1	2	-	1	-	X	2
Ferrous Nitrate	2	2	2	-	2	-	1	-	-	1
Ferrous Sulfate, Copper Gas	2	2	2	1	2	-	1	-	X	1
Ferrous Sulfate, 10%	1	1	-	-	-	-	1	1	X	2
Ferrous Sulfate, Saturated	1	-	-	-	-	-	1	1	-	2
Fire Resistant Hydraulic Fluid, Texaco	-	1	-	-	-	-	1	-	1	1
Firtec 290, MF	-	-	-	-	-	-	1	-	-	-
Fixing Solution, Photo	2	-	-	-	2	-	1	-	-	1
Fluoboric Acid	1	1	-	1	-	-	1	-	1	X
Fluoboric Acid, 65%	2	-	-	1	2	X	1	-	-	1
Fluosilicic Acid	2	1	-	-	-	-	1	-	X	X
Fluosilicic Acid, 50%	2	X	X	1	2	X	1	X	-	-
Formaldehyde	1	X	-	1	-	-	1	2	1	1
Formaldehyde, 37%	2	2	-	1	2	2	-	-	1	1
Formaldehyde, Hot	-	-	-	-	-	-	1	1	X	2
Formic Acid (Under 120°F)	1	X	1	1	2	X	1	2	X	2
Formic Acid, Dilute Hot	1	X	-	1	-	-	1	X	X	2
Freon 12 (Under 100°F)	Use Freon Hose Only								2	1
Freon 114	Use Freon Hose Only								1	1
Fruit Juices	-	-	-	-	-	-	1	1	X	1
Fuel Oil	②	1	①	1	X	2	1	1	2	2
Fumaric Acid	2	X	-	-	-	X	1	-	-	1
Furan, Furfuran	X	X	X	1	-	-	1	-	1	1
Furan Resin	X	X	-	-	-	-	1	-	-	-
Furfural Alcohol, Ant Oil	2	X	X	1	2	-	1	1	2	1
Fusel Oil, Grain Oil	X	X	-	-	-	-	1	-	-	-
Fyrquard 150, 200	-	1	-	-	-	-	1	-	1	1
Fyrquard A60, 90, 100, 150, 220, 300, 500	X	X	-	-	-	-	1	-	-	-
Fyrquard 1000, 15R&O, 220R&O, 550R&O	X	X	-	-	-	-	1	-	-	-
<b>G</b>										
Gallic Acid (Under 100°F)	X	X	X	1	-	X	1	2	X	1
Gas, Natural	-	-	-	X	-	-	1	-	1	1
Gasohol	2	*	*	-	X	-	1	-	2	1
Gasoline, Aviation	X	-	2	-	-	-	1	-	-	1
Gasoline, Meter	X	*	-	-	-	-	1	X	1	1
Gasoline, Premium	②	*	*	-	X	X	1	-	2	1
Gasoline, Sour	X	X	-	-	-	-	1	-	2	1
Gasoline, Standard	①	*	*	2	X	X	1	-	2	1
Gasoline, Unleaded Under 50% Aromatics	X	*	X	-	X	X	1	-	2	1
Gelatin	1	1	-	-	-	-	1	1	X	1
Glauber's Salt	2	X	-	-	-	-	1	-	1	1
Glucose	1	1	1	-	1	1	1	1	1	1
Glue (Under 120°F)	2	2	2	-	1	1	1	2	2	1
Glycerine, Glycerol	1	1	1	1	1	1	1	1	2	1
Glycol FR Fluids	-	1	-	-	-	-	1	-	1	1
Glycols (Under 120°F)	1	1	1	1	1	1	1	1	2	1
Grease, Ester Base	-	-	-	-	-	-	1	1	1	1

○ Cover stock rating only; Rating for tube stock "X"

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Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters			
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Chemical Name									Stainless Steel 316	Aluminum
										Brass
Grease, Petroleum Base	2	1	2	-	2	1	1	1	1	1
Grease, Silicone Base	-	-	-	-	-	-	1	1	1	1
Green Sulfate Liquor, Under 100°F	2	2	1	2	1	-	1	-	1	1
Gulf FR Fluid G-200	-	1	-	-	-	X	1	-	1	1
Gulf FR Fluid P37, P40, P43, P45, P47	-	X	-	-	-	X	1	-	-	-
<b>H</b>										
Halowax Oil	X	X	X	-	X	-	1	-	-	-
Heptachlor, In Petroleum	-	2	X	-	-	-	1	-	-	-
Heptane (Under 100°F)	②	1	②	1	X	1	1	1	1	1
N-Hexaldehyde	2	X	2	-	-	-	1	-	1	1
Hexane (Under 120°F)	②	1	②	2	1	1	1	1	1	1
Hexene	②	2	-	1	-	-	1	-	1	1
Hexyl Alcohol	1	2	1	1	-	-	1	-	1	1
High Viscosity Lubricant, U4	2	1	-	-	-	-	1	-	-	-
High Viscosity Lubricant, H2	2	1	-	-	-	-	1	-	-	-
Hilo MS #1	X	X	-	-	-	-	-	-	-	-
Houghton-Safe 1010,1055 (Phos. Ester)	X	X	X	1	X	-	1	-	1	1
Houghton-Safe 1115,1120, 1130 (Phos. Ester)	X	X	X	1	X	-	1	-	1	1
Houghton-Safe 271,416,520, 616 (Water/Glycol)	2	1	1	-	-	2	1	-	1	1
Houghton-Safe 620, 625, 640, 525 (Water/Glycol)	1	1	1	-	-	2	1	-	1	1
Houghton-Safe 5046, 5046W (Water/Oil Emulsion)	2	1	-	-	-	-	1	-	1	1
Hy-Chock Oil	-	1	-	-	-	-	1	1	1	-
Hydrafluid 760, Texaco and Houghton	-	1	-	-	-	-	1	1	1	-
Hydrafluid AZR&O, A, B, AA, C	-	1	-	-	-	-	1	1	1	-
Hydrasol A	-	1	-	-	-	-	1	1	1	-
Hydraulic Fluid, Phosphate Ester Base	X	X	X	1	-	X	1	1	1	1
Hydraulic Fluid, Std. Petroleum Oils	2	1	2	1	2	2	1	1	1	1
Hydraulic Fluid, Water Glycol Base	1	1	1	-	-	1	1	1	1	1
Hydraulic Fluid HF - 18, HF - 20	-	1	-	-	-	2	1	1	1	1
Hydraulic Fluid HF - 31	-	-	-	-	-	-	1	1	1	1
Hydraulic Oils, Petroleum	2	1	-	-	-	-	1	1	1	1
Hydraulic Oils, Synthetic	-	X	-	-	-	-	1	-	1	1
Hydraulic Safety Fluid 200 & 300, Texaco	-	1	-	-	-	1	1	-	1	1
Hydrazine	X	X	X	-	-	2	1	-	-	-
Hydro-Drive Oil, Houghton	-	1	-	-	-	2	1	-	-	-
Hydrobromic Acid	X	X	-	-	-	-	1	X	1	1
Hydrobromic Acid, 37%	X	X	X	1	2	X	1	X	1	1
Hydrochloric Acid	2	X	-	-	-	-	1	X	X	X
Hydrochloric Acid, 3 Molar	2	X	-	-	-	-	1	X	X	X
Hydrochloric Acid, Concentrated	X	X	-	-	-	-	1	X	X	X
Hydrochloric Acid, 15%	X	X	X	1	2	X	1	X	X	X
Hydrochloric Acid, 37%	X	-	X	1	2	X	1	X	X	X
Hydrocyanic Acid, 20% Under 100°F	X	X	X	-	2	X	1	1	1	1
Hydrocyanic Acid, 98%	-	-	-	-	-	-	1	-	-	-
Hydrofluoric Acid, 10%	2	2	X	1	1	X	1	X	X	X
Hydrofluoric Acid, 20% (Under 120°F)	2	X	X	1	2	X	1	X	X	X
Hydrofluoric Acid, 48% (Under 120°F)	2	X	X	1	2	X	1	X	X	X
Hydrofluoric Acid, 70%	-	X	X	-	2	X	1	X	X	X
Hydrofluoric Acid, Concentrated	X	X	X	1	2	X	1	X	X	X
Hydrofluoric Acid, Anhydrous	-	X	-	-	-	-	1	-	-	-
Hydrofluosilicic	X	X	X	X	-	-	1	X	X	X
Hydrogen	1	1	-	1	-	-	1	-	X	X



# Chemical Resistance Table

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers					Couplings & Adapters				
	A	C	C <sub>2</sub>	J	Z					
	Trade Names									
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon	Carbon Steel	Stainless Steel 304
Chemical Name									Stainless Steel 316	Aluminum
Hydrogen Chloride Gas	-	-	-	1	-	-	1	-	-	1
Hydrogen Cyanide Gas	-	-	-	-	-	-	-	-	-	1
Hydrogen Fluoride (Under 100°F)	-	X	-	-	-	1	-	-	2	2
Hydrogen Peroxide, Dilute	1	2	-	-	-	1	1	1	-	1
Hydrogen Peroxide, 10%	X	1	X	1	2	X	1	X	X	2
Hydrogen Peroxide, 30%	X	2	X	1	2	X	1	X	X	2
Hydrogen Peroxide, 70%	X	X	X	1	-	X	1	X	X	2
Hydrogen Peroxide, 90%	X	X	-	-	-	-	1	-	X	2
Hydrogen Sulfide	2	X	-	-	-	-	1	1	2	2
Hydrogen Sulfide Aqueous Solution	2	X	-	-	-	-	1	-	X	-
Hydrogen Sulfide, Gas	-	-	-	-	-	-	-	-	-	-
Hydrolube, Water Glycol	2	1	-	-	-	X	1	-	1	1
Hydrolubric Oil, Houghton	-	2	-	-	-	2	1	1	-	-
Hydroquinone	X	-	-	-	X	-	1	-	-	1
Hykil No.6 (33%); Water (67%)	-	2	-	-	-	-	1	-	-	-
Hypochlorous Acid (Under 120°F)	X	X	X	-	2	-	1	1	2	2
Hypoid Grease (Parapoid 10-C)	-	1	-	-	-	-	1	-	-	-
<b>I</b>										
Imol, Imol S150, S220, S300, S500	-	1	-	-	-	2	1	1	1	1
Industrol 53	-	1	-	-	-	-	1	-	-	-
Ink (Printers)	1	1	-	-	-	-	1	1	2	2
Ink Oil	-	2	-	-	-	-	1	-	1	1
Insulating Oil (Transformer)	2	1	2	-	X	-	1	-	1	1
Isobutyl Alcohol	2	2	2	1	-	-	1	1	1	2
Iodine (Under 100°F)	X	X	-	1	2	X	1	1	2	2
Iodine, In Alcohol	2	-	-	-	-	X	1	-	-	X
Iodine Pentafluoride	X	X	-	-	-	-	1	-	X	2
Isooctane	1	1	2	2	1	2	1	1	1	2
Isooctyl Thioglucolate	-	-	-	-	-	-	1	1	-	-
Isobutane - WET	X	X	-	-	-	X	1	X	1	2
Isopropyl Acetate	X	X	X	-	X	2	1	1	2	1
Isopropyl Alcohol (Isopropanol)	2	2	2	1	2	2	1	1	1	2
Isopropyl Ether	X	X	X	-	-	-	1	1	1	1
<b>J</b>										
Fuel JP-3 (Under 100°F)	②	1	②	-	X	2	1	1	1	2
Jet Fuel JP-4 (Under 100°F)	①	1	②	-	X	-	1	1	1	2
Jet Fuel JP-5	X	1	X	-	X	-	1	1	2	1
Jet Fuel JP-6	X	1	X	-	X	-	1	1	2	1
Jet Fuel JP-x	2	1	X	-	X	-	1	1	2	1
<b>K</b>										
Kerosene	X	1	②	1	X	-	1	1	1	1
Ketchup	1	1	-	-	-	-	1	1	-	-
Ketones	X	X	X	-	X	X	1	1	1	2
<b>L</b>										
Lacquer Solvents	X	X	X	-	X	2	1	1	X	2
Lacquers	X	X	X	-	X	-	1	1	X	1
Lactic Acid	1	X	X	-	1	X	1	-	X	2
Lactic Acid (5%)	2	1	-	-	-	-	1	1	X	1
Lactic Acid (5% Boiling)	X	X	-	-	-	-	1	-	X	2
Lactic Acid (10% Boiling)	X	X	-	-	-	-	1	-	X	2
Lactol	2	2	2	-	-	-	1	-	1	1
Lard	2	1	-	1	-	-	1	1	1	X
Lasso (Ag Spray)	-	-	-	-	-	-	1	1	-	-
Latex	1	1	-	-	X	-	1	1	1	1
Lead Acetate	X	X	-	1	2	1	1	-	2	2
Lead Arsenate	2	2	-	-	-	-	1	-	1	1
Lead Nitrate	2	2	-	-	1	1	1	-	2	2
Lead Sulfate	1	1	-	1	2	-	1	-	1	1

○ Cover stock rating only; Rating for tube stock "X"

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	A	C	C <sub>2</sub>	J	Z					
	Trade Names									
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon	Carbon Steel	Stainless Steel 304
Chemical Name									Stainless Steel 316	Aluminum
Lead, Tetraethyl (Under 100°F)	X	2	X	-	X	-	1	2	-	-
Lead, Tetramethyl	X	2	X	-	X	1	1	-	-	-
Lecithin	2	X	-	-	-	-	1	-	-	1
Ligroin (Petroleum Ether, Under 120°F)	X	1	-	-	X	-	1	-	2	1
Lime (Chlorinated, Free Chlorine 20%)	-	1	-	1	-	1	-	-	-	2
Lime Bleach (Under 100°F)	X	2	X	-	X	-	-	-	X	2
Lime Sulphur	1	X	-	-	-	-	2	1	2	1
Lime Sulfur (Under 135°F)	1	X	X	-	2	-	2	1	2	1
Lindane (Ag Spray)	-	-	-	-	-	-	1	1	-	1
Linoleic Acid	X	2	X	-	-	-	1	-	X	2
Linseed Oil	X	1	-	-	-	-	1	1	1	1
Linseed Oil (Boiled)	2	2	1	1	1	1	1	-	2	1
Lubricating Oil (SAE 10, 20, 30, 40, 50)	2	2	-	-	-	-	1	1	1	1
Lubricating Oils (Diester, Under 135°F)	X	2	X	-	-	X	1	1	1	1
<b>M</b>										
Machine Oil (Under 135°F)	1	1	2	-	2	-	1	1	1	1
Magnesium Carbonate	1	1	1	-	1	1	1	-	2	2
Magnesium Chloride	1	1	1	1	1	1	1	1	X	2
Magnesium Hydroxide	2	2	2	1	1	X	1	-	1	1
Magnesium Nitrate	2	2	2	-	1	-	1	-	2	2
Magnesium Sulfate	2	2	2	1	1	1	1	1	2	2
Malathion (Ag Spray Dilute)	-	2	-	-	-	-	1	1	1	1
Maleic Acid	2	X	-	-	-	-	1	-	2	2
Malic Acid	-	-	-	-	-	-	1	-	2	2
Manganese Salts	-	1	1	-	1	-	1	-	-	-
Maxmul (Penzoil Hydraulic Fluid)	2	1	2	-	-	-	1	-	1	-
Mercuric Chloride	1	2	2	1	1	2	1	X	X	1
Mercuric Cyanide	1	2	2	-	1	-	-	-	2	2
Mercurous Nitrate (Under 120°F)	1	2	2	-	1	-	-	-	1	1
Mercury	1	2	2	1	1	2	1	1	1	1
Mesityl Oxide	X	X	X	2	X	X	1	-	1	1
Methane	2	1	-	-	-	-	1	-	-	-
Methoxychlor (Insecticide)	-	-	-	-	-	-	1	X	1	1
Methyl Acetate	X	X	X	1	X	-	1	-	1	1
Methyl Acrylate	X	X	X	-	X	-	1	-	1	1
Methyl Alcohol	1	1	1	1	-	-	1	1	1	2
Methyl Amine (25% Aqueous Solution)	2	X	-	-	-	-	1	-	1	1
Methyl Amine (60%)	2	2	-	-	-	-	1	2	1	1
Methyl Amine (99%)	X	X	-	-	-	-	1	-	1	1
Methyl Bromide	X	X	X	-	X	X	1	1	1	1
Methyl Butyl Ketone (MBK)	X	X	X	2	X	-	1	-	1	1
Methyl Cellosolve (Under 100°F)	2	X	-	1	X	-	1	-	2	2
Methyl Chloride	X	X	X	X	X	-	1	1	1	1
Methyl Ethyl Ketone (MEK)	X	X	X	2	X	X	1	1	1	2
Methyl Formate	2	X	X	-	X	-	1	-	2	1
Methyl Isobutyl Ketone (MIBK, 100°F)	X	X	X	2	X	X	1	1	1	1
Methyl Isopropyl Ketone	X	X	X	2	X	X	1	1	1	1
Methyl Methacrylate	X	X	X	2	-	1	-	-	2	2
Methyl Salicylate	2	2	2	-	-	-	1	-	1	1
Methyl Sulfate (Dimethyl, Under 100°F)	X	X	X	-	X	1	1	1	1	-
Methylene Chloride	X	X	X	X	X	-	1	X	1	1
Methylene Dichloride	X	X	X	-	-	-	1	1	1	1
Mineral Oil (Under 120°F)	1	1	1	1	1	1	1	1	1	2
Mineral Spirits	-	1	2	-	X	-	1	-	1	2

EQUIPMENT

HOSE/CPLG.  
SELECTION

G8K  
COUPLINGS

GLOBALSPIRAL  
COUPLINGS

PCM/PCS  
FERRULES

MEGACRIMP  
COUPLINGS

STAINLESS  
STEEL

POWER  
CRIMP  
COUPLINGS

LOC, GL AND  
GLP  
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POLARSEAL  
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Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters			
	Trade Names									
	A	C	C <sub>2</sub>	J	Z		Carbon Steel	Stainless Steel 304	Stainless Steel 316	
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (Cover Rating Only)	PTFE	Nylon	Aluminum	Brass
Chemical Name										
Mobile Therm 603	-	1	-	-	-	1	-	1	1	1
Molasses (Under 120°F)	2	2	2	-	1	1	-	2	1	2
Monochlorobenzene	X	X	X	X	X	1	-	1	1	1
Monoethanolamine	X	2	-	1	X	-	-	1	1	1
Morpholine (Pure Additive)	-	-	-	-	-	1	-	-	1	-
Motor Oils (Under 135°F)	2	1	2	1	2	2	1	1	1	1
Mould Oil	-	-	-	-	-	1	-	1	1	1
Muriatic Acid (Hydrochloric)	X	X	X	1	2	X	1	X	X	X
Mustard	1	2	1	-	1	-	-	X	1	2
<b>N</b>										
Naphtha (Low Aromatic Content)	X	2	X	1	X	-	1	1	1	1
Naphthalene (Tar Camphor)	X	X	X	1	X	-	1	1	1	1
Naphthalene	X	X	X	-	X	-	1	1	1	-
Naphthenic Acid	-	2	-	-	-	1	-	2	1	-
Natural Gas	-	-	-	-	-	1	-	1	1	2
Nickel Acetate	-	-	-	-	-	1	-	1	1	1
Nickel Chloride	2	2	2	1	2	-	1	1	1	1
Nickel Nitrate	2	2	2	1	2	-	1	2	2	X
Nickel Plating Solution	-	2	-	-	2	X	1	-	1	-
Nickel Salts	2	-	1	-	-	1	-	-	-	-
Nicotine Salts	-	-	-	-	-	1	1	1	X	2
Nitric Acid	X	X	-	-	-	1	-	X	1	1
Nitric Acid, 3 Molar	X	X	-	-	-	1	-	X	1	1
Nitric Acid, Concentrated (Boiling)	X	X	-	-	-	1	X	X	2	X
Nitric Acid, Inhibited										
Red Fuming (RFNA)	X	X	-	-	-	1	-	X	1	1
Nitric Acid, Red Fuming (RFNA)	X	X	X	-	X	X	1	X	2	2
Nitric Acid, 5% To 10%	X	X	X	1	2	X	1	X	2	2
Nitric Acid, 20%	X	X	X	1	2	X	1	X	2	2
Nitric Acid, 50% (Boiling)	X	X	X	X	X	X	1	X	2	2
Nitric Acid, 65% (Boiling)	X	X	X	X	X	X	1	X	2	2
Nitric Acid & Hydrochloric Acid	-	X	-	-	-	1	-	X	X	X
Nitrobenzene (Under 100°F)	X	X	X	2	X	X	1	2	1	1
Nitroethane	X	X	X	1	2	-	1	-	1	1
Nitrogen	1	1	2	1	1	1	1	1	1	1
Nitrogen Oxide Up To 50% (Under 100°F)	1	1	2	1	1	-	1	1	1	-
Nitromethane	X	X	X	-	-	1	1	1	1	1
Nitropropane	X	X	X	-	-	1	1	1	1	1
Nyvac 20 (WG), 30 (WG)	-	1	-	-	-	1	-	1	1	1
Nyvac FR Fluid	-	1	-	-	-	1	-	1	1	1
Nyvac FR200 Fluid	-	1	-	-	-	1	-	1	1	1
N-Octane	X	2	-	1	X	-	-	1	1	1
<b>O</b>										
Octyl Alcohol	2	2	2	1	-	-	1	1	1	2
Oils, Crude	X	2	-	-	-	1	-	1	-	-
Oil (SAE, Under 100°F)	1	1	1	1	2	1	1	1	1	1
Oleic Acid (Under 120°F)	2	2	2	1	2	1	-	2	2	1
Oleum	X	X	X	X	-	1	X	-	-	1
Olive Oil	X	2	2	2	X	-	1	-	2	1
OS 45 Type III (OS45)	1	2	-	-	-	1	-	-	-	-
OS 45 Type IV (OS45-1)	1	2	-	-	-	1	-	-	-	-
OS 70	1	2	-	-	-	1	-	-	-	-
Oxalic Acid (5%, Hot And Cold)	2	2	-	-	-	1	2	X	2	1
Oxalic Acid (10%)	2	2	-	-	-	1	2	X	2	1
Oxalic Acid (10% Boiling)	X	X	-	-	-	1	-	X	X	X
Oxalic Acid	X	X	X	1	2	X	1	X	2	2
Oxygen, Gaseous	-	-	-	-	-	1	-	1	1	1
Ozone (Dry)	2	X	2	1	2	1	1	2	1	1
Ozone (Wet)	-	X	-	-	-	1	-	X	2	1

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters			
	Trade Names									
	A	C	C <sub>2</sub>	J	Z		Carbon Steel	Stainless Steel 304	Stainless Steel 316	
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (Cover Rating Only)	PTFE	Nylon	Aluminum	Brass
Chemical Name										
<b>P</b>										
Paint	X	-	-	-	X	X	1	2	-	1
Paint Solvents (Oil Base)	X	X	-	-	X	X	1	2	-	1
Paints (Oil Base)	-	1	-	-	1	-	1	1	-	-
Paint Thinner, Duco	2	1	-	-	-	1	1	2	2	1
Palmetic Acid	2	2	2	1	X	1	1	1	2	2
Palm Oil	2	1	2	-	2	-	1	-	1	1
Paraffin (Petroleum)	2	1	2	1	X	-	1	1	2	1
Paraformaldehyde	2	2	2	-	2	2	1	-	1	1
Peanut Oil (Less Than 100°F)	2	1	2	-	-	1	-	1	1	1
Pentastol	2	2	2	-	2	-	1	1	1	1
Perchloric Acid	X	X	-	-	2	X	1	X	X	2
Perchloroethylene (Tetrachloroethylene)	X	X	X	2	X	-	1	2	1	1
Petroleum Ether	X	2	-	1	-	-	1	-	2	1
Petroleum Oil (Crude)	2	1	-	-	-	1	-	-	-	-
Petroleum Oil (Below 250°F)	2	1	-	-	-	1	-	-	-	-
Petroleum Oil (Above 250°F)	X	X	-	-	-	1	-	-	-	-
Petroleum Oils (Under 100°F)	2	1	2	-	2	2	1	-	1	1
Petroleum Oils (Refined)	2	1	2	-	2	2	1	1	1	1
Petroleum Oils (Sour)	2	2	-	-	X	2	1	-	2	1
Phenol (Carbolic Acid)	X	X	X	1	X	X	1	X	2	1
Phenol (70/30 Water)	X	X	-	-	-	1	-	-	1	1
Phenol (85/15 Water)	X	X	-	-	-	1	-	-	1	1
Phorone (Diisopropylidene Acetone)	X	X	-	-	X	X	1	-	1	1
Phosphate Esters (Concentrated)	X	X	-	X	X	1	2	-	-	-
Phosphate Esters (3 Molar)	X	X	-	2	X	1	2	-	-	-
Phosphate Esters (Dilute)	X	X	-	1	1	X	1	2	-	-
Phosphoric Acid	2	2	-	-	-	1	-	-	2	-
Phosphoric Acid (3 Molar)	X	X	-	-	-	1	-	-	-	-
Phosphoric Acid (Concentrated)	X	X	-	-	-	1	-	-	-	-
Phosphoric Acid (1%)	2	-	-	-	-	1	-	-	1	1
Phosphoric Acid (5%)	2	X	-	-	-	1	-	-	1	1
Phosphoric Acid (10%)	2	X	-	-	-	1	-	X	-	1
Phosphoric Acid (10% Hot)	2	X	-	-	-	1	-	X	-	1
Phosphoric Acid (50%)	2	2	2	1	1	X	1	X	2	2
Phosphoric Acid (50% Hot)	2	X	-	-	-	1	-	X	X	2
Phosphoric Acid (85%)	2	X	-	1	1	X	1	X	2	2
Phosphoric Acid (85% Hot)	2	X	-	-	-	1	-	X	X	X
Phosphoric Acid (Aerated)	-	-	-	-	-	1	-	X	-	2
Phosphoric Acid Air Free	-	-	-	-	-	1	-	X	-	X
Photographic Developers	1	1	-	-	-	1	-	X	1	1
Photographic, Emulsions	-	-	-	-	-	1	-	-	-	-
Photographic, Fixing Solutions	2	-	-	-	2	-	1	-	-	1
Phthalic Acid	-	-	-	-	-	-	-	2	2	1
Picric Acid (Water Solution 100°F)	2	2	-	2	-	1	X	X	1	1
Pinene	X	2	-	2	-	1	-	1	1	1
Pine Oil	X	2	-	2	X	-	1	1	1	1
Piperazine Hydrochloride Solution (34%)	-	2	-	-	-	1	-	-	-	-
Pitch	2	1	-	-	2	2	1	1	-	-
Plating Solutions (Chrome)	X	X	-	-	-	X	1	X	-	X
Plating Solutions (Other)	-	1	-	-	-	1	-	-	-	-
Polyester Resin	-	-	-	-	-	-	2	-	-	-
Polyurethane Foam (Under 125°F)	-	-	-	-	-	1	-	-	-	-
Potassium Acetate	2	2	-	1	2	X	1	-	2	1
Potassium Bicarbonate	1	1	-	-	1	-	1	1	2	2
Potassium Bisulfite	-	1	-	-	-	1	1	-	-	-
Potassium Bromate	-	-	-	-	-	1	-	-	-	-
Potassium Bromide	1	1	-	-	1	2	1	1	X	X
Potassium Carbonate (Potash)	1	1	1	1	1	2	1	1	2	1

○Cover stock rating only; Rating for tube stock "X"

\*Use Gates fuel hose or contact Denver Product Applications Department.





# Chemical Resistance Table

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers							Couplings & Adapters				
	Trade Names											
	A	C	C <sub>2</sub>	J		Z		Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon				
Chemical Name												
Potassium Chlorate	1	1	-	-	-	2	1	1	2	2	2	-
Potassium Chloride (1% To 5%)	1	1	-	1	-	2	1	1	1	2	2	X X
Potassium Chloride (Boiling)	-	-	-	-	-	1	-	-	-	2	2	- X
Potassium Cyanide	1	1	-	1	-	-	1	1	2	1	1	X X
Potassium Dichromate	1	1	-	1	-	-	1	2	1	2	2	-
Potassium Ferrocyanide	-	-	-	-	-	-	1	-	2	1	1	2
Potassium Fluoride	-	-	-	-	-	-	1	-	-	-	-	-
Potassium Hydroxide	2	2	-	-	-	-	1	-	1	1	-	-
Potassium Hydroxide (5%)	1	1	-	-	-	-	1	1	2	2	2	X X
Potassium Hydroxide (27% Boiling)	-	-	-	-	-	-	1	-	2	2	1	X X
Potassium Hydroxide (30%, Caustic Potash)	-	-	-	1	-	-	1	-	-	-	-	-
Potassium Hydroxide (50% Boiling)	-	-	-	-	-	-	1	-	2	2	2	X X
Potassium Hydroxide (70%)	-	X	-	-	-	-	1	-	-	-	X	X
Potassium Hydroxide (70% Hot)	-	-	-	-	-	-	1	-	X	-	X	X
Potassium Iodide	1	1	-	1	-	-	1	1	1	2	2	-
Potassium Nitrate	1	1	-	1	-	-	1	1	1	2	2	2
Potassium Nitrate (1% To 5%)	1	1	-	-	-	-	1	-	1	1	1	2
Potassium Permanganate	1	2	-	-	-	-	1	2	1	2	2	-
Potassium Permanganate (5%)	1	1	-	-	-	-	1	1	1	1	1	-
Potassium Persulfate	-	-	-	-	-	-	1	-	-	-	-	-
Potassium Phosphate	1	-	-	-	1	-	1	-	X	2	2	X
Potassium Sulfate	1	1	-	1	-	-	1	1	1	2	2	1
Potassium Sulfate - 1% & 5%	1	1	-	-	-	-	1	1	1	1	1	X
Potassium Sulfide	1	1	-	-	-	-	1	-	2	2	2	-
Potassium Sulfite	1	1	-	1	-	-	1	-	1	1	1	1
Potassium Thiosulfate	1	-	-	1	-	-	1	-	-	-	-	-
Primatol A, S, P (Ag Spray)	-	-	-	-	-	-	1	-	-	-	-	-
Propane Gas	X	X	-	-	-	X	1	-	1	1	1	-
Propionic Acid	X	X	-	-	-	-	1	-	1	-	2	-
Propyl Acetate	X	X	-	2	-	-	1	-	1	-	-	-
Propyl Alcohol	1	1	2	1	-	X	1	1	1	1	-	2
Propylene (Liquid Or Gas, Ambient)	X	X	-	1	-	-	1	2	1	1	1	-
Propylene Dichloride	-	-	-	-	-	-	1	-	1	2	1	X
Propylene Glycol	1	1	-	1	1	1	1	2	1	1	1	-
Propylene Oxide	X	X	-	-	-	-	-	-	2	1	1	2
Purina Insecticide	X	X	-	-	-	-	1	2	1	1	1	2
Puropale RX Oils	-	1	-	-	-	-	2	1	1	1	1	1
Pyranol, Transformer Oil	2	1	-	-	-	-	-	1	-	1	1	1
Pydraul	X	X	-	-	-	-	1	-	-	-	-	-
Pydraul 10E, 29E-LT, 30E, 60, 65E, 115E	X	X	-	2	-	-	1	-	1	1	1	1
Pydraul 135	-	X	-	2	-	-	-	1	1	1	-	-
Pydraul 150	X	X	X	2	X	2	1	2	1	1	1	1
Pydraul 280	X	X	X	2	X	2	1	2	1	1	1	-
Pydraul 312	X	X	X	2	-	2	1	1	1	1	-	-
Pydraul 50E	-	-	-	2	-	2	1	1	1	1	-	-
Pydraul 540	X	X	X	2	X	X	1	X	1	1	-	-
Pydraul 625	X	X	X	2	X	2	1	2	1	1	-	-
Pydraul A-200	X	X	X	2	X	X	1	2	1	1	-	-
Pydraul F-9	X	X	X	2	X	2	1	1	1	1	-	-
Pyridine (50%)	X	X	-	-	X	1	1	-	1	1	1	1
Pyrogard 160, 230, 630	-	-	-	-	-	-	1	-	1	1	-	-
Pyrogard 51, 53, 55	-	X	-	-	-	-	1	-	1	1	-	-
Pyrogard C, D	-	1	-	-	-	-	2	1	1	1	1	1

○ Cover stock rating only; Rating for tube stock "X"  
 \*Use Gates fuel hose or contact Denver Product Applications Department.

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers							Couplings & Adapters				
	Trade Names											
	A	C	C <sub>2</sub>	J		Z		Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon				
Chemical Name												
R												
Ramrod (Ag Spray)	-	-	-	-	-	-	1	1	1	1	1	1
Rando Oils	-	1	-	-	-	2	1	1	1	1	1	1
Rape Seed Oil	2	X	-	-	X	-	1	2	1	1	1	1
Red Oil (Comm. Oleic Acid, MIL-H-5606)	2	2	2	1	2	-	1	1	2	2	1	1
Refined Wax (Petroleum)	2	1	2	-	-	2	1	1	1	1	1	-
Regal Oils R&O	-	1	-	-	-	2	1	1	1	1	1	1
Richfield Weed Killer	X	2	-	-	X	-	1	-	-	-	-	-
Round Up	2	2	-	-	-	-	1	1	2	1	1	1
Rubilene Oils	-	1	-	-	-	2	1	1	-	-	-	-
S												
Salicylic Acid	1	X	-	-	-	-	1	1	1	1	2	-
Salt Water (Sea Water)	2	2	2	-	2	1	1	1	2	1	1	X
Santosafe W-G15, W-G20, W-G30	-	1	-	-	-	2	1	1	1	1	1	1
Santo Safe 300	X	X	-	-	-	-	1	-	1	1	1	-
Sevin	-	-	-	-	-	-	1	1	-	-	-	-
Sewage	2	2	2	1	2	-	1	1	X	1	1	2
SFR Fluid B (Shell)	-	X	-	-	-	-	1	-	-	-	-	-
SFR Fluid C (Shell)	-	X	-	-	-	-	1	-	-	-	-	-
Shellac	2	1	-	-	-	-	1	1	1	1	1	-
Shellac (Bleached)	2	1	-	-	-	-	1	1	1	1	1	2
Shellac (Orange)	2	1	-	-	-	-	1	1	1	1	1	2
Silicone Greases	2	2	2	-	2	-	1	1	1	1	1	1
Silicone Oils	2	2	2	-	2	-	1	1	1	1	1	1
Silver Cyanide	1	-	-	-	-	-	1	-	1	1	X	-
Silver Nitrate	1	1	1	1	1	-	1	-	2	1	1	2
Skydrol 500A& 7000	X	X	X	2	X	-	1	1	1	1	1	-
Soap Oil	X	X	-	-	X	-	1	-	1	1	-	-
Soap Solutions	2	1	2	1	1	1	1	1	1	1	1	1
Soda Ash (Sodium Carbonate)	1	1	1	1	1	1	1	1	1	1	1	2
Soda Water	-	-	-	-	-	1	1	1	-	-	-	-
Sodium Acetate	X	X	X	1	X	2	1	1	1	1	1	1
Sodium Benzoate	-	-	-	-	-	-	1	1	-	-	-	-
Sodium Bicarbonate	1	1	1	1	1	1	1	1	2	1	1	2
Sodium Bisulfate (Niter Cake)	1	1	1	1	1	1	1	1	X	2	1	X
Sodium Bisulfite	1	1	1	1	1	1	1	1	2	1	1	2
Sodium Borate	1	1	1	1	1	1	1	1	1	1	1	-
Sodium Carbonate	1	1	1	1	1	1	1	1	2	2	2	X
Sodium Chlorate	2	1	-	-	-	1	1	1	2	2	2	X
Sodium Chloride	1	1	1	1	1	1	1	1	2	2	1	X
Sodium Chloride - 2%	1	1	-	-	-	-	1	1	2	2	1	X
Sodium Chloride - 5%	1	1	-	-	-	-	1	1	-	2	1	X
Sodium Chloride - 5% @ 150°F	1	1	-	-	-	-	1	1	-	2	1	-
Sodium Chloride Saturated	1	1	-	-	-	-	1	1	-	1	1	X
(Boiling)	-	-	-	-	-	-	1	-	-	2	1	X
Sodium Chloride Slurry	-	-	-	-	-	-	1	-	-	-	-	-
Sodium Cyanide	1	1	1	1	1	1	1	1	2	1	1	X
Sodium Dichromate	2	1	-	1	2	1	1	1	-	-	-	-
Sodium Ferricyanide	-	-	-	-	-	-	1	-	2	2	2	-
Sodium Ferrocyanide	-	-	-	-	-	-	1	-	-	-	-	-
Sodium Fluoride	-	1	-	-	-	-	1	-	2	2	2	-
Sodium Fluoride (5%)	-	1	-	-	-	-	1	1	2	2	2	-
Sodium Fluoride (70%)	-	-	-	-	-	-	1	-	-	2	-	-
Sodium Hydrosulfide	1	X	-	-	-	-	1	-	-	-	-	-
Sodium Hydrosulfite	-	-	-	-	-	-	1	-	-	-	-	-
Sodium Hydroxide	2	2	-	-	-	-	1	-	2	-	-	X
Sodium Hydroxide (3 Molar)	2	2	-	-	-	-	1	-	-	-	-	X
Sodium Hydroxide (10%)	-	-	-	1	-	-	1	-	-	-	-	-

EQUIPMENT

HOSE/CPLG. SELECTION

G8K COUPLINGS

GLOBALSPIRAL COUPLINGS

PCM/PCS FERRULES

MEGACRIMP COUPLINGS

STAINLESS STEEL

POWER CRIMP COUPLINGS

LOC, GL AND GLP COUPLINGS

POLARSEAL COUPLINGS

POLARSEAL II COUPLINGS

C14 COUPLINGS

PCTS THERMO-PLASTIC COUPLINGS

FIELD ATTACHABLE G1 AND G2 COUPLINGS

FIELD ATTACHABLE C5 AND C5E COUPLINGS

SURELOK AIR BRAKE COUPLINGS

ADAPTERS

QUICK DISCONNECT COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT AND PARTS



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## Chemical Resistance Table

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters						
	Trade Names						Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass		
	A	C	C <sub>2</sub>	J	Z								
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)						PTFE	Nylon
Chemical Name	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Sodium Hydroxide (20% Cold)	1	2	-	-	-	-	1	1	1	1	X	X	
Sodium Hydroxide (20% Hot)	1	X	-	-	-	-	1	-	2	1	1	X	X
Sodium Hydroxide (40%)	1	2	2	1	1	-	1	2	2	1	1	X	X
Sodium Hydroxide (50% Cold)	2	X	X	1	1	-	1	2	2	2	2	X	X
Sodium Hydroxide (50% Hot)	-	-	-	1	2	-	1	X	X	2	2	X	X
Sodium Hydroxide (60%)	2	X	X	1	2	-	1	X	X	2	2	X	X
Sodium Hydroxide (70% Cold)	1	2	-	-	-	-	1	-	-	2	X	X	X
Sodium Hydroxide (70% Hot)	-	-	-	-	-	-	1	-	-	-	-	-	-
Sodium Hydroxide (80% Hot)	1	X	-	-	-	-	1	-	X	X	X	X	X
Sodium Hypochlorite	1	X	-	-	-	-	1	-	X	X	X	X	-
Sodium Hypochlorite, 5%	-	X	X	1	1	X	1	1	X	X	2	X	X
Sodium Hypochlorite, 20%	X	X	X	1	1	X	1	2	X	X	2	X	X
Sodium Hyposulfate	X	-	-	-	-	-	1	-	X	1	1	X	-
Sodium Metaphosphate	2	2	2	1	2	-	1	1	X	1	1	1	X
Sodium Nitrate	X	X	-	1	2	1	1	1	1	2	2	2	2
Sodium Perborate	X	X	-	-	X	-	1	2	X	1	1	1	X
Sodium Peroxide (Sodium Dioxide)	1	2	1	2	1	-	1	X	X	1	1	1	X
Sodium Phosphate	X	1	-	1	-	1	1	1	2	1	1	1	X
Sodium Phosphate (Mono)	1	1	-	-	-	-	1	-	-	-	-	-	-
Sodium Phosphate (Dibasic)	2	1	-	-	-	-	1	-	-	-	-	-	-
Sodium Phosphate (Tribasic)	2	1	-	-	-	-	1	-	2	2	2	-	-
Sodium Silicate	1	1	-	1	1	2	1	1	1	1	1	-	1
Sodium Silicate (Hot)	1	1	-	-	-	-	1	-	2	2	2	X	X
Sodium Sulfate	1	1	-	1	1	1	1	1	2	1	1	-	2
Sodium Sulfide	1	1	-	1	1	1	1	1	X	X	2	X	X
Soium Sulfide, Saturated	1	1	-	-	-	-	1	1	2	2	1	X	X
Sodium Sulfite	2	2	2	1	2	1	1	2	1	1	1	-	X
Sodium Sulfite, 5%	1	1	-	-	-	-	1	-	1	1	1	1	-
Sodium Sulfite, 10% @ 150°F	1	1	-	-	-	-	1	-	2	2	2	2	-
Sodium Thiosulfate (HPO, Antichlor)	1	1	1	1	1	1	1	1	X	1	1	2	X
Sodium Tripolyphosphate (STPP)	-	-	-	-	-	-	1	-	-	1	1	X	X
Solnus Oils	-	1	-	-	-	2	1	1	1	1	1	1	1
Sour Crude Oil	-	-	-	-	-	-	1	-	-	-	-	-	-
Soybean Oil	2	2	2	-	2	-	1	1	1	1	1	1	-
Spent Acid	-	-	-	-	2	-	1	-	-	1	1	-	-
Stannic Chloride	X	2	2	1	X	-	1	X	X	X	X	X	X
Stannic Chloride, 50%	X	1	-	-	-	-	1	-	X	X	X	X	-
Stannous Chloride (Under 150°F)	1	1	-	1	1	-	1	X	-	X	2	X	-
Stannous Chloride, 15%	1	1	-	-	-	-	1	-	X	X	-	X	-
Starch	2	2	-	-	1	1	1	1	X	1	1	1	-
Steam	USE STEAM HOSE						-	2	1	1	-	2	-
Stearic Acid	2	2	2	1	2	1	1	1	X	2	1	X	X
Stearin	-	-	-	-	-	1	1	2	-	-	-	-	-
Stoddard Solvent	2	2	X	1	-	X	1	1	2	1	1	1	1
Styrene (Vinyl Benzene)	X	X	-	-	-	-	1	1	1	1	1	1	1
Styrene (Monomer)	-	X	-	2	-	-	1	2	2	X	2	X	2
Sucrose Solutions	1	1	1	-	1	-	1	-	1	1	1	-	-
Sulfamic Acid (10%, Under 170°F)	-	-	-	1	2	-	1	-	-	-	-	-	-
Sulfate Black Liquor	1	1	-	-	-	-	1	1	2	2	2	X	-
Sulfate Green Liquor	1	1	-	-	-	-	1	1	2	2	2	X	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur (Molten)	X	X	-	-	-	-	-	-	-	-	-	-	-
Sulfur Chloride	X	X	X	-	2	-	1	2	X	X	2	X	X
Sulfur Dioxide (Moist)	2	X	-	-	2	-	1	1	-	2	1	1	X
Sulfur Dioxide (Dry)	X	X	X	-	2	-	1	X	2	1	1	1	1
Sulfur Dioxide (Liquid)	2	X	-	-	2	-	1	-	-	-	-	-	-
Sulfur Hexafluoride (Gas)	1	2	-	-	2	-	1	X	-	-	-	-	-
Sulfur Trioxide (Dry)	X	X	X	X	X	-	1	1	2	2	2	2	X
Sulfuric Acid, 85%	X	X	-	-	-	-	1	-	X	2	1	X	-
Sulfuric Acid, 3 Molar	X	X	-	-	-	-	1	-	-	-	-	-	-

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers						Couplings & Adapters						
	Trade Names						Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass		
	A	C	C <sub>2</sub>	J	Z								
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)						PTFE	Nylon
Chemical Name	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Sulfuric Acid, Aerated, No Velocity	-	-	-	-	-	-	1	-	2	2	2	X	-
Sulfuric Acid, Air Free No Velocity	-	-	-	-	-	-	1	-	X	X	2	X	-
Sulfuric Acid, Concentrated	X	X	-	-	-	-	1	-	-	1	1	-	-
Sulfuric Acid, Fuming, Oleum	X	-	-	-	-	-	1	-	2	1	1	2	-
Sulfuric Acid (10%)	1	2	2	1	1	-	1	X	-	X	X	2	X
Sulfuric Acid (30%)	1	-	-	1	1	-	1	X	X	X	2	X	X
Sulfuric Acid (50%)	2	X	X	1	1	-	1	X	X	X	2	X	X
Sulfuric Acid (75%)	X	X	X	-	2	-	1	X	X	X	2	X	X
Sulfuric Acid (93%)	X	X	X	-	X	-	1	X	2	X	2	X	X
Sulfuric Acid (98%)	X	X	X	X	X	-	1	X	2	X	2	X	X
Sulfurous Acid	2	2	-	-	-	-	1	X	X	X	2	-	-
Sulfurous Acid (10%)	-	X	-	1	1	-	1	-	-	X	2	1	X
Sulfurous Acid (75%)	X	X	X	1	1	-	1	X	X	X	2	X	X
Sun R&O Oils	-	1	-	-	-	2	1	1	1	1	1	1	1
Sunsafe (Fire Resist. Hydr. Fluid)	2	1	-	-	-	2	1	1	1	1	1	1	-
Suntac HPOils	-	1	-	-	-	2	1	1	1	-	1	-	-
Suntac WR Oils	-	1	-	-	-	2	1	1	1	-	1	-	-
Sunvis Oils 700, 800, 900	-	1	-	-	-	2	1	1	1	1	1	1	-
Super Hydraulic Oils (Conoco)	-	1	-	-	-	2	1	1	1	1	1	1	-
Sutan Plus, Herbicide	X	X	X	1	-	-	-	1	1	1	1	1	-
Sutazine Plus, Herbicide	X	X	-	1	-	-	-	1	X	1	1	1	-
Synthetic Oil (Citgo)	-	-	-	-	-	2	-	1	1	1	1	-	-
Syrup	2	1	2	-	-	-	1	1	-	1	1	1	-
T													
Tall Oil (Under 150°F)	2	2	2	-	X	-	1	-	2	X	2	X	-
Tallow	2	2	2	-	-	-	1	1	2	2	2	1	2
Tannic Acid (10%)	2	X	-	1	2	-	1	X	2	1	1	2	X
Tar And Tar Oil	2	-	-	-	-	2	1	1	1	1	1	1	2
Tar (Bituminous, Under 100°F)	2	2	2	X	-	-	1	-	1	1	1	1	2
Tartaric Acid	2	2	2	1	1	-	1	1	X	2	2	2	X
Tellur Oils	-	1	-	-	-	2	1	1	1	1	1	1	1
Tenol Oils	-	1	-	-	-	2	1	1	1	1	1	-	-
Tergitol	-	-	-	-	-	-	1	-	2	1	1	-	2
Terpineol	X	2	-	1	2	-	1	2	-	-	-	-	-
Terresstic	-	1	-	-	-	-	-	1	1	1	1	-	-
Tetraethyl Lead	2	2	-	-	-	-	1	2	-	-	-	-	-
Tetraethyl Lead Blend	X	2	-	-	-	-	1	-	-	-	-	-	-
Tetrahydrofuran (THF)	X	X	-	-	X	2	1	1	2	-	-	-	-
Tetralin	X	X	-	-	X	-	1	2	1	1	1	1	-
Thiopen	X	X	-	-	-	-	1	-	-	-	-	-	-
Titanium Tetrachloride	X	X	X	-	-	-	1	-	1	2	2	X	X
Toluene (Toluol)	X	X	X	X	X	-	1	1	1	1	1	1	1
Toluene Diisocyanate (Under 150°F)	X	-	-	-	-	-	1	-	1	1	1	-	-
Transformer Oil (Askarel Types)	X	X	X	1	X	-	1	-	1	1	1	1	-
Transformer Oil (Petroleum Type)	2	1	2	1	X	2	1	1	1	1	1	1	1
Transmission Fluid, Type A	2	1	2	1	2	-	1	2	1	1	1	1	1
Tributoxyethyl Phosphate	X	X	X	X	X	-	1	2	1	-	-	X	-
Tributyl Phosphate	X	X	X	2	X	-	1	-	1	-	-	X	-
Trichloroethylene	X	X	X	2	X	-	1	2	X	2	1	X	1
Trichloromonofluoroethane (Freon 17)	Use Freon Hose						1	1	1	X	X	-	-
Trichlorotrifluoroethane (Freon 113)	Use Freon Hose						1	1	1	X	-	-	-
Tricresyl Phosphate	X	X	X	1	X	-	1	1	1	2	2	X	-
Triethanolamine (TEA)	2	2	-	1	2	-	1	1	1	1	1	1	1
Tripolyphosphate (STPP)	X	1	-	-	-	-	1	-	2	1	X	-	-
Tung Oil	2	2	-	-	2	-	1	1	1	1	1	1	1
Turpentine	X	2	-	2	X	1	1	1	X	1	1	1	2
Type I Fuel (MIL-S-3136)	2	1	-	-	-	-	1	-	1	1	1	1	-
ASTM Fuel A	X	2	-	-	-	-	1	-	1	1	1	1	-
Type II Fuel (MIL-S-3136)	X	2	-	-	-	-	1	-	1	1	1	1	-

○ Cover stock rating only; Rating for tube stock "X" \*Use Gates fuel hose or contact Denver Product Applications Department.



## Chemical Resistance Table

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers							Couplings & Adapters					
	Trade Names							Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass	
	A	C	C <sub>2</sub>	J	Z								
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE						Nylon
Chemical Name													
Type III Fuel (MIL-3136)													
ASTM Fuel B	X	1	-	-	-	-	1	-	1	1	1	1	-
U													
Ucon Hydrolube Types 150CP, 200CP	-	1	-	-	-	-	2	1	1	1	1	1	1
Ucon Hydrolube Types 275CP, 300CP, 550CP	-	-	-	-	-	-	1	-	-	-	-	-	-
Ucon M1	-	1	-	-	-	-	2	1	1	1	1	1	1
Union ATF Dexron	-	1	-	-	-	-	2	1	1	1	1	1	-
Union ATF Type F	-	1	-	-	-	-	2	1	1	1	1	1	1
Union C-2 Fluid	-	1	-	-	-	-	2	1	1	1	1	1	-
Union C-Poil	-	1	-	-	-	-	2	1	1	1	1	1	1
Union Hydraulic Oil AW	-	1	-	-	-	-	2	1	1	1	1	1	1
Union Hydraulic Tractor Fluid	-	1	-	-	-	-	2	1	1	1	1	1	1
Urea Solution	1	2	-	1	1	1	2	1	1	1	1	2	
V													
Varnish	X	X	X	-	X	-	1	1	2	1	1	1	2
Vegetable Oils	2	1	2	1	-	2	1	1	1	1	1	1	2
Vegetable Oil (Hot)	-	-	-	-	-	-	1	1	2	2	2	1	2
Versilube	1	1	-	-	-	-	1	-	1	1	1	1	-
Versilube F-50, F-44	2	2	2	-	2	2	1	1	1	1	1	1	1
Vinegar	2	X	X	2	X	-	1	1	X	2	1	X	X
Vinyl Acetate	X	X	X	1	X	-	1	-	2	1	2	1	2
Vinyl Chloride (Chloroethylene, Monomer)	X	X	X	X	X	-	1	-	2	1	1	2	X
Vitrea Oils	X	X	X	-	-	2	1	1	1	1	1	-	-

Rating Scale: 1 Excellent 2 Good resistance X Not recommended - Testing recommended	Gates Hose Polymers							Couplings & Adapters				
	Trade Names							Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
	A	C	C <sub>2</sub>	J	Z							
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane (cover rating only)	PTFE					
Chemical Name												
W												
Water	1	1	1	1	1	1	1	1	2	1	1	1
Water, Acid Mine	2	X	-	-	-	-	1	1	X	2	2	X
Water, Brine	2	2	-	-	1	1	1	1	X	2	2	-
Water Deionized, (Demineralized)	-	-	-	-	-	-	1	-	-	-	-	-
Water, Distilled	2	1	-	-	1	1	1	1	X	1	1	1
Water, Fresh	1	1	-	-	-	-	1	1	X	1	1	X
Water In Oil Emulsions	-	-	-	-	-	2	1	1	-	-	-	-
Water, Potable (FDA Tube Only)	Use FDA Hose Only							-	-	-	-	-
Water, Salt	2	1	-	-	-	-	1	1	X	2	2	X
White & Bagley No. 2190												
Cutting Oil	2	1	-	-	-	-	1	-	-	-	-	-
Wines	2	1	1	1	1	1	-	1	1	2	2	1
Wood Oil	2	1	-	1	2	1	1	1	1	1	1	1
X												
Xylene	X	X	-	X	-	2	1	X	2	2	2	-
Z												
Zeric	-	1	-	-	-	2	1	2	-	-	-	-
Zinc Acetate	2	X	-	-	X	-	1	2	1	1	1	1
Zinc Chloride Solutions	1	1	1	1	1	-	1	1	X	2	1	X
Zinc Chromate	-	-	-	1	1	-	1	-	-	1	1	-
Zinc Hydrate	-	-	-	-	-	2	1	-	-	-	-	-
Zinc Sulfate Solutions	2	2	2	1	2	-	1	2	X	2	1	X

○ Cover stock rating only; Rating for tube stock "X"  
 \*Use Gates fuel hose or contact Denver Product Applications Department.

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS



Powering Progress.

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C63

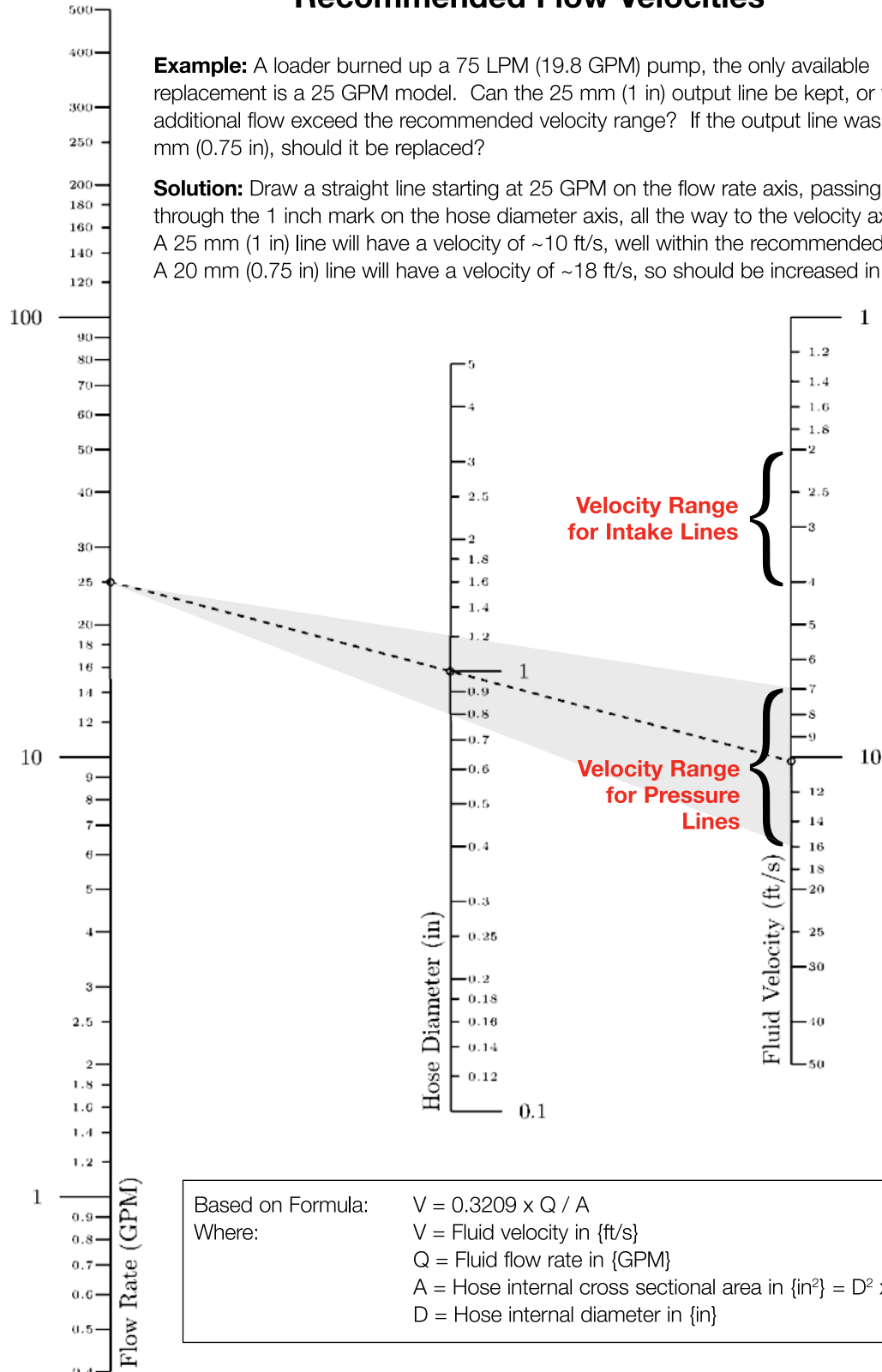


## Nomographic Chart

### Flow Capacity of Hose Assemblies at Recommended Flow Velocities

**Example:** A loader burned up a 75 LPM (19.8 GPM) pump, the only available replacement is a 25 GPM model. Can the 25 mm (1 in) output line be kept, or will the additional flow exceed the recommended velocity range? If the output line was 20 mm (0.75 in), should it be replaced?

**Solution:** Draw a straight line starting at 25 GPM on the flow rate axis, passing through the 1 inch mark on the hose diameter axis, all the way to the velocity axis. A 25 mm (1 in) line will have a velocity of ~10 ft/s, well within the recommended range. A 20 mm (0.75 in) line will have a velocity of ~18 ft/s, so should be increased in size.



## Properties of C14 PTFE Tube

Tensile Strength, 73°F (23°C)		1500-3000 Lb./Sq. In.
Elongation, 73°F (23°C)		100-200%
Stiffness, 73°F (23°C)		60,000 Lb./Sq. In.
Impact Strength	@70°F (21°C)	2.0 Ft.-Lb./In.
	@73°F (23°C)	3.5 Ft.-Lb./In.
	@170°F (77°C)	6.0 Ft.-Lb./In.
Hardness, Durometer		D55-D70 Shore D
Compressive Stress at		
1% Deformation	@73°F (23°C)	600 Lb./Sq.In.
1% Offset	@73°F (23°C)	1000 Lb./Sq.In.
Deformation Under Load, 24 Hrs. @ 122°F (50°C)		
1200 Lb./Sq.In.		4-8%
2000 Lb./Sq.In.		25%
Heat-Distortion Temperature @66 Lb./Sq. In.		250°F (121°C)
Coefficient of Linear Thermal Expansion per °F; 77-140°F (25-60°C)		5.5 x 10 <sup>-5</sup>
Thermal Conductivity 0.18 In.		1.7 B.T.U./Hr./Sq.Ft./°F/In.
Specific Heat		0.25 B.T.U./Lb./°F
Water Absorption		0.0%
Flammability		Nonflammable
Specific Gravity		2.1-2.3

EQUIPMENT
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ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





## EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGSSURELOK AIR  
BRAKE  
COUPLINGS

ADAPTERS

QUICK  
DISCONNECT  
COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT  
AND PARTS

## Electrostatic Discharge

Most applications of PTFE hose do not require the use of a conductive inner tube. Under certain applications, the potential for Static Discharge must be considered. Be aware that static electricity can be a hazard. Under those conditions where static discharge can occur, the use of conductive Gates C14CT hose is recommended. The following should serve to increase your knowledge and understanding of this phenomenon and how to avoid its occurrence:

When two different materials contact each other, electrons from one material can move across its boundary and associate with the other. These electrons align themselves with the material contacted. If the two materials are good conductors of electricity, the positive and negative electrons flow back and forth between them, keeping them in balance. If one or both are insulators, the flow will not occur. A charge will then build up on the surface of one of the materials. When the charge exceeds the electric strength of the material, electric breakdown results.

In applying this to PTFE hose, we have to consider fluids and gases that are poor conductors of electricity and the flow rates of those fluids and gases. In order for a liquid or gas to be a poor electrical conductor, it will generally satisfy one or both of the following conditions:

1. Be nonpolar; that is, an imbalance between protons and electrons, and/or
2. Contain a nonmixable component or a suspended solid; such as water in kerosene.

So when a liquid contacts a PTFE tube that isn't a good conductor (white PTFE innercore), the result is phase separation and the electric charge starts to build. The rate at which static electricity builds up now becomes a function of the fluid flow rate. When the electric strength of the PTFE tube is exceeded, the electric charge will **puncture the tube wall and ground itself on the stainless steel braid of the hose.**

In hydraulics, high pressures generally mean high velocities. Historically, fluids were filtered upstream of the hoses using metallic filter elements. The metallic element helped to ground the charge. But, today, most filtration is done with paper-type and glass-fiber filter elements that have a tendency to inject an electrostatic charge into the fluid they are filtering.

**Steam and fuels are two specific areas of concern. No hoses in this catalog can or should be used in steam applications. Contact Gates Product Application for proper hose recommendation.**

Fuels (i.e., gasoline and white spirits, hydrazine, benzene, diesel oils, etc.) are, for the most part, "nonconductive" liquids. These fluids usually are transferred at

fairly low velocities, but there still is a potential for an electrostatic discharge due to external factors, such as humidity and, to some extent, temperature. You should take all of these factors into account even at fluid velocities at or below 1 meter per second.

When using PTFE hose, you can offset the potential hazard of electrostatic discharge by using a conductive Gates C14CT hose. Carbon is added to the PTFE inner tube wall during manufacture. The carbon layer directs the electrostatic charge down the inner diameter of the hose to the metal end fittings. This prevents the charge from building up on the inner tube wall.

So, it's important to examine any application where nonconductive fluids are used and any of the above conditions exist. This section is not meant to cover all conditions or situations when they involve fuels, steam or other media which may cause electrostatic buildup or potential discharge. If you need help on any individual application, contact Hose/Connector Product Application, Denver.

Following is a list of some of the chemicals that meet at least one of the criteria necessary to create electrostatic discharge:

- Cyclohexane
- Decalin
- Diacetone
- Dibutyl Ether
- Dibutyl Phthalate
- Dibutyl Sebacate
- Dimethyl Phthalate
- Dioctyl Phthalate
- Dipentene
- Fuel Oil
- Gasoline
- Hexane
- Hexene
- Hydrazine
- Kerosene
- Lacquers
- Lacquer Solvents
- Naphtha
- Naphthalene
- Octane
- Paint
- Petroleum
- Pinene
- Silicone Oils
- Skydrol 500 & 700
- Steam
- Toluene
- Transformer Oil
- Turpentine
- Varnish
- Versilube

**General Industry Practice has identified the above fluids as requiring a conductive hose—Gates C14CT.**





# Effusion/Corrosion for PTFE Hose and Hose Assemblies

## What is Effusion?

It is the process where chemical molecules move through the PTFE wall and escape from a hose or hose assembly. It is sometimes called permeation. The rate at which effusion occurs depends upon temperature, pressure, wall thickness and the hose material.

The fact that effusion occurs isn't the problem. This process will happen with most all media in most hose material.

The basic issues are:

1. At what rate will effusion occur?
2. How hazardous are the media?
3. In what kind of environment does effusion take place; closed room, outside, etc.?

## General media concerns regarding the potential effects of effusion:

- Media where corrosion is not of concern, but effusion may displace the air we breathe, thus becoming a hazard to personnel.

Some of the chemicals in this category are:

- Carbon Dioxide
- Nitrogen
- Steam
- Oxygen
- Helium
- Neon
- Argon
- Xenon
- Krypton

- Media that can effuse in their "vapor phase"; i.e., their boiling point is below approximately +52°C (+125°F) at atmospheric pressure. These media can form chemicals that can corrode the braid and/or cause injury to personnel.

Some of these include:

- Acetaldehyde (Flammable, toxic)
- Benzene (Flammable, toxic)
- Liquid Butane (Flammable)
- Carbon Disulfide (Flammable, toxic)
- Diethyl Ether (Flammable, narcotic)
- Ethyl Mercaptan (Flammable, toxic)

- Hydrochloric Acid (Corrosive, toxic)
- Lacquer Solvents (Flammable)
- Methyl Bromide (Flammable, toxic, corrosive)
- Methylene Chloride (Toxic)
- Methyl Formate (Flammable, toxic)
- Liquid Propane (Flammable)
- Sulphur Trioxide (Corrosive, toxic)
- Liquid Chlorine (Corrosive, toxic)

- Media with the potential to effuse and cause corrosion of the braid reinforcement and fitting materials. These chemicals are all gases while at atmospheric pressure and a temperature of +13°C (+56°F) or lower.

Some of these chemicals are:

- Acetylene (Flammable)
- Butadiene (Flammable)
- Butane Gas (Flammable)
- Carbon Monoxide (Toxic, flammable)
- Chlorine (Toxic, corrosive)
- Chlorine Trifluoride (Toxic, corrosive)
- Ethyl Chloride (Toxic, corrosive)
- Hydrogen (Flammable)
- Hydrogen Chloride (Corrosive, toxic)
- Hydrogen Sulfide (Flammable, toxic)
- Hydrocyanic Acid (Flammable, toxic)
- Hydrogen Cyanide (Flammable, toxic)
- Coke Oven Gas (Flammable, toxic)
- Natural Gas (Flammable, toxic)
- Propane Gas (Flammable)
- Sulfur Dioxide (Corrosive)
- Vinyl Chloride Monomer (Toxic, corrosive)

It is important that hose assemblies used in these applications are installed in well-vented areas to avoid potential problems for personnel and/or equipment.

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
PCM/PCS FERRULES
MEGACRIMP COUPLINGS
STAINLESS STEEL
POWER CRIMP COUPLINGS
LOC, GL AND GLP COUPLINGS
POLARSEAL COUPLINGS
POLARSEAL II COUPLINGS
C14 COUPLINGS
PCTS THERMO-PLASTIC COUPLINGS
FIELD ATTACHABLE G1 AND G2 COUPLINGS
FIELD ATTACHABLE C5 AND C5E COUPLINGS
SURELOK AIR BRAKE COUPLINGS
ADAPTERS
QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS





EQUIPMENT

HOSE/CPLG.  
SELECTIONG8K  
COUPLINGSGLOBALSPIRAL  
COUPLINGSPCM/PCS  
FERRULESMEGACRIMP  
COUPLINGSSTAINLESS  
STEELPOWER  
CRIMP  
COUPLINGSLOC, GL AND  
GLP  
COUPLINGSPOLARSEAL  
COUPLINGSPOLARSEAL  
II COUPLINGSC14  
COUPLINGSPCTS  
THERMO-  
PLASTIC  
COUPLINGSFIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGSFIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGSSURELOK AIR  
BRAKE  
COUPLINGS

ADAPTERS

QUICK  
DISCONNECT  
COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT  
AND PARTS

## Hydraulic System Pressure Drop

### What is pressure drop?

Friction is defined as the resistance an object encounters in moving over another. Solids, liquids, and gases all exhibit friction in their motion. In hose and piping systems the result of this friction is pressure drop and heat generation that may be accurately estimated with engineering models.

### Why does pressure drop matter?

If there is excessive pressure drop in a system pumps will have to work harder, use more energy, and the working fluid will increase in temperature. Depending on the source of the additional pressure loss it could: raise the whole system pressure, increasing wear and introducing potentially dangers over pressure conditions; render some tools or equipment functions inoperable, because of inadequate operation pressure; or create damaging cavitation and loss of net positive suction head (NPSH).

### What affects pressure drop?

The factors which contribute pressure loss may be broken down into two general categories: mechanical components and fluid properties. Mechanical components such as valves, flow meters, quick disconnects, adapters, couplings, tubing, hose, etc., all contribute to pressure loss. The amount of pressure loss in mechanical components is impacted by criteria such as cross sectional area, internal surface roughness, length, bends, and geometric complexity. Fluid properties such as density, viscosity, heat capacity and bulk modulus will also contribute to pressure loss. Fluid properties are impacted by temperature, pressure, contamination, air entrainment, and time.

While all of these components contribute to pressure loss, fluid velocity has the most impact. Fluid velocity is a direct product of flow rate and cross sectional area.

### What can be done to reduce pressure drop?

- Check system pressure drop when non-identical replacement parts are required or there is ongoing system problems.
- Use straight adapters and bent couplings whenever possible.
- Replace worn parts and old fluids.
- Lower the fluid velocity.

### How can I calculate pressure drop for a hose assembly?

With some basic system information reliable pressure drop approximations may be readily calculated. First determine the applicable mechanical components and fluid for the analysis (doing 1 hose assembly at a time is recommended), then enter those values into the Gates online pressure drop calculator.

Hose assembly information: Inside Diameter, Length, Couplings, Adapters

**Fluid information:** Density, Viscosity, and Heat Capacity (these may be estimated with fluid type and temperature)

Go to <http://www.gates.com/pressuredrop> to calculate the pressure loss from the system information.



# Pressure Conversions

## Metric to PSI

(1 kPa = .145 psi)

Kilo Pascals (kPa)	Mega Pascals (MPa)	Bar (Bar)	Pounds per Square Inch (psi)
100	0.1	1	14.5
200	0.2	2	29.0
300	0.3	3	43.5
400	0.4	4	58.0
500	0.5	5	72.5
600	0.6	6	87.0
700	0.7	7	101.5
800	0.8	8	116.0
900	0.9	9	130.5
1,000	1.0	10	145.0
2,000	2.0	20	290.1
3,000	3.0	30	435.1
4,000	4.0	40	580.2
5,000	5.0	50	725.2
6,000	6.0	60	870.2
7,000	7.0	70	1,015.3
8,000	8.0	80	1,160.3
9,000	9.0	90	1,305.3
10,000	10	100	1,450
20,000	20	200	2,901
30,000	30	300	4,351
40,000	40	400	5,802
50,000	50	500	7,252
60,000	60	600	8,702
70,000	70	700	10,153
80,000	80	800	11,603
90,000	90	900	13,053
100,000	100	1000	14,504
200,000	200	2000	29,008
300,000	300	3000	43,511

## PSI to Metric

(1 psi = 6.89 kPa)

Pounds per Square Inch (psi)	Kilo Pascals (kPa)	Mega Pascals (MPa)	Bar (Bar)
10	68.9	0.07	0.7
20	137.9	0.14	1.4
30	206.8	0.21	2.1
40	275.8	0.28	2.8
50	344.7	0.34	3.4
60	413.7	0.41	4.1
70	482.6	0.48	4.8
80	551.6	0.55	5.5
90	620.5	0.62	6.2
100	689	0.7	6.9
200	1,379	1.4	13.8
300	2,068	2.1	20.7
400	2,758	2.8	27.6
500	3,447	3.4	34.5
600	4,137	4.1	41.4
700	4,826	4.8	48.3
800	5,516	5.5	55.2
900	6,205	6.2	62.1
1,000	6,895	6.9	68.9
2,000	13,790	13.8	137.9
3,000	20,684	20.7	206.8
4,000	27,579	27.6	275.8
5,000	34,474	34.5	344.7
6,000	41,369	41.4	413.7
7,000	48,263	48.3	482.6
8,000	55,158	55.2	551.6
9,000	62,053	62.1	620.5
10,000	68,948	68.9	689
20,000	137,895	137.9	1,379
30,000	206,843	206.8	2,068
40,000	275,790	275.8	2,758

## Examples

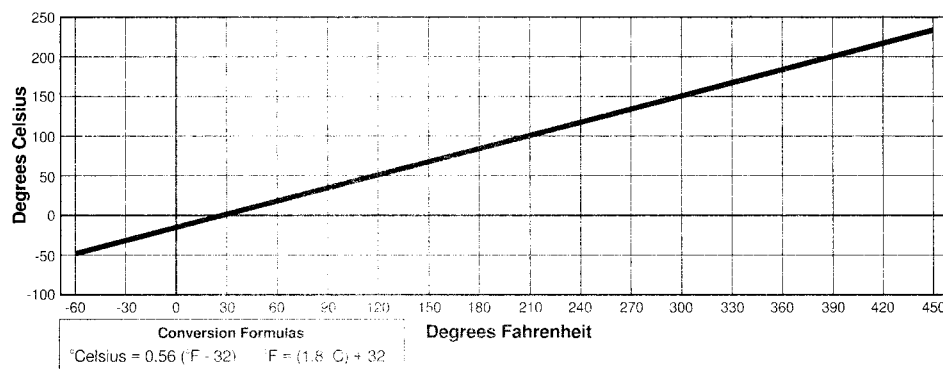
(A) Convert 3,429 psi to the equivalent pressure in Bar.

$$\begin{array}{rcl}
 3,000 \text{ psi} & = & 206.8 \text{ Bar} \\
 + \quad 400 \text{ psi} & = & 27.6 \text{ Bar} \\
 + \quad 20 \text{ psi} & = & 1.4 \text{ Bar} \\
 + \quad 9 \text{ psi} & = & .62 \text{ Bar} \\
 \hline
 3429 \text{ psi} & = & 236.42 \text{ Bar}
 \end{array}$$

(B) Convert 3,429 psi to the equivalent pressure in MPa.

$$\begin{array}{rcl}
 3,000 \text{ psi} & = & 20.680 \text{ MPa} \\
 + \quad 400 \text{ psi} & = & 2.760 \text{ MPa} \\
 + \quad 20 \text{ psi} & = & .140 \text{ MPa} \\
 + \quad 9 \text{ psi} & = & .062 \text{ MPa} \\
 \hline
 3,429 \text{ psi} & = & 23.642 \text{ MPa}
 \end{array}$$

# Fahrenheit-Celsius Conversion



Powering Progress.

[gates.com/hydraulics](http://gates.com/hydraulics)

EQUIPMENT

HOSE/CPLG.  
SELECTION

G8K  
COUPLINGS

GLOBALSPIRAL  
COUPLINGS

PCM/PCS  
FERRULES

MEGACRIMP  
COUPLINGS

STAINLESS  
STEEL

POWER  
CRIMP  
COUPLINGS

LOC, GL AND  
GLP  
COUPLINGS

POLARSEAL  
COUPLINGS

POLARSEAL II  
COUPLINGS

C14  
COUPLINGS

PCTS  
THERMO-  
PLASTIC  
COUPLINGS

FIELD  
ATTACHABLE  
G1 AND G2  
COUPLINGS

FIELD  
ATTACHABLE  
C5 AND C5E  
COUPLINGS

SURELOK AIR  
BRAKE  
COUPLINGS

ADAPTERS

QUICK  
DISCONNECT  
COUPLERS

LIVE SWIVEL

BALL VALVES

ACCESSORIES

EQUIPMENT  
AND PARTS

C69



## Fahrenheit-Celsius Conversion

Look up a temperature reading in the middle column (shaded). If it's in degrees Centigrade, read the Fahrenheit equivalent in the right-hand column. If it's in degrees Fahrenheit, read the Centigrade equivalent in the left-hand column.

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
GLOBALSPIRAL COUPLINGS
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QUICK DISCONNECT COUPLERS
LIVE SWIVEL
BALL VALVES
ACCESSORIES
EQUIPMENT AND PARTS

C	FC	F
-68	-90	-130
-62	-80	-112
-57	-70	-94
-51	-60	-76
-46	-50	-58
-40	-40	-40
-34	-30	-22
-29	-20	-4
-23	-10	14
-17.8	0	32
-17.2	1	33.8
-16.7	2	35.6
-16.1	3	37.4
-15.6	4	39.2
-15.0	5	41.0
-14.4	6	42.8
-13.9	7	44.6
-13.3	8	46.4
-12.8	9	48.2
-12.2	10	50.0
-11.7	11	51.8
-11.1	12	53.6
-10.6	13	55.4
-10.0	14	57.2
-9.4	15	59.0
-8.9	16	60.8
-8.3	17	62.6
-7.8	18	64.4
-7.2	19	66.2
-6.7	20	68.0
-6.1	21	69.8
-5.6	22	71.6
-5.0	23	73.4
-4.4	24	75.2
-3.9	25	77.0
-3.3	26	78.8
-2.8	27	80.6
-2.2	28	82.4
-1.7	29	84.2
-1.1	30	86.0
-.6	31	87.8
0	32	89.6
.6	33	91.4
1.1	34	93.2
1.7	35	95.0
2.2	36	96.8
2.8	37	98.6
3.3	38	100.4
3.9	39	102.2
4.4	40	104.0

C	FC	F
5.0	41	105.8
5.6	42	107.6
6.1	43	109.4
6.7	44	111.2
7.2	45	113.0
7.8	46	114.8
8.3	47	116.6
8.9	48	118.4
9.4	49	120.2
10.0	50	122.0
10.6	51	123.8
11.1	52	125.6
11.7	53	127.4
12.2	54	129.2
12.8	55	131.0
13.3	56	132.8
13.9	57	134.6
14.4	58	136.4
15.0	59	138.2
15.6	60	140.0
16.1	61	141.8
16.7	62	143.6
17.2	63	145.4
17.8	64	147.2
18.3	65	149.0
18.9	66	150.8
19.4	67	152.6
20.0	68	154.4
20.6	69	156.2
21.1	70	158.0
21.7	71	159.8
22.2	72	161.6
22.8	73	163.4
23.3	74	165.2
23.9	75	167.0
24.4	76	168.8
25.0	77	170.6
25.6	78	172.4
26.1	79	174.2
26.7	80	176.0
27.2	81	177.8
27.8	82	179.6
28.3	83	181.6
28.9	84	183.2
29.4	85	185.0
30.0	86	186.8
30.6	87	188.6
31.1	88	190.4
31.7	89	192.2
32.2	90	194.0
32.8	91	195.8

C	FC	F
33.3	92	197.6
33.9	93	199.4
34.4	94	201.2
35.0	95	203.0
35.6	96	204.8
36.1	97	206.6
36.7	98	208.4
37.2	99	210.2
37.8	100	212.0
43	110	230
49	120	248
54	130	266
60	140	284
66	150	302
71	160	320
77	170	338
82	180	356
88	190	374
93	200	392
99	210	410
100	212	413.6
104	220	428
110	230	446
116	240	464
121	250	482
127	260	500
132	270	518
138	280	536
143	290	554
149	300	572
154	310	590
160	320	608
166	330	626
170	338	640
171	340	644
177	350	662
182	360	680
186	366	691
188	370	698
193	380	716
198	388	730
199	390	734
204	400	752
208	406	763
210	410	770
216	420	788
221	430	806
227	440	824
232	450	842



# Decimal and Millimeter Equivalents of Fractions

Inches			Inches			Inches		
Fractions	Decimals	Millimeters	Fractions	Decimals	Millimeters	Fractions	Decimals	Millimeters
1/64	.015625	.397	23/64	.359375	9.128	11/16	.6875	17.463
1/32	.03125	.794	3/8	.375	9.525	45/64	.703125	17.859
3/64	.046875	1.191	25/64	.390625	9.922	23/32	.71875	18.256
1/16	.0625	1.588	13/32	.40625	10.319	47/64	.734375	18.653
5/64	.078125	1.984	27/64	.421875	10.716	3/4	.750	19.050
3/32	.09375	2.381	7/16	.4375	11.113	49/64	.765625	19.447
7/64	.109375	2.778	29/64	.453125	11.509	25/32	.78125	19.844
1/8	.125	3.175	15/32	.46875	11.906	51/64	.796875	20.241
9/64	.140625	3.572	31/64	.484375	12.303	13/16	.8125	20.638
5/32	.15625	3.969	1/2	.500	12.700	53/64	.828125	21.034
11/64	.171875	4.366	33/64	.515625	13.097	27/32	.84375	21.431
3/16	.1875	4.763	17/32	.53125	13.494	55/64	.859375	21.828
13/64	.203125	5.159	35/64	.546875	13.891	7/8	.875	22.225
7/32	.21875	5.556	9/16	.5625	14.288	57/64	.890625	22.622
15/64	.234375	5.953	37/64	.578125	14.684	29/32	.90625	23.019
1/4	.250	6.350	19/32	.59375	15.081	59/64	.921875	23.416
17/64	.265625	6.747	39/64	.609375	15.478	15/16	.9375	23.813
9/32	.28125	7.144	5/8	.625	15.875	61/64	.953125	24.209
19/64	.296875	7.541	41/64	.640625	16.272	31/32	.96875	24.606
5/16	.3125	7.938	21/32	.65625	16.669	63/64	.984375	25.003
						1	1.000	25.400

# Metric (SI) — U.S. Units for Fluid Power Use

(The following conversions are based on information taken from ASTM, American Society for Testing and Materials, Handbook E380-72.)

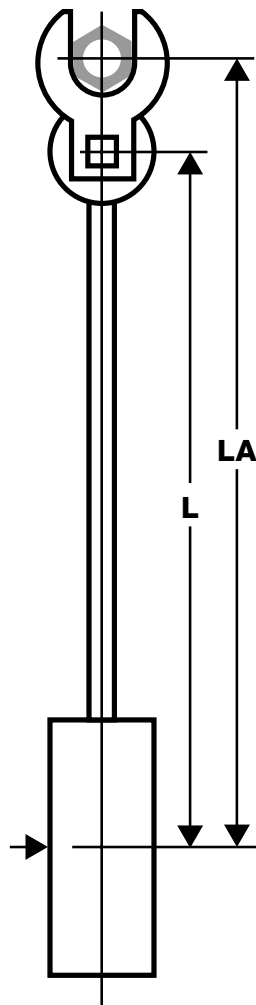
Quantity	Customary U.S. Unit	SI Unit	Conversion from U.S. to SI Units	Conversion from SI to U.S. Units
Area	Square Inch (in²)	Square Metre (m²)	(in²) x (6.4516 x 10 <sup>-4</sup> ) = (m²)	(m²) x 1550.003 = (in²)
Force	Pound (lb)	Newton (N)	(lb) x 4.4482 = (N)	(N) x (2.2481 x 10 <sup>-1</sup> ) = (lb)
Frequency	Cycles/Second (cps)	Hertz (Hz)	1 (cps) = 1(Hz)	1(Hz) = 1(cps)
Length	Inch (in)	Metre (m)	(in) x (2.540 x 10 <sup>-2</sup> ) = (m)	(m) x 39.370 = (in)
Mass	Pound (lb.)	Kilogram (kg)	(lbm) x .4536 = (kg)	(kg) x 2.2046 = (lb.)
Power	Electric Horsepower (HP)	Watt (W)	(HP) x (7.460 x 10 <sup>2</sup> ) = (W)	(W) x (1.3405 x 10 <sup>-3</sup> ) = (HP)
Pressure	Pounds/Sq In (psi)	Newtons/Sq Metre (N/m²)	(psi) x (6.8948 x 10³) = (N/m²)	(N/m²) x (1.4504 x 10 <sup>-4</sup> ) = (psi)
	(psi)	Mega Pascal (MPa)	(Non-Preferred Conversions) (psi)/145 = MPa	(MPa) x 145 = (psi)
	(psi)	Bar (Bar)	psi/14.5 = Bar	(Bar) x (1.4504 x 10¹) = (psi)
	(Bar)	(N/m²)	(Bar) x 100,000 = (N/m²)	(N/m²) x (1.00 x 10 <sup>-5</sup> ) = (Bar)
Temperature	Degrees Fahrenheit (°F)	Degrees Celsius (°C)	(°Celsius) = 0.556(°F-32)	(1.8°C) + 32 = °F
Torque	Pound-Inch (lb.-in)	Newton-Metres (N-m)	(lb.-in) x (1.1298 x 10 <sup>-1</sup> ) = (N-m)	(N-m) x 8.8507 = (lb.-in)
Volume	US Gallon (Gal)	Cubic Metre (m³)	(Gal) x (3.7854 x 10 <sup>-3</sup> ) = (m³)	(m³) x (2.6417 x 10²) = (Gal)
		Litre (l)	(Non-Preferred Conversions) (Gal) x 3.7854 = (l)	(l) x (2.6417 x 10 <sup>-1</sup> ) = (Gal)
Work	Foot-Pound (ft.-lb)	Joule (J)	(ft.-lb.) x 1.3558 = (J)	(J) x (7.3756 x 10 <sup>-1</sup> ) = (ft.-lb)

EQUIPMENT
HOSE/CPLG. SELECTION
G8K COUPLINGS
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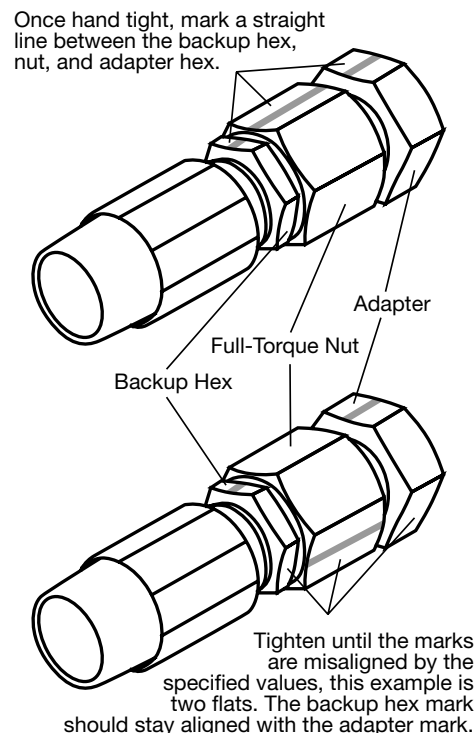


## Tightening and Torque Recommendations for Hydraulic Couplings

1. Determine the correct torque value for your coupling using the manufacturers' recommendations. The minimum torque values are adequate for sealing in most applications; never exceed the maximum torque recommendations. Only use manufacturer specified torque values; do not use SAE recommendations.
2. Calculated the correct torque wrench setting.  $\text{Wrench Setting} = \text{Desired Torque} * L / LA$  (see Figure 1)
3. Ensure that the seal face and threads are clean and in good condition. O-rings should be lubricated with light oil, but threads should be completely dry unless making a tapered pipe thread connection (interference seal).
4. If the assembly has a male connector on one end, install the male connector first.
5. Hand tighten the connection by bringing seal face in contact and rotating the nut by hand until it stops, approximately 0.3-1 ft-lb.
6. Mark the coupling nut and backup hex with a line for flats method of torque verification.
7. Apply a wrench to the backup hex to prevent the coupling and hose from moving while tightening the nut with a torque wrench. Failure to retain the backup hex during installation can cause hose twisting and will result in additional clamp load force that can cause seal face damage.
8. While keeping the backup hex secure apply the torque wrench to the fitting nut and pull until the proper torque is achieved. The coupling nut must be in motion when the final torque is achieved, otherwise the nut must be loosened and retightened until the torque is attained while the nut is in motion.
9. If a torque wrench cannot fit into the coupling area or if it is unavailable, flats method may be used to ensure that JIC couplings are properly tightened, as shown in figure 2. Checking flats is also a good method of ensuring that critical connections have been properly tightened.



**Figure 1** - Torque wrench adjustment when using a crowfoot wrench.  $\text{Torque Wrench Setting} = \text{Desired Torque} * L / LA$



**Figure 2** – Flats method of verifying coupling torque.