



# BUTT WELD SAE FLANGES

## Literature



### Introduction:



Figure 1 B/W SAE Flanges

Butt weld SAE flange is a SAE flange that is made in accordance with SAE J518 / ISO 6162 standards. SAE flanges are supplied for oil hydraulic systems in sectors such as industrial hydraulics, mobile hydraulics and oil and gas.

### Material:

SAE Flanges are manufactured from two kinds of material, respectively steel ST52.3 or stainless steel AISI SS316L. The SAE flange body is made from normalized forgings so that it can be used for high pressure applications. There are two kinds of surface for SAE flange which is rough surface and smooth surface. The rough surface is on the pipe end connection side, while the smooth surface is at flange to flange side.

### Size Range:

For Code 61 series, SAE flanges are available in nominal size ranging from 3/8"NB (DN10) to 5"NB (DN125). While for Code 62 series, SAE flanges size are available from 3/8"NB (DN10) to 3"NB (DN80).



Figure 2 O-ring Side SAE Flange

### Pressure Rating:

Code 61 series and code 62 series represent different working pressure that each series can withstand. The maximum working pressure that Code 61 series can withstand are ranged from 34 Bar to 345 Bar, depending on the sizes. The bigger size of code 61 SAE flange, the lower working pressure that it can withstand. For Code 62 series, it can withstand up to 414 Bar working pressure.

However, the pressure rating of SAE flanges and connected equipment combination might vary from each other. For example: if a pipe connected to the flange has a lower maximum working pressure, it will result in an overall lower working pressure of the system. Therefore in a system, the item with the lowest pressure will be the maximum working pressure of the system.

### Connections Type & Configurations:

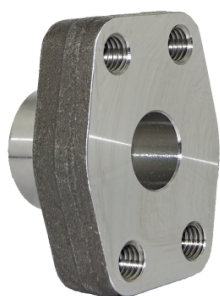


Figure 3 Flat Side SAE Flange

For the connections of SAE flanges, it is usually available in butt weld connection with various thickness such as SCH40, SCH80, SCH160 or SCHXXS. It is advised that SAE flange to assembly with the same pipe size and thickness to ensure smooth passage of fluids. The connection end thickness becomes thicker when the schedule thickness moves from SCH40 to SCH80, applied to other thickness as well. For example, connection end thickness of SAE flange size 1/2" with SCHXXS is thicker than connection end thickness of SAE flange 1/2" with SCH160. The thickness of the connection end also depends on the SAE flange size. The bigger the size, the thicker the thickness. For example, connection end the thickness of SAE flange size 1" with SCH80 is thicker than the connection end thickness of SAE flange size 3/4" with SCH80.

SAE flanges are available in two types: Flat Side and O-ring Side. Flat side of the SAE flange is a SAE flange that comes with bolt thread (UNC / Metric) and the O-ring side of the SAE flange is a SAE flange that contains a groove seat to place a rubber o-ring. Flanges with o-ring have an advantage of preventing leakage as all metal-to-metal flanges are more prone to leakage.

There are 3 configurations of SAE flanges which are flat side, o-ring side or complete set. A complete set of SAE flanges are a combination of flat side and o-ring side where it forms a seal between the flat surface and o-ring held in a recessed circular groove in the other half. By tightening the allen cap screws in diagonal sequence, it draws flat side and o-ring side together and compresses the o-ring.

SAE flange complete set is tightened by using socket head cap screws and spring washers according to the recommended torque value. According to the SAE J518 standard, the lengths of cap screws are usually shorter than the overall length of the SAE flange complete set.

### Steps to assemble SAE Flanges:

#### STEP 1



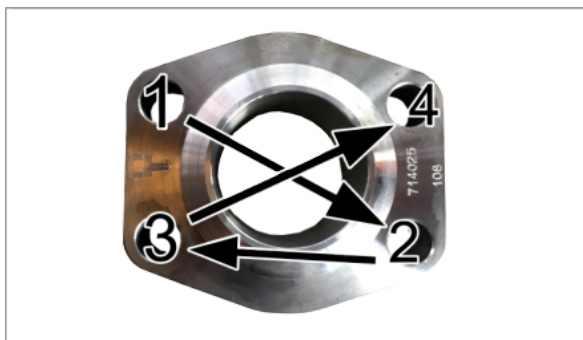
- Ensure the sealed surface is free from scratches and contamination.
- Lubricate with system fluid or any compatible lubricant on the surface of the O-ring portion.

#### STEP 2



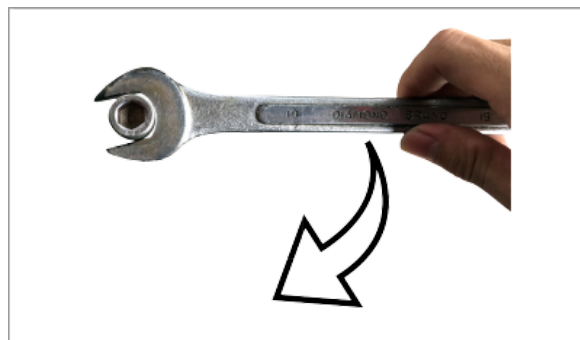
- Position the flange.
- Place the washer on cap screws and bolt through the bolt holes.

### STEP 3



- Tighten the cap screws by hand.
- Torque the cap screws gradually in diagonal sequence till the appropriate torque level based on the below torque table.

### STEP 4



- Tighten the cap screws according to the below torque table.

#### 3000 PSI Series (Code 61) Flange Recommended Screw Torque Table:

Metric Size	Flange Size	Screw Thread	Screw Torque (NM)
13	1/2"	M8	32
19	3/4"	M10	70
25	1"	M10	70
32	1 1/4"	M10	70
38	1 1/2"	M12	130
51	2"	M12	130
64	2 1/2"	M12	130
76	3"	M16	295
89	3 1/2"	M16	295
102	4"	M16	295
127	5"	M16	295

**6000 PSI Series (Code 62) Flange Recommended Screw Torque Table:**

<b>Metric Size</b>	<b>Flange Size</b>	<b>Screw Thread</b>	<b>Screw Torque (NM)</b>
13	1/2"	M8	32
19	3/4"	M10	60
25	1"	M12	60
32	1 1/4"	M12	92
38	1 1/2"	M16	150
51	2"	M20	150
64	2 1/2"	M24	150
75	3"	M30	295

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