




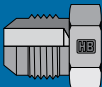











# HOSE / BOX

## Hydraulic Guide

- Identify hydraulic fittings & adapters
- Hydraulic oil basics
- How to identify hydraulic hose

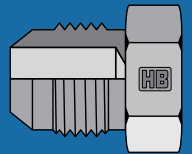
## Product Lineup

	 Hydraulic Emergency Kit	 Hydraulic Fittings Kit	 Cap & Plug Kit	 Individual Fittings	 Premade Hoses
JIC / 37° FLARE 	●	●	●	●	●
NPT / PIPE 	●	●	●	●	●
O-RING FACE SEAL 	●	●	●	●	●
O-RING BOSS 	INCLUDED IN   	INCLUDED IN   	●	●	
BRITISH STANDARD	COMING SOON	COMING SOON	COMING SOON	COMING SOON	COMING SOON
METRIC	COMING SOON	COMING SOON	COMING SOON	COMING SOON	COMING SOON

# HOSE / BOX

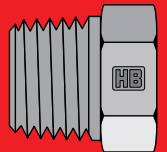
## Hydraulic Thread ID Guide

JIC



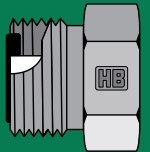
Page 4

NPT / PIPE



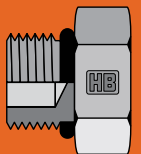
Page 5

O-RING FACE SEAL



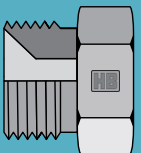
Page 6

O-RING BOSS



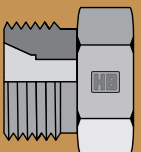
Page 7

BRITISH STANDARD



Page 8

METRIC



Page 9

HYDRAULIC BASICS



Page 10

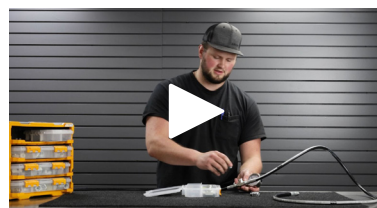
# EVERYTHING YOU NEED TO KNOW ABOUT HYDRAULICS, ALL IN ONE PLACE. **HOSEBOX.COM**

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Fitting and adapter finder  
Thread Identification and Measurement  
How to blogs  
How to video library

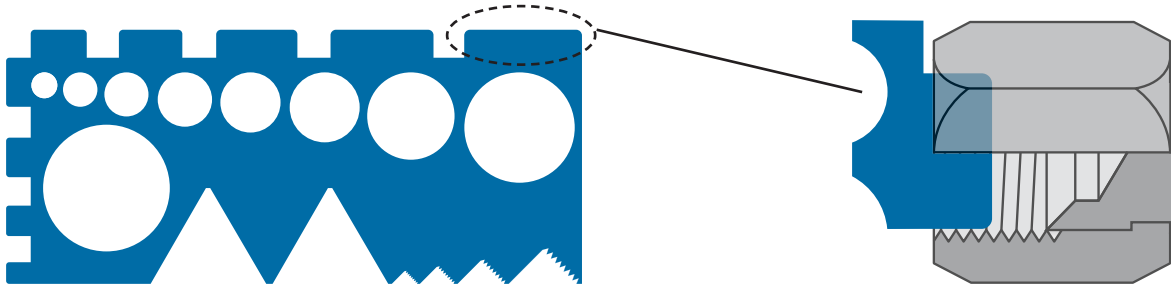


[www.Hosebox.com](http://www.Hosebox.com)



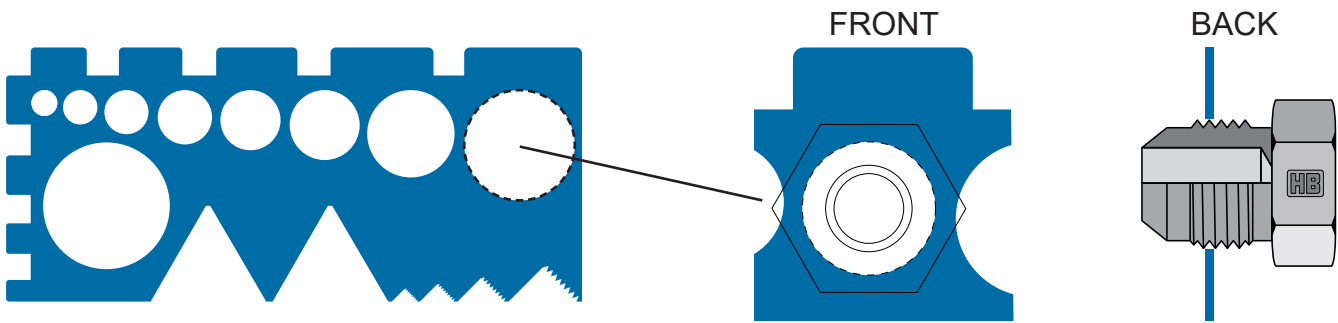
# HOW TO USE: HYDRAULIC FITTINGS THREAD GAUGES

## FEMALE THREADS



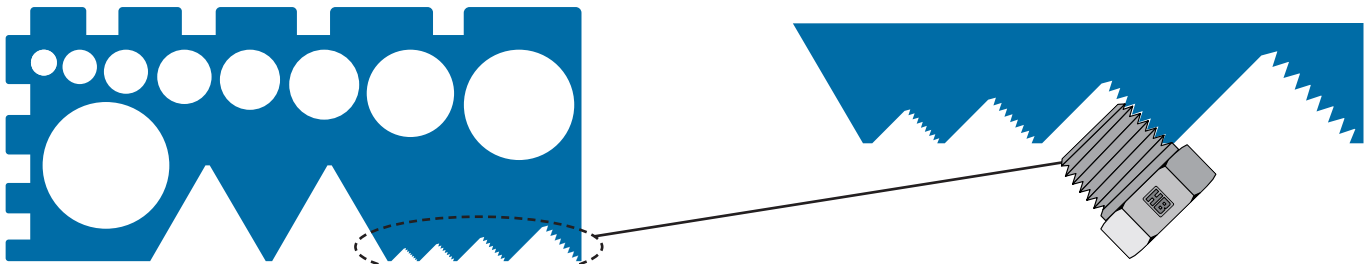
Insert posts into female threads until the closest match is found. For Tapered Female threads, the post will bottom out approximately 2-4 threads deep.

## MALE THREADS



Insert the male fitting into the ports until the closest match is found. For Tapered Male threads, the threads will bottom out anywhere from 2 threads to somewhere in the middle of the thread.

## THREAD GAUGE



Line up threads alongside the thread gauges until the closest match is found. This section of the tool is unable to gauge female threads; however, the corresponding male assembled with the given female can be used to identify the female thread pitch.

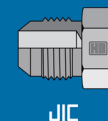
## 30°/60° CHAMFER



Depending on where the part lines up with the tool, the thread style and size are revealed. This is an added level of measurement to help with accurate identification.

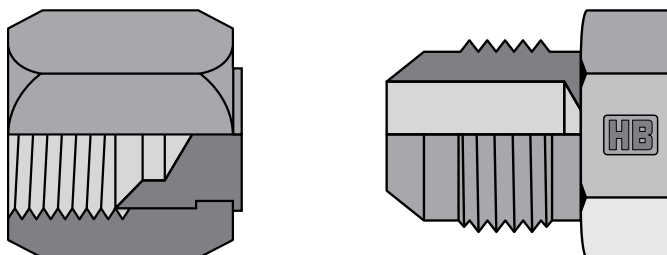


Joint Industries Council 37° Flare

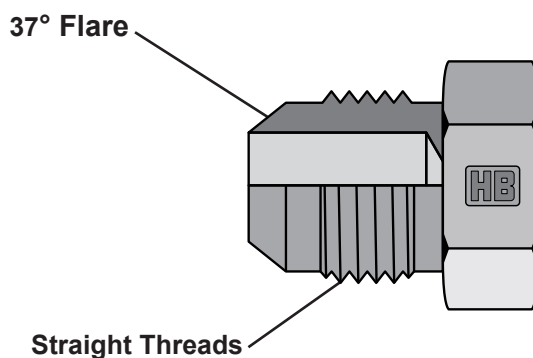


### JIC 37° Flare (SAE J514)

The 37° JIC (Joint Industrial Council) and the SAE O-Ring Boss (ORB) adapter fittings share the same thread specifications. The difference between the two is the style of seal. The JIC thread is very popular and used worldwide. The seal on the JIC fitting is achieved by a metal-to-metal interference fit along the 37° angle on the male and female fittings.

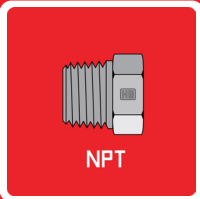


Inch Size	Dash Size	Nominal Thread Size	Male Thread O.D.	Female Thread I.D.
1/8	-02	5/16-24	5/16 (0.31")	9/32 (0.27")
3/16	-03	3/8-24	3/8 (0.38")	11/32 (0.34")
1/4	-04	7/16-20	7/16 (0.44")	13/32 (0.39")
5/16	-05	1/2-20	1/2 (0.50")	15/32 (0.45")
3/8	-06	9/16-18	9/16 (0.56")	17/32 (0.51")
1/2	-08	3/4-16	3/4 (0.75")	11/16 (0.69")
5/8	-10	7/8-14	7/8 (0.88")	13/16 (0.81")
3/4	-12	1 1/16-12	1 1/16 (1.06")	1 (0.98")
7/8	-14	1 3/16-12	1 3/16 (1.19")	1 1/8 (1.10")
1	-16	1 5/16-12	1 5/16 (1.31")	1 1/4 (1.23")
1 1/4	-20	1 5/8-12	1 3/8 (1.63")	1 9/16 (1.54")
1 1/2	-24	1 7/8-12	1 7/8 (1.88")	1 13/16 (1.79")
2	-32	2 1/2-12	2 1/2 (2.50")	2 7/16 (2.42")



# NPT / PIPE

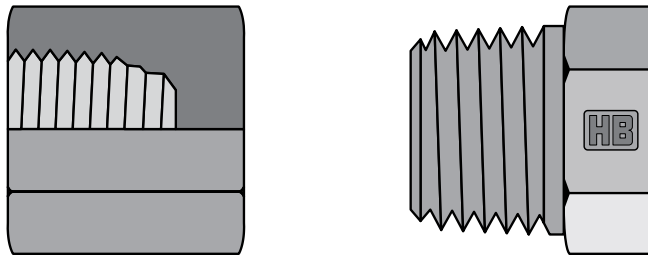
National Pipe Tapered



## National Pipe Tapered (NPT) and National Pipe Tapered Fuel (NPTF) Threads

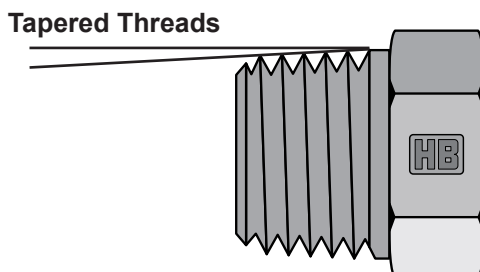
NPT and NPTF adapter threads are tapered and seal together as described in the following paragraph.

The male and female threads connect, and a seal is formed when the two are mated together; the seal is formed during thread deformation. This is known as a dry seal thread. Teflon tape and/or pipe dope can be applied if additional sealing is required. Both NPT and NPTF threaded adapters have the same threads per inch, pitch diameters, and taper; the difference is very slight regarding major and minor diameters and thread form. NPT threads will join with NPTF threads with no problems but additional sealing products such as Teflon tape or pipe dope will be required.

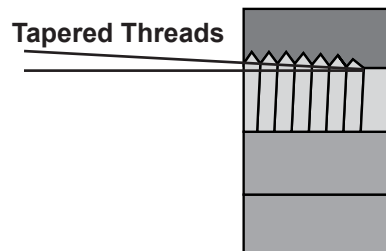


Inch Size	Dash Size	Nominal Thread Size	Male Thread O.D.	Female Thread I.D.
1/8	-02	1/8-27	13/32 (0.41")	3/8 (0.38")
1/4	-04	1/4-18	17/32 (0.54")	1/2 (0.49")
3/8	-06	3/8-18	11/16 (0.68")	5/8 (0.63")
1/2	-08	1/2-14	27/32 (0.84")	25/32 (0.77")
3/4	-12	3/4-14	1 1/16 (1.05")	1 (0.98")
1	-16	1-11 1/2	1 5/16 (1.32")	1 1/4 (1.24")
1 1/4	-20	1 1/4-11 1/2	1 21/32 (1.66")	1 19/32 (1.58")
1 1/2	-24	1 1/2-11 1/2	1 29/32 (1.90")	1 13/16 (1.82")
2	-32	2-11 1/2	2 3/8 (2.38")	2 5/16 (2.30")

NPT/Pipe Male



NPT/Pipe Port



\*Commonly mistaken for O-Ring boss port.  
DO NOT USE O-Ring Boss fittings in Pipe thread ports!

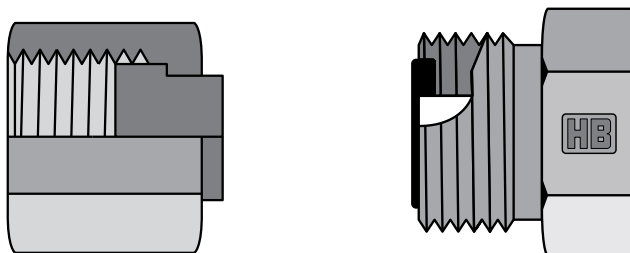
# O-RING FACE SEAL

Flat Face



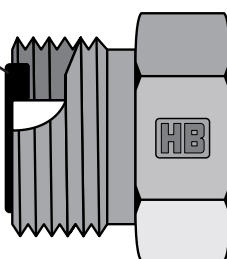
## O-Ring Face Seal ORFS

ORFS(O-Ring Face Seal) fittings incorporate an O-ring at the face of the male fitting that compresses against a flat face inside the female fitting. O-ring face seal fittings are widely used on high-pressure hydraulic applications and are popular in agricultural applications, construction, mining, and offshore. The connection on the O-ring face seal is made when the fittings are tightened and the O-ring compresses against the flat face sleeve.



Inch Size	Dash Size	Nominal Thread Size	Male Thread O.D.	Female Thread I.D.
1/4	-04	9/16-18	9/32 (0.56")	17/32 (0.51")
3/8	-06	11/16-16	11/16 (0.69")	5/8 (0.63")
1/2	-08	13/16-16	13/16 (0.82")	3/4 (0.75")
5/8	-10	1-14	1 (1.00")	15/16 (0.93")
3/4	-12	1 3/16-12	1 3/16 (1.19")	1 1/8 (1.11")
1	-16	1 7/16-12	1 7/16 (1.44")	1 3/4 (1.36")
1 1/4	-20	1 11/16-12	1 11/16 (1.69")	1 5/8 (1.61")
1 1/2	-24	2-12	2 (2.00")	1 15/16 (1.92")

O-Ring on face



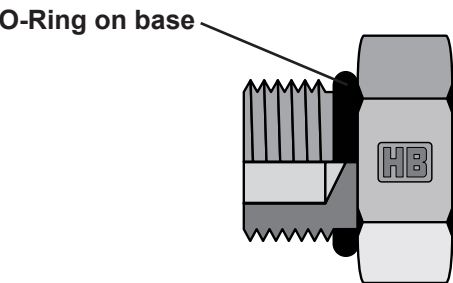
# O-RING BOSS

Straight Thread

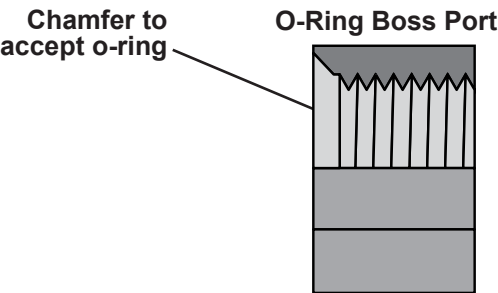


## SAE Straight Thread O-Ring Boss (ORB)

SAE Straight Thread O-Ring Boss (ORB) is recommended for medium to high-pressure hydraulic systems and is commonly referred to as simply O-Ring Boss. The male connector has an O-ring at the base of the threads that forms a very effective seal with the machined seat on the face of the female fitting.



Inch Size	Dash Size	Nominal Thread Size	Male Thread O.D.	Female Thread I.D.
1/8	-02	5/16-24	5/16 (0.31")	9/32 (0.27")
3/16	-03	3/8-24	3/8 (0.38")	11/32 (0.34")
1/4	-04	7/16-20	7/16 (0.44")	13/32 (0.39")
5/16	-05	1/2-20	1/2 (0.50")	15/32 (0.45")
3/8	-06	9/16-18	9/16 (0.56")	17/32 (0.51")
1/2	-08	3/4-16	3/4 (0.75")	11/16 (0.69")
5/8	-10	7/8-14	7/8 (0.88")	13/16 (0.81")
3/4	-12	1 1/16-12	1 1/16 (1.06")	1 (0.98")
7/8	-14	1 3/16-12	1 3/16 (1.19")	1 1/8 (1.10")
1	-16	1 5/16-12	1 5/16 (1.31")	1 1/4 (1.23")
1 1/4	-20	1 5/8-12	1 3/8 (1.63")	1 9/16 (1.54")
1 1/2	-24	1 7/8-12	1 7/8 (1.88")	1 13/16 (1.79")
2	-32	2 1/2-12	2 1/2 (2.50")	2 7/16 (2.42")

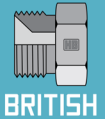


\*Commonly mistaken for NPT/Pipe Thread port.  
DO NOT USE Pipe thread fittings in O-Ring Boss ports!



# BRITISH STANDARD

British Standard Pipe / BSP



**British Standard Pipe (BSP)** is one of the most common fitting styles used worldwide. BSP is used on some of the world's most recognized machinery such as Case IH, JCB, New Holland, and John Deere. British Standard Pipe threads are available in two versions, British Standard Parallel Threads (BSPP) and British Standard Pipe Taper (BSPT).

**BSPP** is very similar in appearance to American National Pipe Straight Mechanical (NPSM) fitting but the two are NOT interchangeable. While both NPSM and BSPP seal on the cone seat of the male / tapered nose of the female, the threads are different in most sizes.

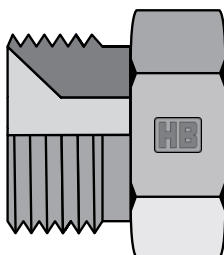
**BSPT** is also very similar in appearance to American National Pipe Taper (Fuel) (NPT(F)) adapters but just like the BSPP/NPSM fitting connection mentioned earlier, the BSPT/NPT(F) are NOT interchangeable due to subtle differences in size and thread form.

Japanese Industrial Standard JIS 30° Flare uses the same thread size and form as the British Standard Pipe family of fittings.

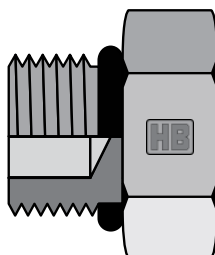
The **JIS 30° Flare** is very similar in appearance to the North American JIC 37° fitting (SAE J514) but is NOT interchangeable due to the difference in the sealing angle and the thread form and size. The JIS 30° fitting connection features a 30° chamfered seat angle on the leading end of the male fitting that fits snugly against the 30° angle machined into the bottom of the female fitting forming a metal-to-metal seal when tightened.

Inch Size	Threads Per Inch	Pitch [mm]	Major Diameter of the thread	
			mm	Inches
1/16	28	0.907	7.723	0.304
1/8	28	0.907	9.728	0.383
1/4	19	1.337	13.157	0.518
3/8	19	1.337	16.662	0.656
1/2	14	1.814	20.995	0.825
3/4	14	1.814	26.441	1.041
1	-11	2.309	33.249	1.309
1 1/4	-11	2.309	41.910	1.650
1 1/2	-11	2.309	47.803	1.882
2	-11	2.309	59.614	2.347
2 1/2	-11	2.309	75.184	2.960

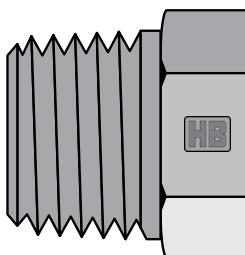
## British Standard Thread Types



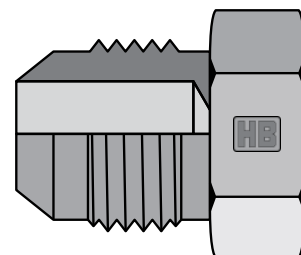
BSPP 60° Flare



BSPP Port



BSPT



JIS

Metric hydraulic adapter fittings resemble British and SAE (American) fittings in many ways.

One of the most popular Metric fitting styles is the ISO 9974. ISO 9974 fittings are commonly used in hydraulic port applications. ISO 9974 fittings resemble SAE O-ring boss fittings and British Standard Parallel Pipe (BSPP) ISO 1179 fittings, the difference being metric threads. ISO 9974 fittings use a captive or retained seal at the base of the threads that mates to a seat surface on the female fitting or ported surface on a hydraulic cylinder or valve. Metric port fittings ISO 6149 also are very similar to ISO 9974 port fittings except they use a non-retained O-ring same as the SAE O-ring Boss Fittings.

Another popular Metric fitting series is the DIN tube fittings. DIN tube fittings have a 24° chamfered seat on the inside of the male fitting that identifies the fitting as DIN, that 24° seat is where the seal takes place when joining a DIN male to a DIN female fitting. DIN fittings employ an identification system used by most manufacturers, this system combines the tube O.D. size and the tube Series, for example, a fitting that is 8mm and heavy duty would be marked "S08".

#### DIN designations:

LL = Extra Light Duty

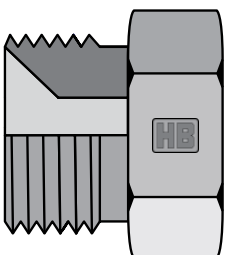
L = Light Duty

S = Heavy Duty

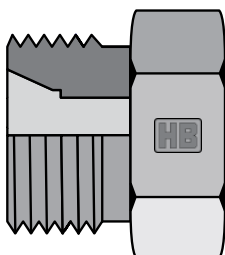
Metric threads are called out using the distance between two threads as the Thread Pitch, this is different than American SAE and British Standard threads that are designated by Threads per Inch. There are three common thread pitches used on all Metric DIN fittings, 1.0mm, 1.5mm & 2.0mm pitches.

Thread	Pitch (mm)	Male Thread O.D.	Female Thread I.D.
M14 x 1.5	1.5	14	12.5
M16 x 1.5	1.5	16	14.5
M18 x 1.5	1.5	18	16.5
M22 x 1.5	1.5	22	20.5
M24 x 1.5	1.5	24	22.5
M30 x 1.5	1.5	30	28.5
M33 x 1.5	1.5	33	31.5
M42 x 1.5	1.5	42	40.5

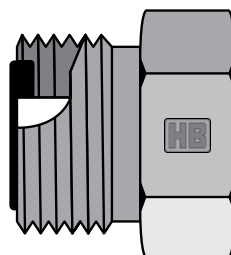
#### Metric Thread Types



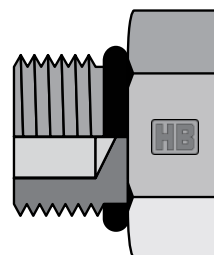
**Metric 60° Flare**



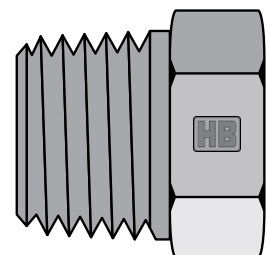
**DIN Tube**



**Metric Flat-Face**



**Metric Port**



**Metric Taper**

# Hydraulic Oil Basics

## Operating temperatures

- It is important to keep your oil temperatures operating around 160° F or less. If oil temperatures start to exceed 200° it will start to break down seals and o-rings that are essential in keeping your system running and operating smoothly.

## Color indicators

- Light Brown and Transparent would be normal
- Milky oil would indicate water in the oil
- Red in color would indicate ATF (Automatic Transmission Fluid)

## AW (anti-wear) 32- 10 weight

- Lighter oil
- Great for year-round applications
- Use in temperatures ranging from -20° F to +50° F
- Pour point of -31° F
- Flash point of 400° F

## AW (anti-wear) 46- 15 weight

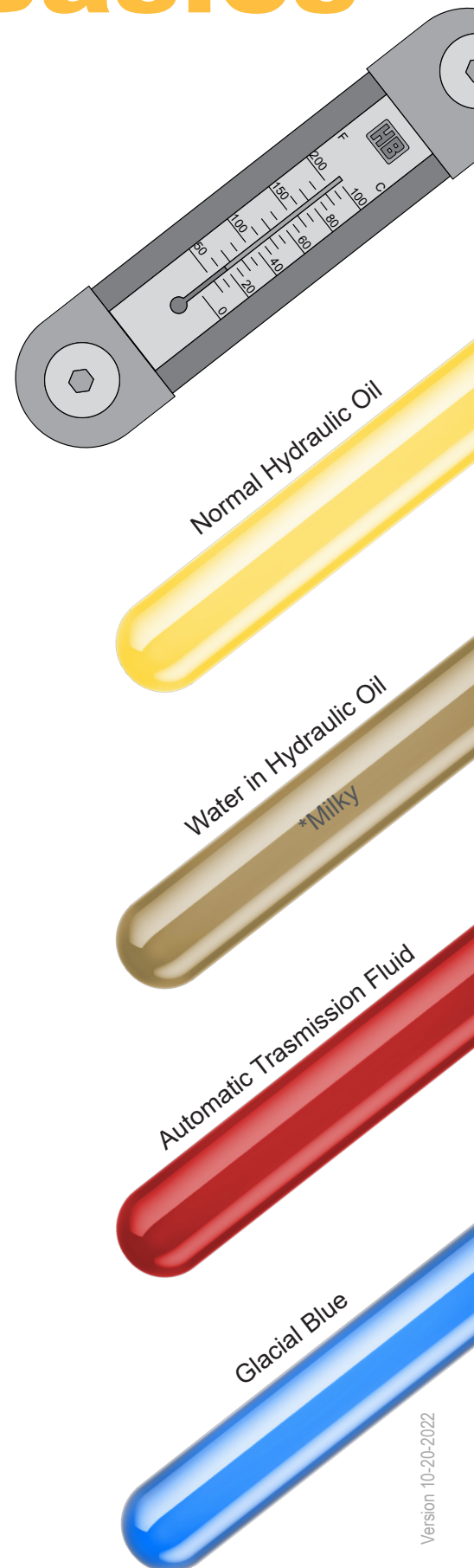
- Heavier, thicker oil
- Better summertime application
- Use in temperatures ranging from +25°F to +70° F
- Pour point of -22° F
- Flash point of 400° F

## AFT (automatic transmission fluid)

- Red in color
- Used for short cycle applications (dump trailer, bale bed)
- Good winter season application
- Pour point of -40° F
- Flash point of 410° F

## Glacial blue- 15 weight

- Nonconductive properties
- Used in power/utility, tree trimming, railroad, and snow plow industries
- Flash point of 253° F
- Pour point of -81°
- Blue in color



# How to Identify Hydraulic Hose

Most hydraulic hose manufacturers voluntarily use the SAE standards for hose performance, dimensions, and general specifications.

## Single spiral suction hose

- The hose that supplies oil from the reservoir to the pump
- Has 1 steel wire wound through to keep the hose from collapsing

## Single braid

- 1000 psi or under (typically)
- Applications: wet kits on semis and trailers, small utility lifts, and return lines

## Double braid

- 2500-4000 psi (typically)
- Good longevity
- Application examples: lawn tractors, skid steers, small agricultural equipment, and Railroad

## Four braid

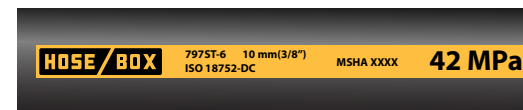
- 4000 psi (typically)
- Great longevity
- Application examples: Construction, Agriculture, and Forestry industries

## Six braid

- 6000 psi (typically)
- Great longevity
- Applications: Large construction equipment, Large Ag equipment, Mining, and Forestry industries

## Hose Layline

- The hose layline gives important information including, inside diameter, working pressure, manufacture standards, and part number



# Hydraulic Hose Maintenance

## Maintenance and safety

- It is important to do routine hose and system inspections. This will maintain your system in good working order and you will greatly reduce the risk of an oil injection injury by hose failure. Oil injections not only result in nasty cuts and tears to the skin but can poison the body because hydraulic fluid is very toxic.