Oil & Lubricants

Hydraulink®

Technical Information

Section 1

Hydraulink Hose and Fittings

PRODUCT SELECTION

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.

Hydraulink Hose and Fittings

PRODUCT SELECTION

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 impulsing?
- ➢ 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 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

PRODUCT SELECTION

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 impulsing 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.

Hydraulink Hose and Fittings

THREAD IDENTIFICATION

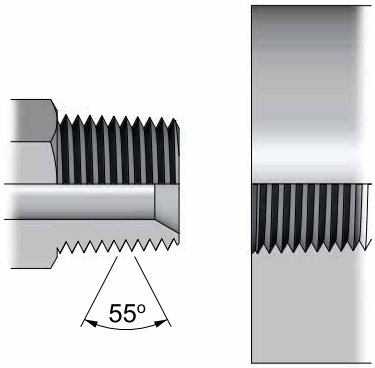
B.S.P.T. - BRITISH STANDARD PIPE TAPER

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*

Hydraulink Hose and Fittings

THREAD IDENTIFICATION

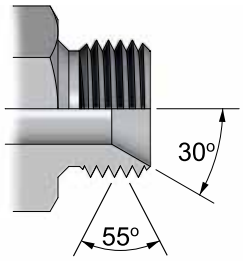
B.S.P.P. - BRITISH STANDARD PIPE PARALLEL

Thread Angle: 55°

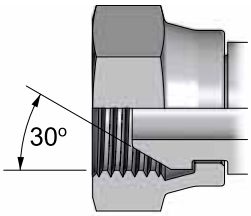
The British Standard Pipe Parallel (BSPP) male is typically coned 30° and will mate with either a BSPP swivel nut female or a BSPP female port.

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).



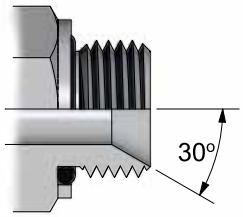
BSPP male



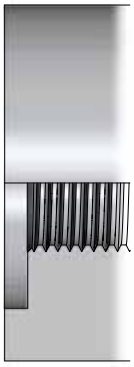
BSPP swivel nut female

Thread Size & TPI	Male Thread O.D. BSPP	Female Thread I.D. BSPP	Torque Settings BSPP nuts
1/8-28	9.7	8.5	12 Nm
1/4-19	13.1	11.4	26 Nm
3/8-19	16.6	14.9	47 Nm
1/2-14	20.9	18.6	79 Nm
5/8-14	22.9	20.6	104 Nm
3/4-14	26.4	24.1	128 Nm
1-11	33.2	30.2	160 Nm
1.1/4-11	41.9	38.9	200 Nm
1.1/2-11	47.8	44.8	270 Nm
2-11	59.6	56.6	350 Nm

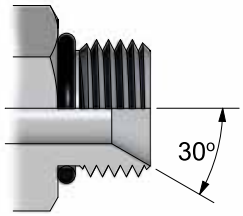
N.B. Torque values are nominal and supplied as a guide only.



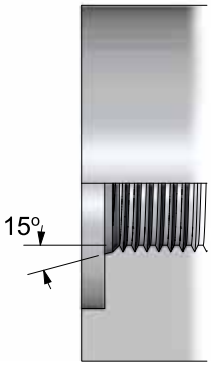
BSPP male with captive o-ring seal



BSPP female port (spot-faced)



BSPP male with o-ring seal



BSPP female port (chamfered)

Hydraulink Hose and Fittings

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

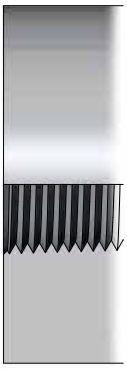
Taper: 1 in 16 by diameter.

Thread Angle: 60°

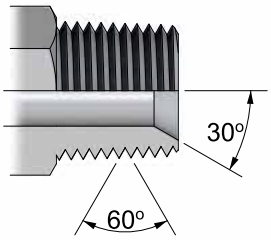
The National Pipe Taper Fuel (NPTF) male is coned 30° and will mate with the NPTF female port (taper), the National Pipe Straight Mechanical (NPSM) female (swivel nut female with 30° sealing cone), or the National Pipe Straight Fuel (NPSF) female port (parallel).

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

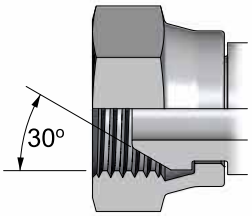
Thread Size & TPI	Male Thread O.D.	Female Thread I.D.	
	NPTF	NPTF	NPSF/SM
1/8-27	10.0	8.6	8.7
1/4-18	13.3	11.2	11.4
3/8-18	16.7	14.7	14.9
1/2-14	20.8	18.2	18.8
3/4-14	26.1	23.5	23.9
1-11.1/2	32.7	29.5	30.2
1.1/4-11.1/2	41.4	38.3	39.1
1.1/2-11.1/2	47.5	44.4	45
2-11.1/2	59.3	56.2	57



NPTF female port (taper)



NPTF male (taper)



NPSM swivel nut female

NPSF female port (parallel)

Hydraulink Hose and Fittings

THREAD IDENTIFICATION

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

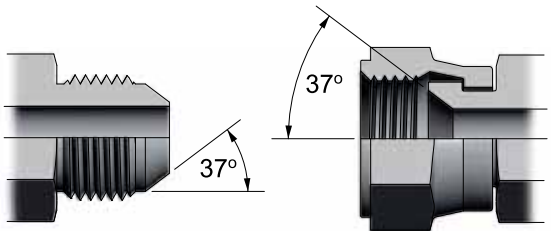
J.I.C. and U.N.“O”-Ring threads are both of the Unified National Form.

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.

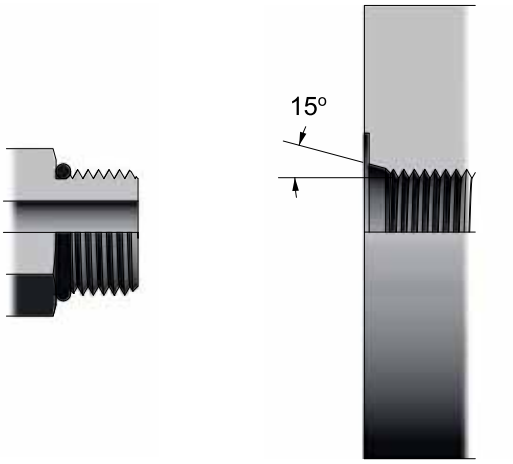
U.N.“O”-Ring refers to the thread type and “O”-Ring for sealing. The female U.N.O port has a chamfer to accept the o-ring.

Thread Size & TPI	Female Thread I.D.	Tube O.D.	Torque Settings JIC	Torque Settings 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

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



JIC male **JIC swivel nut female**



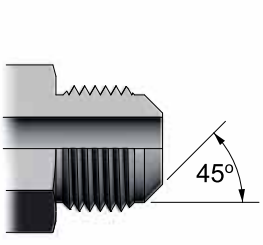
UNO male **UNO female port (chamfered)**

Hydraulink Hose and Fittings

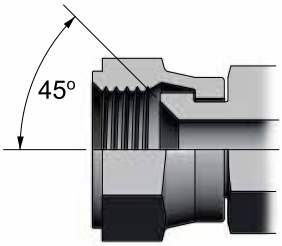
THREAD IDENTIFICATION

S.A.E. - SOCIETY OF AUTOMOTIVE ENGINEERS

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



SAE male



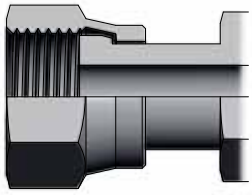
SAE swivel nut female

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

O.R.F.S. - O-RING FACE SEAL

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.

ORFS male



ORFS swivel nut female

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.

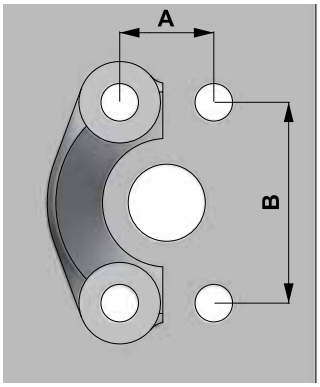
THREAD IDENTIFICATION

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

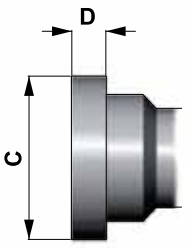
These connections utilise an “O”-Ring for sealing and are widely used for connecting to pump and motor parts as well as end terminations for pipe runs.

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	Code 61	Code 62	Code 61	Code 62	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.

Hydraulink Hose and Fittings

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

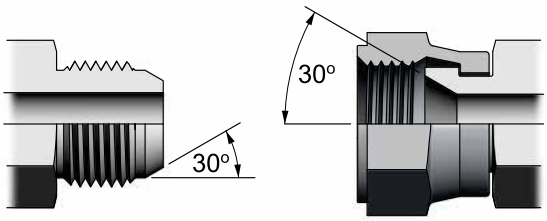
"O"-Ring Flanges:

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

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

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

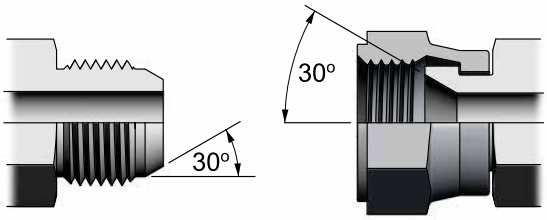
** denotes interchange sizes between JIS and Komatsu.*



Type F JIS male

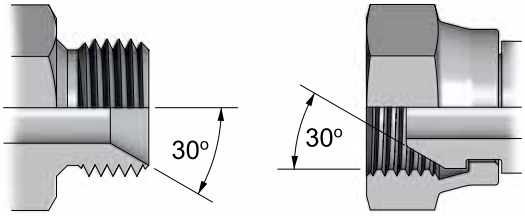
For thread data please refer to BSPP section

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

Hydraulink Hose and Fittings

THREAD IDENTIFICATION

D.I.N. METRICS 24° CONE SYSTEM

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

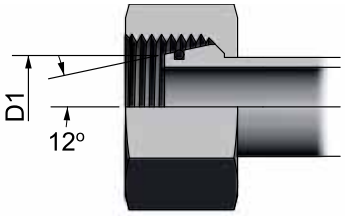
Series LL;	Extra Light, up to 100 bar
Series L;	Light up to 250 bar
Series S;	Heavy up to 640 bar

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.

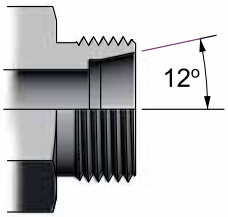
N.B: Rated coupling pressures are subject to the design pressures of the tube or hose being used.

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 cuttting ring and nut. Hose can also be connected directly to tube by use of a hose tail with the D.I.N. Male form

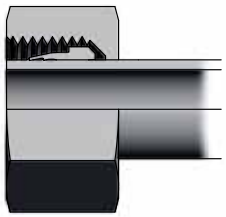
The male form will accept all three female styles shown (right).



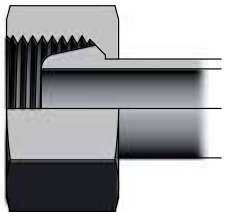
DIN 24° cone female with o-ring



DIN 24° cone male



DIN cutting ring and nut on tube



DIN female swivel nut with spherical seat

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.*

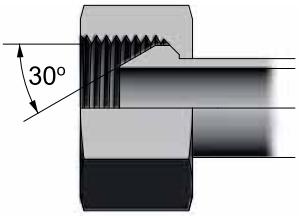
Hydraulink Hose and Fittings

THREAD IDENTIFICATION

D.I.N. METRICS 60° CONE SYSTEM

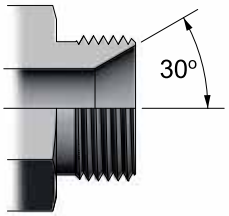
This series utilises a 60° cone seating angle and is used for the connection of hose assemblies and tube. It differs from the 24° series in that the threads are predominately 1.5mm pitch and there is no light or heavy pressure ranges.

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.

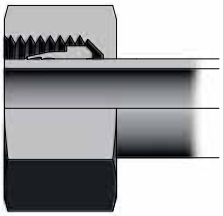


DIN 60° cone female

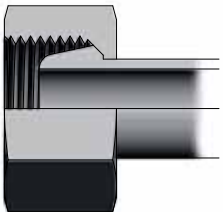
THREAD SPECIFICATIONS		
Thread O.D. & Pitch	Female Thread I.D.	Tube O.D.(mm)
M10-1.0	9.0	5
M12-1.5	10.5	6
M14-1.5	12.5	8
M16-1.5	14.5	10
M18-1.5	16.5	12
M22-1.5	20.5	15
M26-1.5	24.5	18
M30-1.5	28.5	22
M38-1.5	36.5	28
M45-1.5	43.5	35
M52-2.0	56.5	42



DIN 60° cone male



DIN cutiing ring and nut on tube

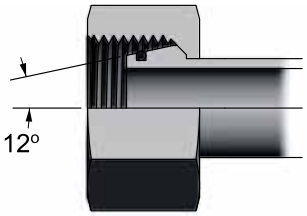


DIN female swivel nut with spherical seat

THREAD IDENTIFICATION

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

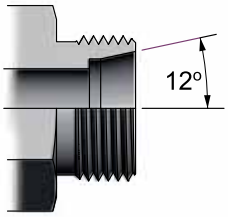
The I.S.O. series of couplings is similar to the D.I.N. light and heavy in function. The male has a 24° included angle sealing cone and a recessed counter bore for locating the tube when used in conjunction with a cutting ring and nut. The male will also accept a swivel nut female with either a cone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



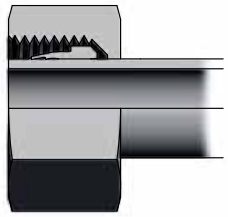
ISO (24° cone) female with o-ring

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

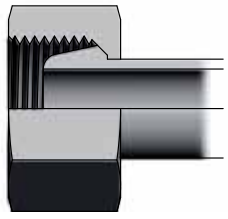
** Interchange with D.I.N. Light*
*** Interchange with D.I.N. Heavy*



ISO (24° cone) male



ISO cutting ring and nut on tube



ISO female swivel nut with spherical seat

Hydraulink Hose and Fittings

THREAD IDENTIFICATION

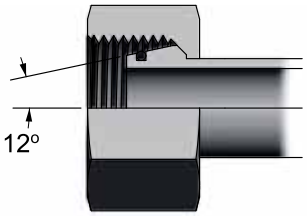
FRENCH METRICS (GAZ & MILLIMETRIQUE SERIES)

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.

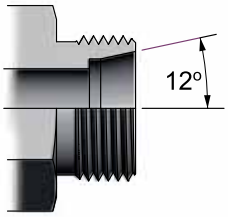
The Gaz and Millimetrique series are identical in all respects except for the O.D. of the tube:

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

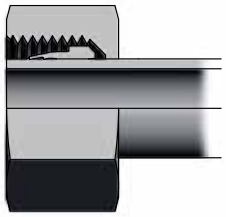


French 24° cone female with o-ring

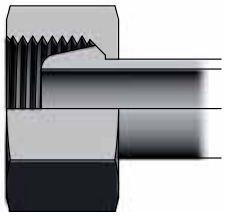
THREAD SPECIFICATIONS LIGHT (L) SERIES			
Thread O.D. & Pitch	Female Thread I.D.	Diameter GAZ	Diameter Millimetrique
M12-1.0	11.0	-	6
M14-1.5	12.5	-	8
M16-1.5	14.5	-	10
M18-1.5	16.5	-	12
M20-1.5	18.5	13.25	14
M22-1.5	20.5	-	15
M24-1.5	22.5	16.75	16
M27-1.5	25.5	-	18
M30-1.5	28.5	21.25	22
M33-1.5	31.5	-	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

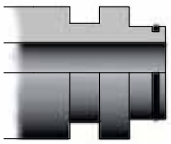
Hydraulink Hose and Fittings

THREAD IDENTIFICATION

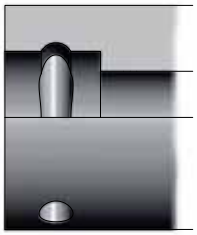
STAPLE-LOK COUPLINGS

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.

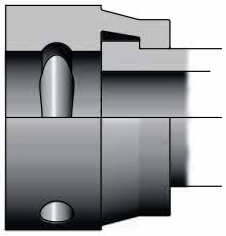


Staple-lok male



Staple-lok fixed female

THREAD SPECIFICATIONS					
Coupling Dash Size	Imperial Size	Male O.D. inch	Male O.D. mm	Female I.D. inch	Female I.D. 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



Staple-lok swivel female

Staple-lok staple

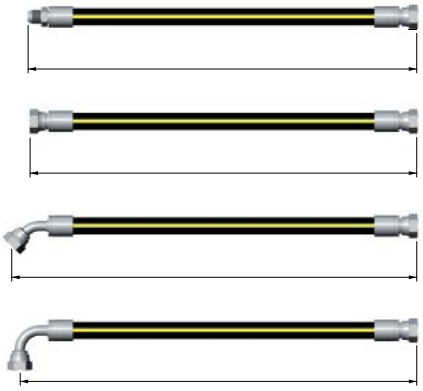
Hydraulink Hose and Fittings

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.



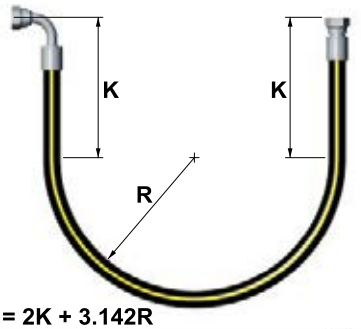
BENT HOSE ASSEMBLY LENGTH

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”.

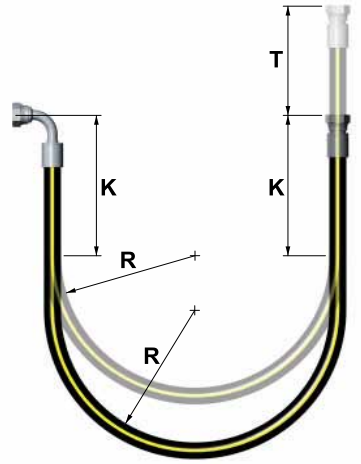
Hose I.D.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1.1/4	1.1/2	2
K (mm)	110	130	130	160	180	210	210	260	260	260	310



Length = 2K + 3.142R

Dynamic Installations

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



Length = 2K + 3.142R + T

Off-Set Angle Measurement

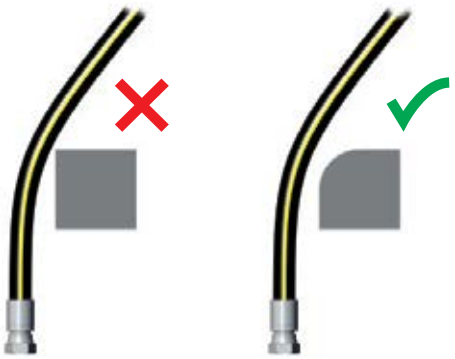
Place hose assembly in line of sight position with coupling furthest away facing upwards. Determine off-set angle by comparing relative position of closest coupling to the far coupling in a clockwise direction.

Hydraulink Hose and Fittings

HOSE INSTALLATION RECOMMENDATIONS

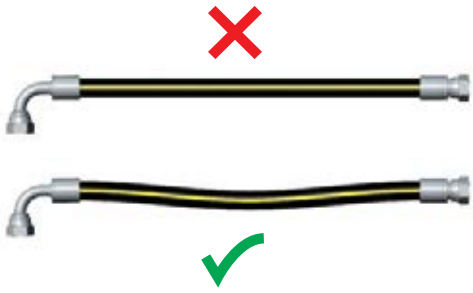
1. Hose Protection
Protect the hose cover from damage such as abrasion, erosion, snagging, and cutting. Where possible, route hose to reduce abrasion from hose rubbing other hose or objects that may abrade it (Fig. 1). Special abrasion-resistant hoses and hose guards are available for additional protection.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

Fig. 1



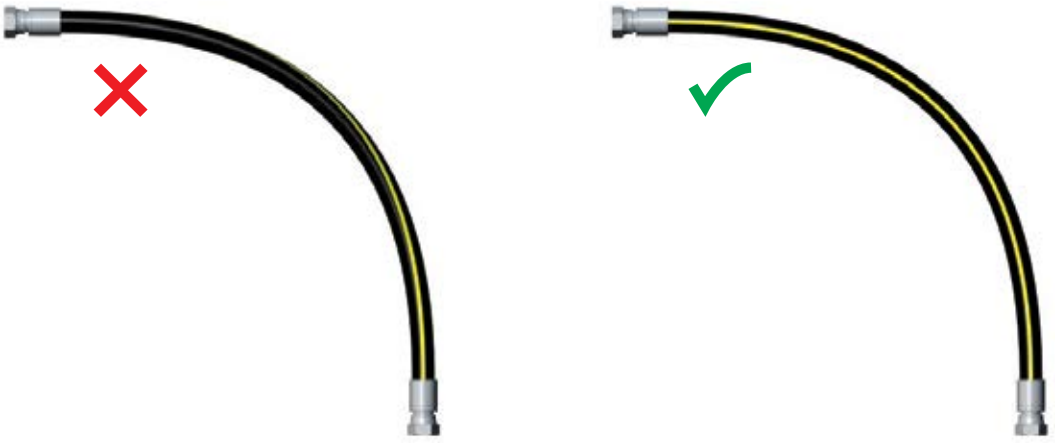
2. Hose And Machine Tolerances
Avoid tension on hose assemblies and adaptors. Design hose to allow for changes in length due to machine motion and tolerances (Fig. 2). Failure to do so may result in seal or assembly failure.

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

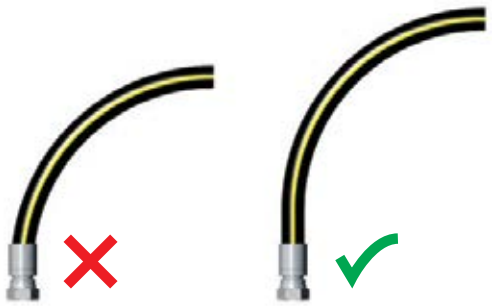


Fig. 4b

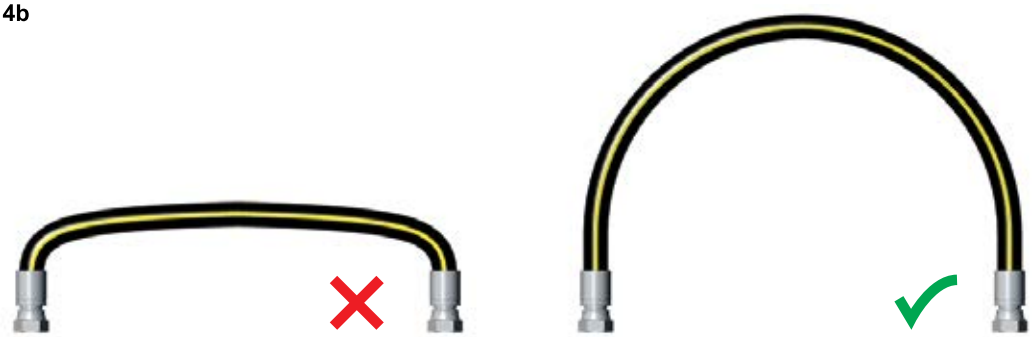


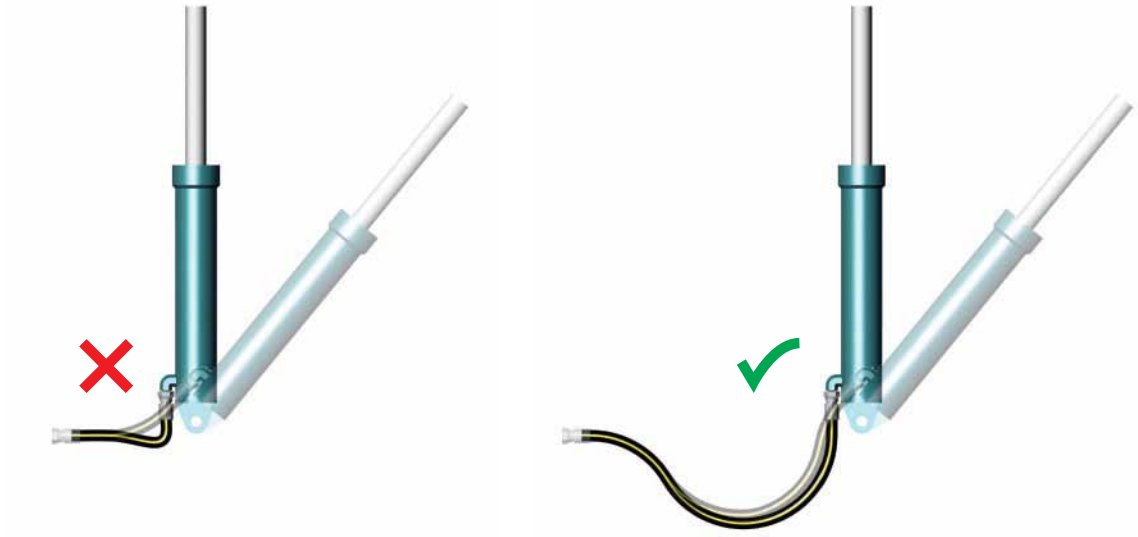
Fig. 4c

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 occuring that are smaller than the minimum bend radius (Fig. 6a).

Fig. 6a



HYDRAULIC

OIL ISO 32

ISO GRADE 32 HYDRAULIC OIL

- Performance Standards: ISO 11158 category HM
- ISO 6743-4 category HM
- ANFOR NFE 48 603 HM
- ANFOR NFE 48-691 (wet)
- SS155434
- SEB 181 222
- VDMA 24318
- DIN 51 524 part 2 HLP
- CINCINNATI MILACRON P 70
- DENISON HF-0, HF-1, HF-2
- VICKERS I-286-S, M-2950-S
- ASTM D 6158
- US Steel 126, 136, 127
- RACINE variable volume vane pumps
- Commercial Hydraulics
- Eaton Brochure 03-401-2010
- Description: Blended from high-quality mineral oils possessing a high viscosity index and low pour point giving long and trouble free service life and will be chemically stable under severe operating conditions. Can be used for all types of hydraulic systems, verins working in very severe conditions. Construction machinery, agricultural machinery and in the industrial sector. Suitable for all types of pumps: Axial pistons, radial pistons, gear systems, blades. Formulated using paraffinic, high viscosity index mineral oil, augmented with performance additives including a zinc anti-wear treatment.

Part Number	Size (Litre)
OIL ISO 32 200L	200
OIL ISO 32 20L	20
OIL ISO 32 5L	5

OIL ISO 46

ISO GRADE 46 HYDRAULIC OIL

- Performance Standards: ISO 11158 category HM
- ISO 6743-4 category HM
- ANFOR NFE 48 603 HM
- ANFOR NFE 48-691 (wet)
- SS155434
- SEB 181 222
- VDMA 24318
- DIN 51 524 part 2 HLP
- CINCINNATI MILACRON P 70
- DENISON HF-0, HF-1, HF-2
- VICKERS I-286-S, M-2950-S
- ASTM D 6158
- US Steel 126, 136, 127
- RACINE variable volume vane pumps
- Commercial Hydraulics
- Eaton Brochure 03-401-2010
- Description: Blended from high-quality mineral oils possessing a high viscosity index and low pour point giving long and trouble free service life and will be chemically stable under severe operating conditions. Can be used for all types of hydraulic systems, verins working in very severe conditions. Construction machinery, agricultural machinery and in the industrial sector. Suitable for all types of pumps: Axial pistons, radial pistons, gear systems, blades. Formulated using paraffinic, high viscosity index mineral oil, augmented with performance additives including a zinc anti-wear treatment.

Part Number	Size (Litre)
OIL ISO 46 200L	200
OIL ISO 46 20L	20
OIL ISO 46 5L	5

OIL ISO 68

ISO GRADE 68 HYDRAULIC OIL

- Performance Standards: ISO 11158 category HM
- ISO 6743-4 category HM
- ANFOR NFE 48 603 HM
- ANFOR NFE 48-691 (wet)
- SS155434
- SEB 181 222
- VDMA 24318
- DIN 51 524 part 2 HLP
- CINCINNATI MILACRON P 70
- DENISON HF-0, HF-1, HF-2
- VICKERS I-286-S, M-2950-S
- ASTM D 6158
- US Steel 126, 136, 127
- RACINE variable volume vane pumps
- Commercial Hydraulics
- Eaton Brochure 03-401-2010
- Description: Blended from high-quality mineral oils possessing a high viscosity index and low pour point giving long and trouble free service life and will be chemically stable under severe operating conditions. Can be used for all types of hydraulic systems, verins working in very severe conditions. Construction machinery, agricultural machinery and in the industrial sector. Suitable for all types of pumps: Axial pistons, radial pistons, gear systems, blades. Formulated using paraffinic, high viscosity index mineral oil, augmented with performance additives including a zinc anti-wear treatment.

Part Number	Size (Litre)
OIL ISO 68 18L	18
OIL ISO 68 200L	200

MOTULTECH RUBRIC BIO

ISO GRADE 46 HYDRAULIC OIL
BIODEGRADABLE

- Performance Standards: ISO 6743-4
- ISO 15380
- DIN 51524 Part 2
- DIN 51524 Part 3
- Approvals: European Ecolabel under N° DE/027/027
- Ecolabel Blaue Engel under rubric N° RAL-UZ 178
- Bosch Rexroth under number RE 90221-01
- Waste code AW 130112
- Properties & Advantages: Very fluid at low temperatures allowing easy start up.
- Excellent shear resistance allowing use at very high pressure.
- Excellent anti-wear properties which increase the pumps life.
- Harmless to elastomers.
- High biodegradability level >90% in 21 days.
- High resistance to oxidation: Long drain oil.
- Anti-corrosion, Anti-rust, Anti-foam.
- Applications: Motul Rubric BIO 46 is a 100% synthetic biodegradable hydraulic oil using high performance Esters. Specially developed for all hydraulic systems working in severe conditions, operating at high pressure within important temperature variation and requiring an environmentally friendly Ecolabel lubricant.

Part Number	Size (KG)
100436	190
104418	20

FOOD GRADE HYDRAULIC

ISO GRADE 32 HYDRAULIC OIL
NSF H1 FOOD GRADE

- Applications: Food Grade Hydraulic Fluids are made from synthetic hydrocarbons (Poly Alph Olefins) and special additive packages recommended for hydraulic systems in food processing plants where incidental food contact may occur. They are also recommended as lubricants for bearings, chains, and valves in canning and bottling machinery etc. They may be applied by various methods including bath reservoir, force feed lubricator or circulating pump.
- Meets NSF H1 approval where incidental food contact can occur.
- All fluid components comply with FDA 21 CFR 178.3570 (Lubricants with incidental food contact)
- Advantages: High viscosity index for improved system performance.
- Provides far longer service life than most mineral based lubricants.
- Extended equipment life.
- Low pour point -55°
- Compatible with mineral oils and most synthetic oils.
- Greatly reduced fire and explosion hazard.
- Meet all requirements of FDA Regulation 21 CFR 178.3570

Part Number	Size (Litre)
OIL-FG32 20L	20

HDDO TRANSMISSION

MOTUL HD 80W-90

GEARBOX & DIFFERENTIAL LUBRICANT
MINERAL - EXTREME PRESSURE

- Standards: API GL-4 and GL-5 / MIL-L-2105D
- Applications: All mechanical transmission synchronised or not synchronised gearboxes, gearbox/differential, transfer gearbox and hypoid differentials without limited slip system operating under shocks, heavy loads and low revolution speed or moderate loads and high revolution speed. Extreme pressure lubricant for an efficient anti wear protection.

Part Number	Size (Litre)
103996	20

GEAR OIL 80W-90

GEARBOX & DIFFERENTIAL LUBRICANT
GL-5

- Standards: API GL-4 and GL-5 / MIL-L-2105D
- Applications: For the lubrication of car, truck, and tractor differential and final drives, transfer and steering gearboxes, and manual transmissions.
- Benefits: Special oxidation-resistant paraffinic base oils combined with high-performance extreme pressure (EP) additives are formulated in Gear Oils 80W90 to ensure long service life to transmission drive lines. .

Part Number	Size (Litre)
OIL-80W90 4L	4

DEXRON III

AUTOMATIC TRANSMISSION & POWER STEERING

- Product Description: DX3 is an automatic transmission fluid (ATF) for use in older automatic transmissions requiring Dexron® IIIH or Mercon® performance. It is also suitable for use in transmissions requiring other common performance levels such as Allison C4 and TES-389, and power steering, pump and hydraulic applications.
- Specifications: DX3 meets the following demanding performance requirements
- Allison TES-389B and C-4
- Ford Mercon® and XL-12
- General Motors Dexron® IIIH
- Volvo 97325, 97335 and 97340
- ZF TE-ML 05L, 09L and 21L
- TASA
- Auto Trak II
- BTR 95LE and BTR 85LE
- Voith H55.6335.xx
- Sperry-Vickers, Denison and Sundstrand hydraulic pump systems
- Power steering fluid applications and many hydraulic systems and smaller rotary air compressors

Part Number	Size (Litre)
OIL-DX3 20L	20

CLEANERS & DEGREASERS

HYDRAULINK FLEETWASH

BIODEGRADABLE & PH NEUTRAL

- Product Description: Fleetwash is a premium quality, general purpose cleaner with the added benefits of being biodegradable and pH neutral. Fleetwash has superior cleaning ability, enabling cleaning of dirt, oil, and grease from cars, trucks, earthmoving equipment and other machinery. Its versatility also allows for cleaning of floors and any other surface requiring removal of soils.
- Features & Benefits: Opaque blue liquid
- Includes powerful oil and grease cutting additives.
- Incorporates low toxicity/biodegradable additives.
- pH neutral formulation that not stain or dull highly polished surfaces.

Part Number	Size (Litre)
HL-FW20L	20
HL-FW4L	4

HYDRAULINK FLEETSHIN

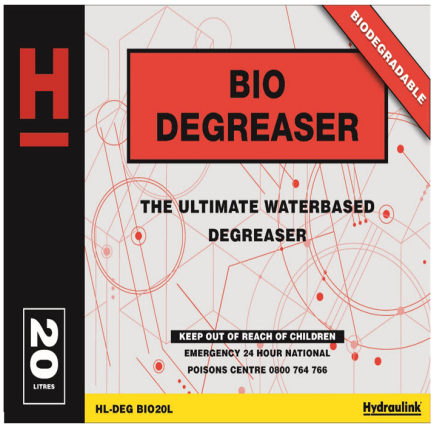
WASH & WAX

- Product Description: Fleetshine is a premium quality wash 'n' wax detergent specially formulated for cars, utes and trucks. Fleetshine provides effective removal of road film, dirt and grime and incorporates wax to create a long lasting shine. Fleetshine is biodegradable and pH neutral so will not dull or stain paint, polished chrome or aluminium.
- Features & Benefits: Opaque lime green liquid
- Premium quality formula
- Incorporates low toxicity/biodegradable additives.
- pH neutral formulation that not stain or dull highly polished surfaces.

Part Number	Size (Litre)
HL-FS20L	20
HL-FS4L	4

HYDRAULINK BIO DEGRE

BIODEGRADABLE



- Product Description: Bio Degreaser is a One Stop Shop heavy duty product formulated to clean dirt, oil and grease from truck bodies, undercarriages and engines. Bio Degreaser's superior cleaning ability, also allows for removal of heavy soils from earth moving equipment, floors, curtainsiders and other surfaces requiring an extra-powerful cleaner/degreaser.
- Features & Benefits: Clear bright red liquid
- Incorporates low toxicity/biodegradable additives
- Incorporates powerful oil/grease cutting additives

Part Number	Size (Litre)
HL-DEG BIO20L	20
HL-DEG BIO4L	4

HYDRAULINK HD DEGREA

NON AROMATIC SOLVENT

- Product Description: HD Degreaser is a non aromatic solvent formulated to clean tools, parts and machinery. In comparison to conventional kerosene/turpentine-based degreasers, HD Degreaser is environmentally friendly, safer to use and under current legislation is not classified as a flammable solvent. HD Degreaser is suitable for degreasing metal parts and equipment and can be applied by spray, swab or in a parts bath. HD Degreaser can be rinsed off and dried or left to air-dry on the parts/equipment to provide short-term rust prevention.
- Features & Benefits: Clear bright colourless liquid
- Non aromatic solvent
- Not classified as a Class 3 flammable product under current legislation
- Flexible application and the ability to provide rust protection for up to 1 week

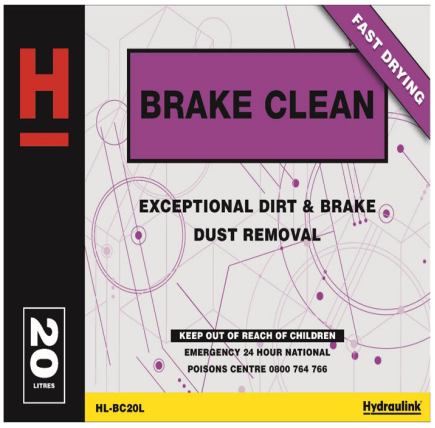
Part Number	Size (Litre)
HL-DEG HD20L	20
HL-DEG HD4L	4

HYDRAULINK HAND CLEA
CITRUS BASED

- Product Description: Hand Cleaner is a highly effective, biodegradable citrus-based hand cleaner designed to remove dirt, grime, oil and grease. Formulated with a grainy texture and powerful additives including d-limonene to aid in fast removal of soils, Hand Cleaner is also pH neutral and contains emollients to protect and condition hands against drying out.
- Features & Benefits: Yellow paste
- Powerful oil and grease cutting additives
- Contains emollients that conditions and protects, to avoid drying and cracking hands
- Biodegradable citrus based formula

Part Number	Size (Litre)
HL-HC20L	20
HL-HC5L	5
HL-HC5LP	5

HYDRAULINK BRAKE CLE
FAST DRYING



- Product Description: Brake Clean is a fast drying solvent designed to remove brake dust and pads with the added ability to remove surface moisture. Applicable for all types of brake pads and discs. Apply by brush or spray. NOTE: Brake Clean is EXTREMELY FLAMMABLE. Use only in well ventilated areas away from any source of ignition.
- Features & Benefits: Clear bright light colourless liquid
- Light solvent carrier base enables fast evaporation of the solvent from the brake pad or disc.
- Ability to remove surface moisture minimises the propensity for surface rust to form on parts

Part Number	Size (Litre)
HL-BC20L	20
HL-BC4L	4

BRAKE CLEAN

HYDRAULINK BRAKE & INDUSTRIAL PARTS CLEANER
600ML

- Applications: Hydraulink Brake and Industrial Parts Cleaner quickly removes grease and oil. Components can often be cleaned without having to disassemble them. Hydraulink Brake and Industrial Parts Cleaner is non-corosive, non-staining and evaporates quickly leaving no residue. Hydraulink Brake and Industrial Parts Cleaner can be used on brakes, industrial machinery, tools and workshop equipment.

Part Number	Size (Litre)
BRAKE CLEAN	0.6

MOTUL BRAKE CLEAN 84

MOTUL BRAKE & PARTS CLEAN
840ML

- Applications: Motul Parts Clean Moderate Dry is a multipurpose non-chlorinated degreaser. It has longer drying time and stronger mist from spray nozzle than of Parts Clean Quick Dry. It is specially formulated to effectively degrease metal parts with oil and brake fluid residues.

Part Number	Size (Litre)
BRAKE CLEAN 840	0.84

GREASE

SUPER MOLYTAC

GREY/BLACK LITHIUM COMPLEX EP GREASE
3% MOLYBDENUM DISULPHIDE

- Advantages: Exceptional oxidation, rust and corrosion resistance
- Excellent resistance to water wash out, even at elevated temperatures
- Compatible with most grease except those gelled with bentone and aluminium complex thickeners
- Resists SQUEEZE OUT from surfaces requiring lubrication under heavy load conditions
- Wide temperature range -20°C to 180°C
- Description: SUPER MOLYTAC is a superior multi-purpose molybdenum disulphide containing grease possessing excellent lubrication characteristics suitable for use in a wide range of anti-friction and plain bearings, ball joints, CV joints, kingpins, and gears and couplings in automotive, marine, agricultural and industrial applications.

Part Number	Size (kg)
GREASE M 450GM	0.45