

Introduction and Technical Information



Muncie[®]
Power
Products



INTERPUMP
FLUID SOLUTIONS 

MEMBERS OF THE INTERPUMP GROUP

Muncie Power Products is a leading manufacturer and distributor of power take-offs and fluid power components for the work truck industry. Since the company was founded in 1935, Muncie Power Products has taken great pride in providing unparalleled service to each and every customer.

As a member of the Interpump Group, Muncie Power Products is excited to expand its hydraulics offering by bringing the Interpump Fluid Solutions line of hose, fittings and crimpers – ***Built to INTERconnect*** – into North America. For more than 30 years, Interpump Fluid Solutions has been a leading producer of high-quality hose and fittings. With inventory available from locations in Indiana and Texas, Muncie Power Products is ready to meet the needs of the North American market.

Introduction and Technical Information

We also have the following catalogs:

Hydraulic Hose
One-Piece Fittings
Accessories



Introduction

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EVIDENCE OF TECHNICAL SPECIFICATIONS

Fitting Solutions:

- a. Interpump supplies fittings in both one-piece and two-piece solutions, highlighting the absolute ability to meet the demands of different markets globally.
- b. Interpump fittings can also be supplied in the stainless steel version as a proof of the ability to provide high value added solutions for the most demanding applications.

Surface Treatments on Fittings:

Interpump can provide different surface treatments according to clients' request, and also in this case highlight an important range of possible solutions:

- a. **Standard plating process:** high corrosion resistance, even in the presence of operating temperatures up to 212°F (100°C);
- b. **ir-zn-ir plating process:** used in automotive sector when a black color with high corrosion resistance is required;
- c. **Zinc Nickel Plating:** this coating is used when high corrosion resistance under heavy exposure is required;
- d. **E-Coat:** this coating is applied on the metal parts in order to protect them from corrosion and from the aggressive action of atmospheric agents.





Product Qualification:

All our products are qualified in accordance with the related construction standards and technical specifications. All required tests are performed in our test laboratory with the latest generation machines. In ongoing collaboration with the market, we provide dedicated testing solutions for all projects developed for our customers.

CERTIFICATION AND INTERPUMP MARKET

Along with certified Environment, Quality and Safety Management Systems, we also focus on Type Approvals, for example, Certification of International Organizations for Specific Products. This allows us to provide strategic and highly selective specialization in markets such as Mining, Naval, Offshore and Automotive. We understand market dynamics and needs through our strong, specialized and reliable team with wide-reaching distribution channels. We supply products and service to all industries requiring fluid line components and hose fittings, through our widespread network of centers across the world.

- DIRECT RETAIL SALES
- EXPRESS DELIVERY
- SALES AND AFTER SALES ASSISTANCE
- HOSE FITTINGS CENTER
- TEST AND REPORTING SERVICES

Your Hydraulic Partner

OUR QUALITY: EXTREME RELIABILITY

- IQNET -THE INTERNATIONAL CERTIFICATION NETWORK
- CISQ
- ASSOFLUID
- UNI – ITALIAN ORGANIZATION FOR STANDARDIZATION
- BUREAU VERITAS
- DNV-GL
- RINA
- LLOYD'S REGISTER
- MSHA
- MED
- ROHS
- REACH
- ABS

The continuous expansion, the continuous improvement of our range, our expertise in production and our excellent Quality Management System allow us to provide a wide range of suitable, compatible and efficient product solutions. With our control plans and testing machines we have achieved a series of International Certification Bodies Type Approvals.

INTERPUMP Quality Certificate & Assurance



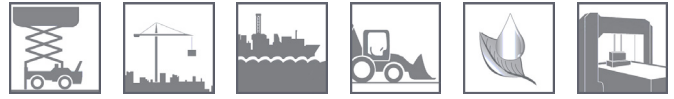
Type Approval							Specific Qualification & Certification			
HOSE REFERENCE	Code	DNV-GL	ABS	LLOYD	BV	RINA	EN 81-20	API 16-D Fire Resistance test	Railway EN45545-2	MED
Hypress 25N	TFD0021			X						
Hypress 15C	TFE001K		X							
Hypress 25C MSHA	BFEM02K	X	X							X
Hypress 45P MSHA	TFDM45P	X			X					X
Hypress 45H MSHA	TFDM45H	X	X		X					X
Hypress R12 MSHA	TFDM012									
Hypress R17 MSHA	BFSM017	X	X							X
Hypress R13 MSHA	TFSM013		X							
Hypress R15 MSHA	TFSM015		X		X					
HyGreen 45H	TFDE45H	X	X							X
HyGreen R13	TFDR013	X	X							X
Kaizen 25N MSHA	BFSM017		X							
LongLife 15C MSHA	THE101K				X					
LongLife 25C	THE102K				X					
Marathon MSHA	THERMM2K	X	X							X
PowerLift 15C	THE0L1K						X			
PowerLift 25C	THE0L2K						X			
Railway	TFDE011								X	
BOP Firescreen 5000	TBOP350							X		

INTERPUMP 2SC

THE002K



APPLICATIONS:



TYPE APPROVAL:

MED, DNV - GL, RINA, BV, LLOYD'S.

APPLICABLE SPECS.:

IMM - EXCEEDS DIN EN 857 2SC - ISO 11237 2SC

No -Skive hose - Exceed EN specification - Impulse tested up to 1.000.000 cycles MED certificate (ISO 15540/15541)

Internal hose: Synthetic rubber, extruded whole without joints, of uniform thickness.

Reinforcement: two high tensile steel wire braids.

Covering: Anti-abrasive synthetic rubber, resistant to oils, fuels and atmospheric conditions.

Recommended fluid: Hydraulic fluids petroleum based, glycol-water based, lubricant

Operating temperature: from -40° C to +120° C (Intermittent), from -40° C to +70° C for water based fluids

7 Part number	10 ID		Size	11 OD		12 Max WP		13 Min BP		14 Min BR		15 Weight		16 Ferrule
	in	mm		mm	bar	psi	bar	psi	mm	inch	kg/m	lb/ft		
THE002K-04	1/4"	6.4	04	13.3	430	6235	1720	24940	50	1.969	0.285	0.191	001C-04	
THE002K-05	5/16"	8.0	05	14.8	400	5800	1600	23200	60	2.362	0.329	0.221	001C-05	
THE002K-06	3/8"	9.5	06	17.1	350	5075	1400	20300	70	2.756	0.422	0.283	001C-06	
THE002K-08	1/2"	12.7	08	20.4	310	4495	1240	17980	80	3.150	0.517	0.347	001C-08	
THE002K-10	5/8"	16.0	10	23.5	280	4060	1120	16240	100	3.937	0.626	0.421	001C-10	
THE002K-12	3/4"	19.0	12	27.6	240	3480	960	13920	120	4.724	0.765	0.514	001C-12	
THE002K-16	1"	25.4	16	35.8	210	3045	840	12180	160	6.299	1.171	0.787	001C-16	
THE002K-20	1.1/4"	31.8	20	43.1	160	2320	640	9280	250	9.843	1.53	1.028	001C-20	
THE002K-24	1.1/2"	38.1	24	50.6	150	2175	600	8700	260	10.236	2.12	1.425	001C-24	

8 Note:

INTERPUMP

EXCEEDS ISO 11237/EN 857 - 2SC DN 6 I.D. 1/4" - W.P. 430 BAR/6235 PSI

1 Type description

5 Applications

9 Marking

13 Min. burst pressure

2 Features and recommendations

6 Type approval

10 Internal

14 Min. bend radius

3 Product code

7 Order code

11 External

15 Hose weight per meter

4 Applicable specs.

8 Note

12 Working pressure

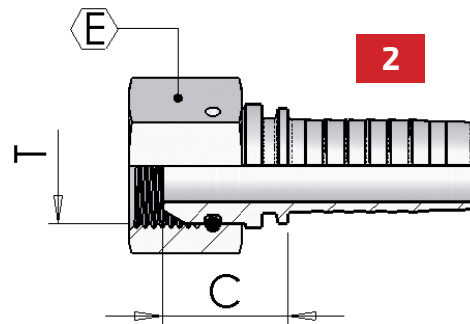
16 Recommended ferrule

1

3

0050

BSP Female 60° cone Thrust Wire



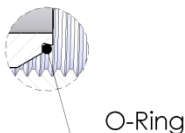
4

5

6

Part number	Hose I.D.		Dimension			
	in	mm	dash size	thread T	hex E	cut-off C
0050-03-02	3/16	4.8	03	1/8-28	14	15
0050-03-04	3/16	4.8	03	1/4-19	19	17
0050-04-02	1/4	6.4	04	1/8-28	14	15
0050-04-04	1/4	6.4	04	1/4-19	19	17
0050-04-06	1/4	6.4	04	3/8-19	22	19
0050-04-08	1/4	6.4	04	1/2-14	27	22
0050-05-04	5/16	7.9	05	1/4-19	19	17
0050-05-06	5/16	7.9	05	3/8-19	22	19
0050-05-08	5/16	7.9	05	1/2-14	27	22
0050-06-04	3/8	9.5	06	1/4-19	19	17
0050-06-06	3/8	9.5	06	3/8-19	22	19
0050-06-08	3/8	9.5	06	1/2-14	27	22
0050-08-06	1/2	12.7	08	3/8-19	22	20
0050-08-08	1/2	12.7	08	1/2-14	27	23
0050-08-10	1/2	12.7	08	5/8-14	30	20
0050-08-12	1/2	12.7	08	3/4-14	32	27
0050-10-08	5/8	15.9	10	1/2-14	27	23
0050-10-10	5/8	15.9	10	5/8-14	30	20
0050-10-12	5/8	15.9	10	3/4-14	32	25
0050-12-08	3/4	19.0	12	1/2-14	27	24
0050-12-12	3/4	19.0	12	3/4-14	32	25
0050-12-16	3/4	19.0	12	1-11	38	26
0050-16-12	1	25.4	16	3/4-14	32	27
0050-16-16	1	25.4	16	1-11	38	27
0050-16-20	1	25.4	16	1 1/4-11	50	30
0050-20-20	1 1/4	31.8	20	1 1/4-11	50	32
0050-20-24	1 1/4	31.8	20	1 1/2-11	55	34
0050-24-24	1 1/2	38.1	24	1 1/2-11	55	34
0050-24-32	1 1/2	38.1	24	2-11	70	34

7



O-Ring

1 Type description

4 Order code

7 Note

2 Description

5 Internal hose diameter

3 Product code

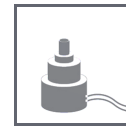
6 Thread dimension



Agriculture



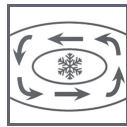
Cranes/lifting



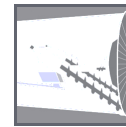
Hydraulic rams



Lifts



**Air conditioning/
refrigeration systems**



Mining & drilling



Test benches



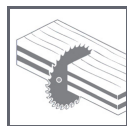
Food industry



Ground movement



Chemistry



Wood industry



Biological oil



Compressors



Railway



Entertainment



Oil-gas



Industry



Jet grouting



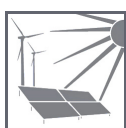
Elevators



Cleaning



Swaging machines



Energy



Automatic machines



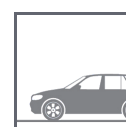
Hydraulic tools



Foundry-steel industry



Marine/off shore



Vehicles



Sewer system



Truck



Lift truck

System subject to normal temperatures



System subject to low temperatures



System subject to high temperatures





Technical Information

PIECE-BY-PIECE, STEP-BY-STEP

Interpump Hydraulics fittings are made of carbon steel (11SMnPb37) or stainless steel AISI 316L controlled and certified.

At the end of their production process, carbon steel fittings undergo an iridescent trivalent zinc plating (minimum thickness 8 microns) - Black zinc plating is also available, if required.

To order a stainless steel insert and/or a stainless steel adapter, insert the letter "X" at the beginning of the part number.

EXAMPLE CODE FOR CREATING ORDER

Type		Hose Dash Size		Thread Dash Size	Note	Part Number
0051	-	06	-	08	Standard	0051-06-08
0051	M	06	-	08	Multispiral	0051M06-08
0051	H	06	-	08	Interlock	0051H06-08
0051	G	06	-	08	One-Piece Braided Hoses	0051G06-08
0051	X	06	-	08	One-Piece Spiral Hoses	0051X06-08
0051	W	06	-	08	Waterblast*	0051W06-08
0051	Y	06	-	08	Waterblast**	0051Y06-08
X0051	-	06	-	08	Stainless Steel / Inox	X0051-06-08

*, ** According to hose catalog page

Connections can be classified in different groups which depend on the final configuration which guaranon of the thread.

Sealing Features:

- a. **Sealing thread:** the sealing is achieved via the flattening of the thread edges as the male fitting is tightened into the female fitting or port.
- b. **With O-Ring:** with O-Ring: the sealing is achieved by the compression of an O-Ring. This connection is better suited for high pressure applications and systems where vibrations are present.
- c. **Metal-to-metal:** the sealing is achieved via two angled faces being wedged into one another by tightening a threaded nut.
- d. **Metal-to-metal combined with O-Ring:** metal to metal combined with O-Ring: the sealing is achieved via a combination an O-Ring and angled sealing faces. When the threaded nut is tightened, the sealing faces are wedged together while also compressing the O-Ring.

On the following page are the main connection types with corresponding standards. The choice of the correct connection type depends on several aspects such as combination type, working pressure, temperatures, chemical compatibility, corrosion resistance, vibrations presence, etc.

Metric Connections (1)

Known as DIN or metric fittings, the seal is achieved via angled sealing faces (metal-to-metal) or through a combination of metal-to-metal with O-Ring compression. The sealing faces are at a 24° angle with or without an O-Ring.

60° Conical Connections (2)

Known as BSP connections (British Standard Pipe) or known as a "Whitworth thread", which can be parallel (BSPP) or tapered (BSPT).

The sealing is achieved via angled sealing faces (metal-to-metal) or through a combination of metal-to-metal with O-Ring compression. The sealing faces are at a 60° angle, with or without an O-Ring.

BSPT Connections (3)

Known as BSPT connections (British Standard Pipe Taper), the sealing is achieved via thread deformation. Since sealing depends only upon thread deformation, the use of a sealant is suggested.

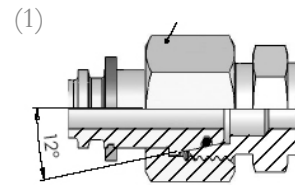
BSPT connections have a 55° thread angle, whereas NPT connections have a 60° thread angle.

JIC 37° Cone - SAE J1514 (4)

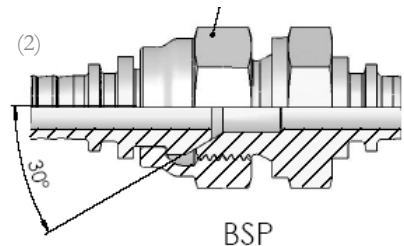
Known as JIC connections (Joint Industrial Council), the seal is achieved via angled sealing faces (metal-to-metal). The sealing faces are at a 37° angle. The threads are UNF straight threads.

Flat Sealing with O-Ring - SAE J1435 (5)

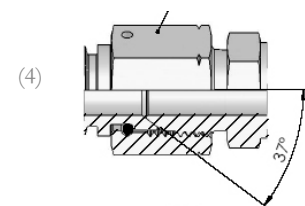
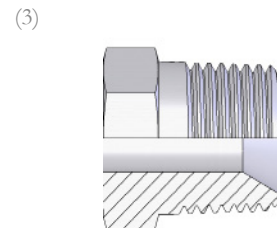
Known as JIC connections (Joint Industrial Council), the seal is achieved via angled sealing faces (metal-to-metal). The sealing faces are at a 37° angle. The threads are UNF straight threads.



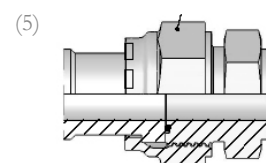
DKOL/DKOS



BSP



JIC



ORFS

SAE with O-Ring – SAE J516 Type BOSS

Male fittings known as ORB (Male O-Ring Boss) that achieve sealing via an O-Ring at the top of the threads which is compressed against a flat sealing face on the port. The threads are UNF straight threads.

These fittings are only compatible with SAE J1926 BOSS ports.

NPTF/NPSM - SAE J516

Known as NPTF connections (National Pipe Taper - Fuel), the sealing is achieved via thread deformation. These fittings are compatible with both NPFT and NPSM connections. NPTF male fittings achieve sealing on NPSM female fittings through metal-to-metal contact on 30° angled sealing faces.

These fittings are not compatible with BSPT threads, as they have a 60° thread angle, whereas BSPT fittings have a 55° thread angle.

24° Gas Cone - French Series

These fittings are similar to DIN fittings, but with thinner threads. The sealing is achieved via metal-to-metal contact on 24° angled sealing faces. The threads are metric straight threads.

JIS (Japanese Industrial Standard)

The sealing is achieved via metal-to-metal contact on 30° angled sealing faces. JIS fittings can be divided into the following types:

- **JIS Toyota:** BSPP thread connections with inverted sealing cones
- **JIS Komatsu:** Similar to JIS Toyota fittings, but with metric straight threads
- **JIS Nissan:** Similar to BSPP connections, but with slightly different cone dimensions

SAFETY INDICATORS, ATTENTION AND NOTES

This section explains three important safety indicators, listed in decreasing order of importance.



WARNING: This symbol is used in order to highlight potentially dangerous and life-threatening situations and/or procedures for the operator.



ATTENTION: This symbol is used in order to highlight situations and/or procedures that can cause potential damage to equipment.



NOTE: This symbol is used in order to highlight important information or references to International Standards.

The purpose of this handbook is to supply useful instruction and suggestions for the correct choice, installation, and maintenance of the assembly in order to assure a long service life.

SAFETY WARNINGS



WARNING: The following will endanger the safety of all persons near the hose assembly(s):

- An improper choice of product
- Incorrect assembly or installation
- Damage to the hoses

This handbook's intended use is to aid in the training, installation, operation, and maintenance of the hose assembly(s) to fundamentally avert potential dangers.

This handbook makes reference to SAE J1273 or ISO/TR 17165-2 "Practical Recommendations to Use Assembled Hoses", specifically paragraph 4, which lists increased risks to hydraulic systems and connections under pressure.

HOSE ASSEMBLY SELECTION



REMINDER: SAE J1273 clearly states that "...fittings of a producer are not generally compatible with hose supplied from another producer".

Normative reference: ISO 17165-2, SAE J1273, EN 982.

"Assembled hose" is defined as the complete hose assembly consisting of hydraulic hose with fittings and connectors. The characteristics of an assembly must include:

- **Flexibility:** resistance to bending and torsional stresses of mechanical machines
- **Stability:** for correct power transmission and flow control, the lowest volumetric expansion/process forming is necessary
- **Minimal flow resistance:** the choice of the correct assembly (hose and fittings) and the layout must guarantee the maximum efficiency of the hydraulic circuit



WARNING: Any hydraulic under pressure is extremely dangerous and may cause serious lesions or other life-threatening injury to the operator.

In order to select the appropriate hose for the application, consider the information below:

Application:

It is necessary to clearly define:

- type of application required (high pressure line, suction line, pilot line with etc.)
- where the hose will be installed (installation difficulty, heat source presence, external mechanical loads, delivery pump with etc.)
- type of machinery (presence of pressure spikes, vibrations, flexibility etc.)
- special required performances (electric conductivity, abrasion resistance, flame-retardant, etc.)
- required connections and thread types
- type of fluid and chemical compatibility
- temperature and environmental conditions (salt water, presence of chemical agents, direct and extended exposure to sunlight with etc.)
- eventual standard and/or local safety obligations

Pressure Lines:

- Working pressure up to ~ 5800 PSI and above (400 bar and above)
- High fluid speed up to ~ 26ft/sec (8 m/s)
- Severe working conditions, with possible pressure spikes (especially in delivery pump) and vibrations
- Generally medium to high pressure hoses are required.

Return Lines:

- Working pressure up to 725-1100 PSI (50-70 bar)
- Moderate fluid speed ~ 9.8-13.1 ft/s (3.0-4.0 m/s)

Suction Lines:

- Generally large diameter hoses are used to reduce pressure drops
- Low pressure: max. ~ 145 PSI (10 bar)
- Moderate fluid speed to avoid cavitation ~ 4.9 ft/s (1.5 m/s)
- Required load-less resistance up to 11.6 – 13.1 PSI (0.8 - 0.9 bar)
- Optimum solution is the chafing strip with steel spiral (ref. SAE 100 R4)

Pilot Lines:

- Average pressure line up to 1450 PSI (100 bar)
- Average fluid speed ~ 16.4 ft/s (5 m/s)
- Compactness and high flexibility are critical for installation

Hose Size and Flow Rate

The component's dimension must be uniform to ensure a regular fluid flow rate in order to reduce the number of pressure drops and to avoid excessive speed of the conveyed fluid. For the hose diameter selection, it is possible to refer to the diagram on the following page. Proper selection of hose may be made if the maximum fluid speed and the flow rate of fluid is known.

The maximum speed advised for fluids depends on the application:

- Suction lines: 1.6 – 4.9 ft/s (0.5 – 1.5 m/s)
- Return lines: 4.9 – 11.5 ft/s (1.5 – 3.5 m/s)
- Pressure lines: 9.8 – 26.2 ft/s (3.0 – 8.0 m/s)
- Pilot lines: ~ 16.4 ft/s (~ 5.0 m/s)

The internal diameter measurement of the hose indicates the hose size. There are different ways to indicate the measure of internal diameter:

DASH SIZE	SAE DIMENSION	NOMINAL DIAMETER (MM)	REFERENCE DN
-03	$\frac{3}{16}$ "	4.8	5
-08	$\frac{8}{16}$ " OR $\frac{1}{2}$ "	12.7	12
-10	$\frac{10}{16}$ " OR $\frac{5}{8}$ "	15.8	16

If it is necessary to replace an assembly already installed on the hydraulic system, it is considered to be properly sized for the application.

If you have to define a new system or verify the efficiency of an existing one, it is possible to refer to the diagram on the following page and proceed as follows.

If it is necessary to replace an assembly already installed on a hydraulic system, it is considered to be properly sized for the application.

If it is necessary to design a new hydraulic system, or to verify the efficiency of an existing one, refer to the nomograph below and proceed as follows:

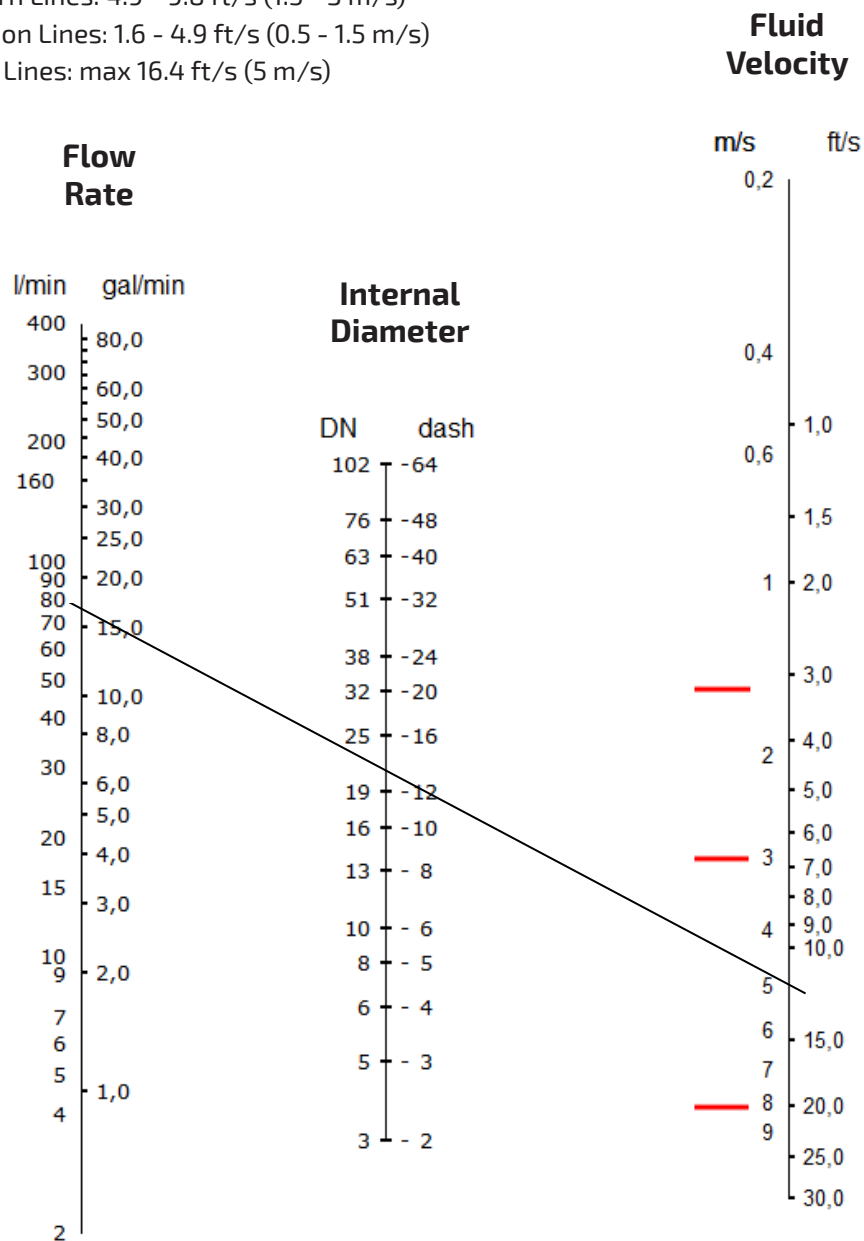
Recommended Fluid Velocity:

Pressure Lines: 9.8 - 26.2 ft/s (3 - 8m/s)

Return Lines: 4.9 - 9.8 ft/s (1.5 - 3 m/s)

Suction Lines: 1.6 - 4.9 ft/s (0.5 - 1.5 m/s)

Pilot Lines: max 16.4 ft/s (5 m/s)



Pressure

To properly select the correct flexible hose and fittings, consider that the maximum working pressure for these components must be higher than the maximum system pressure of the application. It is necessary to consider both the static working pressure and the dynamic or "pulsing" pressure when pressure variations occur within a dynamic application.

SAE J1927 gives a method to define the reduction of the life of the flexible hose according to a specific hydraulic application when measuring pressure peaks and pulsing frequencies.



WARNING: Hose selection must be made according to the maximum pressure reached by the system.

Pressure spikes and drops can be verified through a device capable of recording sudden pressure changes. A hydraulic system can be calibrated by checking the safety valve placed in the circuit in order to protect against eventual pressure spikes and drops.

Hydraulics system classification can be made according the following pressure range:

- **Low pressures:** up to 1000 - 1600 PSI (70 - 110 bar)
- **Medium-high pressures:** 3000 - 5000 PSI (210 - 245 bar)
- **High to very high pressures:** up to 6000 PSI and above (420 bar and above)

Fluid to Convey

Fluid type: chemical identification, concentration, temperature, etc. Flexible hose selection must consider chemical compatibility of the fluid being conveyed.

The enclosed summarizing sheet provides information regarding the rubber compound type used in Interpump's flexible hoses. Using this chart, chemical compatibility can be confirmed for Interpump hoses with different fluid types.

As a precaution for applications which emit fumes or use dangerous or aggressive fluids, an evaluation of the fluid will be required to determine if it is necessary to pin-prick the cover to allow permeability of the fluid through the hose.

Temperature

The internal temperature of the conveyed fluid must not exceed the stated temperature range on the hose data sheet. Temperatures higher than the stated maximum temperature will accelerate rubber aging and compromise the life of the flexible hose. Temperatures lower than the suggested minimum can greatly reduce the flexibility of the hose, causing the rubber to become brittle and crack.

Generally, most Interpump rubber compounds can work within a temperature range -40°F to +212°F (-40°C to +100°C) with possible intermittent temperature peaks of up to +257°F (+125°C).

The wide variety of variables in service can significantly alter the projected life of the hose assembly.



ATTENTION: Continuous operation at temperatures close to the stated minimum and maximum temperature limits will reduce hose life (SAE J1273, DIN 20066).

Special rubber compounds may allow for a greater temperature range.

For hoses used in extreme-temperature applications, refer to Interpump High- and Low-Temperature product lines.



NOTE: As clearly detailed in the preceding paragraphs, the temperature of the external environment greatly influences the life of the hose assembly. Avoid installation of the product(s) near heat sources or provide proper heat shielding. An increase of 50°F (10°C) above the maximum stated temperature may decrease expected hose life by as much as half. Cracks in the rubber cover can also be caused by flexing, especially as excessively low temperatures

Connection types

In order to achieve a long service life of a hose assembly, it is necessary to select the correct connection types.

It is critically important to follow the information contained in this catalog to select the correct connections. Each hose page lists the suggested ferrule and insert combination (or one-piece fitting configuration) as recommended through testing conducted by Interpump Fluid Solutions. Interpump, nor any of its subsidiaries or affiliates, does not guarantee any hose and fitting combinations which do not follow the recommendations listed in this catalog.

In accordance with SAE J1273, which states that components from two different manufacturers are not typically compatible, Interpump does not guarantee, nor will supply, any combinations of flexible hose and fittings which do not adhere to the suggested solutions listed in this catalog.

When choosing the correct connections, verify the following:

- the sealing capability at the required working pressure
- the corrosion resistance, fluid, and/or environmental conditions
- the presence of vibration (flanges and O-Rings are suggested where vibrations are present)
- in the case of O-Ring fittings, the working temperature(s) must be considered (specific O-Ring materials may be required to achieve proper sealing at certain temperatures)



ADDITIONAL INFORMATION

External Environment

Ozone, UV radiation, heat, or chemical agents can cause damage to flexible hoses and fittings, reducing service life. It is important to evaluate the characteristics of the external environment (in terms of temperature, ozone, chemical agents, and/or solvents) in order to select the proper external hose covering.

For particular requirements such as fire resistance, conductivity, etc., where the catalog information is not detailed enough to select the correct hose, contact Muncie Power Products' customer service team for assistance.

Vibrations

Vibrations can also reduce hose life.

Where necessary, perform tests for hose vibrations to check vibration amplitude and frequency. In the case of vibration, the use of collars or other similar systems may reduce the effects of vibration on the hose assembly.

HOSE ASSEMBLY PREPARATION

Hose Assembly Length:

Hose cut must be performed correctly with a proper device in order to ensure:

- A square cutting surface, perpendicular to the hose axis
- Avoiding damage to the hose reinforcement

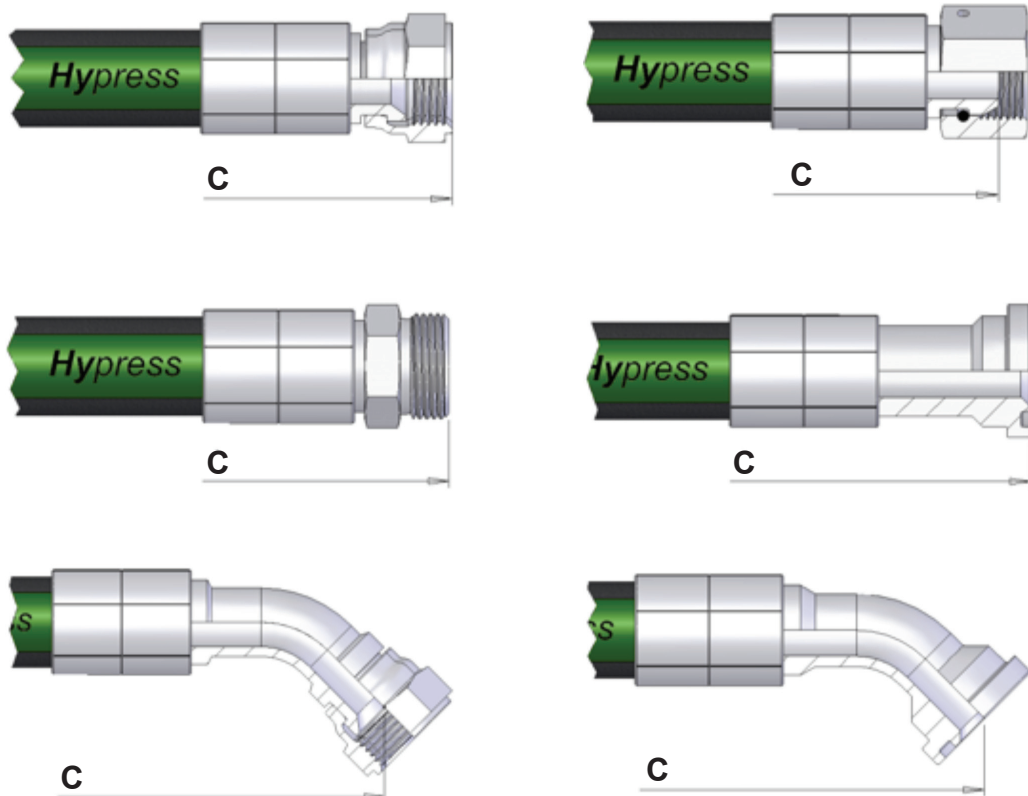


ATTENTION: Remember, a cut that is not square will always cause:

- A lack of proper sealing and assembly leakage
- Irregular rubber compression during the swaging and possible ferrule fracture

When cutting spiral hose, use a lower cutting speed than is used for a braided hose (applies to both the cutting blade rotation speed and cutting speed).

Hose assembly length has to be calculated according the following indication: (refers to SAE J 517 – 10):

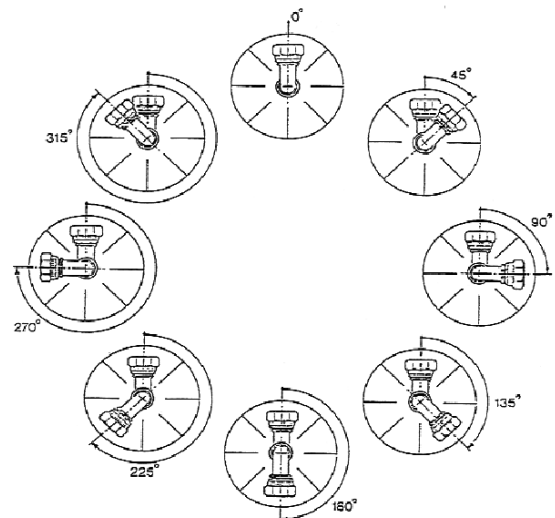


Several Standards (DIN 20066, EN 853 – 857, etc.) define the hose assembly length tolerances referring to the hose size and the total assembly length.

The following chart is an indication of hose length tolerances according to DIN20066:

LENGTH	UP TO -16 (DN 25)	-20, -24, & -32 (DN 32 - DN 50)	-38 AND LARGER (DN 60 - DN 100)
UP TO 24.803" (630 MM)	+0.275" / -0.118" (+7 MM / -3 MM)	+0.472" / -0.157" (+12 MM / -4 MM)	+0.984" / -0.236" (+25 MM / -6 MM)
24.842" – 49.212" (631 – 1250 MM)	+0.472" / -0.157" (+12 MM / -4 MM)	+0.787" / -0.236" (+20 MM / -6 MM)	+0.984" / -0.236" (+25 MM / -6 MM)
49.251 - 98.425" (1251 – 2500 MM)	+0.787" / -0.236" (+20 MM / -6MM)	+0.984" / -0.236" (+25 MM / -6 MM)	+0.984" / -0.236" (+25 MM / -6 MM)
98.464" - 314.960" (2501 – 8000 MM)	+1.5% / -0.5%	N/A	N/A
315.000" AND LARGER (>8001 MM)	+3% / -1%	N/A	N/A

Refer to the following picture to define the correct fitting orientation:



Refer to the following picture to define the correct fitting orientation:



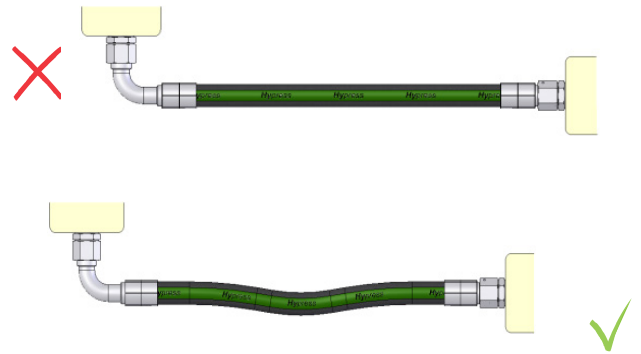
NOTE: Always consider the natural hose bend in order to avoid unnatural stress on the hose and its reinforcement.

ROUTING

Use precaution when installing the hose assembly in order to avoid unnecessary hose damage and the seal being compromised:

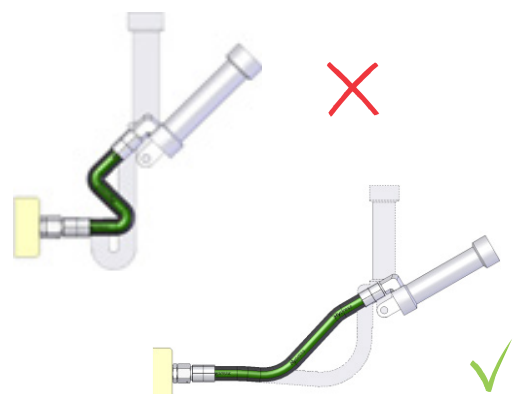
1-Hose Assembly Length

Provide the right length for the assembly. Over length will cause pressure loss. Short length could cause hose traction. Always consider some slack in the hose to allow shortening or elongation.

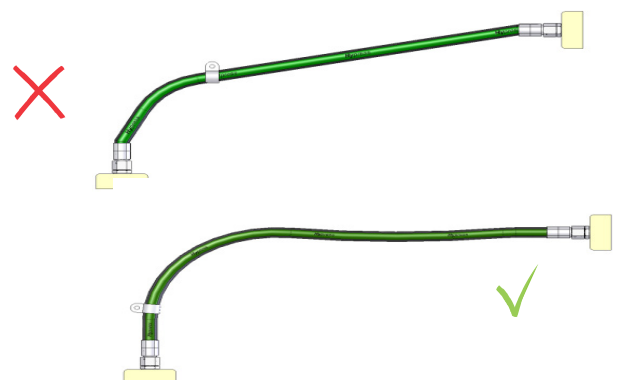


Provide the correct length for the assembly. Too long of length will cause a pressure loss.

Hose length has to go along with the machine movement, in order to avoid kinks and stress.



Consider hose length variation and define the correct length and the correct clamping position to fix the assembly.



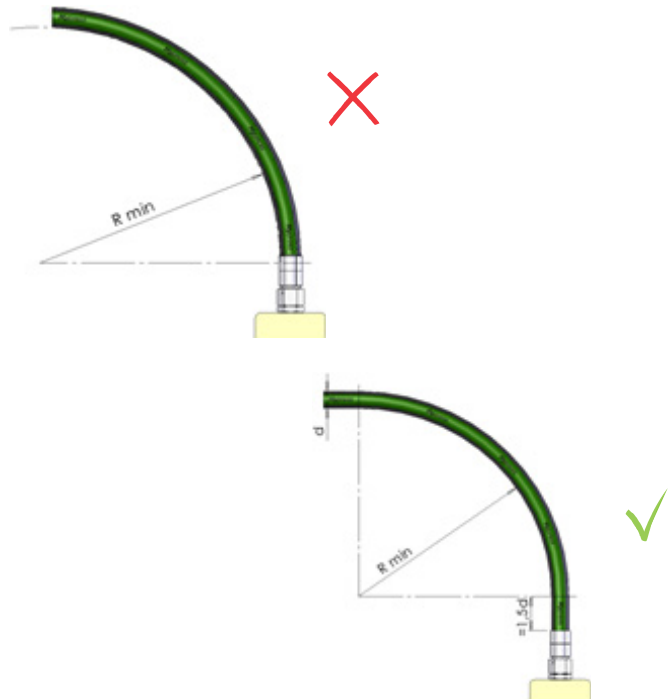


2 - Minimum Bend Radius:

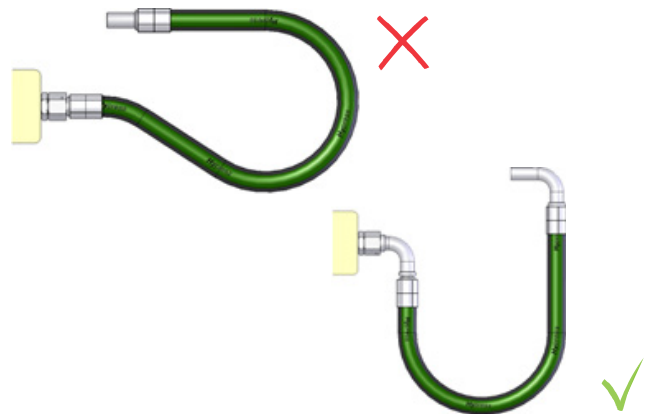
Always consider the recommended minimum bend radius and provide sufficient hose so that the hose is not being stressed.

Installation with a tighter bend will reduce hose life.

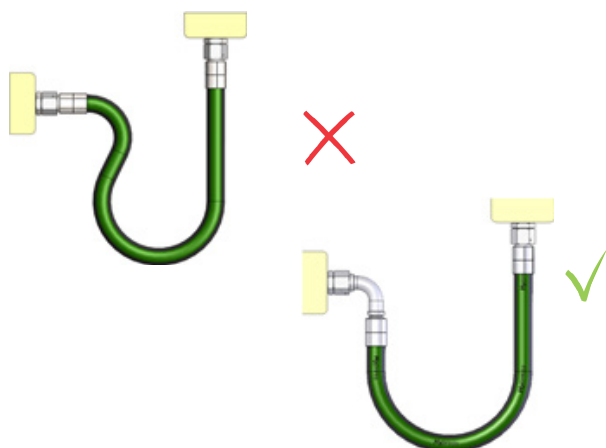
A minimum length of 1.5 times the external hose diameter is required (D) between hose fittings and the bend.



Use proper adapters and hose fitting terminations, in order to avoid a tight bend.

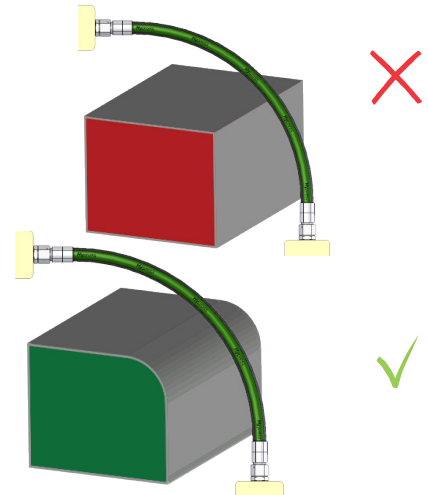


Too tight of a bend may kink the hose, restrict or stop the fluid flow, or damage the hose reinforcement.

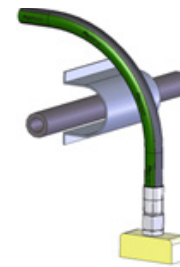


3 - Hose Protection:

Protect the hose against damage, abrasion and avoid contact with sharp and hard objects.

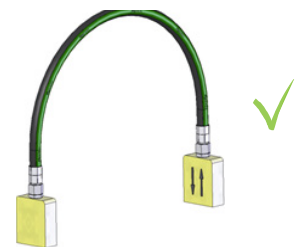
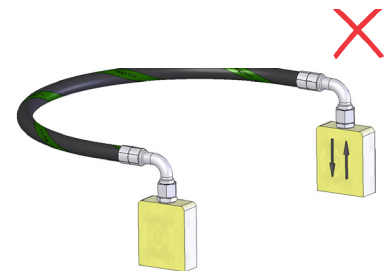


Insulate the hose assembly from heat source(s), using a shield, a fire sleeve, and/or metal protection.



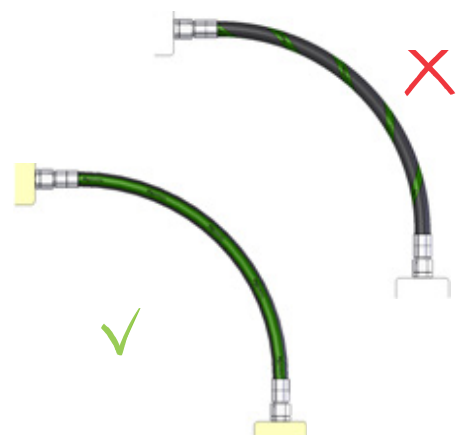
4 - Hose Movement:

Take into consideration the relative movement between the two connected parts. Avoid hose torque: during the application the hose has to flex in one single plane.



Do not install hose with a twist. Always consider the use of the correct adapter, swivel nut or swivel adapter to avoid twist.

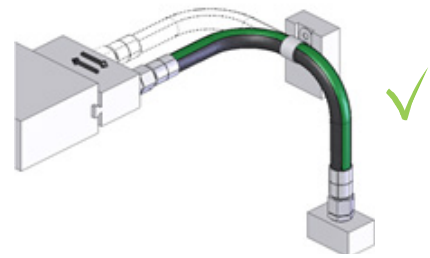
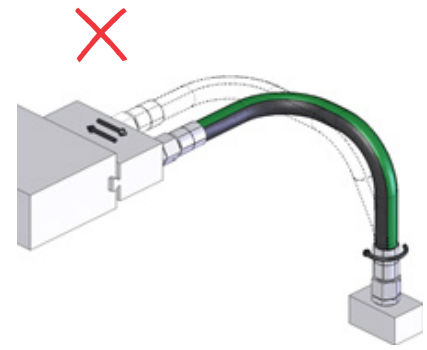
To avoid torsion, use the branding line as a straight guide.



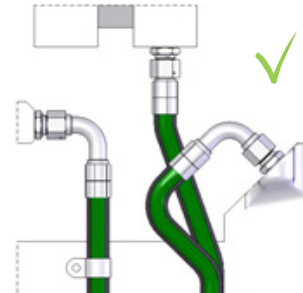
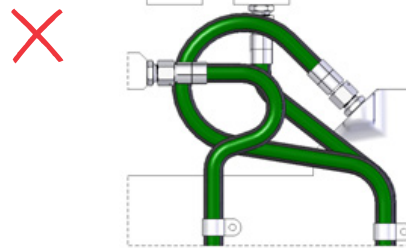


5 - Routing:

If the hose is linked at two different angles, fix the assembly at the point of the angle change, restricting movement to only one angle.

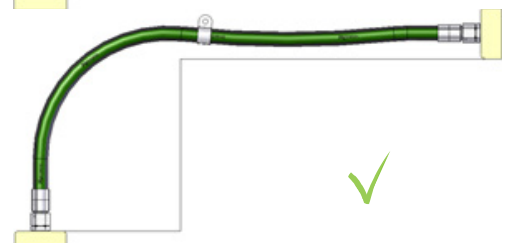
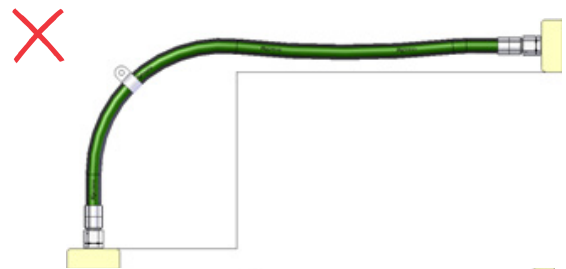


Always consider the use of 90° or 45° adapters in order to have a better layout. The system will result in an easier set up, easier maintenance, and easier inspection.



Always use clamps and wrappers to support long length assemblies.

Fix long length assemblies properly, with suitable clamps in order to avoid hose whipping and unnatural stress on the fittings.



A misalignment between sealing cone and thread causes "leakage."



In reference to the warning above, always remember when tightening to:

- First, fasten the end without tightening
- Rotate the hose according to the natural bend
- Tighten the end avoiding twisting
- Mount the ends without damaging the thread (follow the suggested crimp specifications to guarantee the conformity of the thread)
- Always verify that the surface is dry (additional torque will be required if surface is wet)
- Verify the lubrication and cleanliness of the sealing surface
- Verify the presence of the O-Ring where it is requested

TESTING AND INSPECTION

Inspect the hose to verify the cut angle and any areas of abrasion or wear on the hose cover.

Perform the requested test if necessary (Ref. ISO 1402).

Clean the assembly using a "pig" and sponge or flushing the assembly to reach an optimal cleanliness level.

Once the installation is completed, let the air out, increase the pressure to the working rate and verify the fitting seal of the assembly.

In order to avoid injury during the final test:

- Do not touch any part of the system during the proof test
- Keep away from the test area
- Decrease the pressure until the system is discharged before loosening the connection.

CLEANING HOSE

Be sure that the assembly is cleaned to the level fit for the application.

Impurities and pollution could damage the system by:

- Blocking the hydraulic components, thus reducing efficiency
- Tube wear may cause a premature failure
- Lower heat dissipation

It is possible to use a special machine to flush the assembly using a filtered, water-based fluid. It is possible, in this way, to gain a high level of cleanliness (refer to international Standard NAS 1638, ISO 4406, SAE479, BS5540/4).



NOTE: After assembling the hose and performing the necessary test(s), remove all possible contamination.

The entire assembly should be protected by means of a proper vessel to avoid environmental pollution.

HANDLING AND STORING

Rubber and plastic products can alter their characteristics during time. It is necessary to store hoses in order to control their aging, implementing the FIFO (first-in, first-out), the manufacturing date of the hose and/or the assembly will give the priority.

Several Standards give useful indication on the storing:
ISO 2230 e ISO 8331, BS 5244, SAE J1273, DIN 7716, DIN 20066.

SAE J 517:

- Flexible rubber hose or a hose assembly has a total operative life of 40 quarters (ten years) depending upon inspection and pressure testing to verify the conformity.
- Thermoplastic hoses are often considered to have an unlimited operating life.

Maximum hose storage life depends on several parameters:

Area – Temperature – Humidity

Goods must be stored in a dry and fresh area, without dust.

Temperature should be between 41°-77° F (5°-25°C) (do not exceed 100° F or 38°C) and humidity should not exceed 65%.

Keep Far from Heat Sources

- Oxygen and ozone

Hose should be protected from the circulating air and placed in a closed box or covered by means of polyethylene cover. High voltage electrical equipment should be avoided because of the harmful effect of ozone.

- Oil, solvents, fumes

Avoid contact with corrosive agents, detergents, and other organic liquids. Some metals may also affect the rubber (manganese, iron, copper).

- Narrow spaces and bending

The internal diameter of the coil/bobbin must be higher than double the minimum bending radius of the product (according to the manufacturer indication). Do not bend or pile the hose. Avoid every mechanical stress (tension, compression) which can speed up the aging process.

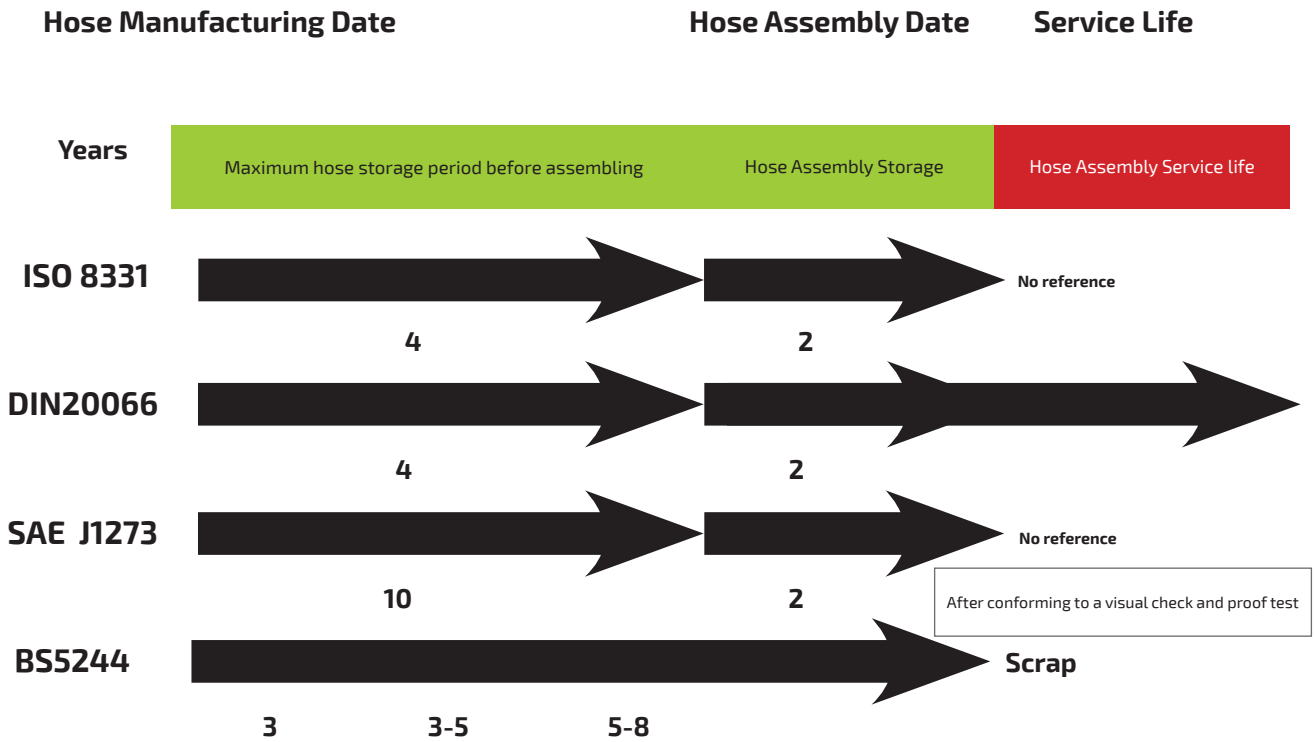
- Protect the hose from insects and rodents.

- Sunlight and rain

Hose should be protected from sunlight and UV sources.



NOTE: Always check the hose integrity before delivery. It is recommended to perform further tests on the hose in cases of long periods of storage.



Hose: perform a proof test assembly - perform proof test on all the assemblies

PREVENTIVE MAINTANANCE - ACCORDING TO SAE J1273

A good preventative maintenance program can help to ensure reliable equipment function, avoid potential injuries, and keep the hydraulic system operating at its maximum efficiency.

Frequency of Inspection

The frequency of inspection is dependent upon all factors linked to the application and the past history of the machine.

Visually Check (hose and fittings)

Visual inspect hose and fittings to evaluate:

- a. Leakage
- b. Cover damage, cuts or abrasions
- c. Exposed reinforcement
- d. Hose dents, bends under the specified minimum bend radius, or hoses in torsion
- e. Hose stiffening with a hard or burnt cover
- f. Cover slipping from reinforcement, or with a low adhesion to the reinforcement
- g. Fittings damaged or badly corroded
- h. Fittings not properly tightened
- i. Other possible nonconformities

Whenever a nonconformity has been detected, verify the assembly and replace it.

During hose and fittings inspection, verify all hydraulic components on the system are in order by checking:

- a. Connection seals
- b. Damage to the assembly due to missing guide(s), clamp(s), or guard(s)
- c. Excessive dirt and debris around hose
- d. Fluid: level, type, clearing ed absence if air

If any of these conditions are present, correct the problem(s) before starting the hydraulic circuit.

Functional Test

A functional test will determine if the system is functioning properly.

Perform a function test of the hydraulic circuit at normal working pressures to ensure that the system is operating according to the manufacturer's specifications.

SAFETY INSTRUCTIONS - SAE J1273- AUGUST 2004



WARNING: Improper selection, fabrication, installation, or maintenance of hose and hose assemblies for fluid-power systems may result in serious personal injury or property damage. These recommended practices can reduce the likelihood of component or system failure, thereby reducing the risk of injury or damage. It is important to consider all the aspects related to the application and to respect the following technical indications and suggestions inside this manual.

Listed are some potential conditions and situations that may lead to personal injury and/or property damage:

Fluid Injections

Fine streams of escaping pressurized fluid can penetrate skin and enter a human body. These fluid injections may cause severe tissue damage and loss of limb. Consider various means to reduce the risk of fluid injections, particularly in areas normally occupied by operators.

Consider careful routing, adjacent components, warnings, guards, shields, and training programs. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Avoid contact with escaping fluids. Treat all leaks as though pressurized and hot enough to burn skin. Never use any part of your body to check a hose for leaks.

If a fluid-injection accident occurs, see a doctor immediately.

Do not delay or treat as a simple cut! Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

Doctors unfamiliar with this type of injury should consult a knowledgeable medical source.

Whipping Hose

If a pressurized hose assembly blows apart, the fittings can be thrown off at high speed, and the loose hose can flail or whip with great force. This is particularly true in compressible-fluid systems.

When this risk exists, consider guards and restraints to protect against injury.

Fire and Explosions from Conveyed Fluids

Most fluid-power media, including fire-resistant hydraulic fluids, will burn under certain conditions. Fluids which escape from pressurized systems may form a mist or fine spray which can flash or explode upon contact with an ignition source.

Consider selecting, guarding, and routing hose to minimize the risk of combustion (ref to Section 5 ISO 3457).

Fire and Explosions from Static-Electric Discharge:

Fluid passing through hose can generate static electricity, resulting in a static-electric discharge.

This may create a spark that can ignite system fluids or gases in the surrounding atmosphere.

When this potential exists, select hose specifically designed to carry the static-electric charge to ground.

Electrical Shock:

Electrocution could occur if hose conducts electricity through a person. Some applications may require a non-conductive hose in order to avoid electricity (ref. ISO 3949).

Some applications may require a hose with sufficient conductivity to carry the static-electric charge to ground.

Mechanisms Controlled by Fluid Power:

Mechanisms controlled by fluids in hoses can become hazardous when a hose fails.

- Always install protective shield between operator and the mechanical device
- Do not work next to pressurized equipment
- Do not touch system under pressure
- Always use proper safety equipment, including eye protection, breathing apparatus, and adequate ventilation
- Staff should always be appropriately trained in the preparation, assembly and use of equipment
- The user should design and implement a maintenance program that suits the specific application and each specific hose in that application.



LIABILITY STATEMENT

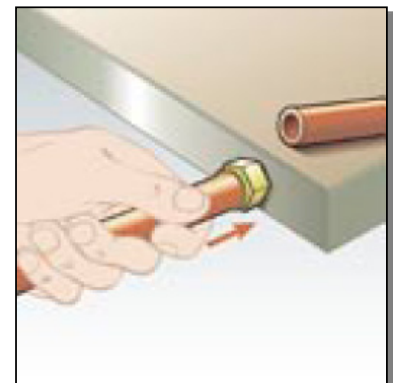
Interpump hoses are designed as an engineered solution to be used only in conjunction with Interpump fittings. The use of Interpump fittings on hose supplied by other manufacturers and/or the use of Interpump hose with fittings supplied by other manufacturers may result in the production of unreliable and unsafe hose assemblies; which can lead to equipment damage, personal injury, or death. The use of Interpump fittings on hose supplied by other manufacturers and/or the use of Interpump hose with fittings supplied by other manufacturers is neither recommended nor authorized by Muncie Power Products or any of its affiliates. Muncie Power Products and the Interpump Group disclaim all liability for any hose assembly produced using hose-fitting combinations not specified in this catalog, incorrect fitting insertion depths, and/or final crimping specifications.

UNILOCK - ASSEMBLY INSTRUCTIONS

Cut the hose at a right angle using a sharp, non-serrated blade. If necessary, use a lubricant (water/soap solution of 5% soap and 95% water) for easier assembly.



Insert fitting into the hose, past the first barb on the fitting. Place the end of the fitting against a supported flat object (workbench, door, wall, etc.). Apply steady force while gripping the hose approximately one inch from the end until the fitting is fully inserted into the hose (the red plastic collar will cover the cut end of the hose).



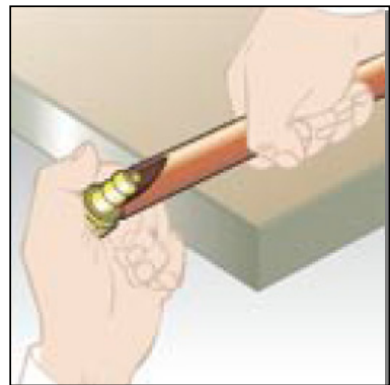
During assembly, remember that UniLock fittings are ready for use after full insertion into the hose, where the end of the hose is cut square and completely covered by the plastic collar on the fitting.

UNILOCK - DISASSEMBLY INSTRUCTIONS

Cut lengthwise along a line, approximately one inch in length, at a 20° angle from the centerline of the hose. Be careful not to cut or nick the barks of the fitting while cutting the hose.



Firmly grip the hose and give a sharp downward tug to remove the fitting.



Before reusing a UniLock fitting, check for any signs of damage. A damaged fitting will cause leakage.

INTERPUMP COVER SOLUTIONS

The hose cover is a critical aspect of correctly meeting the customer needs and application requirements.

Interpump provides the following cover options:

Abrasion Resistant Cover Options

Cover



Super cover



Extra cover



Mega cover

Standard Cover

Competitive and reliable solution for general hydraulic applications where the hose is not exposed to direct sunlight or abrasion (hose-to-hose or hose-to-metal). The standard cover performs well at low temperatures. NOTE: this cover is not stocked in North America.

Super Cover

Solution with twice the ozone and abrasion resistance compared to standard cover. Suitable for potential aggressive conditions like ground movement and pressure washer applications.



NOTE: This cover is not stocked in North America.

Low Temperature Cover

This special blend of polymers and additive allows this rubber compound to perform well in cold environments and extreme conditions (minimum operating temperatures of -58°F (-50°C)).

Extra Cover

This cover can be used in applications requiring better abrasion and ozone resistance, such as:

- continuous flexing, even when small bend radius is combined with high abrasion (forklift masts and telescopic arms)
- direct exposure to sunlight (the hydraulic line mounted outside of the machine body)
- hose bundles subject to flexing and impulse at different pressure levels (hoses connecting excavator arms)
- hose exposed to hose-to-metal abrasion and impact with an external body

This cover is not recommended for applications with a very low external temperature. This cover is not stocked in North America.



MSHA Approved Cover

Interpump's MSHA cover performance in terms of abrasion and ozone resistance make this cover a perfect solution for any underground or open mining applications. This cover compound has been certified to meet the Flame-Resistance Designation "U.S. MSHA" by the U.S. Department of Labor, Mine Safety and Health Administration.

The combination of the high elasticity, extreme ozone and UV resistance makes the MSHA cover reliable in applications where exposure to direct sunlight and ozone are present, even when the hose is installed at a low bend radius.



NOTE: Hydraulic hoses stocked in North America feature the MSHA cover.



High Temperature Cover

This cover was developed as a solution for hoses exposed to ambient temperatures in excess of 212°F (100°C). The HT cover is recommended for these applications:

- applications in the engine compartment of trucks (e.g. power steering)
- injection molding heating circuits
- foundries

The special rubber compound used in the HT cover is not recommended in applications experiencing high ozone concentration and/or direct exposure to sunlight.



Mega Cover

Interpump's Mega cover (UHMWPE - Ultra-high Molecular Weight Polyethylene) is the best solution to protect against hose abrasion. This cover helps to eliminate both hose-to-hose and hose-to-external body abrasion.

In many applications, the use of the Mega cover can be a replacement for external hose protection (PU sleeves, Thermoplastic or steel wire springs), resulting in cost savings.

The favorable chemical stability, ozone, UV, and water resistance make this cover a good choice in extreme working environments, such as subsea applications, oil field applications, and snow gun applications.

A new MSHA-approved UHMWPE cover is available upon request.



IMM Cover Key Features

Abrasion Resistance according to ISO 6945 (F= 25N – 2000 cycles):

EN std. Target: 0.50 g loss

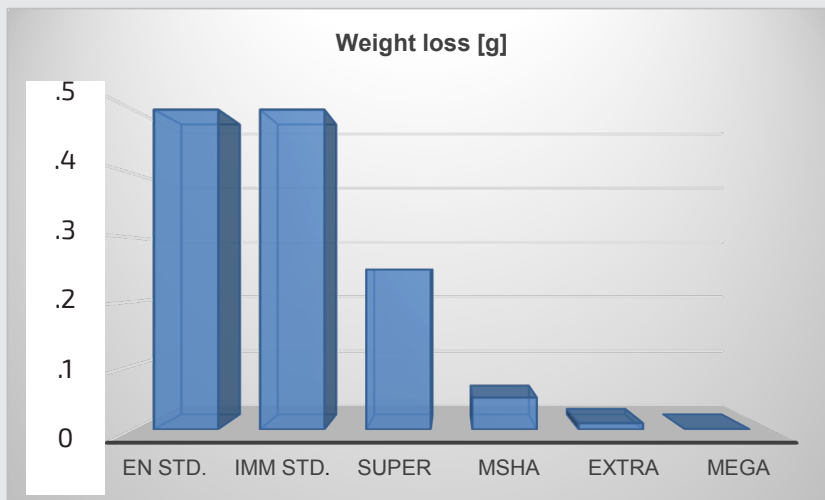
IMM std. Cover: EN std.

IMM Super Cover: x 2 EN std.

IMM Extra Cover: x 50 EN std.

IMM MSHA Cover: x 10 EN std.

IMM Mega Cover: not measurable



Ozone Resistance according to ISO 7326 (50 pphm – T=104°F (40°C))

EN std. Target: 72 h

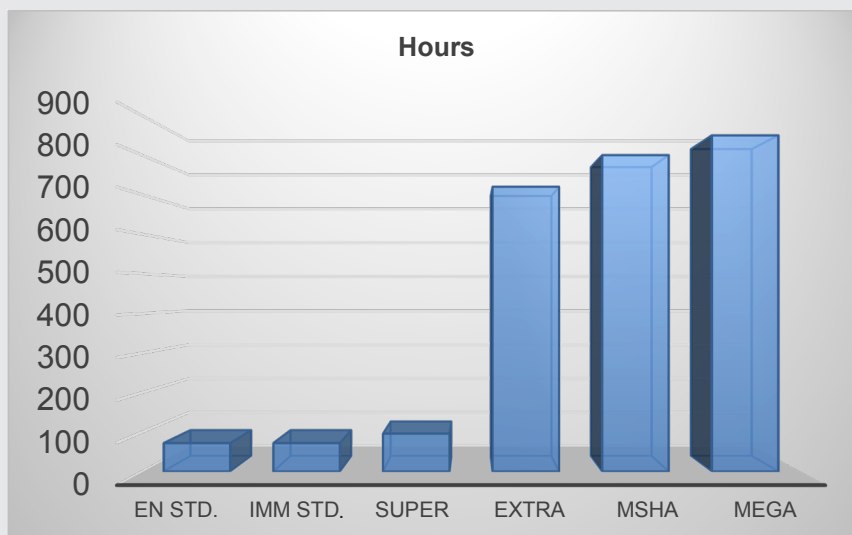
IMM std. Cover: EN std.

IMM Super Cover: better than EN std.

IMM Extra Cover: x 10 EN std.

IMM MSHA Cover: > 10 EN std.

IMM Mega Cover: > 10 EN std.



Thread Diameter

Type	thread	dash	male (mm)		female (mm)	
			size	max	min	max
BSP	1/8-28	02	9.7	9.5	8.8	8.6
Metric	M10x1	10	9.9	9.8	9.1	8.9
UNF	7/16-20	04	11.0	10.9	10.0	9.7
Metric	M12x1.5	12	11.9	11.7	10.6	10.4
UNF	1/2-20	05	12.6	12.5	11.6	11.3
BSP	1/4-19	04	13.1	12.9	11.8	11.4
Metric	M14x1.5	14	13.9	13.7	12.6	12.4
UNF	9/16-18	06	14.2	14.0	13.0	12.8
UNF	5/8-18	07	15.8	15.6	14.6	14.4
Metric	M16x1.5	16	15.9	15.7	14.6	14.4
BSP	3/8-19	06	16.6	16.4	15.3	15.0
UN	11/16-16	09	17.4	17.2	16.1	15.7
Metric	M18x1.5	18	17.9	17.7	16.6	16.4
UNF	3/4-16	08	19.0	18.8	17.6	17.3
Metric	M20x1.5	20	19.9	19.7	18.6	18.4
UN	13/16-16	11	20.5	20.4	19.2	18.9
BSP	1/2-14	08	20.9	20.7	19.1	18.6
Metric	M22x1.5	22	21.9	21.7	20.6	20.4
UNF	7/8-14	10	22.1	21.9	20.6	20.3
BSP	5/8-14	10	22.9	22.6	21.1	20.6
UNS	1-14	13	25.3	25.1	23.8	23.4
Metric	M26x1.5	26	25.9	25.7	24.6	24.4
BSP	3/4-14	12	26.4	26.2	24.6	24.1
UN	1 1/16-12	12	26.9	26.7	25.1	24.7
Metric	M30x1.5	30	29.9	29.7	28.6	28.4
Metric	M30x2	30	29.9	29.7	28.2	27.8
UN	1 3/16-12	14	30.1	29.8	28.3	27.9
UN	1 5/16-12	16	33.2	33.0	31.4	31.0
BSP	1-11	16	33.2	32.9	30.9	30.3
Metric	M36x2	36	35.9	35.7	34.2	33.8
UN	1 7/16-12	15	36.4	36.2	34.6	34.2
Metric	M38x1.5	38	37.9	37.7	36.6	36.4
UN	1 5/8-12	20	41.2	40.9	39.4	39.0
BSP	1 1/4-11	20	41.9	41.6	39.5	39.0
Metric	M42x2	42	41.9	41.7	40.2	39.8
UN	1 11/16-12	21	42.8	42.5	41.0	40.6
Metric	M45x1.5	45	44.9	44.7	43.6	43.4
Metric	M45x2	45	44.9	44.7	43.2	42.8
UN	1 7/8-12	24	47.5	47.3	48.7	45.3
BSP	1 1/2-11	24	47.8	47.4	45.4	44.8
UN	2-12	32	50.7	50.5	48.9	48.5
Metric	M52x2	52	51.9	51.7	50.2	49.8
BSP	2-11	32	59.6	59.3	57.2	56.7
UN	2 1/2-12	32	63.4	63.2	61.6	61.2



Manufacturing Standards

Description	Standards
Gas / BSP	BS 5200 ; ISO 8434-6 ; ISO 12151-6
Metric 24°	DIN 3861; DIN 3865 ; ISO 8434-1 ; ISO 8434-4 ; ISO12151-2
Metric 60°	DIN 7631; DIN 3863
ORFS	SAE J1453 ; ISO 8434-3 ; ISO12151-1
NPT	SAE J514
Jic 37°	SAE J514 ; ISO 8434-2 ; ISO 12151-5
SAE Code 61 Flange	SAE J518 ; ISO 6162-1 ; ISO 12151-3
SAE Code 62 Flange	SAE J518 ; ISO 6162-2 ; ISO 15151-3
Banjós	DIN 7642
JIS	JIS B 8363

Recommended Installation Torque

BSPP					
inch	dash size	with O-Ring		without O-Ring	
		Nm	lb.ft.	Nm	lb.ft.
1/8	02	15	11	20	15
1/4	04	20	15	25	18
3/8	06	27	20	34	25
1/2	08	47	35	59	44
5/8	10	56	41	85	63
3/4	12	80	59	118	87
1	16	109	80	137	101
1 1/4	20	133	98	167	123
1 1/2	24	164	121	206	152
2	32	196	145	245	181

JIC 37°					
inch	dash size	Nm	Nm	lb.ft.	lb.ft.
		min	max	min	max
7/16	04	15	17	11	13
1/2	05	19	22	14	16
9/16	06	27	30	20	22
5/8	07	40	45	30	33
3/4	08	59	65	44	48
7/8	10	68	79	50	58
1 1/16	12	107	119	79	88
1 3/16	14	128	140	94	103
1 5/16	16	158	170	117	125
1 5/8	20	215	237	159	175
1 7/8	24	254	288	187	212
2 1/2	32	339	384	250	283

SAE J518 Code 61 Flange Half Bolt					
inch	dash size	Nm	Nm	lb.ft.	lb.ft.
		min	max	min	max
1/2	08	15	19	11	14
3/4	12	21	29	15	21
1	16	27	35	20	26
1 1/4	20	35	46	26	34
1 1/2	24	46	58	34	43
2	32	54	66	40	49
2 1/2	40	79	91	58	67

SAE J518 Code 62 Flange Half Bolt					
inch	dash size	Nm	Nm	lb.ft.	lb.ft.
		min	max	min	max
1/2	08	15	19	11	14
3/4	12	25	33	18	24
1	16	42	50	31	37
1 1/4	20	62	75	46	55
1 1/2	24	116	133	86	98
2	32	199	216	147	159

Metric			
mm	dash size	Nm	lb.ft.
		M12-1.5	12
M14-1.5	14	26	19
M16-1.5	16	30	22
M18-1.5	18	41	30
M20-1.5	20	53	39
M22-1.5	22	76	56
M24-1.5	24	88	65
M26-1.5	26	106	78
M30-2	30	116	86
M36-2	36	133	98
M42-2	42	151	111
M45-2	45	173	128
M52-2	52	202	149

JIS 60°			
inch	dash size	Nm	lb.ft.
		1/4	04
3/8	06	34	25
1/2	08	59	44
5/8	10	85	63
3/4	12	118	87
1	16	137	101
1 1/4	20	167	123
1 1/2	24	206	152
2	32	245	181

ORFS			
inch	dash size	Nm	lb.ft.
		9/16	06
11/16	09	38	28
13/16	11	57	42
1	13	90	66
1 3/16	14	130	96
1 7/16	15	170	125
1 11/16	21	200	148
2 1/2	32	240	177

Conversion Unit

unit	from	to	coeff.
length	m meters	ft foot	3.281
length	mm millimeters	in inch	0.03934
area	m ² square meter	in ² square inch	1550
volume	l liters	gal gallon (UK)	0.264
weight	kg kilogram	lb pound	2.205
torque	Nm Newton-meters	lb ft pound foot	0.7374
velocity	m/s meters/second	ft/s feet per second	3.281
flow rate	l/min liters per minute	gal/min gallon per minute	0.264
pressure	bar (105N/m ²)	psi pound/square inch	14.503
temperature	C° celsius	°F fahrenheit	°C(9/5)+32

Pressure Conversion Factors

METRIC TO PSI			
1 kPa = 0.145 psi			
bar	Mpa	kPa	psi
40	4	4000	580
50	5	5000	725
60	6	6000	870
70	7	7000	1015
80	8	8000	1160
90	9	9000	1305
100	10	10000	1450
200	20	20000	2900
300	30	30000	4350
400	40	40000	5800
500	50	50000	7250
600	60	60000	8700
700	70	70000	10150
800	80	80000	11600
900	90	90000	13050
1000	100	100000	14500
2000	200	200000	29000
3000	300	300000	43500

PSI TO METRIC			
1 psi = 6.89 kPa			
psi	kPa	Mpa	bar
500	3445	3.4	34
600	4134	4.1	41
700	4823	4.8	48
800	5512	5.5	55
900	6201	6.2	62
1000	6890	6.9	69
2000	13780	13.8	138
3000	20670	20.7	207
4000	27560	27.6	276
5000	34450	34.5	345
6000	41340	41.3	413
7000	48230	48.2	482
8000	55120	55.1	551
9000	62010	62.0	620
10000	68900	68.9	689
20000	137800	137.8	1378
30000	206700	206.7	2067
40000	275600	275.6	2756



Thread Codes

	Gas BSP	Metric		Jic SAE / UN UNF	ORFS UN UNF UNS	NPTF
02	1/8"-28					1/8"-27
04	1/4"-19			7/16"-20		1/4"-18
05				1/2"-20		
06	3/8"-19			9/16"-18	9/16"-18	3/8"-18
07				5/8"-18		
08	1/2"-14			3/4"-16		1/2"-14
09					11/16"-16	
10	5/8"-14	M10x1	M10x1,5	7/8"-14		
11					13/16"-16	
12	3/4"-14	M12x1.5		1 1/16"-12		3/4"-14
13					1"-14	
14		M14x1.5		1 3/16"-12	1 3/16"-12	
15					1 7/16"-12	
16	1"-11	M16x1.5		1 5/16"-12		1"-11 1/2
18		M18x1.5				
20	1 1/4"-11	M20x1.5		1 5/8"-12		1 1/4"-11 1/2
21					1 11/16"-12	
22		M22x1.5				
24	1 1/2"-11	M24x1.5		1 7/8"-12		1 1/2"-11 1/2
26		M26x1.5				
30		M30x1.5	M30x2			
32	2"-11			2 1/2"-12	2"-12	2"-11 1/2
36		M36x1.5	M36x2			
38		M38x1.5				
40	2 1/2"-11					
42		M42x2				
45		M45x1.5	M45x2			
52		M52x1.5	M52x2			

ID Hose Size Identification

SAE dash	ISO ref		R5	
	mm	inches	mm	inches
-2	3.2	1/8	-	-
-3	5	3/16	-	-
-4	6.4	1/4	4.8	3/16
-5	8	5/16	6.4	1/4
-6	10	3/8	7.9	5/16
-	-	13/32	-	-
-8	12.5	1/2	10.3	13/32
-10	16	5/8	12.7	1/2
-12	19	3/4	15.9	5/8
-14	-	7/8	-	-
-16	25	1	22.2	7/8
-	-	1 1/8	-	-
-20	31.5	1 1/4	28.6	1 1/8
-	-	1.3/8	-	-
-24	38	1 1/2	34.9	1 3/8
-	-	1 13/16	-	-
-32	51	2	46	1 3/16
-36	-	2 1/4	-	-
-40	64	2 1/2	60.3	2 3/8
-48	76	3	-	-
-56	89	3 1/2	-	-
-64	102	4	-	-

Chemical resistance table

Chemical name \ Resistance	NBR	CR	NBR/PVC	PTFE
Petroleum based oil	1	3	2	1
Diesel fuel	1	2	2	1
Water oil emulsions	1	1	1	1
Water glycol emulsions	1	1	1	1
Phosphate esters	5	4	4	1
Gas permeation	3	3	3	3
Weathering	5	2	2	1
Ozone	3	1	2	1
Heat	3	3	3	1
Flame resistance	4	3	3	3
Flame resistance	5	1	2	1
Bio oil	1	5	4	1

Legend:

1- Excellent 2- Very Good 3- Good 4- Sufficient 5- Poor

These values are for guidance only and they are related to the hose liner. Several factors in working operations could affect hose service life. For details concerning specific fluid, contact Muncie Power Products Technical Department. The outer cover of the hose is intended to protect the reinforcement layer(s) from mechanical influences (abrasion, weathering, etc), cover compounds are not designed to exhibit the same chemical resistance as the tube compounds. Interpump Hydraulics should be consulted about the compatibility of the cover, should the application involve the extended exposure or immersion in a liquid. In general, the hydraulic hoses of the Interpump Fluid Solutions product range are not designed for immersion in the service fluid. These types of special applications should be avoided or carefully analyzed, taking care to provide additional external protections for the hoses or by selecting special types of hoses (e.g. hoses with a thermoplastic cover which have been validated for the specific application). The turbulence of the fluid, the high temperature and nature of the fluid as well as other elements may impact the properties or integrity of the hose cover material (the cover compound of the hose is designed to resist to oil drops and external agents, not immersion in the service fluid). For more detailed information or for any technical questions, contact Muncie Power Products.





















Polymer based compound:

NBR	TFS0017 - TFE002K - TFD0021 - TFE001K - TFD0011 - TFA201K - TFA202K - TFS0006 - TFS0003 - TFD03TE - TFD02TE TFS0004 - TFDH021B - TFDH011B - TFDL021N - TFDL011N - THE003K - THE002K - THD0021 - THE102K - THE101K TFEM02KN - TFDG4SH - TFDG015 - TFE0P10 - TFN002K - TFB002K - TFN001K - TFB001K - THE01K - THE02K TFDE011 - THE0M2K - TFS0005 - TFS00JG - THE001K
CR	TFSM013 - TFD04SH - TFD04SP - TFSM012 - TFD0011B - TFSM015N - THM04SPN - THM04SHN
PTFE	TF00T1 - TF00TP1 - TF00T2 - TF00THP - TF00LTC

REFERENCE STANDARD	Max Working Pressure of main connections (design factor 4:1)							
	CONNECTION							
ISO 8434-6		Thread Size	1/8	1/4		3/8	1/2	5/8
	BSP 60° cone with O-Ring	MAX WP		400		400	350	350
	BSP 60° cone without O-Ring	MAX WP	350	350		350	315	315
ISO 8434-2	37° flared (JIC)	Thread size		7/16-20	1/2-20	9/16-18	3/4-16	7/8-14
		MAX WP		350	350	350	310	240
ISO 8434-3	O-Ring face seal (ORFS)	Thread size		9/16-18	5/8-18	11/16-16	13/16-16	1-14
		MAX WP		630	630	630	630	400
ISO 8434-1	24° cone light series	Thread size	M12X1.5 (6L)	M14X1.5 (8L)	M16X1.5 (10L)	M18X1.5 (12L)	M22X1.5 (15L)	M26X1.5 (18L)
		MAX WP	415	400	350	330	275	250
	24° cone heavy series	Thread size	M16X1.5(8S)	M18X1.5 (10S)	M20X15 (12S)	M22X1.5 (14S)	M24X1.5 (16S)	M30X2 (20S)
		MAX WP	630	630	630	630	420	420
SAE J518 ISO 6162-1 ISO 6162-2	Code 61 Flange (3000 PSI Flange)	Flange size					1/2	
	Code 62 Flange (6000 PSI Flange)	MAX WP					350	
SAE J514	NPTF (dry seal pipe)	Thread size	1/8	1/4		3/8	1/2	5/8
		MAX WP	345	275		275	240	
JIS B 8363	BSP 60° inverted cone (Toyota)	Thread size		1/4		3/8	1/2	5/8
		MAX WP		345		345	345	275
	BSP 60° inverted cone (Komatsu)	Thread size		M14X1.5	M16X1.5	M18X1.5	M22X1.5	M24X1.5
		MAX WP		345	345	345	345	280

REFERENCE STANDARD	Max Working Pressure of main connections (design factor 4:1)							
	CONNECTION							
ISO 8434-6		Thread Size	3/4	1	1 1/4	1 1/2	2	
	BSP 60° cone with O-Ring	MAX WP	315	250	200	160	125	
	BSP 60° cone without O-Ring	MAX WP	250	200	160	125	80	
ISO 8434-2	37° flared (JIC)	Thread size	1 1/16-12	1 5/16-12	1 5/8-12	1 7/8-12	2-1/2-12	
		MAX WP	240	210	170	140	105	
ISO 8434-3	O-Ring face seal (ORFS)	Thread size	1 3/16-12	1 7/16-12	1 11/16-12	2-12		
		MAX WP	400	400	250	250		
ISO 8434-1	24° cone light series	Thread size	M30X2 (22L)	M36X2 (28L)	M45X2 (35L)	M52X2 (42L)		
		MAX WP	215	165	125	100		
	24° cone heavy series	Thread size	M36X2 (25S)	M42X2 (30S)	M52X2 (38S)			
		MAX WP	420	420	420			
SAE J518 ISO 6162-1 ISO 6162-2	Code 61 Flange (3000 PSI Flange)	Flange size	3/4	1	1 1/4	1 1/2	2	
	Code 62 Flange (6000 PSI Flange)	MAX WP	350	350	280	210	210	
SAE J514	NPTF (dry seal pipe)	Thread size	3/4	1	1 1/4	1 1/2	2	
		MAX WP	210	170	150	140	140	
JIS B 8363	BSP 60° inverted cone (Toyota)	Thread size	3/4	1	1.1/4	1 1/2		
		MAX WP	275	205	170	105		
	BSP 60° inverted cone (Komatsu)	Thread size	M30x1.5	M33X1.5	M36X1.5	M42X1.5		
		MAX WP	280	205	170	105		

HOSE CHART																	COVER	HOSE OPERATING TEMP		
HOSE REFERENCE			Size	03	04	05	06	08	10	12	16	20	24	32	40	48			ABRASION RESISTANCE LEVEL	Temp Range [°C]
Hose	Code	Reference Standard	DN	5	6	8	10	12	16	19	25	31	38	51	63	78				
			MAX WORKING PRESSURE [bar]																	
International Standard	Hypress 1SN	TFD0011	EN 853-SAE 100R1AT-ISO 1436	250	225	215	180	160	130	105	88	63	50	40				I	-40 ÷ 100	
	Hypress 2SN	TFD0021	EN 853-SAE 100R2AT-ISO 1436	415	400	350	330	275	250	215	165	125	90	80				I	-40 ÷ 100	
	Hypress 1SC	TFE001K	EN 857-ISO 11237		225	215	180	160	130	105	88							I	-40 ÷ 120	
	Hypress 2SC	BFEM02K	EN 857-SAE 100R16-ISO 11237		400	350	330	275	250	215	165							I	-40 ÷ 120	
	EASY K 1SC	TFA201K	EN 857-ISO 11237		225	215	180	160	130	105	88							STD	-40 ÷ 100	
	EASY K 2SC	TFA202K	EN 857-ISO 11237		400	350	330	275	250	215	165							STD	-40 ÷ 100	
	Hypress 4SP	TFDM4SP	EN 856-ISO 3862		450	445	415	350	280	210	185	165						I	MSHA	-40 ÷ 100
	Hypress 4SP	TFD04SP	EN 856-ISO 3862		450	445	415	350	280	210	185	165						II	-40 ÷ 100	
	Hypress 4SH	TFDM4SP	EN 856-ISO 3862							420	385	350	300	250				I	MSHA	-40 ÷ 100
	Hypress 4SH	TFD04SH	EN 856-ISO 3862							420	385	350	300	250				II	-40 ÷ 100	
	Hypress R12	TFDM012	EN 856-SAE 100R12-ISO 3862				280	280	280	280	280	210	176	176				I	MSHA	-40 ÷ 121
	SAE 100R3	TFS0003	SAE 100R3-ISO 4079	103	86	83	78	69	60	52	39	26						STD	-40 ÷ 100	
	Hypress 2TE	TFD02TE	EN 854	80	75	68	63	58	50	45	40	35						STD	-40 ÷ 100	
	Hypress 3TE	TFD03TE	EN 854	160	145	130	110	93	80	70	55	45	40	33				STD	-40 ÷ 100	
	UniLock	BFS0006I	SAE 100R6	34	28	28	28	28	24	21	12							STD	-40 ÷ 100	
	SAE 100R5	TFS0005	SAE 100R5		210	210	157	140	122	105	56	43	35	24				STD	-40 ÷ 100	
	Hypress R17	BFSM017	ISO 11237-SAE 10017	210	210	210	210	210	210	210	210							I	MSHA	-40 ÷ 100
	Hypress R13	TFSM013	EN 856-SAE 100R13-ISO 3862							350	350	350	350	350				I	MSHA	-40 ÷ 121
Hypress R15	TFSM015	SAE 100R15-ISO 3862							420	420	420	420	420				I	MSHA	-40 ÷ 121	
High performance	Compressor	TFDC011B	EN 853-SAE 100R2AT-ISO 1436	225	215	180	160	130	105	88	63	50	40				STD	-40 ÷ 135		
	HyCelsius 1SN	TFDH011	EN 853-SAE 100R1AT-ISO 1436	225	215	180	160	130	105	88	63	50	40				STD	-40 ÷ 135		
	HyCelsius 2SN	TFDH021	EN 853-SAE 100R2AT-ISO 1436	400	350	330	275	250	215	165	125	90	80	30			STD	-40 ÷ 135		
	HyFreeze 1SN	TFDL011	EN 853-SAE 100R1AT-ISO 1436	225	215	180	160	130	105	88	63	50	40				STD	-50 ÷ 100		
	HyFreeze 2SN	TFDL021	EN 853-SAE 100R2AT-ISO 1436	400	350	330	275	250	215	165	125	90	80				STD	-50 ÷ 100		
	HyOzone	TFEM02K	EN 857-SAE 100R16-ISO 11237	400	350	330	275	250	215	165							I	MSHA	-40 ÷ 120	
	Pilot Plus 150	TFE0P15	IMM Specs	150	150	150	150	150										I	-40 ÷ 120	
	Kaizen 2SN	BHDM021	EN 853-SAE 100R2AT-ISO 1436	420	420	360	350	290	250	215	175	140	125	90				I	MSHA	-40 ÷ 120
	1SC	BHES01K	EN 857-ISO 11237	250	250	250	200	150	150	110	100	90	75	50	40			I	-40 ÷ 120	
	2SC	THE002K	EN 857-SAE 100R16-ISO 11237	430	400	350	310	280	240	210	160	150	100	80	65			II	-40 ÷ 120	
	3SC	THE003K	IMM Specs			500	475	420	380	315								II	-40 ÷ 120	
	LongLife 1SC	BHES01K	EN 857-ISO 11237	250	250	250	200	150	150									II	-40 ÷ 120	
	LongLife 2SC	THE102K	EN 857-SAE 100R16-ISO 11237	430	400	350	310	280	240	185								II	-40 ÷ 120	
	Marathon	BHEMM2K	EN 857-SAE 100R16-ISO 11237	450	420	385	350	350	280	250								II	MSHA	-40 ÷ 120
	HyGreen R15	TFGD015	SAE 100R15-ISO 3862							420	420	420	420	420				I	-40 ÷ 121	
Bio - Flex	THDB4SH	EN 856-ISO 3862							420								II	-40 ÷ 100		

HOSE CHART																		COVER	HOSE OPERATING TEMP
HOSE REFERENCE		Size	03	04	05	06	08	10	12	16	20	24	32	40	48	ABRASION RESISTANCE LEVEL	Temp Range [°C]		
Hose	Code	Reference Standard	DN	5	6	8	10	12	16	19	25	31	38	51	63			78	
			MAX WORKING PRESSURE [bar]																
Jet 1SN/1SC	TFN0011/ TFN001K/ TFB0011/ TFB001K	ISO 7751		250	250	250	250										STD	-40 ÷ 135	
Jet 2SN/2SC	TFN0021/ TFN002K/ TFB0021/ TFB002K	ISO 7751		400	400	400	400										STD	-40 ÷ 135	
Jet Plus 1SN/1SC	THN0011/ THN001K/ THB0011/ THB001K	ISO 7751		250	250	250	250										STD	-40 ÷ 135	
Jet Plus 2SN/2SC	THN0021/ THN002K/ THB0021/ THB002K	ISO 7751		400	400	400	400										STD	-40 ÷ 135	
SewerJet 280	TSWR280	ISO 7751				280	280		280	280	280							-40 ÷ 70	
HyBlast 10k	TFW0070	IMM Specs								700								-10 ÷ 70	
HyBlast 12k	TFW0085	IMM Specs		850		850	850		850	850								-10 ÷ 70	
HyBlast 15k	TFW0110	IMM Specs		1100		1100	1100		1000									-10 ÷ 70	
HyBlast 18k	TFW0125	IMM Specs				1250	1200											-10 ÷ 70	
HyBlast 20k	TFW0145	IMM Specs				1450	1450		1350									-10 ÷ 70	
LongLift 1SC	THL101K	EN 857-ISO 11237		250	250	250	200	150	150									-40 ÷ 120	
LongLift 2SC	THL102K	EN 857-SAE 100R16-ISO 11237		430	400	350	310	280	240	185								-40 ÷ 120	
LongLife Dual 1SC	T2E101K	EN 857-ISO 11237		250		250	250											-40 ÷ 120	
LongLife Dual 2SC	T2E102K	EN 857-SAE 100R16-ISO 11237		430		350	310											-40 ÷ 120	
Railway	TFDE011	EN 853*SAE 100R1AT-ISO 1436		225	215	180	160	130	105	88							STD	-40 ÷ 100	
PowerLift 1SC	THE0L1K	EN 81-20								50	50	45						-40 ÷ 100	
PowerLift 2SC	THE0L2K	EN 81-20									50	50						-40 ÷ 100	
HyJack	THE2J2K	IMM Specs		760	725													-40 ÷ 100	
Snow Storm 1SC	THEPS1K	IMM Specs								100	100	100						-40 ÷ 100	
HyTruck 200	TTRK200	IMM Specs							200	200								-40 ÷ 100	
HyTruck 250	TTRK250	IMM Specs							250	250								-40 ÷ 100	
HyTruck 350	TTRK300	IMM Specs							350	350								-40 ÷ 100	
Mega Drill	THEMMDR	EN 857-SAE 100R16-ISO 11237							350	350 (210)							 MSHA	-40 ÷ 100	
Mega Jet	TFS04JG	IMM Specs								550	450	450	420					-40 ÷ 100	
Mega Jet	THS00JG	IMM Specs								600	550	500	480					-40 ÷ 100	
BOP Firescreen 5000	TBOP350	IMM Specs											350				STD	-40 ÷ 121	

Solution for applications

- 1-Refer to dedicated section for extended Temperature Range information
- 2-UNMWPE cover available as alternative (MEGA COVER)
- 3-Ask technical office for cover different configuration request

Built to INTERconnect.





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