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Technical Information

Section 1



GENERAL INFORMATION

An essential step in ensuring that a hydraulic system is safe and delivers optimum performance and service life is selecting the correct fluid conveying components.

Although a lot of the work undertaken in this industry is the replacement of existing components with a duplicate it is still good practice to check the product against the application especially if the service life of the product to be replaced was not acceptable or when fault finding on an existing system.

In some cases a problem with a hose assembly or other fluid conveying products can point to an underlying problem with the system itself or possibly the products have been incorrectly specified originally.

A simple method to assist in remembering the key selection criteria is the anagram:

F.A.C.T.O.R.S.

F = Fluid

A = Application

C = Connections

T = Temperature

O = Operating Pressures

R = Rate(s) of Flow

S = Size

F - FLUID

The materials in the products selected must be compatible with the fluid that is to be conveyed. Compatibility considerations will vary between products depending on the fluid in question.

When checking product fluid compatibility the following should be taken into account;

Hose; where the application requires the use of chemicals or special oils it is advisable to ensure that the cover is also resistant. For gaseous applications it is possible that permeation could occur. Permeation, sometimes referred to as effusion, is the migration of fluid through the pores of the tube polymer resulting in gradual fluid loss. Where permeation occurs it is important to ensure that as well as the hose tube the reinforcement and cover are compatible. When conveying gaseous liquids it is advisable to pin-prick the cover to prevent fluid build-up under the cover causing blistering. Continual build-up of fluid in this blistering could eventually cause the cover to split resulting in potential hazards such as the release of toxic fumes, fire or even explosions.

Couplings & other products; As well ensuring the body material is compatible any seals in hose connectors, positional adaptors, quick release couplings, ball Valves, live swivels etc are also compatible.

A - APPLICATION

When selecting products it is important to check how and where they are going to be used as this will help to assess the likely demands that will be placed on the products.

Some of the aspects to consider are;

- Is the product going to be installed on mobile equipment or industrial plant?
- Is the application static or dynamic?
- Any installation constraints?
- Any mechanical loadings? Care should be taken not subject products to tension or torsional loads.
- Will it be subjected to constant impulsive?
- What fluid lines best suit the application? Flexible or rigid?
 - ❖ Flexible (hose). Hose has advantages such as;
 - *Easier to route around obstacles*
 - *Helps to dampen sound*
 - *Can absorb pressure spikes*
 - *Less prone to damage from vibration or movement*
 - *Generally easier to replace in the field*
 - ❖ Rigid (pipe or tube). Advantages of rigid lines;
 - *Less susceptible to mechanical damage*
 - *Good heat dissipation*
 - *Tube can be bent to tight radii*
 - *Does not breakdown through ageing*
- If selecting hose consider the following:
 - ❖ Does the cover need to be abrasion resistant?
 - ❖ Does it need to be non-conductive?
 - ❖ Any requirement for the hose to meet any specific Industry specifications? Such as mining, marine, military etc.
 - ❖ O.D of hose if it to run over pulleys (forklift application)
 - ❖ Composition of hose, rubber or thermoplastic? Note; Thermoplastic hose types are excellent for use in the marine and food industries.

Taking the time to get a good overview of the application will help when considering other aspects in the selection process, some of which are interrelated (such as pressure, flow & size).

Some accessory products such as Quick Release Couplings & Ball valves have specific selection requirements that need to be considered. These are discussed in detail in the relevant training modules.

C - CONNECTIONS

When replacing an existing hose assembly match the existing end connections with the new ones. If a new assembly is being specified consider what interface (thread/sealing face) type would best suit the application. In most cases the type of connection is determined by the exit thread of the adaptor fitted to the port machined into the component to which the assembly is being fitted.

Confirm what style of hose connection is required (or preferred by the customer), where wire braided hose is being used it is possible to fit either Crimp or Re-usable (field attachable) and in low pressure applications a Push-On.

For 90° hose connections check the configuration required e.g. compact or swept bend style.

Rigid lines: pipe or tube

For pipe the most common connection is the welded type, this can be either a socket or butt weld style. Of these the butt weld should be preferred for high pressure however the socket style is the most commonly used due to the ease of assembly.

For tube there are three main options;

1. Flareless type
2. Flare type
3. Socket weld

T - TEMPERATURE

Two aspects of temperature must be considered when selecting products;

1. Fluid temperature; Check capability of product to withstand system fluid temperature, both minimum and maximum. Hydraulic systems can generate heat but this should not be excessive in well designed systems. The most common causes of excessive heat are undersized components or flow restrictions within the system.

2. Ambient temperature;

The exposure to high or low ambient temperatures should also be considered. Generally there are not many issues associated with this.

Hose is most likely to be affected, some situations where a problem could occur are;

When an installation requires hose to be run near a hot manifold it may be advisable to use a heat shield or sleeving.

Where a hose is subjected to a high ambient temperature in conjunction with an elevated fluid temperature the service life may be reduced.

Hose used in a cold environment, such as hoses on a forklift working in a coolstore, may have exhibit cracking on the cover.

Notes;

1. The viscosity rating of most hydraulic oils is set at a temperature of 40° Celsius.
2. Rubber polymers are affected differently by hot air than hot oil.
3. Rubber stores heat

O - OPERATING PRESSURES

Determine maximum system or circuit pressures, this may vary depending on the circuit function. Always take into account the possibility of pressure spikes when establishing the maximum pressures that could be generated in a system.

Remember to look at the application or function, this will help to visualise the possible loadings on the product.

For example, the crowd cylinder circuit on an excavator is more likely to be subjected to spike pressure than the slew circuit.

Always ensure that the product is working within a 4:1 safety factor. That is; the maximum pressure the product will be exposed to is less than 25% of the products minimum burst pressure. Where pressure spikes or impulsive can occur it is good practice, where this is possible, to specify a product that will be working at 75% of its pressure rating for normal system pressure, this will give a safety buffer to absorb spikes.

Note;

Any product fitted between the pump and valve will always be exposed to the highest pressures of the system.

R - RATES OF FLOW

There are two areas to look at with regards to fluid flow.

Volume;

This is the amount of fluid that will be flowing through the product in a given time. When selecting product it is best to look at the maximum flow that is to be conveyed. Maximum pump output is a good starting point but consideration should also be given to return flow from the piston side of cylinders, this can be high depending on the bore to annulus ratio of the cylinder.

Volume is usually measured in Gallons (imperial) or Litres (metric) per minute.

Velocity;

This is the speed of the fluid through the product and is directly related to the fluid volume and the product size. Fluid speed is a key factor in determining pressure drops and heat build up in systems.

Velocity is stated as; feet per second (imperial) or metres per second (metric)

S - SIZE

The size (flow area) of the product is key part in ensuring the system functions efficiently.

The flow area of the product and the volume of fluid determines the velocity of the fluid in the system. If the fluid velocity is too high then in some cases excessive pressure drop or heat generation can occur. A Nomograph is the easiest method of determining fluid velocity for any given volume versus product size.

Notes;

The potential service life of products can be significantly reduced if they are constantly operating at maximum limits.

Some areas of the selection process are interrelated however the key to correct product selection is the understanding of the application and what is required of the product.

THREAD IDENTIFICATION

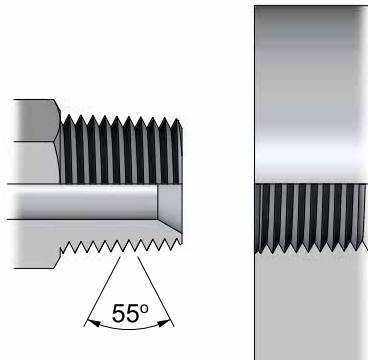
B.S.P.T. - BRITISH STANDARD PIPE TAPER

Taper: 1 in 16 by diameter

Thread Angle: 55°

The BSPT (British Standard Pipe Taper) male is intended to mate with the BSPT female only. Although the taper male will screw into BSP Parallel fixed female sockets, this is not recommended practice where avoidable as a reliable seal cannot be guaranteed.

While many BSPT males are coned 30° and will mate with BSP Parallel swivel nut females, this is not recommended practice as the taper form can deform the parallel thread and reduce the integrity of the seal.



Thread Size & TPI	Male Thread O.D. BSPT*	Female Thread I.D. BSPT
1/8-28	9.7	8.5
1/4-19	13.1	11.4
3/8-19	16.6	14.9
1/2-14	20.9	18.6
5/8-14	22.9	20.6
3/4-14	26.4	24.1
1-11	33.2	30.2
1.1/4-11	41.9	38.9
1.1/2-11	47.8	44.8
2-11	59.6	56.6

*Basic gauge plane diameter at basic gauge depth

THREAD IDENTIFICATION

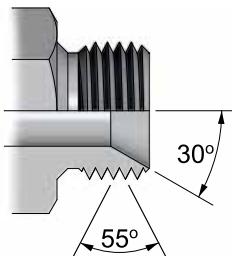
B.S.P.P. - BRITISH STANDARD PIPE PARALLEL

Thread Angle: 55°

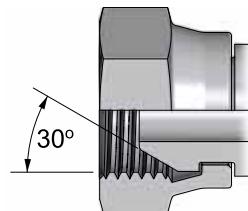
The British Standard Pipe Parallel (BSPP) male is typically coned 30° and will mate with either a BSPP swivel nut female or a BSPP female port.

BSPP female ports are normally spot faced, sealing is by either a soft metal washer, a bonded seal or a captive "O" ring.

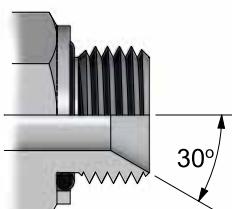
In some cases, the port is chamfered to accept an "O" ring seal. (Similar to the U.N.O. style).



BSPP male



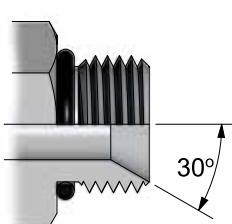
BSPP swivel nut female



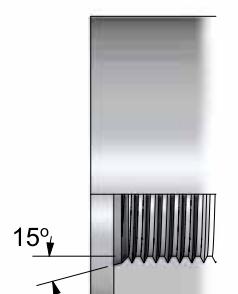
BSPP male with captive o-ring seal



BSPP female port (spot-faced)



BSPP male with o-ring seal



BSPP female port (chamfered)

N.B. Torque values are nominal and supplied as a guide only.

THREAD IDENTIFICATION

N.P.T. - NATIONAL PIPE THREAD

- N.P.T.F.:** National Pipe Taper Fuel
N.P.S.M.: National Pipe Straight Mechanical
N.P.S.F.: National Pipe Straight Fuel

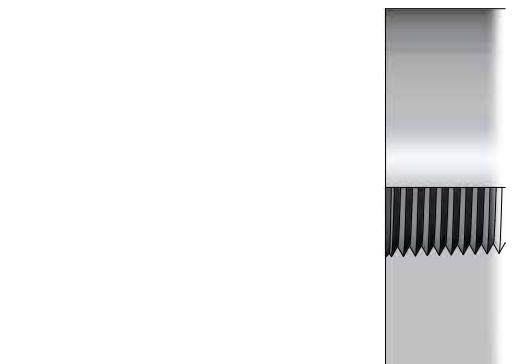
Taper: 1 in 16 by diameter.

Thread Angle: 60°

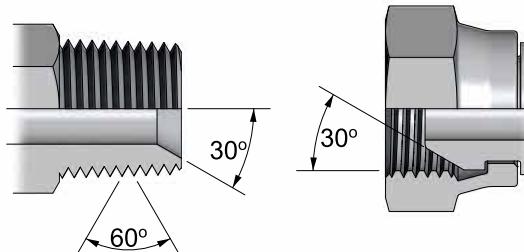
The National Pipe Taper Fuel (NPTF) male is coned 30° and will mate with the NPTF female port (taper), the National Pipe Straight Mechanical (NPSM) female (swivel nut female with 30° sealing cone), or the National Pipe Straight Fuel (NPSF) female port (parallel).

As NPTF is a “dryseal” thread, no sealing medium is required. However a sealing medium can be used to prevent thread galling.

Thread Size & TPI	Male Thread O.D. NPTF	Female Thread I.D.	
		NPTF	NPSF/SM
1/8-27	10.0	8.6	8.7
1/4-18	13.3	11.2	11.4
3/8-18	16.7	14.7	14.9
1/2-14	20.8	18.2	18.8
3/4-14	26.1	23.5	23.9
1-11.1/2	32.7	29.5	30.2
1.1/4-11.1/2	41.4	38.3	39.1
1.1/2-11.1/2	47.5	44.4	45
2-11.1/2	59.3	56.2	57



NPTF female port (taper)



NPTF male (taper)

NPSM swivel nut female



NPSF female port (parallel)

THREAD IDENTIFICATION

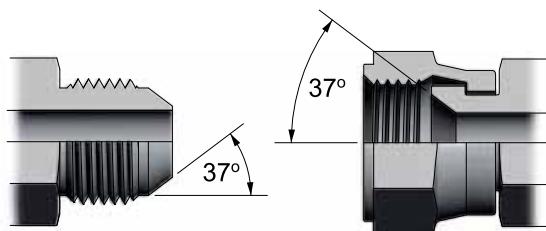
J.I.C / U.N. O-RING THREAD

J.I.C. and U.N.“O”-Ring threads are both of the Unified National Form.

J.I.C. refers to the 37° flare type sealing face. The J.I.C. female is usually a swivel nut, but can also be a fixed socket (port) with a 37° sealing face in the base of the socket.

U.N.“O”-Ring refers to the thread type and “O”-Ring for sealing. The female U.N.O port has a chamfer to accept the o-ring.

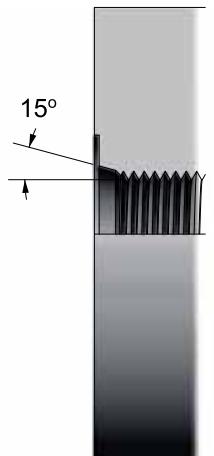
Thread Size & TPI	Female Thread I.D.	Tube O.D.	Torque Settings	
			JIC	UN"O"
7/16 x 20 UNF	9.8	1/4"	14 Nm	21 Nm
1/2 x 20 UNF	11.5	5/16"	19 Nm	25 Nm
9/16 x 18 UNF	13.0	3/8"	30 Nm	34 Nm
3/4 x 16 UNF	17.4	1/2"	50 Nm	72 Nm
7/8 x 14 UNF	20.3	5/8"	80 Nm	100 Nm
1 1/16 x 12 UN	24.8	3/4"	130 Nm	176 Nm
1 3/16 x 12 UN	28.2	7/8"	140 Nm	220 Nm
1 5/16 x 12 UN	31.2	1"	156 Nm	290 Nm
1 5/8 x 12 UN	39.2	1.1/4"	188 Nm	350 Nm
1 7/8 x 12 UN	45.5	1.1/2"	268 Nm	460 Nm
2 1/2 x 12 UN	61.5	2"	346 Nm	540 Nm



JIC male

JIC swivel
nut female

UNO male

UNO female
port
(chamfered)

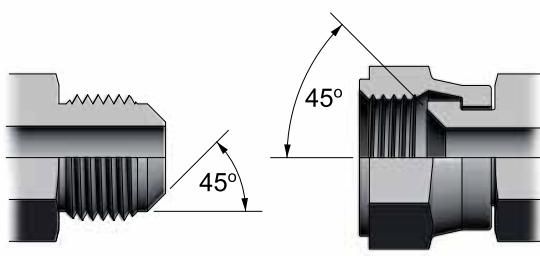
N.B. Torque values are nominal and supplied as a guide only.

THREAD IDENTIFICATION

S.A.E. - SOCIETY OF AUTOMOTIVE O.R.F.S. - O-RING FACE SEAL ENGINEERS

This system utilises the U.N. thread series and a 45° flare sealing face. Primarily used in the automotive and refrigeration industries.

This system uses an "O"-Ring for sealing. The "O"-Ring is housed in the face of the male and is compressed by the face of the female on connection. Connecting threads are U.N. form.

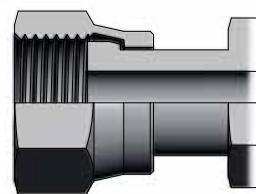


SAE male

SAE swivel nut female



ORFS male



ORFS swivel nut female

Thread Size & TPI	Tube O.D.	Female Thread I.D.
7/16-20	1/4"	9.8
1/2-20	5/16"	11.4
5/8-18	3/8"	14.3
11/16-16	7/16"	16
3/4-16	1/2"	17.5
7/8-14	5/8"	20.5
1.1/16-14	3/4"	24.8
1.1/4-12	7/8"	30.1
1.3/8-12	1"	33.2

Thread Size & TPI	Female Thread I.D.	Tube O.D.	"O"-ring size	Torque Settings *
9/16-18 UNF	12.8	1/4"	5/16x1/16	14-16 Nm
11/16-16 UN	16.0	3/8"	3/8x1/16	24-27 Nm
13/16-16 UN	19.1	1/2"	1/2x1/16	43-47 Nm
1-14 UN	23.5	5/8"	5/8x1/16	60-69 Nm
1.3/16-12UN	26.1	3/4"	3/4x1/16	90-95 Nm
1.7/16-12 UN	34.2	1"	15/16x1/16	125-135 Nm
1.11/16-12 UN	40.6	1.1/4"	1.3/16x1/16	170-190 Nm
2-12 UN	48.0	1.1/2"	1.1/2x1/16	200-225 Nm

N.B. Torque values are nominal and supplied as a guide only.

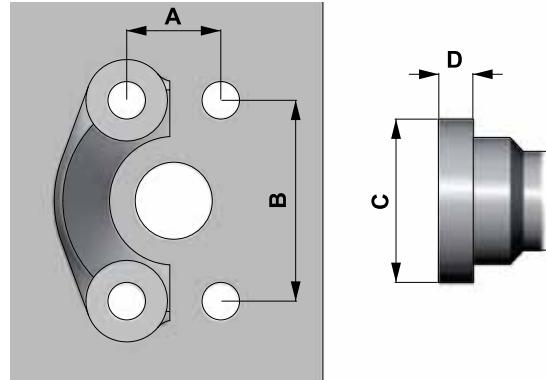
THREAD IDENTIFICATION

S.A.E. O-RING FLANGES (SAE - J518)

These connections utilise an "O"-Ring for sealing and are widely used for connecting to pump and motor parts as well as end terminations for pipe runs.

The "O"-Ring is housed in the flange head face and seals on a flat face female port, the flange is held in place by two clamp halves (or a one piece clamp) which are secured by four bolts.

SAE flanges are available in two pressure classes: **Standard Series, Code 61**, which goes to 5000 psi (dependent on size), and the **High Pressure Series, Code 62**, which is rated to 6000 psi for all sizes.



SAE flange
clamp / port
bolt spacing

SAE flange
head
dimensions

Nominal Flange Size	A (mm)		B (mm)		C (mm)		D (mm)	
	Code 61	Code 62						
1/2	17.48	18.24	38.1	40.49	30.18	31.75	6.75	7.75
*5/8	19.8	-	42.90	-	34.0	-	6.73	-
3/4	22.23	23.80	47.63	50.80	38.10	41.28	6.73	8.76
1	26.19	27.76	52.37	57.15	44.45	47.63	8.0	9.53
1.1/4	30.18	31.75	58.72	66.68	50.80	53.98	8.0	10.29
1.1/2	35.71	36.50	69.85	79.38	60.33	63.50	8.0	12.57
2	42.88	44.45	77.77	96.82	71.42	79.38	9.53	12.57

Nominal Flange Size	Pressure Rating		"O"-ring size		UNC Bolt size		Bolt torque	
	Code 61	Code 62	Code 61 and 62	AS568A number	Code 61	Code 62	Code 61	Code 62
1/2	5000 psi	6000 psi	3/4x1/8	210	5/16x1.1/4	5/16x1.1/4	20-25 Nm	20-25 Nm
3/4	5000 psi	6000 psi	1x1/8	214	3/8x1.1/4	3/8x1.1/2	28-40 Nm	34-45 Nm
1	5000 psi	6000 psi	1.5/16x1/8	219	3/8x1.1/4	7/16x1.3/4	37-48 Nm	56-68 Nm
1.1/4	4000 psi	6000 psi	1.1/2x1/8	222	7/16x1.1/2	1/2x1.3/4	48-62 Nm	85-102 Nm
1.1/2	3000 psi	6000 psi	1.7/8x1/8	225	1/2x1.1/2	5/8x2.1/4	62-79 Nm	158-181 Nm
2	3000 psi	6000 psi	2.1/4x1/8	228	1/2x1.1/2	3/4x2.3/4	73-90 Nm	271-294 Nm

The 5/8 size flange is not part of the SAE standard. It is included in the J.I.S. standards and is used by Komatsu and other O.E.M's.

N.B. Torque values are nominal and supplied as a guide only

Caterpillar flanges used on XT3 hose are the same as the SAE Code 61, XT5 flanges have the same diameter as the SAE Code 62 but are thicker in the flange head.

French Gaz (Poclain) flanges are completely different to, and will not interchange with the SAE flanges.

THREAD IDENTIFICATION

J.I.S. - JAPANESE INDUSTRIAL STANDARDS

Japanese Industrial Standards (J.I.S.) incorporate B.S.P. and metric threads as well as flanges in their connection standards.

Taper Threads:

Type R; BSPT Male (*Identical to BSP standard*)

Parallel Threads:

Type G; BSPP Male (*Identical to BSP standard*)

Type C; BSPP Swivel Nut Female (*Identical to BSP standard - for thread data please refer to BSPP section*)

Type F; BSPP Swivel Nut Female, 30° Flare Seat

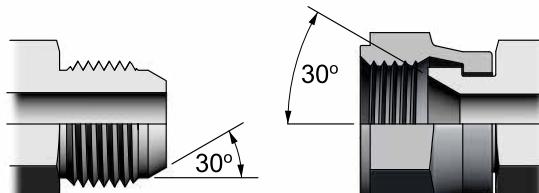
Type M; Metric, Male, 30° Cone

Type MF; Metric, Swivel Nut Female, 30° Flare Seat

"O"-Ring Flanges:

Type I; Equivalent to Code 61 (*Identical to SAE standard*)

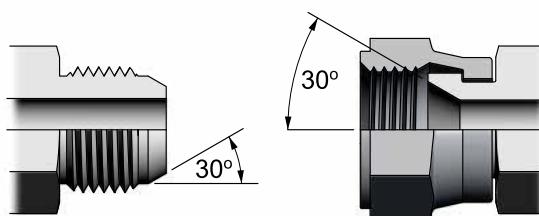
Type II; Equivalent to Code 62 (*Identical to SAE standard*)



Type F JIS male

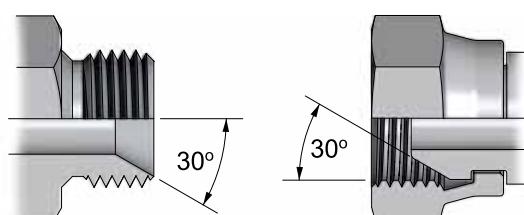
For thread data
please refer to
BSPP section

Type F JIS
swivel nut
female



Type MF JIS male

Type MF JIS
swivel nut
female



Type M JIS male

Type M JIS
swivel nut
female

THREAD SPECIFICATIONS			
Metric Threads (J.I.S)		Komatsu Threads (Metric)	
14-1.5*	12.5	14-1.5*	12.5
18-1.5*	16.5	18-1.5*	16.5
22-1.5*	20.5	22-1.5*	20.5
27-2.0	25	24-1.5	22.5
33-2.0	31	30-1.5	28.5
42-2.0	40	33-1.5	31.5
50-2.0	48	36-1.5	34.5
60-2.0	58	42-1.5	40.5

* denotes interchange sizes between JIS and Komatsu.

THREAD IDENTIFICATION

D.I.N. METRICS 24° CONE SYSTEM

The D.I.N. System allows for the connection of hose assemblies and tube in three main pressure series:

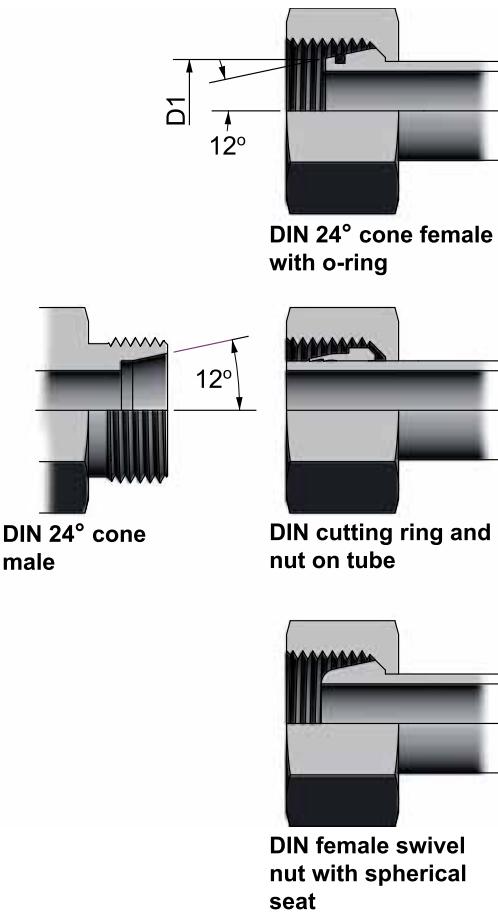
- Series LL; Extra Light, up to 100 bar
- Series L; Light up to 250 bar
- Series S; Heavy up to 640 bar

The pressure ranges are determined by the tube O.D. and the thread size e.g. a 12mm light coupling has an 18mm thread O.D. whereas a 12mm heavy coupling has a 20mm O.D. thread.

N.B: Rated coupling pressures are subject to the design pressures of the tube or hose being used.

Tubing is connected to the D.I.N. Male by the use of a cutting ring and nut. Hose assemblies can be connected by swivel nut females having either a spherical seal, 24° cone seal (can be fitted with "O"-Ring), or a standpipe with cutting ring and nut. Hose can also be connected directly to tube by use of a hose tail with the D.I.N. Male form

The male form will accept all three female styles shown (right).



THREAD SPECIFICATIONS LIGHT (L) SERIES			
Thread O.D. & Pitch	Female Thread I.D.	Diameter D1 (mm)	Tube O.D.(mm)
M12-1.5	10.5	7.2	6
M14-1.5	12.5	9.2	8
M16-1.5	14.5	11.6	10
M18-1.5	16.5	13.8	12
M22-1.5	20.5	16.8	15
M26-1.5	24.5	19.8	18
M30-2.0	28	23.8	22
M36-2.0	34	29.8	28
M45-2.0	43	37.2	35
M52-2.0	50	44.2	42

THREAD SPECIFICATIONS HEAVY (S) SERIES			
Thread O.D. & Pitch	Female Thread I.D.	Diameter D1 (mm)	Tube O.D.(mm)
M14-1.5	12.5	7.2	6
M16-1.5	14.5	9.2	8
M18-1.5	16.5	11.6	10
M20-1.5	18.5	13.8	12
M22-1.5	20.5	15.8	14
M24-1.5	22.5	17.8	16
M30-2.0	28	22	20
M36-2.0	34	27	25
M42-2.0	40	32	30
M52-2.0	50	40	38

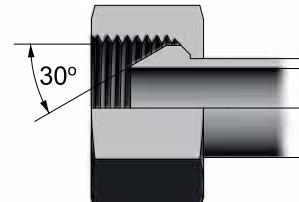
* N.B. Diameter D1 is nominal and may vary between manufacturers.

THREAD IDENTIFICATION

D.I.N. METRICS 60° CONE SYSTEM

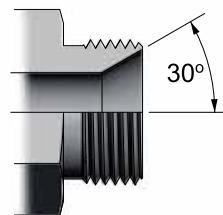
This series utilises a 60° cone seating angle and is used for the connection of hose assemblies and tube. It differs from the 24° series in that the threads are predominately 1.5mm pitch and there is no light or heavy pressure ranges.

The D.I.N. 60° male will accept the universal (spherical seat) female, a 60° coned female and tube fitted with a cutting ring and nut.

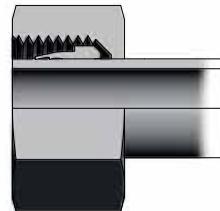


DIN 60° cone female

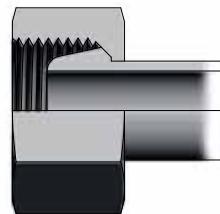
THREAD SPECIFICATIONS		
Thread O.D. & Pitch	Female Thread I.D.	Tube O.D.(mm)
M10-1.0	9.0	5
M12-1.5	10.5	6
M14-1.5	12.5	8
M16-1.5	14.5	10
M18-1.5	16.5	12
M22-1.5	20.5	15
M26-1.5	24.5	18
M30-1.5	28.5	22
M38-1.5	36.5	28
M45-1.5	43.5	35
M52-2.0	56.5	42



DIN 60° cone male



DIN cutting ring and
nut on tube

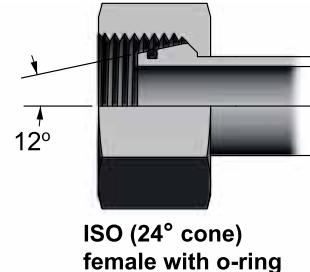


DIN female swivel
nut with spherical
seat

THREAD IDENTIFICATION

I.S.O. METRICS (INTERNATIONAL STANDARDS ORGANISATION)

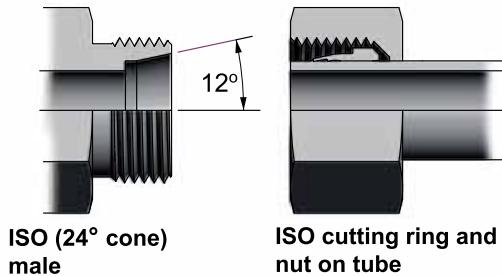
The I.S.O. series of couplings is similar to the D.I.N. light and heavy in function. The male has a 24° included angle sealing cone and a recessed counter bore for locating the tube when used in conjunction with a cutting ring and nut. The male will also accept a swivel nut female with either a cone or a spherical seal.



THREAD SPECIFICATIONS		
Thread O.D. & Pitch	Female Thread I.D.	Tube O.D.(mm)
M12-1.0	11.0	6
M14-1.5*	12.5	8
M16-1.5*	14.5	10
M18-1.5*	16.5	12
M20-1.5	18.5	14
M22-1.5*	20.5	15
M24-1.5**	22.5	16
M27-1.5	25.5	18
M30-1.5	28.5	22
M33-1.5	31.5	25
M36-1.5	34.5	28
M39-1.5	37.5	30
M42-1.5	40.5	32
M45-1.5	43.5	35
M48-1.5	46.5	38
M52-1.5	50.5	40

* Interchange with D.I.N. Light

** Interchange with D.I.N. Heavy



THREAD IDENTIFICATION

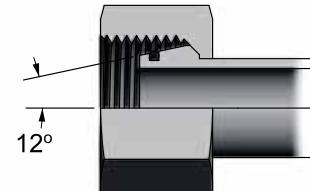
FRENCH METRICS (GAZ & MILLIMETRIQUE SERIES)

The series are similar to the D.I.N. 24° type where the male has a 24° included angle sealing cone and a recessed counterbore for locating the tube.

The male will accept a cutting ring and nut for use with tube or a swivel nut female with either a cone or spherical seal.

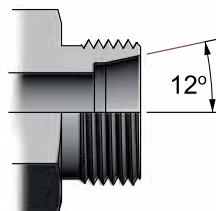
The Gaz and Millimetrique series are identical in all respects except for the O.D. of the tube:

- Gaz series uses fractional number O.D. metric tubing.
- Millimetrique series uses whole number O.D. metric tubing.

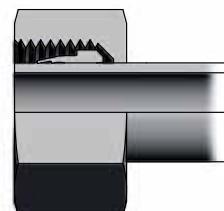


French 24° cone female with o-ring

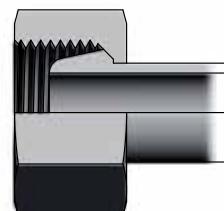
THREAD SPECIFICATIONS LIGHT (L) SERIES			
Thread O.D. & Pitch	Female Thread I.D.	Diameter	
		GAZ	Millimetrique
M12-1.0	11.0	-	6
M14-1.5	12.5	-	8
M16-1.5	14.5	-	10
M18-1.5	16.5	-	12
M20-1.5	18.5	13.25	14
M22-1.5	20.5	-	15
M24-1.5	22.5	16.75	16
M27-1.5	25.5	-	18
M30-1.5	28.5	21.25	22
M33-1.5	31.5	-	25
M36-1.5	34.5	26.75	28
M39-1.5	37.5	-	30
M42-1.5	40.5	-	32
M45-1.5	43.5	33.5	35
M48-1.5	46.5	-	38
M52-1.5	50.5	42.25	40
M54-2.0	52.0	-	45
M58-2.0	56.0	48.25	-



French 24° cone male



Cutting ring and nut on tube



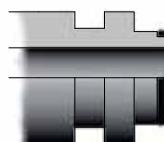
French female swivel nut with spherical seat

THREAD IDENTIFICATION

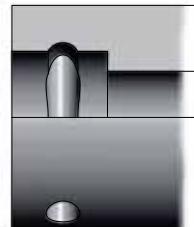
STAPLE-LOK COUPLINGS

Originally designed in Germany for underground mining equipment, the Staple-lok requires no spanners for connection or disconnection. The male and female are pushed together and held with a retaining staple or "U" clip.

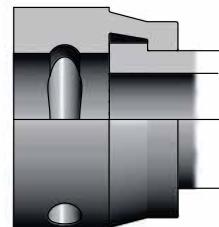
Sealing is achieved by the captive "O"-Ring located on the male spigot. The female can either be fixed or swivel type. The coupling is not designed to swivel under pressure.



Staple-lok male



Staple-lok fixed female



Staple-lok swivel female



Staple-lok staple

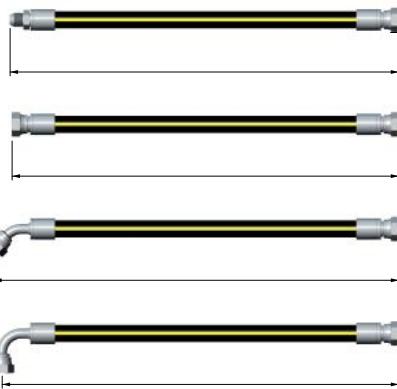
Coupling Dash Size	Imperial Size	THREAD SPECIFICATIONS		Female I.D.	
		Male O.D. inch	mm	inch	mm
-4	1/4	0.58	14.8	.59	15.0
-6	3/8	0.78	19.8	.79	20.0
-8	1/2	0.94	23.9	.95	24.1
-12	3/4	1.13	28.8	1.14	29.0
-16	1	1.53	38.9	1.54	39.1
-20	1.1/4	1.80	45.7	1.81	46.0
-24	1.1/2	2.16	54.9	2.17	55.1
-32	2	2.52	64.0	2.53	64.3

HOSE ASSEMBLY MEASUREMENT

STRAIGHT HOSE ASSEMBLY LENGTH

Overall hose assembly lengths are determined by measuring the centreline length between the coupling end faces for straight couplings, or through the sealing face centreline for angled couplings (examples to right).

Sufficient length allowance should be made to compensate for hose contraction and expansion under operating procedures.



BENT HOSE ASSEMBLY LENGTH

For installations that require a 180° bend in the hose assembly, the overall length can be calculated as follows:

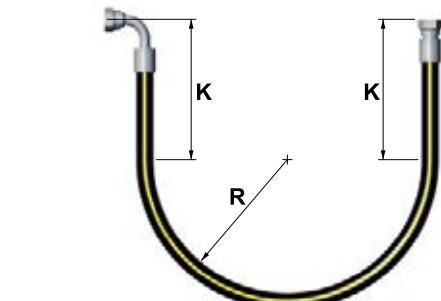
Static Installations

To avoid localised concentration of bending strain on the hose couplings, a free distance (K) of hose should be designed into the length of each assembly. Distance "K" includes length of coupling and adaptor (if used). Dimension "R" should not be less than the manufacturer's recommended bend radius for the hose used. Refer to chart below for "K" dimensions of hoses with I.D. from 3/16" to 2".

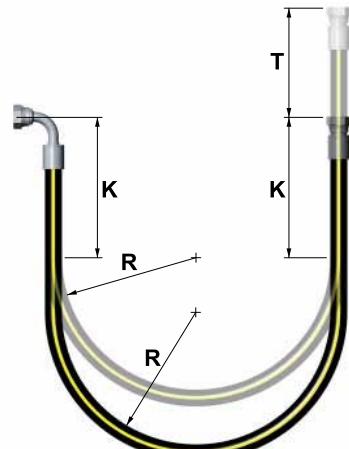
Hose I.D.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1.1/4	1.1/2	2
K (mm)	110	130	130	160	180	210	210	260	260	260	310

Dynamic Installations

When a hose assembly is subjected to relative motion between the two end couplings, additional hose length is required to accommodate the travel distance. In the diagram (right) "T" represents the amount of travel.



$$\text{Length} = 2K + 3.142R$$



$$\text{Length} = 2K + 3.142R + T$$

Off-Set Angle Measurement

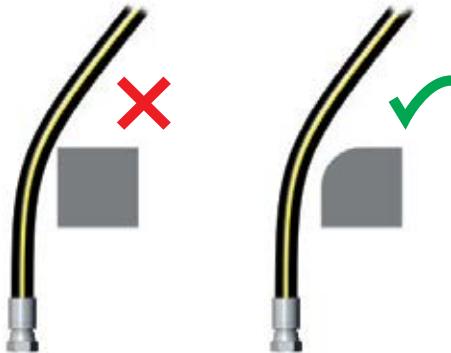
Place hose assembly in line of sight position with coupling furthest away facing upwards. Determine off-set angle by comparing relative position of closest coupling to the far coupling in a clockwise direction.



1. Hose Protection

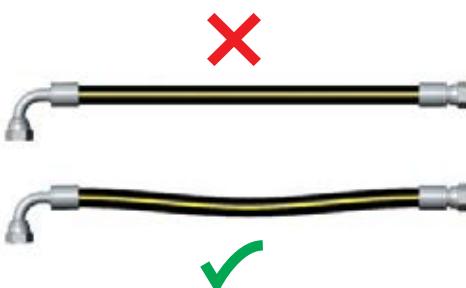
Protect the hose cover from damage such as abrasion, erosion, snagging, and cutting. Where possible, route hose to reduce abrasion from hose rubbing other hose or objects that may abrade it (Fig. 1). Special abrasion-resistant hoses and hose guards are available for additional protection. Special consideration may also need to be given to hose assemblies near heat sources.

Fig. 1


2. Hose And Machine Tolerances

Avoid tension on hose assemblies and adaptors. Design hose to allow for changes in length due to machine motion and tolerances (Fig. 2). Failure to do so may result in seal or assembly failure.

Fig. 2


3. Torsional Twist

Do not transfer torque to hose while installing. This transfer of torque can result in torsional twist, which may result in premature hose assembly failure. Use swivel type couplings or adaptors for ease of alignment as needed to prevent twisting during installation. Use the brand lay-line as a guide to ensure the hose is not pre-loaded with torsional twist when installed (Fig. 3).

Fig. 3



4. Minimum Bend Radius

The minimum bend radius for hose supplied by Hydraulink is detailed in this catalogue. Routing at less than minimum bend radius is not recommended and may reduce hose life.

Prevent sharp bending at the hose/fitting juncture (Fig. 4a). Unnecessary stress at this point may result in leaking, hose rupturing, or the hose assembly blowing apart.

Stress at this point can be minimised by ensuring adequate hose length (Fig. 4b), or by use of angled adaptors and couplings (Fig 4c).

Fig. 4a

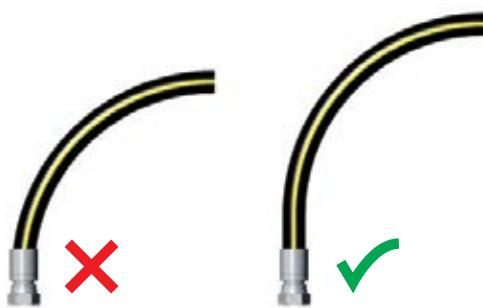


Fig. 4b



Fig. 4c



5. Hose Length Change

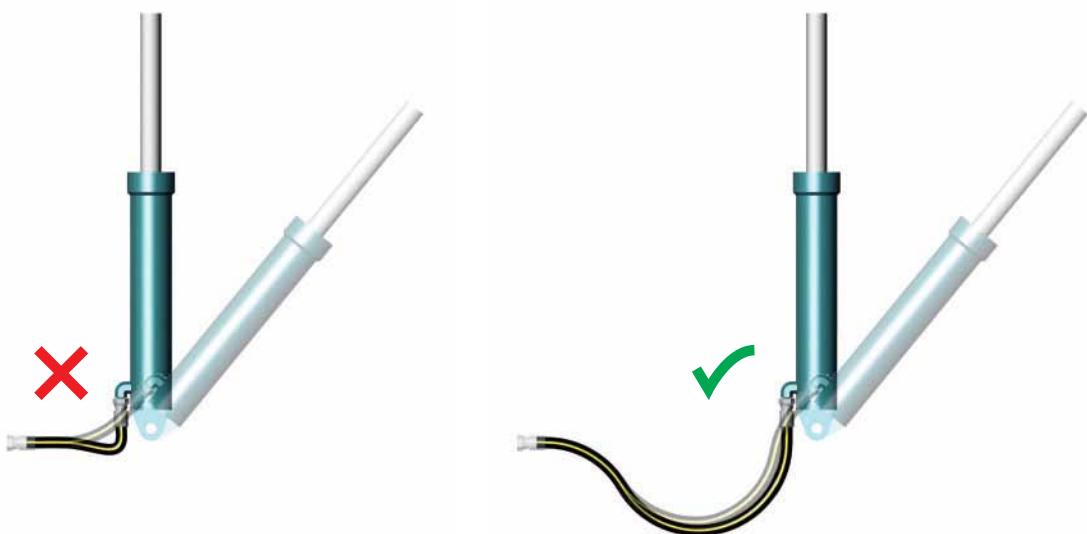
Hydraulic hose can expand longitudinally when pressurised, and this hose length change must be considered when specifying or installing hose assemblies (Fig. 5) When clamping hose lengths, always place clamps to avoid stressing the fitting end.

Fig. 5


6. Relative Movement

When specifying or installing hoses that have movement relative to each other, provide adequate hose length to absorb the required movement and prevent bends occurring that are smaller than the minimum bend radius (Fig. 6a).

Fig. 6a



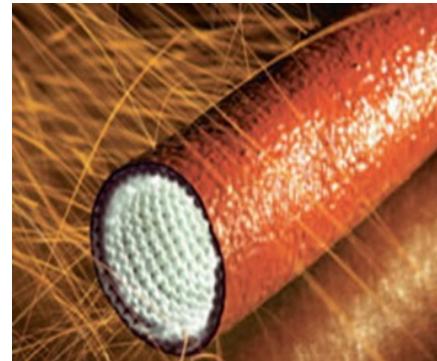
HOSE PROTECTION

BRVINYL BEND RESTRICTOR
TAPERED BLACK PVC SLEEVE

Part Number	I.D - mm	I.D - inches	Overall length - mm	Overall Length - inches	Suits Hose
BR1050	16	0.63	139.7	5.5	1/4 - 1 and 2 Wire
BR1051	18.54	0.73	152.4	6	3/8 - 1 and 2 Wire

HTG

HeatGuard® PROTECTIVE SLEEVING
KNITTED COATED FIBREGLASS HOSE SLEEVING



Part Number	I.D - mm	I.D - inches
HTG-10	15.75	5/8
HTG-12	19.05	3/4
HTG-14	22.35	7/8
HTG-16	25.4	1
HTG-18	28.45	1 1/8
HTG-22	35.05	1 3/8
HTG-24	38.1	1 1/2
HTG-26	41.15	1 5/8
HTG-28	44.45	1 3/4
HTG-32	50.8	2
HTG-36	57.15	2 1/4
HTG-40	63.5	2 1/2
HTG-44	69.85	2 3/4
HTG-48	76.2	3
HTG-6	9.53	3/8
HTG-8	12.7	1/2

SGX

HEAVY DUTY PROTECTIVE HOSE GUARD
HIGH DENSITY POLYETHYLENE PROTECTIVE HOSE
WRAP



Part Number	Nominal O.D - mm	Nominal I.D - mm	HOSE O.D RANGE - mm
SGX-110	150	135	150+
SGX-12	13	9	9 > 12
SGX-16	16.5	12	12 > 17
SGX-20	20	15	16 > 22
SGX-25	24.5	19	22 > 28
SGX-32	30	23	27 > 33
SGX-40	39	30.5	33 > 42
SGX-50	46.5	38	42 > 55
SGX-63	58	47	52 > 65
SGX-75	73	61	65 > 80
SGX-90	84.5	70.5	80 > 150

TEXS

WOVEN NYLON HOSE GUARD
MSHA APPROVED ABRASION RESISTANT
SLEEVING



Part Number	Internal dimension - mm	Internal Dimension - inches	I.D when opened - mm	I.D when opened - inch
TEXS20	31	1.24	20	0.8
TEXS23	36	1.44	23	0.92
TEXS27	42	1.68	27	1.08
TEXS31	49	1.96	31	1.24
TEXS36	54	2.16	36	1.44
TEXS40	63	2.52	40	1.6
TEXS47	74	2.96	47	1.88
TEXS60	94	3.76	60	2.4
TEXS66	104	4.16	66	2.64
TEXS73	115	4.60	73	2.92

HOSE CLAMPS

ASS

STAINLESS STEEL CLAMP
GENERAL PURPOSE BAND CLAMPS



Part Number	Minimum Final I.D - mm	Minimum Final I.D - inches	Maximum Final I.D - mm	Maximum Final I.D - inches	Band width - mm	Band Width - inches	Hex Head - inches
ASS-04	6.3	0.25	15.875	0.625	7.9375	5/16	1/4
ASS-06	7.9	0.3125	22.225	0.875	7.9375	5/16	1/4
ASS-08	11.1	0.44	25.4	1	12.7	1/2	5/16
ASS-10	12.7	0.5	26.9875	1.0625	12.7	1/2	5/16
ASS-12	12.7	0.5	31.75	1.25	12.7	1/2	5/16
ASS-16	17.4	0.6875	38.1	1.5	12.7	1/2	5/16
ASS-20	19.0	0.75	44.45	1.75	12.7	1/2	5/16
ASS-24	25.4	1	50.8	2	12.7	1/2	5/16
ASS-28	31.7	1.25	57.15	2.25	12.7	1/2	5/16
ASS-32	38.1	1.5	63.5	2.5	12.7	1/2	5/16
ASS-36	44.4	1.75	69.85	2.75	12.7	1/2	5/16
ASS-40	50.8	2	76.2	3	12.7	1/2	5/16
ASS-44	57.1	2.25	82.55	3.25	12.7	1/2	5/16
ASS-48	63.5	2.5	88.9	3.5	12.7	1/2	5/16
ASS-56	76.2	3	101.6	4	12.7	1/2	5/16
ASS-60	82.5	3.25	107.95	4.25	12.7	1/2	5/16
ASS-64	63.5	2.5	114.3	4.5	12.7	1/2	5/16
ASS-80	89.0	3.5	140.0	5.5	12.7	1/2	5/16

HSHC

HEAVY DUTY HOSE CLAMP
T-BOLT TYPE HOSE CLAMP



Part Number	Minimum Final I.D - mm	Minimum Final I.D - inches	Maximum Final I.D - mm	Maximum Final I.D - inches	Bolt Thread	Bolt Head (mm)	Band Width - mm	Band Width - inches
HSHC17-19	17	0.67	19.00	0.75	M6	8	19.8	0.31

HSHC104-112	104	4.09	112.00	4.41	M8	13	27.5	0.51
HSHC113-121	113	4.45	121.00	4.76	M8	13	27.5	0.51
HSHC122-130	122	4.80	130.00	5.12	M8	13	27.5	0.51
HSHC131-139	131	5.16	139.00	5.47	M10	15	19.8	0.59
HSHC140-148	140	5.51	148.00	5.83	M10	15	19.8	0.59
HSHC149-161	149	5.87	161.00	6.34	M10	15	19.8	0.59
HSHC162-174	162	6.38	174.00	6.85	M10	15	19.8	0.59
HSHC175-187	175	6.89	187.00	7.36	M10	15	19.8	0.59
HSHC188-200	188	7.40	200.00	7.87	M10	15	19.8	0.59
HSHC201-213	201	7.91	213.00	8.39	M10	15	19.8	0.59
HSHC20-22	20	0.79	22.00	0.87	M6	8	19.8	0.31
HSHC227-239	227	8.94	239.00	9.41	M10	15	19.8	0.59
HSHC23-25	23	0.91	25.00	0.98	M6	8	19.8	0.31
HSHC240-252	240	9.45	252.00	9.92	M10	15	19.8	0.59
HSHC26-28	26	1.02	28.00	1.10	M6	8	19.8	0.31
HSHC29-31	29	1.14	31.00	1.22	M7	10	22	0.39
HSHC32-35	32	1.26	35.00	1.38	M7	10	22	0.39
HSHC36-39	36	1.42	39.00	1.54	M7	10	22	0.39
HSHC40-43	40	1.57	43.00	1.69	M7	10	22	0.39
HSHC42-45	42	1.65	45.00	1.69	M7	10	22	0.39
HSHC44-47	44	1.73	47.00	1.85	M7	10	22	0.39
HSHC48-51	48	1.89	51.00	2.01	M7	10	22	0.39
HSHC52-55	52	2.05	55.00	2.17	M7	10	22	0.39
HSHC56-59	56	2.20	59.00	2.32	M7	10	22	0.39
HSHC60-63	60	2.36	63.00	2.48	M7	10	22	0.39
HSHC64-67	64	2.52	67.00	2.64	M7	10	22	0.39
HSHC68-73	68	2.68	73.00	2.87	M8	13	27.5	0.51
HSHC74-79	74	2.91	79.00	3.11	M8	13	27.5	0.51
HSHC80-85	80	3.15	85.00	3.35	M8	13	27.5	0.51
HSHC86-91	86	3.39	81.00	3.19	M8	13	27.5	0.51
HSHC92-97	92	3.62	97.00	3.82	M8	13	27.5	0.51
HSHC98-103	98	3.86	103.00	4.06	M8	13	27.5	0.51

OT

TWIN EAR CLAMP

TWIN EAR ZINC PLATED GENERAL PURPOSE
CLAMP

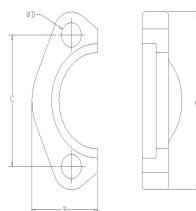
Part Number	Minimum Final I.D - mm	Maximum Final I.D - mm
OT-0507	5	7
OT-0709	7	9
OT-0911	8.1	11
OT-1113	10.8	13
OT-1315	12.5	15
OT-1417	14	17
OT-1517	14	17
OT-1518	15	18
OT-1720	16.2	20
OT-2023	19	23
OT-2327	22.5	27

SAE FLANGES

W

SAE C61 CLAMP

SAE CODE 61 FLANGE CLAMP

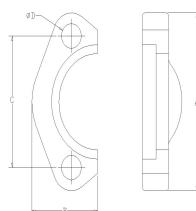


Part Number	NOMINAL SAE FLANGE SIZE	Diameter mm (A)	Width mm (B)	Bolt Hole Spacing mm (C)	Hole Size mm (D)
W-08	1/2	54	23	38.1	9
W-12	3/4	65.1	26.1	47.6	11
W-16	1	69.8	29.4	52.4	11
W-20	1 1/4	79.4	36.5	58.7	11
W-24	1 1/2	93.7	41.3	69.8	13.5
W-32	2	101.6	48.4	77.8	13.5
W-40	2 1/2				

WHP

SAE C62 CLAMP

SAE CODE 62 FLANGE CLAMP



Part Number	NOMINAL SAE FLANGE SIZE	Diameter mm (A)	Width mm (B)	Bolt Hole Spacing mm (C)	Hole Size mm (D)
WHP-08	1/2	56.3	28.1	40.5	9
WHP-12	3/4	71.4	30.2	50.8	11
WHP-16	1	80.9	34.9	57.1	13
WHP-20	1 1/4	95.2	38.9	66.7	15
WHP-24	1 1/2	112.7	47.6	79.4	17
WHP-32	2	133.3	57.1	96.8	21

CAP

UN SAE FLANGE CAPSCREW
UN THREAD SAE FLANGE CAPSCREW (ANSI B18.3)
AND WASHERS



Part Number	Size (UNC)	Suits spring washer
CAP12X112	1/2 x 1.1/2	WASHER 1/2
CAP12X134	1/2 x 1.3/4	WASHER 1/2
CAP34X212	3/4 x 2.1/2	WASHER 3/4
CAP38X112	3/8 x 1.1/2	WASHER 3/8
CAP38X114	3/8 x 1.1/4	WASHER 3/8
CAP516X114	5/16 x 1.1/4	WASHER 5/16
CAP58X2	5/8 x 2	WASHER M16
CAP716X112	7/16 x 1.1/2	WASHER 7/16
CAP716X134	7/16 x 1.3/4	WASHER 7/16

CAPM

MET SAE FLANGE CAPSCREW
METRIC THREAD SAE FLANGE CAPSCREW (DIN 912) AND WASHERS



Part Number	Size (Metric)	Suits spring washer
CAPM10X30	M10 x 30	WASHER M10
CAPM10X35	M10 x 35	WASHER M10
CAPM10X45	M10 x 45	WASHER M10
CAPM12X35	M12 x 35	WASHER M12
CAPM12X45	M12 x 45	WASHER M12
CAPM14X50	M14 x 50	WSP916B
CAPM16X55	M16 x 55	WASHER M16
CAPM20X65	M20 x 65	WASHER M20
CAPM8X25	M8 x 25	WASHER M08
CAPM8X30	M8 x 30	WASHER M08

WASHER

UN SPRING WASHERS

UN SPRING WASHERS FOR UN FLANGE CLAMP

BOLTS



Part Number	Size
WASHER 1/2	1/2
WASHER 3/4	3/4
WASHER 3/8	3/8
WASHER 5/16	5/16
WASHER 7/16	7/16

WASHER-M

MET SPRING WASHERS

METRIC SPRING WASHERS FOR METRIC FLANGE

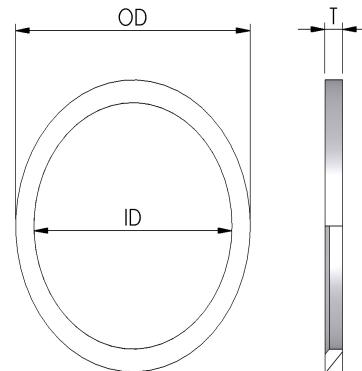
CLAMP BOLTS



Part Number	Size
WASHER M08	8mm
WASHER M10	10mm
WASHER M12	12mm
WASHER M14	14mm
WASHER M16	16mm

FRS

SAE FLANGE SPACER

SAE CODE 62 FLANGE SPACER RING TO ADAPT TO
CATERPILLAR XT5 STYLE FLANGE CLAMP

Part Number	Suits SAE Nominal size	Outside Diameter - mm	Inside Diameter - mm	Thickness - mm
FRS-12	12	41	33	5.5
FRS-16	16	47.4	39	4.7
FRS-20	20	53.3	45	4
FRS-24	24	63.2	52	1.7
FRS-32	32	79.1	68	1.7

PROJECTILE CLEANING

CT-C

TUBE/HOSE CLEANING PROJECTILES - COUPLING
FOAM PROJECTILES FOR PNEUMATIC CLEANING
SYSTEMS



Part Number	Nominal O.D - mm	Hose/Tube min I.D - mm	Hose/Tube min I.D - inches	Hose/Tube max I.D - mm	Hose/Tube max I.D - inches	Standard pack quantity
CT-C07	7	5.26	0.21	6.48	0.26	100
CT-C10	10	7.52	0.30	8.70	0.34	100
CT-C12	12	9.02	0.36	10.43	0.41	100
CT-C14	14	10.53	0.41	12.17	0.48	100
CT-C16	16	12.03	0.47	13.91	0.55	100
CT-C18	18	13.53	0.53	15.65	0.62	100
CT-C20	20	15.04	0.59	17.39	0.68	100
CT-C22	22	16.54	0.65	19.13	0.75	100
CT-C26	26	19.55	0.77	22.61	0.89	50
CT-C33	33	24.81	0.98	28.70	1.13	40
CT-C40	40	30.08	1.18	34.78	1.37	30
CT-C50	50	37.59	1.48	43.48	1.71	20
CT-C60	60	45.11	1.78	52.17	2.05	20

CT-S

TUBE/HOSE CLEANING PROJECTILES - HOSE
FOAM PROJECTILES FOR PNEUMATIC CLEANING
SYSTEMS



Part Number	Nominal O.D - mm	Hose/Tube min I.D - mm	Hose/Tube min I.D - inches	Hose/Tube max I.D - mm	Hose/Tube max I.D - inches	Standard pack quantity
CT-S07	7	5.26	0.21	6.48	0.26	100
CT-S10	10	7.52	0.30	8.70	0.34	100
CT-S12	12	9.02	0.36	10.43	0.41	100
CT-S14	14	10.53	0.41	12.17	0.48	100
CT-S16	16	12.03	0.47	13.91	0.55	100
CT-S18	18	13.53	0.53	15.65	0.62	100
CT-S20	20	15.04	0.59	17.39	0.68	100
CT-S22	22	16.54	0.65	19.13	0.75	100
CT-S26	26	19.55	0.77	22.61	0.89	50
CT-S33	33	24.81	0.98	28.70	1.13	40
CT-S40	40	30.08	1.18	34.78	1.37	30
CT-S50	50	37.59	1.48	43.48	1.71	20
CT-S60	60	45.11	1.78	52.17	2.05	20

CT-A

TUBE/HOSE CLEANING PROJECTILES - ABRASIVE
FOAM PROJECTILES FOR PNEUMATIC CLEANING
SYSTEMS



Part Number	Nominal O.D - mm	Hose/Tube min I.D - mm	Hose/Tube min I.D - inches	Hose/Tube max I.D - mm	Hose/Tube max I.D - inches	Standard pack quantity
CT-A07	7	5.26	0.21	6.48	0.26	100
CT-A10	10	7.52	0.30	8.70	0.34	100
CT-A12	12	9.02	0.36	10.43	0.41	100
CT-A14	14	10.53	0.41	12.17	0.48	100
CT-A16	16	12.03	0.47	13.91	0.55	100
CT-A18	18	13.53	0.53	15.65	0.62	100
CT-A22	22	16.54	0.65	19.13	0.75	100
CT-A26	26	19.55	0.77	22.61	0.89	50
CT-A33	33	24.81	0.98	28.70	1.13	40
CT-A40	40	30.08	1.18	34.78	1.37	30
CT-A50	50	37.59	1.48	43.48	1.71	20
CT-A60	60	45.11	1.78	52.17	2.05	20

HOSE CLEANING

PCK-MULTI

PROJECTILE CLEANING KIT

PROJECTILE LAUNCHER AND NOZZLES IN CASE



Part Number	Height (case closed)	Width - mm	Depth - mm	Weight
PCK-MULTI	150	470	350	5kg

REPLACEMENT SEALS

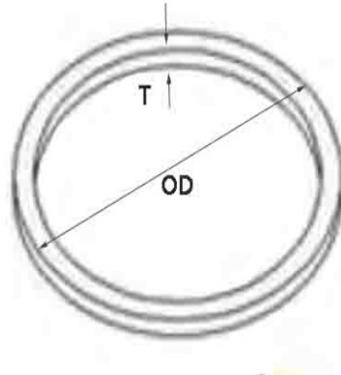
D**BONDED SEAL****SELF CENTERING BONDED (DOWTY) SEAL**

Part Number	Internal dimension - mm	Suits thread
D-02	10.4	1/8-28 BSPP
D-04	13.7	1/4-19 BSPP
D-06	17.3	3/8-19 BSPP
D-08	21.5	1/2-14 BSPP
D-10	24.3	5/8-14 BSPP
D-12	27.1	3/4-14 BSPP
D-16	33.9	1-11 BSPP
D-20	42.9	1.1/4-11 BSPP
D-24	48.4	1.1/2-11 BSPP
D-32	60.6	2-11 BSPP
D-M10	10	M10
D-M12	12	M12
D-M14	14	M14
D-M16	16	M16
D-M18	18	M18
D-M20	20	M20
D-M22	22	M22
D-M24	24	M24
D-M26	26	M26
D-M27	27	M27
D-M30	30	M30
D-M33	33	M33
D-M6	6	M6
D-M8	8	M8

RSB

BSP STUD STEEL RING

BSP STUD O-RING STEEL RETAINING RING



Part Number	Suits BSPP Male thread	Thickness - mm	Ring O.D - mm
RSB-04	1/4-19	1.5	20.2
RSB-06	3/8-19	1.6	23.9
RSB-08	1/2-14	1.7	28.7
RSB-12	3/4-14	1.8	35
RSB-16	1-11	2.3	44.4
RSB-20	1.1/4-11	2.3	54.8
RSB-24	1.1/2-11	2.3	56.9

V

BSP STUD O-RING

BSP STUD NITRILE O-RING



Part Number	Suits BSPP Male thread	Thickness - mm	Seal I.D - mm
V-02	1/8-28	2.38	6
V-04	1/4-19	2.38	11
V-06	3/8-19	2.38	14
V-08	1/2-14	2.38	19
V-12	3/4-14	2.38	24
V-16	1-11	2.5	30
V-20	1.1/4-11	3.175	38

FTS

FLARETITE SEAL

JIC 37° FLARE MALE FLARETITE CLIP ON SEAL



Part Number	Suits JIC Male thread
FTS37-07	7/16-20
FTS37-09	9/16-18
FTS37-12	3/4-16
FTS37-14	7/8-14
FTS37-17	1.1/16-12
FTS37-21	1.5/16-12
FTS37-26	1.5/8-12

IP

CAT FLANGE D-RING SEAL

D-SECTION RING INTERCHANGE WITH CAT 1P
SERIES

Part Number	Suits Caterpillar nominal size	Flange Diameter - mm	Seal Thickness - mm	Seal I.D - mm
1P-3700	1/2	31.8	5	19
1P-3702	3/4	41.3	5	25.4
1P-3703	1	47.6	5	31.9
1P-3704	1.1/4	54	5	38.2
1P-3705	1.1/2	63.5	5	44.7
1P-3709	2	79.4	5	63.9

Y

SAE FLANGE O-RING

SAE CODE 61 & CODE 62 FLANGE NITRILE O-RING

- Y-10 JIS KOMATSU STYLE FLANGE



Part Number	Suits SAE Flange Nominal Size	Seal Thickness - mm	Seal I.D - mm
Y-08	1/2	3.6	18.5
Y-10	5/8*	3.6	21.8
Y-12	3/4	3.6	24.9
Y-16	1	3.6	33
Y-20	1.1/4	3.6	37.6
Y-24	1.1/2	3.6	47.2
Y-32	2	3.6	56.6
Y-40	2.1/2	3.6	69.3

Y-HP

SAE FLANGE O-RING - HIGH PRESSURE

SAE CODE 61 & CODE 62 FLANGE NITRILE O-RING

- Y-10 JIS KOMATSU STYLE FLANGE



Part Number	Suits SAE Flange Nominal Size	Seal Thickness - mm	Seal I.D - mm
Y-12HP	3/4	3.6	24.9
Y-16HP	1	3.6	33
Y-20HP	1.1/4	3.6	37.6

Z

ORFS O-RING
ORFS MALE NITRILE O-RING



Part Number	Suits ORFS Male Thread	Seal Thickness - mm	Seal I.D - mm
Z-09	9/16-18	1.8	8.9
Z-11	11/16-16	1.8	10.2
Z-13	13/16-16	1.8	12.4
Z-16	1-14	1.8	15.6
Z-19	1.3/16-12	1.8	19.8
Z-23	1.7/16-12	1.8	24.4
Z-27	1.11/16-12	1.8	29.9
Z-32	2-12	1.8	37.8

X

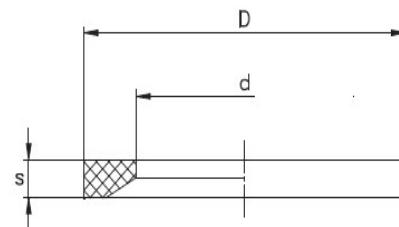
UNO STUD O-RING
UNO STUD NITRILE O-RING



Part Number	Suits UNF Male Thread	Seal Thickness - mm	Seal I.D - mm
X-07	7/16-20	1.8	8.9
X-08	1/2-20	1.8	10.5
X-09	9/16-18	2	11.9
X-12	3/4-16	2.2	16.4
X-14	7/8-14	2.5	19.2
X-17	1.1/16-12	3	23.5
X-19	1.3/16-12	3	26.6
X-21	1.5/16-12	3	29.7
X-26	1.5/8-12	3	37.5
X-30	1.7/8-12	3	43.7

ORT

ELASTOMERIC SEAL
BSP STUD CAPTIVE SEAL



Part Number	DIAMETER (D)	DIAMETER (d)	CROSS-SECTION (s)	SUITS THREAD SIZE
ORT-02	11.9	8.4	1.0	1/8 BSPP
ORT-04	16.5	11.6	1.5	1/4 BSPP
ORT-06	18.9	14.7	1.5	3/8 BSPP
ORT-08	23.9	18.5	1.5	1/2 BSPP
ORT-12	29.2	23.9	1.5	3/4 BSPP
ORT-16	35.7	29.7	2.0	1 BSPP

YU

POLYURETHANE U SEALS FOR SAE FLANGES
POLYURETHANE SEAL TO SUIT CODE 61 & 62 SAE
FLANGES

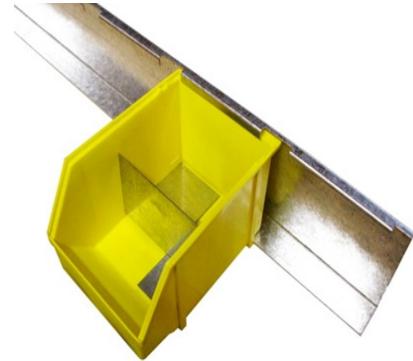


Part Number	Suits SAE Flange Nominal Size	External diameter - mm	Seal Thickness - mm (T)	Seal width-mm (S)
YU-12	3/4	31.8	3.4	3.8
YU-16	1	39.6	3.4	3.8
YU-20	1.1/4	44.5	3.4	3.8
YU-24	1.1/2	53.8	3.4	3.8
YU-32	2	63.4	3.4	3.8

STORAGE BINS

PB

STORAGE BINS AND RAILS
YELLOW PLASTIC STORAGE BINS AND
ACCESSORIES



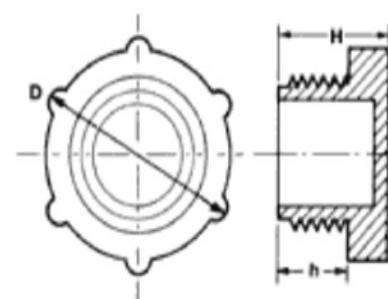
Part Number	Description	Height - mm	Width - mm	Depth - mm	Weight - kg
PB-11	Steel Divider	70	115	125	0.115
PB-12	Bin Rail	110	2340	35	3
PB-13	Plastic Bin	100	130	180	0.135

THREAD PROTECTION

PSB

BSP PLUG

BSP THREADED PLASTIC PROTECTIVE PLUG

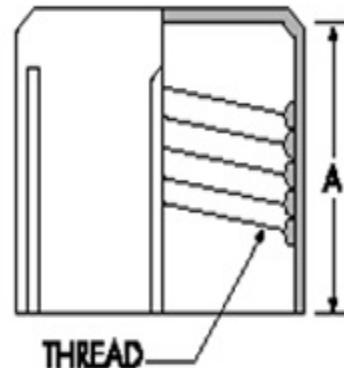


Part Number	BSPP Male Thread (A)	Thread - L1	Overall L2 - mm	Diameter CH1 - mm
P-B04	1/4-19	6.5	12.8	18.8
P-B06	3/8-19	5.5	12	22.9
P-B08	1/2-14	10.3	17.3	28
P-B12	3/4-14	11	17	32.3
P-B16	1-11	10.8	16.9	39.8

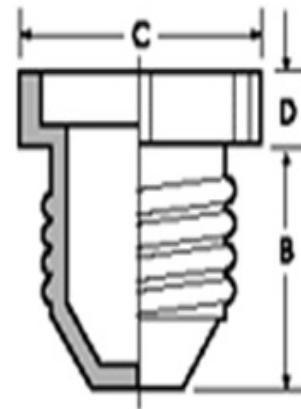
PSC

BSP CAP

BSP THREADED PLASTIC PROTECTIVE CAP



Part Number	BSPP Female Thread (A)	Overall L1 - mm
P-C04	1/4-19	10.5
P-C06	3/8-19	15.5
P-C08	1/2-14	21.2
P-C12	3/4-14	22
P-C16	1-11	26

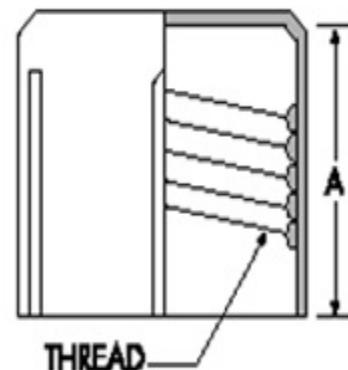
PSG**JIC PLUG****JIC THREADED PLASTIC PROTECTIVE PLUG**

Part Number	JIC Male thread (A)	Thread - L1	Head - L2	Diameter CH1 - mm
P-G06	3/8-24	11.68	4.57	12.7
P-G07	7/16-20	13.46	4.83	15.75
P-G08	1/2-20	13.46	6.35	17.27
P-G09	9/16-18	12.7	6.35	20.57
P-G12	3/4-16	19.05	6.35	23.88
P-G14	7/8-14	22.1	6.35	26.93
P-G17	1.1/16-12	22.61	6.35	31.75
P-G21	1.5/16-12	23.62	6.35	38.1
P-G26	1.5/8-12	23.62	6.35	50.8

PSJ

JIC CAP

JIC THREADED PLASTIC PROTECTIVE CAP

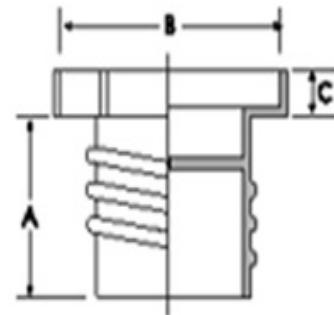


Part Number	JIC Female thread (A)	Overall L1 - mm
P-J06	3/8-24	11.94
P-J07	7/16-20	11.94
P-J08	1/2-20	11.94
P-J09	9/16-18	13.46
P-J12	3/4-16	14.48
P-J14	7/8-14	17.27
P-J17	1.1/16-12	19.05
P-J21	1.5/16-12	21.34
P-J26	1.5/8-12	23.1

PSR

ORFS PLUG

ORFS THREADED PLASTIC PROTECTIVE PLUG

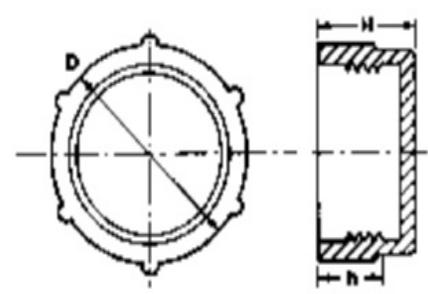


Part Number	UNF Male Thread (A)	Thread - L1	Head - L2	Diameter CH1 - mm
P-R09	9/16-18	12.2	6.35	17.3
P-R11	11/16-16	11.2	6.35	22.1
P-R13	13/16-16	12.7	6.35	23.9
P-R16	1-14	15	6.35	29.5
P-R19	1.3/16-12	16	6.35	33.8
P-R23	1.7/16-12	19	6.35	41.4

PST

ORFS CAP

ORFS THREADED PLASTIC PROTECTIVE CAP



Part Number	UNF Female Thread (A)	Thread - L1	Head - L2	Diameter CH1 - mm
P-T09	9/16-18	9.5	13.7	16.5
P-T11	11/16-16	11	15	20
P-T13	13/16-16	9.3	15.3	23.3
P-T16	1-14	12	17.2	27.6
P-T19	1.3/16-12	13	19.1	32.7
P-T23	1.7/16-12	15.2	21.7	38.9

PV

SAE C61 FLANGE CAP

SAE CODE 61 FLANGE PLASTIC PROTECTIVE CAP



Part Number	Nominal SAE Flange Size	Internal diameter - mm	Internal depth - mm
P-V08	1/2	30.2	9.91
P-V12	3/4	38.35	11.05
P-V16	1	44.7	11.81
P-V20	1.1/4	51.05	11.81
P-V24	1.1/2	60.58	11.81
P-V32	2	71.37	14.86

PVH

SAE C62 FLANGE CAP

SAE CODE 62 FLANGE PLASTIC PROTECTIVE CAP



Part Number	Nominal SAE Flange Size	Internal diameter - mm	Internal depth - mm
P-VH12	3/4	40.89	13.87
P-VH16	1	47.24	14.68
P-VH20	1.1/4	53.59	15.47
P-VH24	1.1/2	63.12	17.53
P-VH32	2	78.99	17.53

PVC

THREAD CAP (PVC)

PVC HEAT SHRINK PROTECTIVE CAP



Part Number	Internal diameter - mm
PVC CAP 25MM	25
PVC CAP 28MM	28
PVC CAP 31MM	31
PVC CAP 34MM	34
PVC CAP 38MM	38
PVC CAP 46MM	46

THREAD SEALANT**X005**

THREAD TAPE



Part Number	PACKAGING
X005	ROLL

CABLE TIES

CABLE TIE

GENERAL PURPOSE CABLE TIE



Part Number	Width (mm)	Length (mm)
CT-5	4.8	300
CT-5L	7.6	380

WATERBLAST ACCESSORIES

WBC

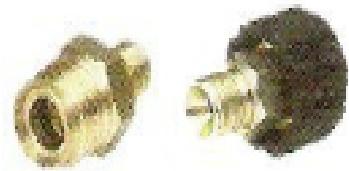
WATERBLAST QUICK RELEASE COUPLINGS



Part Number	Base size	Port Threadform	Thread size	Rated W.P (Bar)	Flow rate (L/m)
WBC-04F	06	BSPP Socket	1/4 - 19	250	30
WBC-04M	06	BSPP Socket	1/4 - 19	250	30
WBC-06F	06	BSPP Socket	3/8 - 19	250	30
WBC-06M	06	BSPP Socket	3/8 - 19	250	30

WBSB

WATERBLAST SWIVEL COUPLINGS



Part Number	Spigot size	Connection Threadform	Thread size	Port Threadform	Thread Size	Rated W.P (Bar)	Flow rate (L/m)
WBSB-F04	11mm	BSPP Female	1/2 - 14	BSPP Male	1/4 - 19	250	40
WBSB-F06	11mm	BSPP Female	1/2 - 14	BSPP Male	3/8 - 19	250	40
WBSB-M04	11mm	BSPP Male	1/2 - 14	BSPP Male	1/4 - 19	250	40
WBSB-M06	11mm	BSPP Male	1/2 - 14	BSPP Male	3/8 - 19	250	40

WBSE

WATERBLAST SWIVEL COUPLINGS



Part Number	Spigot size	Connection Threadform	Thread size	Port Threadform	Thread Size	Rated W.P (Bar)	Flow rate (L/m)
WBSE-F04	11mm	BSPP Female	1/2 - 14	BSPT Socket	1/4 - 19	250	40
WBSE-F06	11mm	BSPP Female	1/2 - 14	BSPT Socket	3/8 - 19	250	40
WBSE-M04	11mm	BSPP Male	1/2 - 14	BSPT Socket	1/4 - 19	250	40
WBSE-M06	11mm	BSPP Male	1/2 - 14	BSPT Socket	3/8 - 19	250	40