PRODUCT ENQUIRY / DEVELOPMENT FORM

Doc No. FM-0301.09 C

Please send this completed form to: group.tech@pirtek.com.au OR Fax to (02) 8822 9019

Centre	
Contact Person	
Customer / End User	
Date	

Please attach any photos or dimensional sketches of the products (or application) with this form if appropriate to assist in clarifying request

Date response / quote required	

SIZE	**Dash Size**	**Millimetres**

TEMPERATURE °C	
Temperature of Medium °C	
Environmental Temp °C	

Comments on Temperature

Please add comments on temperature here

APPLICATION	Consider (but not limited to) whether the component is indoor or outdoor, bend radius, movement, types of conditions, type of machine or apparatus, what the product is intended for, etc

Be as descriptive as possible to convey what the hose / item will be subjected to in this cell

MEDIUM CONVEYED	

If the medium is more complex and no MSDS is attached, please detail here with as much information as possible

Comments on Medium

If medium is complex then is MSDS attached?	**Y / N**

Please add specific details pertaining to medium here

PRESSURE (Bar)	
Operating Pressure (Bar)	
Peak Pressure (Bar)	
VACUUM / SUCTION (Gauge)	
mm Mercury (mm/hg)	
Bar	

Comments on Pressure or Suction

Please add specific details pertaining to pressure or suction here

PIRTEK

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Doc No. FM-0301.09 C

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ENDS / ADAPTORS - Connections	
Prospective Part No.	
Type (Termination)	
Termination Angle (°)	
Material	
Retention type eg Bandit	

Comments on Ends

Please add specific details pertaining to ends here

DELIVERY	
Date product is required to the customer	

Comments on Delivery

Please add specific details pertaining to delivery here

COMMERCIAL AND ORDER DETAILS

Opening Order Quantity (qty or metres)	
Annual Quantity (qty or metres)	
On going or once-off project	

Comments on Quantity and Commercial Considerations

Please add specific details pertaining to quantity and any commercial considerations here

Please advise what current Product Brands and Part Numbers are being used in the Application (if applicable)

Please indicate how any existing product is performing in the application and in what aspects are improvements sought

Target Pricing if known or if applicable

General Comments pertaining to this enquiry

Please add general details pertaining to this enquiry here

PIRTEK

Recommended Practices for Hydraulic Hose Assemblies – SAE J1273 2002-12

Foreword

This SAE Recommended Practices is intended as a guide to consider when selecting, routing, fabricating, installing, replacing, maintaining, and storing hose for fluid-power systems. It is subject to change to keep pace with experience and technical advances. For those new to hose use in fluid power systems, this guide outlines practices to note during each phase of system design and use. Experienced designers and users skilled in achieving proper results, as well as the less experienced, can use this outline as a list of considerations to keep in mind.

Fluid-power systems are complex and require extensive knowledge of both the system requirements and the various types of hose. Therefore, all inclusive, detailed, step by step instructions are not practical and are beyond the scope of this document. Less experienced designers and users who need more information can consult specialists such as hose suppliers and manufacturers. This-guide can improve the communication process.

Safety Considerations

These recommended practices involve safety considerations; note these carefully during all phases of design and use of hose systems. 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.

1. Scope – SAEJ1273 provides guidelines for selection, routing, fabrication, installation, replacement, maintenance, and storage of hose and hose assemblies for fluid-power systems. Many of these SAE-Recommended Practices also may be suitable for other hoses and systems.
2. Reference
   - 2.1 Applicable publications – The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of SAE publications shall apply.
   - 2.1.1 SAE publications – Available for SAE, 400 Commonwealth Drive, Warrendale, PA 15096-000

     SAEJ343 – Test and Procedures for SAE 100 R Series Hydraulic Hose and Hose Assemblies

     SAEJ514 – Hydraulic Tube Fittings

     SAEJ517 – Hydraulic Hose

     SAEJ1927 – Cumulative Damage Analysis for Hydraulic Hose Assemblies
   - 2.1.2 ISO publications – Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002

     ISO 3457 – Earth moving machinery – Guards and shields – definitions and specifications.
3. Definitions

   These explanations serve only to clarify this document and are not intended to stand alone. They are presented sequentially, with the former helping to explain the latter.
   - 3.1 Fluid-power
     Energy transmitted and controlled using pressurised hydraulic fluids or compressed air.
   - 3.2 Hose – flexible conductor.
     In this document, the term hose also may refer to a hose assembly with related accessories used in fluid power applications.
   - 3.3 Hose fitting or fitting – connector which can be attached to the end of a hose.
   - 3.4 Hose assembly – hose with hose fittings attached.
   - 3.5 Hose failure – occurrence in which a hose stops meeting system requirements.
   - 3.6 Hose service life – length of time a hose meets system requirements without needing replacement.
4. Safety considerations – listed in 4.1 to 4.7 are some potential conditions and situations that may lead to personal injury and/or property damage. This list is not necessarily all inclusive. Consider reasonable and feasible means, including those described in this section, to reduce the risk of injuries or property damage.

   Training, including the information in this document, for operators, maintenance personnel, and other individuals working with hoses under pressure is encouraged.
   - 4.1 Fluid injections – fine streams of escaping pressurised 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 pressurised 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 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.
   - 4.2 Whipping hose – if a pressurised 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 the risk exists, consider guards and restraints to protect against injury.
   - 4.3 Burns from conveyed fluids – fluid-power media may reach temperatures that can burn human skin. If there is risk of burns from escaping fluid, consider guards and shields to prevent injury, particularly in areas normally occupied by operators.
   - 4.4 Fire and explosions from conveyed fluids – most fluid-power media, including fire-resistant hydraulic fluids, will burn under certain conditions. Fluids which escape from pressurised 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 minimise the risk of combustion (see Section 5 and ISO 3457).
   - 4.5 Fire and explosions from static-electric discharge – fluid passing through hose can generate static electricity, resulting in static-electric discharge. This may create sparks 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.

(R) Test and Test Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies – SAE J343 July 2001

This document is technically equivalent to ISO 6605 except as noted in the foreword.

Foreword – this document has not changed other than to put it into the new SAE technical standards board format.

SAE J343 has been revised to be technically equivalent to ISO 6605, except that additional tests in paragraphs 4.9 to 4.14 were included.

1. Scope – this SAE standard gives methods for testing and evaluation performance of the SAE 100R series of hydraulic hose and hose assemblies (hose and attached end fittings) used in hydraulic fluid power systems.

   Specific tests and performance criteria for evaluating hose assemblies used in hydraulic service are in accordance with the requirements for hose in the respective specifications of SAE J517.

   This document further establishes a uniform means of testing and evaluating performance of hydraulic hose assemblies.

2. Reference

   2.1 Applicable publications – The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

   2.1.1. SAE Publications – available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001

   SAE J517 Hydraulic hose.

   2.1.2. ASTM publications – available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

   ASTM D 380 – standard methods of testing rubber hose.

   2.1.3 ISO publications – available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

   ISO 3448 – industrial liquid lubricants-ISO viscosity classification

   ISO 6605 – hydraulic fluid-power hose assemblies – method of test.

3. Test procedures

   The test procedures described in the current issue of ASTM D 380 shall be followed. However, in cases of conflict between the ASTM specifications and those described as follows, the latter shall take precedence. Unless otherwise specified in this document, or other SAE standards, tests shall be conducted at the prevailing ambient temperature of the testing facility.

4. Standard test warning – water or another liquid suitable for the hose under test shall be used as the test medium. The use of air and other gaseous materials as testing media should be avoided because of the risk to operators. In special cases where such media are required for the tests, strict safety measures are imperative. Furthermore, it is stressed that when a liquid is used as the test medium, it is essential that all air is expelled from the test piece because of the risk of injury to the operator due to the sudden expansion of trapped air released when the hose bursts.

   4.1. Dimensions check test – The hose shall be inspected for conformity to all dimensions tabulated in the applicable specification.

   Determine finished outside diameters and reinforcement diameters, where required, by calculation from measurement of the respective circumference.

   As an alternative, use a flexible tape graduated to read the diameter directly.

   Measure the inside diameter by means of a suitable expanding ball or telescoping gauge.

   Measure concentricity over both the reinforcement and the finished outside diameters using either a dial indicator gauge or a micrometer.

   Round the foot of the measuring instrument to conform to the inside diameter of the hose.

   Take reading at 90 degree intervals around the hose.

   NOTE: Acceptability is based on the total variation between the high and low readings.

   Take inside and outside diameter measurements at a minimum of 25mm from the hose ends and concentricity measurements at a minimum of 13 mm from the hose ends.

   4.2 Proof test

   Test the hose assemblies hydrostatically to the specified proof pressure for a period of not less than 30 s nor more than 60 s.

   There shall be no indication of failure or leakage.

   4.3 Change in length test – Conduct measurements for the determination of elongation or contraction on a previously untested, unaged hose assembly having at least 600 mm length of free hose between hose fittings.

   Attach the hose assembly to the pressure source in an unrestricted straight position. If the hose is not straight due to its natural curvature, it may be fastened laterally to achieve a straight position. Pressurise to the specified operating pressure for a period of 30 s, then release the pressure.

   Place accurate reference marks 500 mm apart on the outer cover of the hose, midway between fittings, after allowing the hose assembly to restabilise for a period of 30 s, following pressure release.

   Repressurise the hose assembly to the specified operating pressure for a periods of 30 s.

   Measure the final length while the hose is pressurised. The final length is the distance between reference marks while the hose is-pressurised.

   Complete the determination of the change in length using Equation 1:

$$\Delta l = \frac{l_1 - l_0}{l_0} \times 100 \qquad \text{(Eq.1)}$$

   where:

   l is the distance between the reference marks when the hose was not pressurised following the initial pressurisation;

   l_1 is the distance between the reference marks under pressure;

   Δl is the percentage change in length, which will be position (+) in the case of an increase in length and negative (–) in the case of a decrease in length.

   4.4 Burst test – Subject unaged hose assemblies, on which the end fittings have been attached for not more than 30 days, to a hydrostatic pressure, increased at a constant rate so as to attain the specified minimum burst pressure within a period of not less than 15 s more than 60 s.

   Reject hose assemblies showing leakage, hose burst or indication of failure below the specified minimum burst pressure.

   NOTE: This is a destructive test. Assemblies which have been subjected to this test shall be destroyed.

   4.5 Cold bend test – subject hose assemblies to the specified temperature in a straight position for 24 h.

   Then, while still at the specified temperature, the samples shall be evenly and uniformly bent once over a mandrel having a diameter equal to twice the specified minimum bend radius. Bending shall be accomplished within a period of not less than 8-s nor more than 12 s.

   In the case of hose sizes up to and including 22 mm nominal inside diameter, bend them through 180 degrees over the mandrel; in the case of hose sizes larger than 22 mm nominal inside diameter, bend them through 90 degrees over the mandrel.

   After bending, allow the sample to warm to room temperature, visually examine it for cover cracks and subject it to the proof test. There shall be no cover cracks or leakage. (In lieu of the bending test, hoses larger than 22 mm nominal inside diameter may be considered acceptable if samples of tube and cover pass the Low Temperature Test on Tube and Cover of ASTM D 380).

   Reject any samples with visible cracks of leakage.

   NOTE: This is a destructive test. Assemblies which have been subjected to this test shall be destroyed.

   4.6 Impulse test – test for unaged hose assemblies with end fittings which have been attached for not more than 30 days. Where the individual standard requires, also test aged hose assemblies.

   Apply a pulsating pressure internally to the hose assemblies at a rate between 0.5 and 1.34 Hz; record the frequency used. The pressure cycle shall fall within the shaded areas of Figure 1 of SAE J343 and conform as closely as possible to the curve shown.

   Select a test fluid which complies with the requirements of ISO VG 46± 4.6 at 40°C per ISO 3448, and circulate it at a rate sufficient to maintain a uniform fluid temperature within the hose assemblies.

Other fluids may be used as agreed upon between the customer and the manufacturer.

Calculate the free (exposed) length of hose under test, shown on Figure 2, as follows:

a. Hose sizes up to and including 22 mm nominal inside diameter (see Equation 3):

180 degrees bend free length = πr+2d (Eq.3)

b. Hose sizes larger than 22 mm nominal inside diameter (see-Equation 4):

90 degrees bend free length = $\frac{\pi}{2}$r+2d (Eq.3)

where:

r = minimum bend radius

d = hose outside diameter

Connect the test pieces to the apparatus. The test pieces shall be installed according to Figure 2 of SAE J343. Test pieces of hose of nominal inside diameter up and including 22 mm shall be bent through 180 degrees and hoses of nominal inside diameter larger than 22 mm shall be bent through 90 degrees.

Test the hose at the impulse test pressure indicated in the individual specification. The test fluid shall be circulated through the assemblies at the specified temperature with a tolerance of 3°C. Cooling or heating of the test chamber shall not be permitted, except when individual standards require testing with synthetic base test fluids at a temperature higher than 150°C. When such higher temperatures are required, the impulse test fluid need not be circulated if both the fluid and the assemblies are externally heated in the test chamber, at the specified temperature with a tolerance of 5°C.

Determine the duration of the impulse test in total number of cycles by the individual standard for the hose assemblies. Where aged samples are required, refer to the individual standards.

It is recommended the test fluid be changed frequently to prevent breakdown.

NOTE: This is a destructive test. Assemblies which have been subjected to this test shall be destroyed.

4.7 Leakage test – Subject unaged hose assemblies, on which the end fitting have been attached for not more than 30 days, to a hydrostatic pressure of 70% of the specified minimum burst pressure for a period of between 5.0 to 5.5. min.

Reduce the fluid pressure to O MPa.

Re-apply the 70% of minimum burst hydrostatic pressure for another 5.0 to 5.5 min period.

Reject assemblies showing leakage or failure.

NOTE: This is a destructive test. Assemblies which have been subjected to this test shall be destroyed.

A mercury or salt water solution electrode shall be provided at the upper end as shown, by inserting a non-meticallic plug with an O-ring seal to distance of 75-mm from the end of the tubing, thus providing an average test length of 255 mm. Mercury or salt water solution shall then be added to a level
25 mm above the plug. Any suitable conductor to this electrode may be used, including a threaded end attached to the plug if so desired. Concentration of salt water, if used, shall be 450 g NaCl per litre of H_20.

1000 V DC shall be applied between the upper electrode and the lower electrode (adaptor or male fitting hex). The current shall be measured with an instrument with a sensitivity of at least 1 μA(1 x 10–6 A).

4.13 Resistance to vacuum test – The hose shall not blister nor show any other indication of failure when subjected to the specified vacuum for a period of 5 min. Where practicable, one end of the hose shall be equipped with a transparent cap and electric light to permit visual examination for failure. Where the length or size of the hose precludes visual examination, failure shall be-determined by inability to pass through the hose a ball or cylinder 6.5 mm less in diameter than the bore or hoses of 12.5-mm nominal inside diameter and larger. For hoses under 12.5-mm nominal inside diameter, a ball or cylinder 3.0 mm smaller in diameter than the bore shall be used.

Hose and Fitting Compatibility

Pirtek strongly recommend that only Pirtek hose and fittings are used in an assembly. We do not condone the use of other brand hose used with our fittings, or other fittings used with our hose. Any fabrication of a hose assembly outside this is deemed to be the fabricators risk and is not recommended.

The SAE specification for Hydraulic Hose, J517, paragraph 5 reads:

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

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

Selection of Hose

System type
The selection and installation of hoses must be in relation to pump pressure, operating cycle, inner diameters of pipes, type of fluid.

Operating pressure
Hose lines are rated for continuous operation at the maximum operating pressures specified for the hose. Generally, the operating pressure is one fourth the hose minimum burst pressure, thus meeting the SAE recommended safety factor of 4 to 1.

Pressure surges
Almost all hydraulic systems develop pressure surges which may exceed relief valve settings and affect the service life of hose and system components. In systems where surges are severe, select a hose that will increase the safety factor.

Operating temperatures
Operating temperatures specified refer to maximum temperature of the fluid or gases being conveyed (with peaks up to 120°C. Continuous operation at or near maximum rated temperatures will materially reduce the service life of the hose. Refer to Pirtek for advice on permissible operating temperatures for fluids other than general purpose mineral oils in hydraulic hoses.

Ambient temperatures
Very high or low ambient (outside of hose) temperatures will affect cover and reinforcement materials, thus influencing the life of the hose.

Bend radius
Recommended minimum bend radii are based on maximum operating pressures with no flexing of the hose.

Vibration and flexing
Hose lines are designed to withstand maximum vibration and flexing.

Volumetric expansion
Hose is normally manufactured with a neutral braid angle to reduce volumetric expansion.

Gaseous fluid systems
High pressure gaseous systems are very hazardous.
Hose lines should be adequately protected from external shock and mechanical or chemical damage.
They should also be suitably protected to prevent whiplash action in the event of failure for any reasons.
It is recommended to increase the safety factor when dealing with gaseous fluid systems.

Pirtek hose & associated products have not been tested or certified for use on aircraft and therefore must not be used in such applications.

Hose Installation Guide

Particular care must be taken to avoid certain conditions when installing hose assemblies. These conditions might arise from :

- 1. Changes in length
- 2. Proximity of high temperature sources
- 3. Twisting / torsion
- 4. Bends in tight locations
- 5. Rubbing / abrasion
- 6. Improper hose movement
- 7. Longitudinal pull on hose ends (vertical drops or spring tensioned reels)

Some situations can result in violation of the hose technical specifications unless the operating conditions of the hose are fully appreciated.
Take note of the examples given overleaf to avoid problems and premature hose failure.

A Word About Twist

Only 7° of angular twist in an assembly can reduce the expected hose life by up to 80%. Pay particular attention to factors that induce twist and learn to recognise them in the field. Take note also of the allowable tolerance for orientation of elbow fittings (page A 08) when assembling hoses.

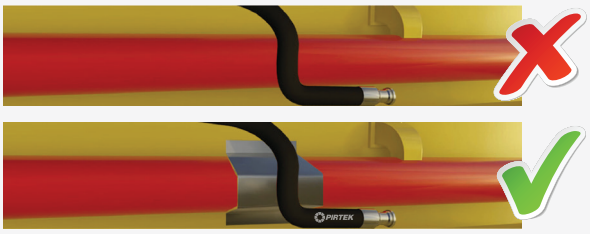
HOSE INSTALLATION GUIDELINES

Length may vary +2% to -4% when pressure is applied.
Allow enough slack to accommodate this movement.
Important to note, that the metal hose fittings are not part of the flexible portion. Allow ample free length for flexing.

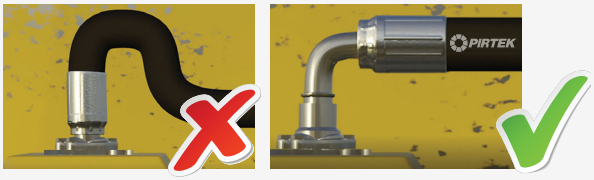
Use the layline to determine that no twist has been induced when tightening. Use 2 spanners to counteract twist.

Ensure that bending of a hose occurs in the same plane as the movement of the attachment point to avoid induced twist.

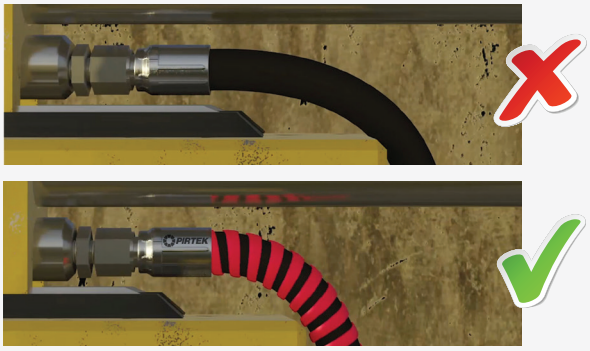
Ensure to have a straight section before bending commences. Using too small a bend radius will greatly reduce flow hose life.



Avoid hot manifolds etc. where possible or isolate with Fire Sleeve or other protective means.



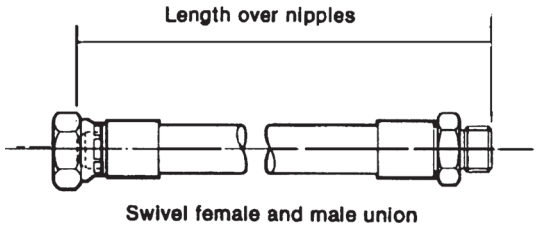
Use elbows and adaptors to relieve strain for correct installations allowing easier access and maintenance.

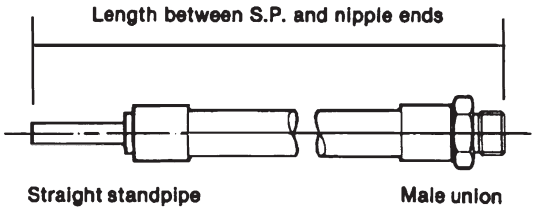


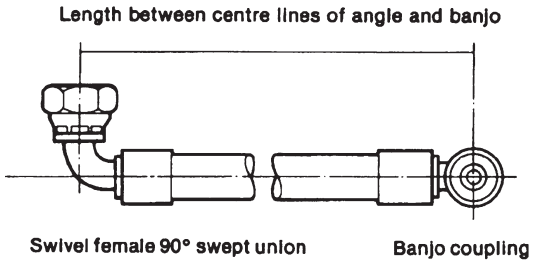
Avoid sharp corners and ensure a straight section of 1.5 the diameter before bending commences.
Use Pirtek Spiral Guard, Das Sleeve or Steel Spring Guard to protect your hose in operating conditions.

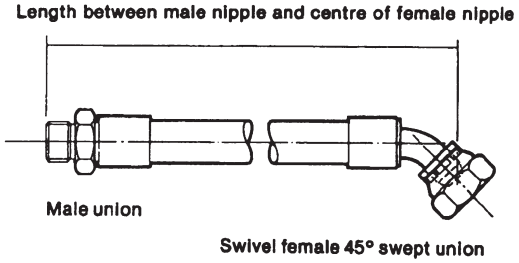
Use clamps to support long runs or keep the hose away from moving parts. Clamps must not be allowed to move as may cause abrasion.
Important to note, when using clamps keep clear of bends.

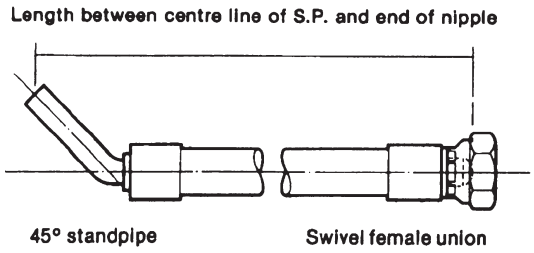
How to measure Pirtek assemblies

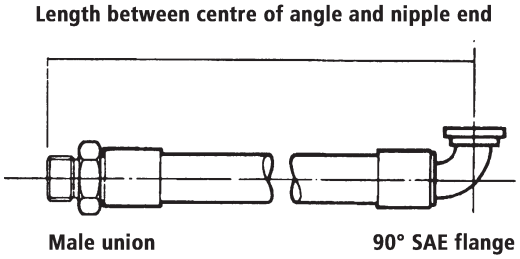










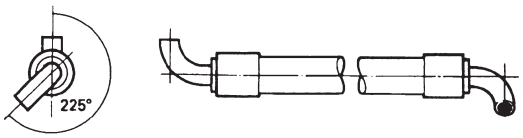


Standard Tolerances

Assembly length

0mm	– 305mm	± 3mm
305mm	– 457mm	± 4mm
457mm	– 914mm	± 6mm
914mm upwards		±1%

Elbow angle ±3°



Angular Relationships

Hold the assembly so that you can look along the length of the hose and with the fitting furthest away from you in the vertical position. Measure the angle between the vertical fitting and the one nearest to you in a clockwise direction. Relationship can then be expressed from 0˚ to 360˚.

If the angle is not given, the elbows are positioned at 0˚.

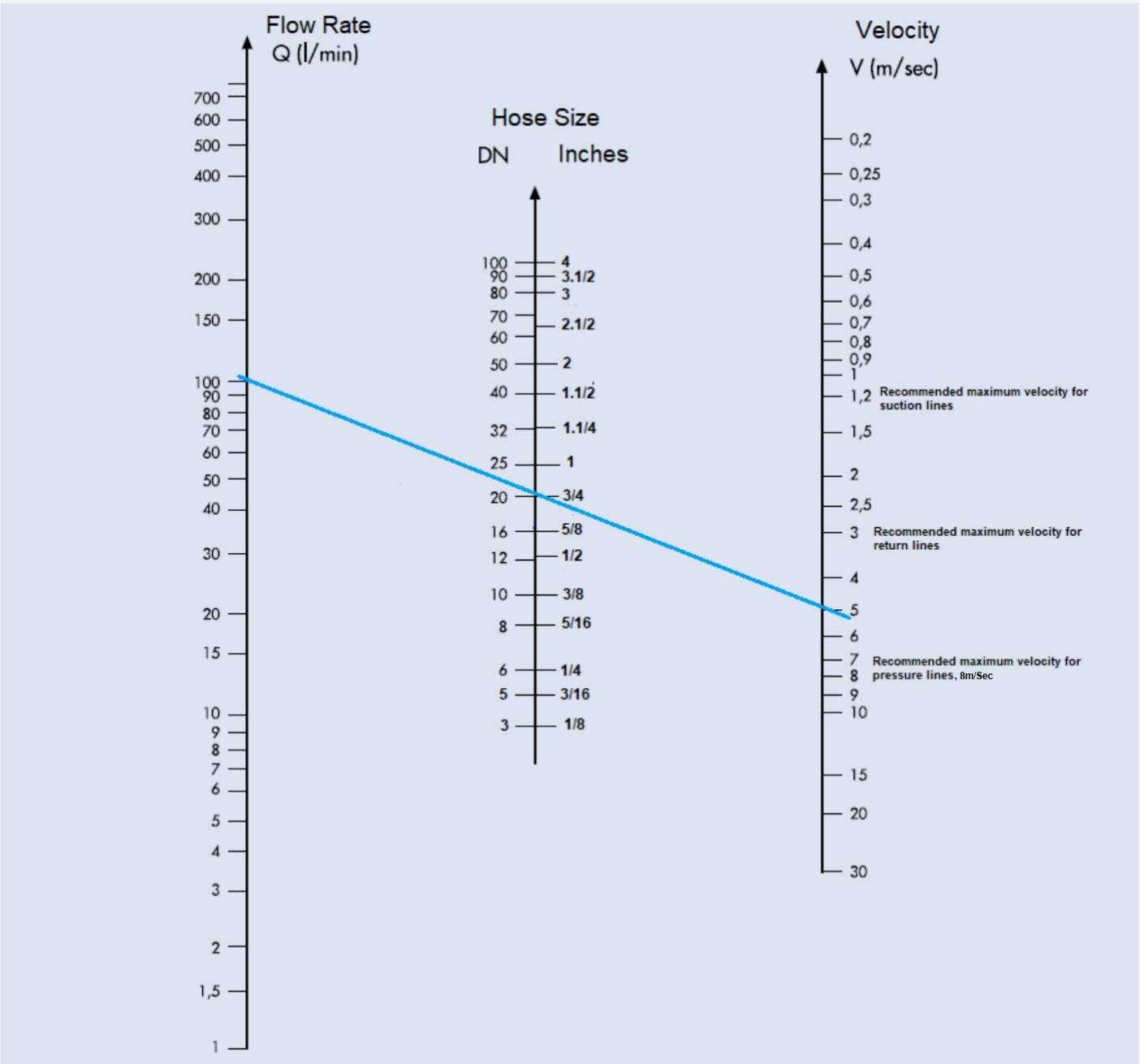
HOSE SIZE TERMINOLOGY (HOSE SIZE REFERS TO THE INSIDE DIAMETER)				
HOSE SIZE	DASH SIZE	MINE TERMINOLOGY	METRIC SIZE	DN SIZE
1/4”	-04	NO 4	6 MM	DN6
3/8”	-06	NO 6	10 MM	DN10
1/2”	-08	NO 8	13 MM	DN13
5/8”	-10	NO 10	16 MM	DN16
3/4”	-12	NO 12	20 MM	DN20
1”	-16	NO 16	25 MM	DN25
1 1/4”	-20	NO 20	32 MM	DN32
1 1/2”	-24	NO 24	40 MM	DN40
2”	-32	NO 32	50 MM	DN50
2 1/2”	-40	NO 40	63.5 MM	DN63
3”	-48	NO 48	75 MM	DN75

NORMOGRAPH FOR DETERMINATION OF NOMINAL HOSE DIAMETER

This normograph provides a guide for the determination of the nominal diameter (DN) required for a hose
It is always recommended to use a larger size hose if there is doubt as to the flow, but never a smaller size than indicated.

Example:

The flow rate of your system is 100 l/min (litres per minute).
Connect your straight edge from the 100 in the flow rate column to under the recommended maximum velocity range for pressure lines.
Ensure the straight line does not go over the recommended velocity index.
The straight edge line intersects at DN20 (3/4”), so the minimum hose size to use is 3/4”.



Hose Pressure Flow Chart

Pressure drop in psi (pounds per square inch) LPM (litres per minute) / for 3 metres of hose (smooth bore) without fittings.

Fluid specification:
Specific gravity = .85; Viscosity = v = 20 centistokes (C.S.), (20 C.S.= 97 S.S.U.); Ref; MIL-H 5606, 70°F. (+21°C).

Litres per minute

"Hose ID (inches)"	3/16	1/4	5/16	3/8	13/32	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 13/16	2
0.9	10	3.1														
1.9	19	6	2.7													
3.8	40	12	5.5	2.4												
7.6	95	24	10	4.8	3.5											
11.4	185	46	17	7	5	2.2										
15.1		78	29	12	8	3	1.2									
18.9		120	44	18	12	4.5	1.6	.72								
30.3			95	39	26	10	3.6	1.4	.60							
37.9				59	40	15	5.7	2	1	.55						
45.4				80	52	20	7.2	2.6	1.5	.75	.43					
56.8					75	30	10	4.2	2.2	1.2	.67	.38				
68.1					107	40	15	6.3	3	1.5	.70	.55	.35			
75.7						49	19	8	3.4	2	1.1	.65	.43	.27		
94.6						72	26	11	5.5	3	1.6	1	.64	.40	.17	
113.5							34	14	7	3.6	2.2	1.3	.80	.52	.22	.14
132.5							47	19	9.5	5	2.8	1.7	1.1	.70	.27	.18
151.4								25	12	6.5	3.4	2.2	1.4	.90	.38	.24
189.3								36	17	9	5.3	3.3	2	1.3	.54	.35
227.1								50	23	12	7.5	4.4	2.8	1.8	.75	.45
265.0									31	17	9.3	6	3.8	2.4	1	.65
302.8									38	21	12	7.1	4.6	3	1.2	.76
340.7									49	27	15	9	5.9	3.8	1.5	1
378.5										33	19	12	7	4.7	1.9	1.3
567.8										60	36	22	13	8.5	3.4	2.2
757.1												36	23	15	6	3.9
946.4												54	33	22	8.5	5.3
1135.6													45	29	12	7.5
1514.2														51	21	14
1892.7															32	20

Formulas and Conversion Factors for Fluid-Power Use

Quantity	Metric Units	U.S. Customary Units	From Metric to U.S Units	From U.S.to Metric Units
Area	Square centimetres (cm^2)	Square inches (ins^2)	cm2 x 0.155 = ins^2	ins^2 x 6.452 = cm^2
Length	Metres (mt)	Feet (ft)	mt x 3.2081	ft x 0.305 = mt
Weight	Kilograms (Kg)	Pounds (lbs)	Kg x 2.2046 = lbs	lbs x 0.4356 = Kg
Volume	Cubic Centimetres (cm^3)	Cubic Feet (ft^3)	cm3 x 0.061 = ft^3	ft^3 x 16.39 = cm^3
	Litres (lt)	U.S. Gallons (gal)	lt x 0.2541 =U.S. gal	U.S. gal x 3.7 = lt
	Litres (lt)	U.K. Gallons (gal)	lt x 0.2198 =U.K. gal	U.K. gal x 4.55 = lt
Power	Kilowatts (KW)	Horsepower (HP)	HP x 0.7457 = KW	KW x 1.3410 = HP
Frequency	Hertz (Hz)	Cycles / sec (cps)	Hz = cps	cps = Hz
Load (Torque)	Metre Kilograms Kg.m	Foot Pounds (ft.lbs)	Kg.m x 7.233 = ft.lbs	ft.lbs x 0.1383 = Kg.m
Pressure	Bar (bar)	Pounds / square inch (psi)	bar x 14.50 = psi	psi x 0.0689 = bar
	Kilopascal (kPa)	Pounds / square inch (psi)	kPa x 0.145 = psi	psi x 6.8948 = kPa
	Atmospheres (Atm)	Pounds / square inch (psi)	Atm x 14.70 = psi	psi x 0.068 = Atm
Density	Gram / cubic centimetre (gr / cm^3)	Pounds / cubic inch (lb / ins^3)	gr/cm^3 x 0.03613 = lb/ins^3	lb/ins^3 x 27.68 = gr/cm^3
Temperature	Degrees Celsius (^oC)	Degrees Fahrenheit (^oF)	(C° = F°-32) / 1.8	F° = (C° x 1.8) + 32

Inches Conversion to Millimetres

Inches		Millimetres
Fractions	Decimals	
1/64	0.01563	0.3970
1/32	0.03125	0.7940
3/64	0.04688	1.1910
1/16	0.06250	1.5880
5/64	0.07813	1.9840
3/32	0.09375	2.3810
7/64	0.10938	2.7780
1/8	0.12500	3.1750
9/64	0.14063	3.5720
5/32	0.15625	3.9690
11/64	0.17188	4.3660
3/16	0.18750	4.7630
13/64	0.20313	5.1590
7/32	0.21875	5.5560
15/64	0.23438	5.9530
1/4	0.25000	6.3500
17/64	0.26563	6.7470
9/32	0.28125	7.1440
19/64	0.29688	7.5410
5/16	0.31250	7.9380
21/64	0.32813	8.3340
11/32	0.34375	8.7310

Inches		Millimetres
Fractions	Decimals	
23/64	0.35938	9.12800
3/8	0.37500	9.52500
25/64	0.39063	9.92200
13/32	0.40625	10.31900
27/64	0.42188	10.71600
7/16	0.43750	11.11300
29/64	0.45313	11.50900
15/32	0.46875	11.90600
31/64	0.48438	12.30300
1/2	0.50000	12.70000
33/64	0.51563	13.09700
17/32	0.53125	13.49400
35/64	0.54688	13.89100
9/16	0.56250	14.28800
37/64	0.57813	14.68400
19/32	0.59375	15.08100
39/64	0.60938	15.47800
5/8	0.62500	15.87500
41/46	0.64063	16.27200
21/32	0.65625	16.66900
43/64	0.67188	17.06600
11/16	0.68750	17.46300

Inches		Millimetres
Fractions	Decimals	
45/64	0.70313	17.85900
23/32	0.71875	18.25600
47/64	0.73438	18.65300
3/4	0.75000	19.05000
49/64	0.76563	19.44700
25/32	0.78125	19.84400
51/64	0.79688	20.24100
13/16	0.81250	20.63800
53/64	0.82813	21.03400
27/32	0.84375	21.43100
55/64	0.85938	21.82800
7/8	0.87500	22.22500
57/64	0.89063	22.62200
29/32	0.90625	23.01900
59/64	0.92188	23.41600
15/16	0.93750	23.81300
61/64	0.95313	24.20900
31/32	0.96875	24.60600
63/64	0.98438	25.00300
1	1.00000	25.40000

Pressure Conversion Factors

BAR TO P.S.I.				
Bar	Kilopascals	Megapascals	Kg / cm²	PSI
1	100	0.1	1.02	14.5
2	200	0.2	2.04	29.0
3	300	0.3	3.06	43.5
4	400	0.4	4.08	58.0
5	500	0.5	5.10	72.5
6	600	0.6	6.12	87.0
7	700	0.7	7.14	101.5
8	800	0.8	8.16	116.0
9	900	0.9	9.18	130.5
10	1,000	1	10.20	145.0
20	2,000	2	20.40	290.1
30	3,000	3	30.60	435.1
40	4,000	4	40.80	580.2
50	5,000	5	51.00	725.2
60	6,000	6	61.20	870.2
70	7,000	7	71.40	1015.3
80	8,000	8	81.60	1160.3
90	9,000	9	91.80	1305.4
100	10,000	10	102.00	1450.4
200	20,000	20	204.00	2900.8
300	30,000	30	306.00	4351.2
400	40,000	40	408.00	5801.6
500	50,000	50	510.00	7252.0
600	60,000	60	612.00	8702.4
700	70,000	70	714.00	10152.8
800	80,000	80	816.00	11603.2
900	90,000	90	918.00	13053.6
1000	100,000	100	1020.00	14504.0
2000	200,000	200	2040.00	29008.0
3000	300,000	300	3060.00	43512.0

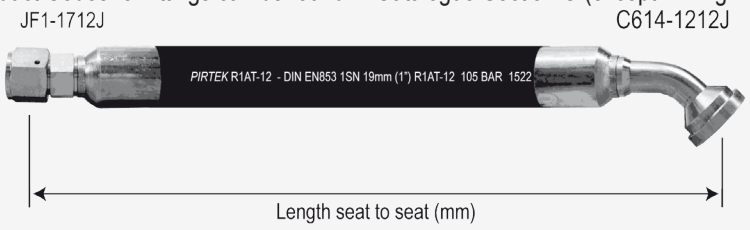
P.S.I. TO BAR				
PSI	Kilopascals	Megapascals	Kg / cm²	BAR
10	69	0.069	0.7	0.69
20	138	0.138	1.4	1.38
30	207	0.207	2.1	2.07
40	276	0.276	2.8	2.76
50	345	0.345	3.5	3.45
60	414	0.414	4.2	4.14
70	483	0.483	4.9	4.83
80	552	0.552	5.6	5.52
90	621	0.621	6.3	6.21
100	689	0.689	7.0	6.89
200	1379	1.379	14.1	13.79
300	2068	2.068	21.1	20.68
400	2758	2.758	28.1	27.58
500	3447	3.447	35.2	34.47
600	4137	4.137	42.2	41.37
700	4826	4.826	49.2	48.26
800	5516	5.516	56.2	55.16
900	6205	6.205	63.3	62.05
1000	6895	6.895	70.3	68.95
2000	13790	13.790	140.6	137.90
3000	20684	20.684	210.9	206.84
4000	27579	27.579	281.2	275.79
5000	34474	34.474	351.5	344.74
6000	41369	41.369	421.8	413.69
7000	48263	48.263	492.1	482.63
8000	55158	55.158	562.5	551.58
9000	62053	62.053	632.8	620.53
10000	68948	68.948	703.1	689.48
20000	137895	137.895	1406.1	1378.95
30000	206843	206.843	2109.2	2068.43

Thread Identification

Thread Identification

ORDERING PIRTEK ASSEMBLIES

Should you wish to describe a Pirtek hose assembly in an abbreviated form, please use the following format. A forward slash is used to separate each field. Product Codes for fittings can be found in Catalogue Section C (except Mining Fittings Section U)



If spiral guard SSG-025 were fitted over the full length, the designation would be:

R1AT-12 / JF1-1712J / C614-1212J / 1200 / SSG-025

If both ends were fitted with the 45° flanged elbow set in alignment, the designation would appear:

R1AT-12 / C614-1212J / 1200 / 0

Generic Pattern : Hose / End A / End B / Length / Protection / Angle

Pirtek hose & associated products have not been tested or certified for use on aircraft and therefore must not be used in such applications.

Torque and Threaded Connections

BSPT and NPT tapered thread assembly requirements usually dictate a number of wrench flats from hand tight. The hand tight position is described in the British Standard for BSPT as Gauge Length. Table 1 at right summarises the recommended parameters when tightening these fittings. Note that a thread sealing compound is generally used with both these fittings in order to achieve a seal, and so the use of a torque figure for assembly can play no meaningful role.

Thread Identification Tables commencing on page 16 document the recommended tightening torques for JIC and UNO type fittings, since correct torque is essential to minimize leaks from them. Too little torque will preclude proper seat contact, whilst too much can cause O-Ring extrusion (in the case of UNO), splitting of the female JIC seat, damage to the nut, or at the very least damage through cold working of the metal in the contact area. Since thread sealants are not required with these fittings, torque can adopt a more meaningful role in the assembly process. However, in field installation work, suitable torque wrenches are rarely available, and it is usual to fall back to the use of a number of wrench flats from wrench resistance to achieve the desired result. For the case of UNF style fittings, the tabulation at right may assist in achieving the correct torque during assembly if a torque wrench is unavailable during installation. The procedure is:

1. Tighten the nut with the fingers until a distinct bottoming out on the seat can be felt.
2. Use a marking system (permanent marker or centre punch) to provide reference points on the opposing flats of the nut and connector.
3. Tighten the nut with a spanner to rotate it the tabulated number of hex flats, using the reference marks as a guide.

Note: The torque Values shown on the following pages are based on plated carbon steel fittings.

"Thread BSPT"	"Tube Size"	"Gauge Length Turns of Thread"	"Max. Turns of Thread inc. Fitting Allowance"	"Min. Recommended Thread Engagement mm"
1/8 - 28	2	43/8	71/8	5.8
1/4 - 19	4	41/2	71/4	6.4
3/8 - 19	6	43/4	71/2	8.6
1/2 - 14	8	41/2	71/4	8.6
3/4 - 14	12	51/4	8	11.7
1 - 11	16	41/2	71/4	11.7
1.1/4 - 11	20	51/2	81/4	17
1.1/2 -11	24	51/2	81/4	18
2 - 11	32	67/8	101/8	19.5

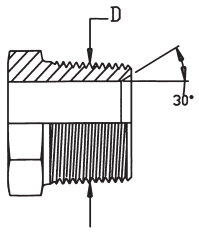
Table 1 BSPT Thread Engagement
Recommended Thread Engagement lengths for NPT fittings are the same as for BSPT

Thread UNF	Tube Size	Torque Nm	No. of Hex Flats from Wrench Resistance
7/16-20	4	15-16	2
1/2-20	5	19-21	2
9/16-18	6	24-28	1.1/2
3/4-16	8	49-53	1.1/2
7/8-14	10	77-85	1.1/2
1.1/16-12	12	107-119	1.1/4
1.3/16-12	14	127-140	1.1/4
1.5/16-12	16	147-154	1
1.5/8-12	20	172-181	1
1.7/8-12	24	215-226	1
2.1/2-12	32	332-350	1

Table 2 JIC / UNO Threads
Note: Torque values given are for plated steel components without lubrication

Thread Identification

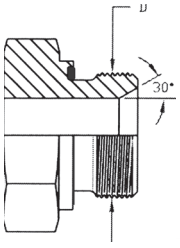
BRITISH STANDARD PIPE TAPER MALE - (BSPT)



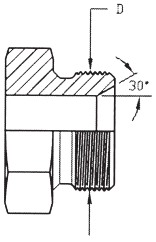
Applicable Standards
Thread Form: AS 1722.1-1975, ISO 7

Pipe Size	Dash Size	Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Max Work Press (Bar) Hose Fittings	Thread OD 'D' on Diagram	
					mm	in
1/8"	2	1/8" - 28	690	350	9.73	0.383
1/4"	4	1/4" - 19	650	350	13.16	0.518
3/8"	6	3/8" - 19	550	275	16.67	0.656
1/2"	8	1/2" - 14	410	275	20.96	0.825
5/8" *	10	5/8" - 14	340	210	22.91	0.902
3/4"	12	3/4" - 14	340	210	26.45	1.041
1"	16	1" - 11	275	210	33.25	1.309
1 1/4"	20	1 1/4" - 11	200	140	41.91	1.650
1 1/2"	24	1 1/2" - 11	140	140	47.81	1.882
2"	32	2" - 11	140	140	59.62	2.347

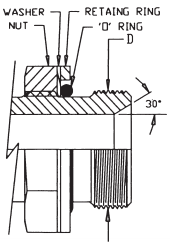
BRITISH STANDARD PIPE PARALLEL MALE - (BSPP)



Applicable Standards
Thread Form: AS 1722.2-1992, ISO 228
Seal: DIN 3852 Part 11 Form E



Applicable Standards
Thread Form: AS 1722.2-1992, ISO 228
Seal: DIN 3852 Part 2 Form B



Applicable Standards
Thread Form: AS 1722.2-1992, ISO 228
Seal: ISO 1179-3 Form G

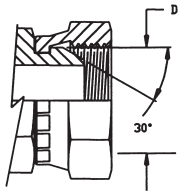
Pipe Size	Dash Size	Correct Torque (Nm)	Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors		Max Work Press (Bar) Hose Fittings	Thread OD 'D' on Diagram	
				Fixed	Adj.		mm	ins
1/8"	2	20	1/8" - 28	600	350		9.73	0.383
1/4"	4	50	1/4" - 19	600	400	630	13.16	0.518
3/8"	6	80	3/8" - 19	600	400	550	16.67	0.656
1/2"	8	100	1/2" - 14	400	350	430	20.96	0.825
5/8" *	10	120	5/8" - 14	400	275	420	22.91	0.902
3/4"	12	200	3/4" - 14	400	315	420	26.45	1.041
1"	16	380	1" - 11	400	250	420	33.25	1.309
1 1/4"	20	500	1. 1/4" - 11	380	200	350	41.91	1.650
1 1/2"	24	600	1 .1/2" - 11	380	160	350	47.81	1.882
2"	32	750	2" - 11	250	125	350	59.62	2.347

** 5/8" Size is not subject to Standards*
Note: The torque values given are for plated carbon steel components without lubrication.

Thread Identification

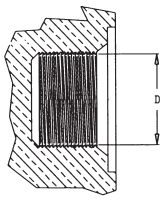
BRITISH STANDARD PIPE

PARALLEL FEMALE - (BSPP)

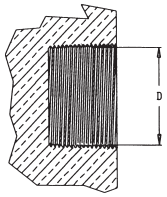


Applicable Standards
Thread Form: AS 1722.2-1992, ISO 228

TAPER FEMALE - (BSPT)



Applicable Standards
Thread Form: AS 1722.2-1992, ISO 228
Sealing area: DIN 3852 Part 2 Form X



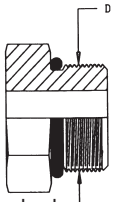
Applicable Standards
Thread Form: AS 1722.2-1992, ISO 228

Pipe Size	Dash Size	Correct Torque (Nm) BSAP	Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors		Hose Fitting	Thread ID 'D' on Diagram	
				Fixed	Swivel	Bar	mm	ins
1/8"	2	20	1/8" - 28	550	550	350	8.59	0.338
1/4"	4	50	1/4" - 19	550	550	630	11.46	0.451
3/8"	6	80	3/8" - 19	520	520	550	14.96	0.589
1/2"	8	100	1/2" - 14	380	380	430	18.65	0.734
5/8" *	10	120	5/8" - 14	275	275	420	20.6	0.811
3/4"	12	200	3/4" - 14	275	275	350	24.13	0.95
1"	16	380	1" - 11	240	240	350	30.3	1.193
1 1/4"	20	500	1 .1/4" - 11	200	200	250	38.97	1.534
1 1/2"	24	600	1. 1/2" - 11	175	175	210	44.86	1.766
2"	32	750	2" - 11	140	140	210	56.67	2.231

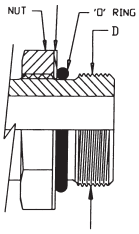
** 5/8" Size is not subject to Standards*

Note: The torque values given are for plated carbon steel components without lubrication.

UNIFIED NATIONAL O RING - (UNO)



Applicable Standards
Thread Form: SAE J1926, ISO 11926-1



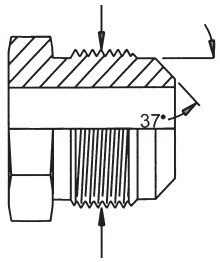
Applicable Standards
Thread Form: SAE J1926, ISO 11926-1
Adjustable type

Pipe Size	Dash Size	Correct Torque (Nm)	Nominal Thread Size & Pitch	Max Working Pressure Adaptors (Bar)		Hose Fittings	Thread OD 'D' on Diagram	
				Fixed	Adj.	Bar	mm	ins
5	1/8"	8 - 9	5/16" - 24	420	420	-	7.87	0.31
6	3/16"	11 - 12	3/8" - 24	420	420	-	9.65	0.38
7	1/4"	18 - 20	7/16" - 20	310	310	350	11.07	0.44
8	5/16"	23 - 26	1/2" - 20	310	310	350	12.70	0.50
9	3/8"	29 - 33	9/16" - 18	310	240	350	14.25	0.56
12	1/2"	49 - 53	3/4" - 16	310	240	315	19.00	0.75
14	5/8"	59 - 64	7/8" - 14	240	205	275	22.17	0.87
17	3/4"	93 - 102	1. 1/16" - 12	240	205	275	26.95	1.06
21	1"	122 - 134	1. 5/16" - 12	205	170	210	33.30	1.31
26	1 1/4"	198 - 218	1. 5/8" - 12	170	135	210	41.22	1.62
30	1 1/2"	209 - 231	1. 7/8" - 12	170	135	170	47.57	1.87
40	2"	296 - 325	2. 1 /2" - 12	135	100	-	63.45	2.50

Note: The hex flats from finger tight method is recommended for UN-O fittings.

Thread Identification

JOINT INDUSTRY COUNCIL - (JIC) - MALE

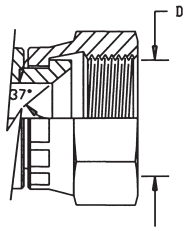


Applicable Standards
Thread Form: SAE J514

Dash Size	Nominal Tube Size in	Correct Torque Nm	Nominal Thread Size & Pitch	Max Working Pressure (Bar) Adaptors	Thread OD 'D' on Diagram	
					mm	in
05	1/8"	8-9	5/16" - 24	-	7.87	.310
06	3/16"	11-12	3/8" - 24	-	9.65	.380
07	1/4"	15-16	7/16" - 20	595	11.07	.436
08	5/16"	19-21	1/2" - 20	595	12.70	.500
09	3/8"	24-28	9/16" - 18	490	14.25	.561
12	1/2"	49-53	3/4" - 16	420	19.00	.748
14	5/8"	77-85	7/8" - 14	385	22.17	.873
17	3/4"	107-119	1 1/16" - 12	280	26.95	1.061
19	7/8"	127-149	1 3/16" - 12	280	30.10	1.188
21	1"	147-156	1 5/16" - 12	245	33.30	1.311
26	1 1/4"	172-181	1 5/8" - 12	245	41.22	1.623
30	1 1/2"	215-226	1 7/8" - 12	145	47.57	1.873
40	2"	332-350	2 1/2" - 12	120	63.45	2.498

Note: The hex flats from finger tight method is recommended for 37° and 45° flare fittings. The torque values given are for plated carbon steel components without lubrication.
See page 15

JOINT INDUSTRY COUNCIL - (JIC) - FEMALE



Applicable Standards
Thread Form: SAE J514

Dash Size	Nominal Tube Size in	Correct Torque Nm	Nominal Thread Size & Pitch	Max Working Pressure (Bar) Adaptors	Thread ID 'D' on Diagram	
					mm	in
05	1/8"	8-9	5/16" - 24	-	6.85	.270
06	3/16"	11-12	3/8" - 24	-	8.63	.340
07	1/4"	15-16	7/16" - 20	480	10.00	.394
08	5/16"	19-21	1/2" - 20	480	11.60	.457
09	3/8"	24-28	9/16" - 18	345	13.00	.512
12	1/2"	49-53	3/4" - 16	310	17.60	.693
14	5/8"	77-85	7/8" - 14	260	20.50	.807
17	3/4"	107-119	1 1/16" - 12	240	25.00	.985
19	7/8"	127-140	1 3/16" - 12	230	28.09	1.106
21	1"	147-154	1 5/16" - 12	225	31.30	1.233
26	1 1/4"	172-181	1 5/8" - 12	170	39.20	1.544
30	1 1/2"	215-226	1 7/8" - 12	145	45.60	1.796
40	2"	332-350	2 1/2" - 12	120	61.50	2.422

Note: The hex flats from finger tight method is recommended for 37° and 45° flare fittings. The torque values given are for plated carbon steel components without lubrication.
See page 15

JOINT INDUSTRY COUNCIL- (JIC) - PIRTEK TEST PRESSURES (HOSE FITTINGS)

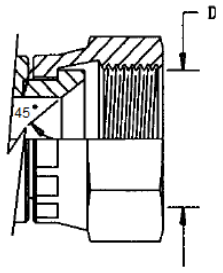
IMPORTANT SAFETY NOTE: Whilst Pirtek's thread termination pressure ratings exceed those stipulated in the respective Standards, discretion must be used prior to selection for appropriate applications. These test pressures correlate to material S12L14

Dash Size	Nominal Tube Size in	Correct Torque Nm	Nominal Thread Size & Pitch	Actual Max Work Pressure (Bar)	Min. Burst Press (Bar)	No. of Wrench Flats from Wrench Resistance
05	1/8"	8-9	5/16" - 24	N/A	N/A	
06	3/16"	11-12	3/8" - 24	N/A	N/A	
07	1/4"	15-16	7/16" - 20	420 *c	1680	2
08	5/16"	19-21	1/2" - 20	420 *c	1680	2
09	3/8"	24-28	9/16" - 18	420 *c	1680	1.1/2
12	1/2"	49-53	3/4" - 16	420 *c	1680	1.1/2
14	5/8"	77-85	7/8" - 14	420 *c	1680	1.1/2
17	3/4"	107-119	1 1/16" - 12	420 *c	1680	1.1/4
19	7/8"	127-140	1 3/16" - 12	420 *c	1680	1.1/4
21	1"	147-154	1 5/16" - 12	420 *w	1680	1
26	1 1/4"	172-181	1 5/8" - 12	350 *w	1400	1
30	1 1/2"	215-226	1 7/8" - 12	350 *w	1400	1
40	2"	332-350	2 1/2" - 12	250 *w	1000	1

*c = Crimped Nut *w = Wire Nut
Note: The hex flats from finger tight method is recommended for 37° and 45° flare fittings. The torque values given are for plated carbon steel components without lubrication.
See page 15

Thread Identification

SOCIETY OF AUTOMOTIVE ENGINEERS - (SAE) - **FEMALE**

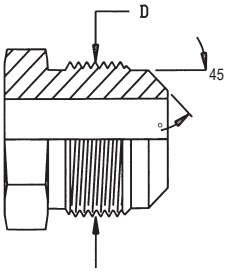


Applicable Standards
Thread Form: SAE J512

Dash Size	Nominal Tube Size in	Nominal Thread Size & Pitch	Correct Torque (NM)	Max Working Pressure Hose Fitting (Bar)	Thread OD 'D' on Diagram	
5	1/8"	5/16" - 24	8-9	-	6.85	.270
6	3/16"	3/8" - 24	11-12	-	8.63	.340
7	1/4"	7/16" - 20	15-16	450	11.60	.394
8	5/16"	1/2" - 20	19-21	450	11.60	.457
10	3/8"	5/8" - 18	22-24	450	14.20	.560
12	1/2"	3/4" - 16	49-53	420	17.60	.693
14	5/8"	7/8" - 14	77-85	420	20.50	.807
17	3/4"	1 .1/16" - 14	107-119	420	25.00	.985
20	7/8"	1. 1 /4" - 12	-	-	-	-
22	1"	1. 3/8" - 12	-	-	-	-

Note: The hex flats from finger tight method is recommended for 37° and 45° flare fittings.

SOCIETY OF AUTOMOTIVE ENGINEERS - (SAE) - **MALE**



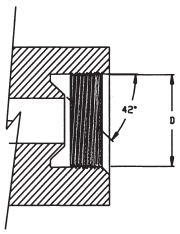
Applicable Standards
Thread Form: SAE J512

Dash Size	Nominal Tube Size in	Nominal Thread Size & Pitch	Maximum Working Pressure (Bar)		Hose Fitting Bar	Thread OD 'D' on Diagram	
			Steel	Brass		mm	in
5	1/8"	5/16" - 24	345	237	-	7.87	0.31
6	3/16"	3/8" - 24	345	221	-	9.65	0.38
7	1/4"	7/16" - 20	310	162	410	11.07	0.44
8	5/16"	1/2" - 20	275	126	350	12.70	0.50
10	3/8"	5/8" - 18	275	102	350	15.85	0.62
12	1/2"	3/4" - 16	275	74	350	19.00	0.75
14	5/8"	7/8" - 14	210	48	350	22.17	0.87
17	3/4"	1 .1/16" - 14	210	-	350	26.95	1.06
20	7/8"	1. 1 /4" - 12	170	-	-	29.46	1.16
22	1"	1. 3/8" - 12	170	-	-	35.05	1.38

Note: The hex flats from finger tight method is recommended for 37° and 45° flare fittings.

Thread Identification

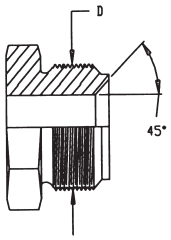
SOCIETY OF AUTOMOTIVE ENGINEERS - (SAE) - INVERTED FLARE FEMALE



Applicable Standards
Thread Form: SAE J512

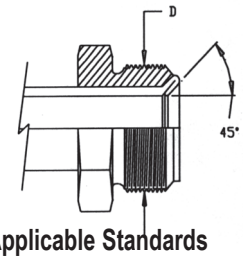
Dash Size	Nominal Tube Size (ins)	Nominal Thread Size & Pitch	Max Work Pressure (bar) Adaptors		Thread ID 'D' on Diagram	
			Steel	Brass	mm	in
5	1/8"	5/16" - 28	320	237	6.85	0.27
6	3/16"	3/8" - 24	340	221	8.63	0.34
7	1/4"	7/16" - 24	270	162	10.00	0.39
8	5/16"	1/2"- 20	225	126	11.60	0.46
10	3/8"	5/8" - 18	225	102	14.70	0.58
11	7/16"	1. 1/16" - 18	230	74	15.70	0.62
12	1/2"	3/4" - 18	215	48	17.60	0.69
14	5/8"	7/8" - 18	215	-	22.10	0.87
17	3/4"	1 .1/16" - 16	215	-	25.30	1.00

SOCIETY OF AUTOMOTIVE ENGINEERS - (SAE) - INVERTED FLARE MALE



Applicable Standards
Thread Form: SAE J512

Adaptor Version



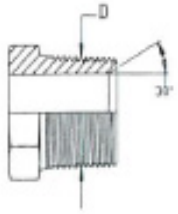
Applicable Standards
Thread Form: SAE J512

Tube version

Pipe Size	Dash Size	Nominal Thread Size & Pitch	Max Work Press (Bar) - SAE J1065 Adaptors		Hose Fittings	Thread OD 'D' on Diagram	
			Fixed	Adj.	Bar	mm	ins
5	1/8"	5/16" - 28	320	237	-	7.87	0.31
6	3/16"	3/8" - 24	340	221	-	9.65	0.38
7	1/4"	7/16" - 24	270	162	210	11.07	0.44
8	5/16"	1/2"- 20	225	126	210	12.70	0.50
10	3/8"	5/8" - 18	225	102	210	15.85	0.62
11	7/16"	11/16" - 18	230	74	-	17.46	0.69
12	1/2"	3/4" - 18	215	48	160	19.00	0.75
14	5/8"	7/8" - 18	215	-	-	22.17	0.87

Thread Identification

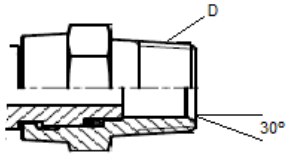
NATIONAL PIPE TAPER FUEL- (NPTF) MALE



Applicable Standards
Thread Form: SAE J476

Pipe Size	Dash Size	Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Hose Fittings Bar	Thread OD 'D' on Diagram	
					mm	in
1/8"	2	1/8" - 27	689	350	10.32	0.406
1/4"	4	1/4" - 18	655	350	13.89	0.546
3/8"	6	3/8" - 18	552	275	17.06	0.671
1/2"	8	1/2" - 14	414	275	21.43	0.843
3/4"	12	3/4" - 14	345	210	26.98	1.062
1"	16	1" - 11. 1/2	275	210	33.33	1.312
1 1/4"	20	1 1/4" - 11. 1/2	207	150	42.46	1.671
1 1/2"	24	1 1/2" - 11. 1/2	138	140	48.42	1.906
2"	32	2" - 11. 1/2	138	140	60.32	2.375

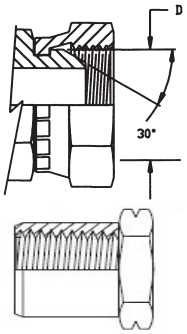
NATIONAL PIPE TAPER FUEL (NPTF) MALE SWIVEL



Applicable Standards
Thread Form: SAE J476

Pipe Size	Dash Size	Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Hose Fittings Bar	Thread OD 'D' on Diagram	
					mm	in
1/8"	2	1/8" - 27	-	210	10.32	0.406
1/4"	4	1/4" - 18	260	210	13.89	0.546
3/8"	6	3/8" - 18	200	210	17.06	0.671
1/2"	8	1/2" - 14	170	210	21.43	0.843
3/4"	12	3/4" - 14	170	160	26.98	1.062
1"	16	1" - 11. 1/2	-	140	33.33	1.312

NATIONAL PIPE STRAIGHT MECHANICAL- (NPSM) FEMALE
NATIONAL PIPE TAPER FUEL - (NPTF) FEMALE FIXED

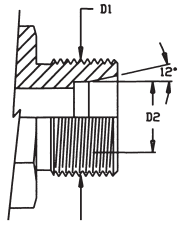


Applicable Standards
Thread Form: SAE J476

Pipe Size	Dash Size	Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Hose Fittings Bar	Thread ID 'D' on Diagram	
					mm	in
1/8"	2	1/8" - 27	414	345	9.12	.359
1/4"	4	1/4" - 18	345	345	11.91	.468
3/8"	6	3/8" - 18	275	275	15.08	.593
1/2"	8	1/2" - 14	275	240	19.05	.750
3/4"	12	3/4" - 14	241	210	24.21	0.953
1"	16	1" - 11. 1/2	207	170	30.56	1.203
1 1/4"	20	1 1/4" - 11. 1/2	138	-	38.89	1.531
1 1/2"	24	1 1/2" - 11. 1/2	103	-	45.24	1.781
2"	32	2" - 11. 1/2	103	-	57.15	2.250

Thread Identification

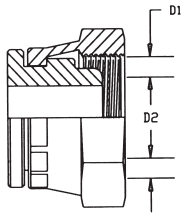
METRIC MALE 'DKL' LIGHT SERIES



Applicable Standards
Thread Form: DIN 2353, DIN 3861, DIN 3901, DIN 3902

Dash Size	Nominal Tube Size 'D2' mm	Correct Torque Nm	Nominal Thread Size & Pitch	Max Work Press (bar) DIN2401 Pt 1 Adaptors	Hose Fittings Bar	Thread OD 'D1' on Diagram
-12	6	20	M12 - 1.5	315	350	12
-14	8	35	M14 - 1.5	315	420	14
-16	10	40	M16 - 1.5	315	420	16
-18	12	45	M18 - 1.5	315	420	18
-22	15	55	M22 - 1.5	160	350	22
-26	18	110	M26 - 1.5	160	350	26
-30	22	130	M30 - 2.0	160	350	30
-36	28	200	M36 - 2.0	160	280	36
-45	35	220	M45 - 2.0	160	210	45
-52	42	240	M52 - 2.0	160	210	52

METRIC FEMALE 'DKL' LIGHT SERIES

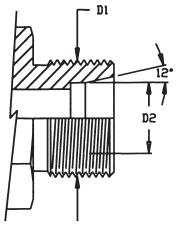


Applicable Standards
Thread Form: DIN 2353 DIN 3861 DIN 3901 DIN 3902

Dash Size	Nominal Tube Size 'D2' mm	Correct Torque Nm	Nominal Thread Size & Pitch	Max Work Press (bar) DIN2401 Pt 1 Adaptors	Hose Fittings Bar	Thread ID 'D1' on Diagram
-12	6	20	M12 - 1.5	315	350	10.5
-14	8	35	M14 - 1.5	315	420	12.5
-16	10	40	M16 - 1.5	315	420	14.5
-18	12	45	M18 - 1.5	315	420	16.5
-22	15	55	M22 - 1.5	160	350	20.5
-26	18	110	M26 - 1.5	160	350	24.5
-30	22	130	M30 - 2.0	160	350	28.0
-36	28	200	M36 - 2.0	160	280	34.0
-45	35	220	M45 - 2.0	160	210	43.0
-52	42	240	M52 - 2.0	160	210	50.0

Thread Identification

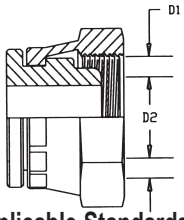
METRIC MALE 'DKS' HEAVY SERIES



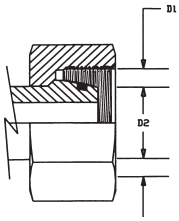
Applicable Standards
Thread Form: DIN 2353, DIN 3861, DIN-3901, DIN 3902

Dash Size	Nominal Tube Size 'D2' mm	Correct Torque Nm	Nominal Thread Size & Pitch	Max Work Press (bar) DIN2401 Pt 1 Adaptors	Hose Fittings Bar	Thread OD 'D1' on Diagram
-14	6	40	M14 - 1.5	630	630	14
-16	8	45	M16 - 1.5	630	630	16
-18	10	50	M18 - 1.5	630	630	18
-20	12	60	M20 - 1.5	630	630	20
-22	14	80	M22 - 1.5	630	630	22
-24	16	100	M24 - 1.5	400	450	24
-30	20	160	M30 - 2.0	400	420	30
-36	25	240	M36 - 2.0	400	420	36
-42	30	260	M42 - 2.0	400	420	45
-52	38	350	M52 - 2.0	315	420	52

METRIC FEMALE 'DKS' HEAVY SERIES



Applicable Standards
Thread Form: DIN 2353 DIN 3861 DIN-3901 DIN 3902

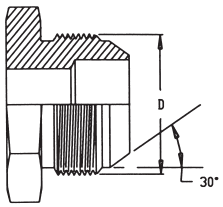


Applicable Standards
Thread Form: DIN 2353 DIN 3861 DIN-3901 DIN 3902

Dash Size	Nominal Tube Size 'D2' mm	Correct Torque Nm	Nominal Thread Size & Pitch	Max Work Press (bar) DIN2401 Pt 1 Adaptors	Hose Fittings Bar	Thread ID 'D1' on Diagram (mm)
-14	6	40	M14 - 1.5	630	630	12.5
-16	8	45	M16 - 1.5	630	630	14.5
-18	10	50	M18 - 1.5	630	630	16.5
-20	12	60	M20 - 1.5	630	630	18.5
-22	14	80	M22 - 1.5	630	630	20.5
-24	16	100	M24 - 1.5	400	450	22.5
-30	20	160	M30 - 2.0	400	420	28.0
-36	25	240	M36 - 2.0	400	420	34.0
-42	30	260	M42 - 2.0	400	420	40.0
-52	38	350	M52 - 2.0	315	420	50.0

Thread Identification

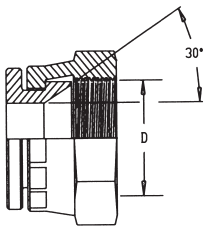
JAPANESE INDUSTRIAL STANDARD MALE - BSPP



Applicable Standards
Thread Form: JIS BO0202

Dash Size	Nominal		Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Thread OD 'D' on Diagram	
	Tube Size	Thread				
	ins	mm			mm	in
2	1/8"	3.2	1/8" - 28	350	9.73	0.383
4	1/4"	6.4	1/4" - 19	350	13.16	0.518
6	3/8"	10	3/8" - 19	350	16.67	0.656
8	1/2"	12	1/2" - 14	350	20.96	0.825
12	3/4"	19	3/4" - 14	275	26.45	1.041
16	1"	25	1" - 11	210	33.25	1.309
20	1 1/4"	32	1. 1/4" - 11	170	41.91	1.65
24	1 1/2"	38	1..1/2" - 11	105	47.81	1.882
32	2"	50	2" - 11	105	59.62	2.347

JAPANESE INDUSTRIAL STANDARD FEMALE - BSPP

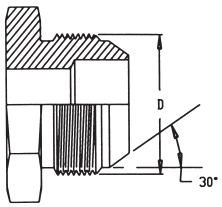


Applicable Standards
Thread Form: JIS B0202

Dash Size	Nominal		Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Hose Fittings Bar	Thread ID 'D' on Diagram	
	Tube Size	Thread					
	ins	mm				mm	in
2	1/8"	3.2	1/8" - 28	350	-	8.59	0.338
4	1/4"	6.4	1/4" - 19	350	450	11.46	0.451
6	3/8"	10	3/8" - 19	350	420	14.96	0.589
8	1/2"	12	1/2" - 14	350	420	18.65	0.734
12	3/4"	19	3/4" - 14	275	350	24.13	0.95
16	1"	25	1" - 11	210	300	30.3	1.193
20	1 1/4"	32	1. 1/4" - 11	170	-	38.97	1.534
24	1 1/2"	38	1. 1/2" - 11	105	-	44.86	1.766
32	2"	50	2" - 11	105	-	56.67	2.231

Thread Identification

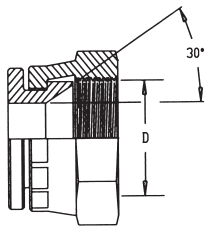
JAPANESE INDUSTRIAL STANDARD MALE - METRIC



Applicable Standards
Thread Form: JIS B8363

Dash Size	Nominal		Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Hose Fittings Bar	Thread OD 'D' on Diagram	
	Tube Size	Thread					
	ins	mm				mm	in
12			12 - 1.5		450	12	0.472
14			14 - 1.5	275	420	14	0.551
16			16 - 1.5		420	16	0.629
18			18 - 1.5	275	420	18	0.708
20			20 - 1.5		-	20	0.787
22			22 - 1.5	275	420	22	0.866
24			24 - 1.5	275	420	24	0.944
30			30 - 1.5	275	350	30	1.181
33			33 - 1.5	275	300	33	1.299
36			36 - 1.5		250	36	1.417
42			42 - 1.5		210	42	1.653

JAPANESE INDUSTRIAL STANDARD FEMALE - METRIC



Applicable Standards
Thread Form: JIS B8363

Dash Size	Nominal		Nominal Thread Size & Pitch	Max Work Press (Bar) Adaptors	Hose Fittings Bar	Thread ID 'D' on Diagram	
	Tube Size	Thread					
	ins	mm				mm	in
12			12 - 1.5		450	10.5	0.413
14			14 - 1.5	275	420	12.5	0.492
16			16 - 1.5		420	14.5	0.571
18			18 - 1.5	275	420	16.5	0.649
20			20 - 1.5		-	18.5	0.728
22			22 - 1.5	275	420	20.5	0.807
24			24 - 1.5	275	420	22.5	0.886
30			30 - 1.5	275	350	28.5	1.122
33			33 - 1.5	275	300	31.5	1.240
36			36 - 1.5		250	34.5	1.358
42			42 - 1.5		210	40.5	1.594

Thread Identification

STAPLELOK

Staplelok has its origins in the German coal mining industry. It is often referred to as 'Stecko', the name given to the product by its inventor, and derived from the German verb 'stecken' meaning 'to pin', along with a truncation of 'O-Ring'.

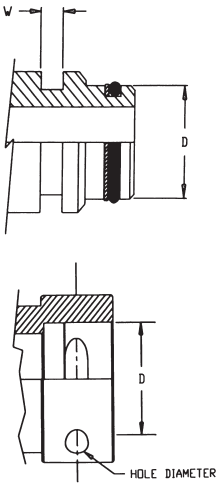
Staplelok has become the predominant hydraulic hose fitting world wide in underground coal mining.

Sealing and Identification: The male spigot is equipped with an annular O-Ring with Teflon backup ring that together seal against the cylindrical machined wall of the female coupling. Retention is via a horseshoe shaped square section staple that is inserted through holes in the female socket. The holes align with an annular slot in the male fitting.

Advantages: Allows connections to be made in confined spaces and in difficult environments. No torsional load is applied in the fitting, and connection is easy, with no need of spanners. A combination hammer and lever tool is commonly used to facilitate insertion and removal of staples.

Variations: Available in the original form, and a more recent 'Super' form to cope with demands for higher working pressures. The 'Super' form employs the same design characteristics, but uses an extra wide staple (sometimes in the form of 2 standard staples laminated together) to increase the shear strength of the staple. No published Standard exists for the 'Super' form.

STAPLELOK MALE & FEMALE



Applicable Standards
Thread Form: DIN 20 043 + SAE J1467
Pirtek Adaptors meet or exceed DIN20043, BS6537, and NCB638 requirements

Size	Nom. Tube Size		'W' or Hole Dia mm		'D' on Diagram mm		Max. Working Pressure (bar) (Based on Use of St. Steel 'D' Staples)
	in	mm	Male	Fem	Male	Female	
6	1/4"	4	5.1	6	9.9	15.1	500
10	3/8"	6	5.1	6	13.9	20.1	420
13	1/2"	8	5.1	6	17.9	24.1	420
20	3/4"	12	5.1	6	23.9	29.1	350
25	1"	16	7.1	8.5	30.9	39.1	280
32	1.1/4"	20	7.1	8.5	37.9	46.1	210
40	1.1/2"	24	7.2	9	46.9	55.2	185
50	2"	32	7.2	9	55.9	64.2	165
63	2.1/2"	40	7.2	9	60.8	80.9	70
76	3"	48	39.4	9	85.5	86.1	67

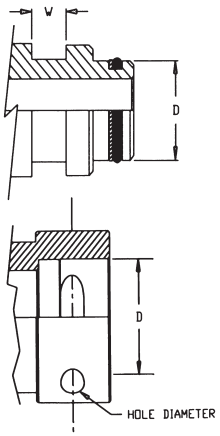
Stainless Steel staples of all types conform to 420S45 (1.4028) (X30Cr13) in BS EN10088-2:2005.

Thread Identification

STAPLELOK SAFETY

- The life expectancy of staples subjected to high pressures and impulses is potentially less than that of the hose and fittings combinations within the same circuit
- Failure of a staple can result in fracture of the staple, or a loss of spring tension leading to dislodgement as a result of system depressurisation followed by re-pressurisation
- **FOR THIS REASON, PIRTEK RECOMMENDS THAT STAPLES SHOULD ALWAYS BE REPLACED BY NEW STAPLES WHEN UNDERTAKING EQUIPMENT MAINTENANCE OR OVERHAULS**

SUPER STAPLELOK MALE & FEMALE



Applicable Standards
Not covered by Standard

Size	Nom. Tube Size		'W' or Hole Dia mm		'D' on Diagram mm		Max. Working Pressure (bar) (Based on Use of St. Steel 'D' Staples)
	in	mm	Male	Fem	Male	Female	
13	1/2"	8	9.1	9.1	15.9	24.3	520
20	3/4"	12	9.1	9.1	21.9	29.3	420
25	1"	16	13.1	13.6	30.9	39.6	420
32	1.1/4"	20	13.1	13.6	37.9	46.6	420
40	1.1/2"	24	13.1	13.6	43.9	55.6	420
50	2"	32	13.1	13.6	49.9	64.6	420

- Stainless Steel staples of all types material is 420S45 (1.4028) (X30Cr13) in BS EN10088-2:2005.

Thread Identification

SKV / SSKV

SSKV and its lower pressure derivative SKV, like Staplelok, have their origins in Germany. Developed specifically for applications requiring secure connections without the need for special tools, and without the drawbacks associated with the older Staplelok technology (bulky profile and easily dislodged or broken staples), it finds many applications both in mining and general industry. The acronym SSKV is derived from the German language meaning 'steckschalenklemmverbindung' or 'plug shell clamp connection'.

Sealing and Identification: Sealing resembles Staplelok in that the male spigot is equipped with an annular O-Ring with Teflon backup ring. These seal against the cylindrical machined wall of the female coupling. Retention is however much more sophisticated than Staplelok. A spring loaded shell not unlike a Victaulic clamp is retained by means of a threaded nut that is hand tightened into position to prevent dislodgement of the shell. An (optional) removeable red coloured clip behind the threaded nut in turn prevents unplanned loosening of the nut. Size identification is best done by way of the male collar OD or female body OD (they are designed to be equal). See dimensions D and E below.

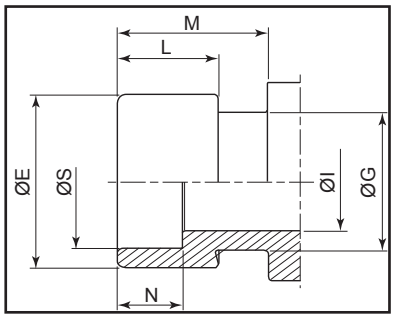
Advantages: Allows connections to be made in confined spaces and in difficult environments. No torsional load is applied in the fitting, and connection is easy, with no need of spanners. The slim external profile of the coupling does not protrude beyond the hose outside diameter in most cases, and overall connection length is short. There exist no projecting components to cause snagging or dislodgement.

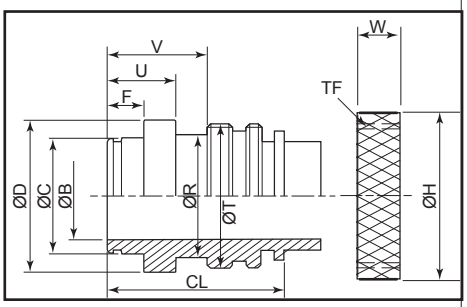
The 2 forms of the fittings are dimensionally different to preclude accidental intermixing between different pressure circuits.

Variations: Available in the both medium and high pressure forms to fill the demands for a wide range of working pressures. The 'SSKV' form has been extensively tested within Australia to SAE J343 for both working pressure and impulse cycles, and has comfortably exceeded 500,000 impulses in all tests (continuing). No Standard exists for either form of the fitting at this point.

Both forms of the fitting are suited to applications where MDG 41 compliance is demanded.

SKV MALE & FEMALE





Nom. Tube	DN	6	10	13	20	25	32	40	50	63	76	100
	ins	1/4"	3/8"	1/2"	3/4"	1"	1¼"	1½"	2"	2½"	3"	4"
	Dash	04	06	08	12	16	20	25	32	40	48	64
Pressure (bar)	Max. Working	-	-	-	-	280	210	185	165	70	70	64
	Min. Burst	-	-	-	-	1120	840	740	660	280	280	256
SKV Female (Hosetails and Adaptors)												
Dimensions (mm)	S	-	14	18	23	27	33	44	56	66	88	105
	E	-	20	22	28	33	39.8	53	65	75	99	118
	G	-	14	15.9	19.9	24.9	31.1	38.9	52.9	63.9	84.8	138
	I	-	7	9.8	15	19	24	32	44	55	67	85
	L	-	16	18	17	17	23.6	24.5	24.5	24.5	38	38
	M	-	24	26.5	27	28.5	37	37.5	38	38	54.5	60
	N	-	11.2	13.2	13.2	13.2	18.2	15.2	15.2	15.2	25.2	26
SKV Male (Hosetails)												
Dimensions (mm)	B	-	7	9.8	15	19	24	32	44	55	67	86
	C	-	14	18	23	27	33	44	56	66	88	105
	D	-	20	22	28	33	39.8	53	65	75	99.3	138
	R	-	14	15.9	19.9	24.9	31.1	38.9	52.9	63.9	84.8	101
	T	-	19	20	28	37	43	50	64	75	95	122
	F	-	11	13	13	13	18	15	15	15	25	25
	V	-	24	26.5	27	28.3	35	37.5	38	38	54.5	38
	H	-	25	28	36	42	50	62	75	85	110	138
	W	-	14	14.5	15	12.5	14	19	19.5	19.5	28	37.5
	TF	-	19	20	28	37	40/43	50	64	75	95	125
SKV Male (Adaptors)												
	B	-	7	9.8	15	19	24	32	44	55	67	86
	C	-	14	18	23	27	33	44	56	66	88	105
	D	-	20	22	28	33	39.8	53	65	75	99.3	118
	R	-	14	15.9	19.9	24.9	31.1	38.9	52.9	63.9	84.8	101
	T	-	24	26	32	37	43	60	70	80	107	122
	F	-	11	13	13	13	18	15	15	15	25	25
	V	-	24	26.5	27	28.3	35	37.5	38	38	54.5	61
	H	-	29	33	36	42	50	70	80	90	125	138
	W	-	15	14.5	15	12.5	14	22	23	25.5	28	37.5
	TF	-	24	26	32	37	40/43	60	70	80	107	125

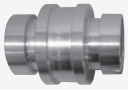
Thread Identification

SKV / SSKV ASSEMBLY PROCEDURE

Step 1:

Ensure you have the appropriate SKV / SSKV components

The SKV / SSKV connections comprise:

- Support Clip 
- Shell 
- Male End w/- Retaining Nut 
- Female End 

Step 2:

Lubricate the O-Ring and internal body of the female fitting using Pirtek Protect Lanoline Grease. Insert the male spigot into the female until the shoulders touch as can be seen in the photograph at right.

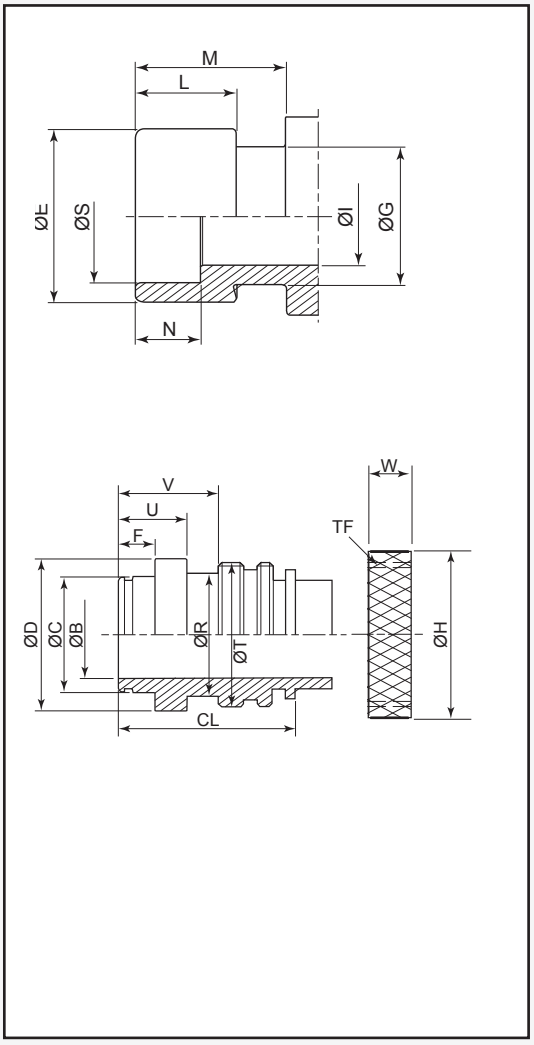
Step 3:

Fit the spring supported Shell over the mating male and female connection and ensure that it is a snug fit into the grooves, equally ensuring that the two halves of the shell meet and align. Ensure that the split in the Shell is level, parallel and forms a complete closed diameter to ensure that it is properly engaged in the grooves as evident at right.

Step 4:

Lubricate the thread of the retaining nut with Pirtek Protect Lanoline Grease. Turn the retaining nut toward the shell by hand until it meets firmly against the shoulder of the shell. A "C" Spanner may be used, but is not essential. Clip the optional plastic safety clip into position firmly at the rear of the retaining nut ensuring that it is not loose, although some sideways movement is permitted in the housing groove.

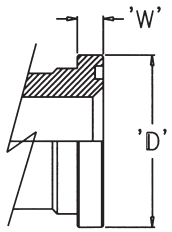
SSKV MALE & FEMALE



Nom. Tube	DN	6	10	13	20	25	32	40	50	63
	ins	1/4"	3/8"	1/2"	3/4"	1"	1¼"	1½"	2"	2½"
	Dash	04	06	08	12	16	20	25	32	40
Pressure (bar)	Max. Working	-	420	420	420	420	420	420	420	350
	Min. Burst	-	1680	1680	1680	1680	1680	1680	1400	1400
SSKV Female (Hosetails and Adaptors)										
Dimensions (mm)	**S**	-	14	18	23	28	33	42	54	65
	E	-	20	24	30	36	44	54	70	84
	G	-	14	18	23	28	33	39	56	69
	I	-	7	10	15	20	24	30	40	50
	L	-	16	18	18	21	26	29.5	31	41
	M	-	24	26.5	27	33	39	43.5	46	62.5
	N	-	11	13	13	15	18	20	20	25
SSKV Male (Hosetails)										
Dimensions (mm)	**B**	-	7	10	15	20	24	30	40	50
	C	-	14	18	23	28	33	42	54	65
	D	-	20	24	30	36	44	54	70	84
	R	-	14	18	23	28	33	39	56	69
	T	-	19	23	32	38	43	50/55	66	86
	F	-	11	13	13	15	18	20	20	25
	V	-	25	26.5	27	32	39	43	46	62.5
	H	-	25	30	38	45	52	64	78	98
	W	-	14	13.5	15	13.5	13.5	19	19.5	25
	TF	-	20	23	32	38	43	50/55	66	86
SSKV Male (Adaptors)										
Dimensions (mm)	**B**	-	7	10	15	20	24	30	40	50
	C	-	14	18	23	28	33	42	54	65
	D	-	20	24	30	36	44	54	70	84
	R	-	14	18	23	28	33	39	56	69
	T	-	24	28	34	41	50	60	76	95
	F	-	11	13	13	15	18	20	20	25
	V	-	24	26.5	27	32	39	43	46	62.5
	H	-	29	34	40	47	64	72	85	110
	W	-	15	13	15	14.5	19	22	23	28
	TF	-	21.5	28	34	41	50	60	70	90

Thread Identification

SAE J518 CODE 61 FLANGE



Applicable Standards

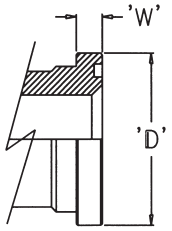
Thread Form: SAE J518-1

ISO6162-1

Dash Size	Nominal Tube Size		'W' on Diagram		Max Work Press. Adaptors	Hose Fittings	Flange OD 'D' on Diagram	
	ins	mm	ins	mm	bar	Bar	ins	mm
8	1/2"	12.7	0.265	6.73	350	350	1.188	30.18
10 †	5/8"	16	0.265	6.73	350	350	1.340	34
12	3/4"	19	0.265	6.73	350	350	1.500	38.1
16	1"	25.4	0.315	8	320	350	1.750	44.45
20	1 .1/4"	32	0.315	8	280	280	2.000	50.8
24	1 .1/2"	38	0.315	8	210	210	2.375	60.33
32	2"	51	0.375	9.53	210	210	2.812	71.42
40	2 .1/2"	63.5	0.375	9.53	175	175	3.312	84.12
48	3"	76	0.375	9.53	160	160	3.999	101.60
56	3.1/2"	89	0.444	11.3	35	35	4.499	114.30
64	4"	102	0.444	11.3	35	35	4.999	127.00

† Komatsu produce flanges to the Japanese **JIS** Standard. They comply with Code 61 and Code 62 in all respects except O-Ring groove dimensions. Refer to Pirtek fittings catalogue Section C for details. Never use Imperial O-Rings (**Y** or **OKS**) in Komatsu® flanges - only **KY** series. Dash Size 10 is unique to the **JIS** Standard.

SAE J518 CODE 62 FLANGE



Applicable Standards

Thread Form: SAE J518-2

ISO6162-2

Dash Size	Nominal Tube Size		'W' on Diagram		Max Work Press. Adaptors	Flange OD 'D' on Diagram	
	ins	mm	ins	mm	bar	ins	mm
8	1/2"	12.7	0.305	7.75	420	1.250	31.750
12	3/4"	19	0.345	8.76	420	1.625	41.280
16	1"	25.4	0.375	9.53	420	1.875	47.630
20	1 .1/4"	32	0.405	10.29	420	2.125	53.980
24	1 .1/2"	38	0.495	12.57	420	2.500	63.500
32	2"	51	0.495	12.57	420	3.125	79.380

NOTE: Komatsu use flanges that comply with Code 61 and Code 62 in all respects except O-Ring groove dimensions. Refer to Pirtek fittings catalogue Section C for details. They comply to a JIS Standard, and include a Dash 10 size.

'SUPERCAT' FLANGE

NOTE: This term applies to flanges with a flange head thickness of 14.2 mm, but conform in all other respects to the dimensions of SAE Code 62 flanges. They are to be found on new generation Caterpillar® equipment.

Pirtek have available a range of fittings that conform to the dimensions of the new fittings. Please refer to Fittings Catalogue Section C for detail. Product Codes follow Code 62 guidelines, but have a suffix 'C' to differentiate them eg C621C

No SAE Standard has been published as yet for the flanges

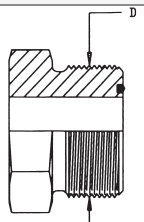
Flange Size		Associated Bolt Details for Flange Clamps									
		Code 61				Code 62 and Supercat					
		UNC Bolts Grade 8		Metric Bolts Class 10.9		UNC Bolts Grade 8			Metric Bolts Class 10.9		
Dash	Size	Thread	Length	Thread	Length	Thread	Length Code 62	Length Supercat	Thread	Length Code 62	Length Supercat
08	1/2"	5/16"-18	1¼"	M8 x 1.25	25	5/16"-18	1¼"	-	M8 x 1.25	30	-
10 *	5/8"	5/16"-18	1¼"	M8 x 1.25	35	-	-	-	-	-	-
12	3/4"	3/8"-16	1¼"	M10 x 1.5	30	3/8"-16	1½"	1¾"	M10 x 1.5	35	45
16	1"	3/8"-16	1¼"	M10 x 1.5	30	7/16"-14	1¾"	1¾"	M12 x 1.75	45	45
20	1.1/4"	7/16"-14	1½"	M10 x 1.5	30	½"-13	1¾"	2"	M12 x 1.75*	45	50
24	1.1/2"	½"-13	1½"	M12 x 1.75	35	5/8"-11	2¼"	2½"	M16 x 2	55	60
32	2"	½"-13	1½"	M12 x 1.75	35	¾"-10	2¾"	-	M20 x 2.5	70	-
40	2.1/2"	½"-13	1¾"	M12 x 1.75	40	-	-	-	-	-	-
48	3"	5/8"-11	1¾"	M16 x 2	50	-	-	-	-	-	-
56	3.1/2"	5/8"-11	2"	M16 x 2	50	-	-	-	-	-	-
64	4"	5/8"-11	2"	M16 x 2	50	-	-	-	-	-	-

Supercat Flange Clamps (not available from Pirtek) use the same bolt spacings as Code 62 but the bolts are generally longer to accommodate the 14.2 mm flange thickness

*NOTE: designs pre 2012 thread can be M14x2.

Thread Identification

'O' RING FACE SEAL MALE



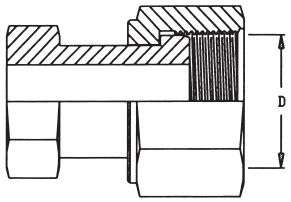
Applicable Standards
Thread Form: SAE J1453

Dash Size	Nominal Tube Size (ins)	Nominal Thread Size & Pich	Correct Torque (Nm)	Max Work Press. (bar) Adaptors	Hose Fittings Bar	Thread OD 'D' on Diagram ins	mm
4	1/4"	9/16 - 18	15	630	450	0.56	14.22
6	3/8"	11/16- 16	25	630	450	0.69	17.52
8	1/2"	13/16 - 16	45	630	420	0.82	20.82
10	5/8"	1-14	65	413	420	1.00	25.40
12	3/4"	1. 3/16 - 12	95	413	420	1.19	30.22
16	1"	1. 7/16 - 12	130	413	420	1.44	36.57
20	1 1/4"	1. 11/16 - 12	190	275	350	1.69	42.92
24	1 1/2"	2 - 12	220	275	300	2.00	50.80
				Max. Press. (Mpa)			

Applicable Standards
Thread Form: Metric
Standard: Unknown Chinese Standard
A metric threaded design similar to ORFS is increasingly being encountered on equipment of Chinese origin. The pressure rating is linked to the designed working pressure of the hose that it accompanies (Sizes and pressures marked with * refer to spiral hoses. All others relate to a 3-braid design and should be considered the maximum achievable).
The O-Ring sits in a recessed flat area of the face rather than in a groove as found in the SAE J1453 version of ORFS.

14	¼"	M14 x 1.5		65		-	14
16	5/16"	M16 x 1.5		53		-	16
18	⅜"	M18 x 1.5		53		-	18
20*	¼"*	M20 x 1.5		100*		-	20
22	½"	M22 x 1.5		38		-	22
24*	⅜"	M24 x 1.5		70		-	24
27*	⅝", ½"*	M27 x 1.5		34, 60*		-	27
30	¾"	M30 x 1.5		30		-	30
33*	⅝"*	M33 x 2		55*		-	33
36*	¾"*	M36 x 2		46*		-	36
39	1"	M39 x 2		21		-	39
45*	1¼", 1"*	M45 x 2		12, 35*		-	45
52*	1½", 1¼*	M52 x 2		11, 32*		-	52
64*	2"*	M64 x 2		9, 25*		-	64
70*	2"*	M70 x 2		20*		-	70

'O' RING FACE SEAL FEMALE



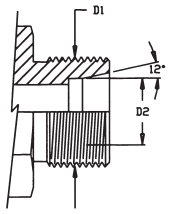
Applicable Standards
Thread Form: SAE J1453
Materials Available: S12L14 (Mild Steel) GB12361-12362 Part II (Drop Forged)

Dash Size	Nominal Tube Size (ins)	Nominal Thread Size & Pich	Correct Torque (Nm)	Max Work Press.(bar) SAE J1453 Adaptors	Hose Fittings Bar	Thread iD 'D' on Diagram ins	mm
4	1/4"	9/16 - 18	15	420	450	0.51	12.95
6	3/8"	11/16 - 16	25	420	450	0.63	16
8	1/2"	13/16 - 16	45	420	420	0.75	19.05
10	5/8"	1 - 14	65	420	420	0.93	23.62
12	3/4"	1. 3/16 - 12	95	420	420	1.11	28.19
16	1"	1. 7/16 - 12	130	420	420	1.36	34.54
20	1. 1/4"	1. 11/16 - 12	190	280	350	1.61	40.89
24	1. 1/2"	2 - 12	220	280	300	1.92	48.76

See also Chinese Metric Form documented above

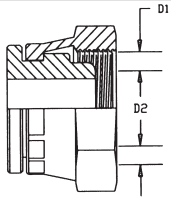
Thread Identification

GAZ FRENCH METRIC MALE



Dash Size	Nominal Tube Size 'D2" mm	Nominal Thread Size & Pitch)	Thread OD 'D' on Diagram	
			mm	in
20	13.25	M20 - 1.5	20.0	0.787
24	16.75	M24 - 1.5	24.0	0.944
30	21.25	M30 - 1.5	30.0	1.181
36	26.75	M36 - 1.5	36.0	1.417
45	33.50	M45 - 1.5	45.0	1.771
52	42.25	M52 - 1.5	52.0	2.047
58	48.25	M58 - 2.0	58.0	2.283

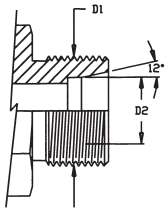
GAZ FRENCH METRIC FEMALE



Dash Size	Nominal Tube Size 'D2" mm	Nominal Thread Size & Pitch)	Thread ID 'D' on Diagram	
			mm	in
20	13.25	M20 - 1.5	18.5	0.728
24	16.75	M24 - 1.5	22.5	0.885
30	21.25	M30 - 1.5	28.5	1.122
36	26.75	M36 - 1.5	34.5	1.358
45	33.50	M45 - 1.5	43.5	1.712
52	42.25	M52 - 1.5	50.5	1.988
58	48.25	M58 - 2.0	55.0	2.165

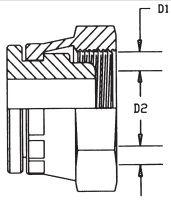
Thread Identification

KOBELCO METRIC MALE



Dash Size	Nominal Tube Size 'D2" mm	Nominal Thread Size & Pitch	Thread OD 'D' on Diagram	
			mm	in
30	22.30	M30 - 1.5	30.0	1.181
36	28.20	M36 - 1.5	36.0	1.417
45	35.20	M45 - 1.5	45.0	1.771

KOBELCO METRIC FEMALE



Dash Size	Nominal Tube Size 'D2" mm	Nominal Thread Size & Pitch	Thread ID 'D' on Diagram	
			mm	in
30	22.3	M30 - 1.5	28.5	1.122
36	28.2	M36 - 1.5	34.5	1.358
45	35.2	M45 - 1.5	43.5	1.712

NOTES