

# North American Thread Types

## Iron Pipe Thread Abbreviations

N—National  
P—Pipe

S—Straight Thread  
T—Tapered Thread

F—Fuels  
M—Mechanical Joint

## NPTF

National pipe tapered thread for Fuel is a dryseal thread. It is used for both male and female ends.

The NPTF male will mate with the NPTF, NPSF, or NPSM female.

The NPTF male has tapered threads and a 30°inverted seat. The NPTF female has tapered threads and no seat. The seal takes place by deformation of the threads. The NPSM female has straight threads and a 30°inverted seat. The seal takes place on the 30°seat.

The NPTF connector is similar to, but not interchangeable with, the BSPT connector. The thread pitch is different in most size. Also, the thread angle is 60°instead of the 55°angle found on BSPT threads.

## NPSF

National pipe straight thread for Fuels is sometimes used for female ends and properly mates with the NPTF male end. However, the SAE recommends the NPTF thread in preference to the NPSF for female ends.

## NPSM

National pipe straight thread for Mechanical joint is used on the female swivel nut of iron pipe swivel adapters. The leak-resistant joint is not made by the sealing fit of threads, but by a tapered seat in the coupling end.

Dash Size	Nominal Size(In.)	No. Threads per Inch	Female Thread	Male Thread	Max. Torque Recommendation for Dry NPTF* (Ft.Lbs)
			I.D.(In.)	O.D. (In)	
-2	1/8	27	23/64	13/32	20
-4	1/4	18	15/32	35/64	25
-6	3/8	18	19/32	43/64	35
-8	1/2	14	3/4	27/32	45
-12	3/4	14	61/64	1-1/16	55
-16	1	11-1/2	1-13/64	1-5/16	65
-20	1-1/4	11-1/2	1-17/32	1-43/64	80
-24	1-1/2	11-1/2	1-25/32	1-29/32	95
-32	2	11-1/2	2-1/4	2-3/8	120

### \*NOTES:

1、 Torque values can vary considerably depending on thread condition. Use only enough torque to achieve adequate sealing.

- 2、 With female straight or parallel pipe threads(NPSM),maximum values are 50% of those listed in the table.
- 3、 If thread sealant is used, maximum values shown should be decreased by 25%.

## **JIC (37° Flare)**

The Society of Automotive Engineers(SAE) specifies 37° angle flare or seat be used with highpressure hydraulic tubing. These are commonly called JIC couplings.

The JIC 37°flare male will mate with a JIC female only. The JIC male has straight threads and a 37° flare seat. The JIC female has straight threads and a 37° flare seat. The seal is made on the 37° flare seat.

Some sizes have the same threads as the SAE 45° flare. Carefully measure the seat angle to differentiate.

Dash Size	Nominal Size(In.)	Thread Size	Female Thread	Male Thread	Steel Torque Recommendation (Ft.Lbs)	
			I.D.(In.)	O.D.(In.)	Min.	Max.
-2	1/8	5/16-24	17/64	5/16	-	-
-3	3/16	3/8-24	21/64	3/8	-	-
-4	1/4	7/16-20	25/64	7/16	10	11
-5	5/16	1/2-20	29/64	1/2	13	15
-6	3/8	9/16-18	1/2	9/16	17	19
-8	1/2	3/4-16	11/16	3/4	34	38
-10	5/8	7/8-14	13/16	7/8	50	56
-12	3/4	1-1/16-12	31/32	1-1/16	70	78
-14	7/8	1-3/16-12	1-7/64	1-3/16	-	-
-16	1	1-5/16-12	1-15/64	1-5/16	94	104
-20	1-1/4	1-5/8-12	1-35/64	1-5/8	124	138
-24	1-1/2	1-7/8-12	1-51/64	1-7/8	156	173
-32	2	2-1/2-12	2-27/64	2-1/2	219	243

### **\*NOTES:**

Some C5、 C5E and Lock-On coupling may have dual machined seats (both 37° and 45° seats).

## **SAE (45° Flare)**

A term usually applied to fittings having a 45° angle flare or seat. Soft copper tubing is generally used in such applications as it is easily flared to the 45° angle. These are for low-pressure applications—such as for fuel lines and refrigerant lines.

The SAE 45° flare male will mate with an SAE 45°flare female only or a dual seat JIC/SAE 45°.

The SAE male has straight threads and a 45°flare seat. The SAE female has straight threads and a 45° flare seat. The seal is made on the 45° flare seat.

Some sizes have the same threads as the SAE 37° flare.

Carefully measure that seat angle to differentiate.

Dash Size	Nominal Size(In.)	Thread Size	Female Thread	Male Thread	Steel Torque Recommendation(Ft.-Lbs.)	
			I.D.(In.)	O.D.(In.)	Min.	Max.
-2	1/8	5/16-24	17/64	5/16	-	-
-3	3/16	3/8-24	21/64	3/8	-	-
-4	1/4	7/16-20	25/64	7/16	10	11
-5	5/16	1/2-20	29/64	1/2	13	15
-6	3/8	5/8-18	9/16	5/8	17	19
-7	7/16	11/16-16	5/8	11/16	-	-
-8	1/2	3/4-16	11/16	3/4	34	38
-10	5/8	7/8-14	13/16	7/8	50	56
-12	3/4	1-1/16-14	63/64	1-1/16	70	78

**\*NOTES:**

Some C5,C5E and Lock-On couplings may have dual machined seats (both 37° and 45° seats).

## Special Power Steering Thread End

Dash Size	Nominal Size(In.)	Thread Size	Female Thread	Male Thread
			I.D.(In.)	O.D.(In.)
-6	3/8	11/16-18	5/8	11/16

## O-Ring Boss

The O-ring boss male will mate with an O-ring boss female only. The female is generally found on ports.

The male has straight threads, a sealing face and an O-ring. The female has straight and a sealing face. The seal is made on the sealing face on the female.

Dash Size	Nominal Size(In.)	Thread Size	Female Thread	Male Thread	O-Ring		Steel Torque Recommendation(Ft.Lbs)			
			I.D.(In.)	O.D.(In.)	I.D.(In.)	DESCR	Min.	Max.	Min.	Max.
-2	1/8	5/16-24	17/64	5/16	0.239	-	-	-	-	-
-3	3/16	3/8-24	21/64	3/8	0.301	30R	-	-	8	10
-4	1/4	7/16-20	25/64	7/16	0.351	40R	14	16	14	16
-5	5/16	1/2-20	29/64	1/2	0.414	50R	-	-	18	20
-6	3/8	9/16-18	1/2	9/16	0.468	60R	24	26	24	26
-8	1/2	3/4-16	11/16	3/4	0.644	80R	37	44	50	60
-10	5/8	7/8-14	13/16	7/8	0.755	100R	50	60	72	80
-12	3/4	1-1/16-12	31/32	1-1/16	0.924	120R	75	83	125	135

-14	7/8	1-3/16-12	1-7/64	1-3/16	1.048	140R	-	-	160	180
-16	1	1-5/16-12	1-15/64	1-5/16	1.171	160R	111	125	200	220
-20	1-1/4	1-5/8-12	1-35/64	1-5/8	1.475	200R	133	152	210	280
-24	1-1/2	1-7/8-12	1-51/64	1-7/8	1.720	-	156	184	270	360
-32	2	2-1/2-12	2-27/64	2-1/2	2.337	-	-	-	-	-

## O-Ring Flange-SAE J518

The SAE Code 61 and Code 62 4-Bolt Split Flange is used worldwide, usually as a connection on pumps and motors. There are three exceptions.

1. The -10 size, which is common outside of North America, is not an SAE standard size (generally found on Komatsu equipment).
2. Caterpillar flanges, which are the same flange O.D. as SAE Code 62, have a thicker flange head ("C" dimension is Table).
3. Poclain flanges, which are completely different from SAE flanges.

Dash Size	Nominal Flange Size (In.)	Code 61 (FL)				Code 62 (FLH)				Caterpillar Code 62 (FLC)			
		Flange O.D. (In.)	A. (In.)	B. (In.)	C. (In.)	Flange O.D. (In.)	A. (In.)	B. (In.)	C. (In.)	Flange O.D. (In.)	A. (In.)	B. (In.)	C. (In.)
-8	1/2	1.188	0.688	1.500	0.265	1.250	0.718	1.594	0.305				
-12	3/4	1.500	0.875	1.875	0.265	1.625	0.937	2.000	0.345	1.625	0.938	2.000	0.560
-16	1	1.750	1.031	2.065	0.315	1.875	1.093	2.250	0.375	1.875	1.094	2.250	0.560
-20	1-1/4	2.000	1.188	2.312	0.315	2.125	1.250	2.625	0.405	2.125	1.250	2.625	0.560
-24	1-1/2	2.375	1.406	2.750	0.315	2.500	1.437	3.125	0.495	2.500	1.438	3.125	0.560
-32	2	2.812	1.688	3.062	0.375	3.125	1.750	3.812	0.495	3.125	1.750	3.812	0.560
-40	2-1/2	3.312	2.000	3.500	0.375								
-48	3	4.000	2.438	4.188	0.375								
-56	3-1/2	4.500	2.750	4.750	0.422								
-64	4	5.000	3.062	5.125	0.442								
-80	5	6.000	3.625	6.000	0.442								

## O-Ring Face Seal (ORFS)-SAE J1453

A seal is made when the O-ring in the male contacts the flat face on the female. Couplings are intended for hydraulic systems where elastomeric seals are acceptable to overcome leakage and leak resistance is crucial.

The solid male O-ring face seal fitting will mate with a swivel female O-ring face seal SAE J1453 fitting only.

An O-ring rests in the O-ring groove in the male.

Dash Size	Nominal Size(In.)	Thread Size	Female Thread	Male Thread	O-Ring Size
			I.D.(In.)	O.D.(In.)	
-4	1/4	9/16-18	1/2	9/16	-011
-6	3/8	11/16-16	5/8	11/16	-012
-8	1/2	13/16-16	3/4	13/16	-014
-10	5/8	1-14	15/16	1	-016
-12	3/4	1-3/16-12	1-1/8	1-3/16	-018
-16	1	1-7/16-12	1-11/32	1-7/16	-021
-20	1-1/4	1-11/16-12	1-19/32	1-11/16	-025
-24	1-1/2	2-12	1-29/32	2	-029

## Flareless Tube

The flareless solid male will mate with a female flareless nut and compression sleeve only.

The male has straight threads and a 24° seat. The female has straight threads and has a compression sleeve for a sealing surface. The seal is made between the compression sleeve and the 24° seat on the male, and between the compression sleeve and the tubing on the female.

Dash Size	Tube Size(In.)	Nominal Size(In.)	Thread Size	Female Thread	Male Thread
				I.D.(In.)	O.D.(In.)
-2	1/8	5/16	5/16-24	17/64	5/16
-3	3/16	3/8	3/8-24	21/64	3/8
-4	1/4	7/16	7/16-20	25/64	7/16
-5	5/16	1/2	1/2-20	29/64	1/2
-6	3/8	9/16	9/16-18	1/2	9/16
-8	1/2	3/4	3/4-16	11/16	3/4
-10	5/8	7/8	7/8-14	13/16	7/8
-12	3/4	1-1/16	1-1/16-12	31/32	1-1/16
-14	7/8	1-3/16	1-3/16-12	1-7/64	1-3/16
-16	1	1-5/16	1-5/16-12	1-15/64	1-5/16
-20	1-1/4	1-5/8	1-5/8-12	1-35/64	1-5/8
-24	1-1/2	1-7/8	1-7/8-12	1-51/64	1-7/8
-32	2	2-1/2	2-1/2-12	2-27/64	2-1/2

## North American Stand Pipe(NASP)

A stand pipe assembly is comprised of three components attached to a male fitting. The components are a Stand Pipe Tube, Bite Sleeve and Nut. The Nut is placed over the Stand Pipe, followed by the Bite Sleeve (see illustration below). The Bite Sleeve and Stand Pipe are selected on the basis of tube O.D. required.

Dash Size	Tube O.D.(In.)	Tube Length (In.)
-4	0.25	0.88
-6	0.38	0.88
-8	0.50	1.00
-12	0.75	1.16
-16	1.00	1.12

## **SAE Inverted Flare**

The SAE 45° inverted flare male will mate with an SAE 42°inverted flare female only.

The male has straight threads and a 45° inverted flare. The female has straight threads and a 42° inverted flare. The seal is made on the 45° flare seat on the male and the 42°flare seat on the female.

Dash Size	Nominal Size(In.)	Thread Size	Female Thread	Male Thread
			I.D.(In.)	O.D.(In.)
-2	1/8	5/16-28	9/32	5/16
-3	3/16	3/8-24	21/64	3/8
-4	1/4	7/16-24	25/64	7/16
-5	5/16	1/2-20	29/64	1/2
-6	3/8	5/8-18	37/64	5/8
-7	7/16	11/16-18	5/8	11/16
-8	1/2	3/4-18	45/64	3/4
-10	5/8	7/8-18	13/16	7/8
-12	3/4	1-1/16-16	1	1-1/16