TUBE FITTINGS INSTALLATION PROCEDURE

In installations that may require occasional disassembly or partial removal for maintenance purpose, Ferrule fittings plays key functional role here. As these joints can be broken and remade without affecting the integrity of the joint.

As the ferrule(s) moves axially into the fitting body, the body's angled shape radially compresses the end of the ferrule onto the outer diameter of the tubing. It is this radial compression that creates the leak tight seal between the fitting, ferrule and tubing.

TECHNICAL STANDARDS

The following two standards applicable for Single Compression Fittings, can also be used for Double Compression Fittings,
(a). BS 4368; Part IV, 1984
(b). IS 10103: 1982;
as because there is no seperate standard for Double Ferrules Compression.

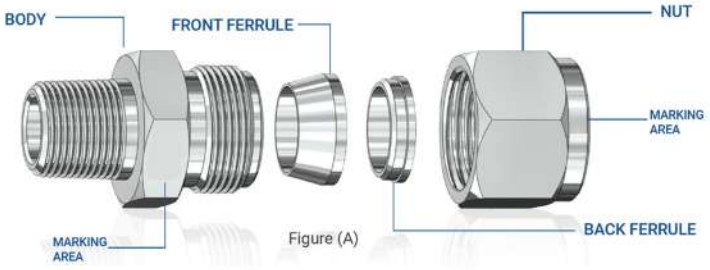


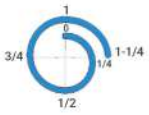
Figure (A)

In the above fig. (A) we have Body, Front Ferrule, Back Ferrule & Nut to show the assembly the tube, nut & ferrules into the body of the fitting and hold the fitting in a rigid vice then tighten the nut upto hand tight as per fig.(C) to fig.(F)

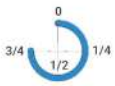
A. Mark 6'0 clock position on the nut using a marker

B. Using a wrench tighten the nut as described in the fig.(B)

C. If the nut is overtightened the ferrule will deform improperly causing the joint to fail (so tighten the nut as per the given parameters)



1&1/4 Turns of the nut is required for 1/4" (6mm) and higher



3/4 Turns of the nut is required for 3/16" (4mm) and lower.

Figure (B)

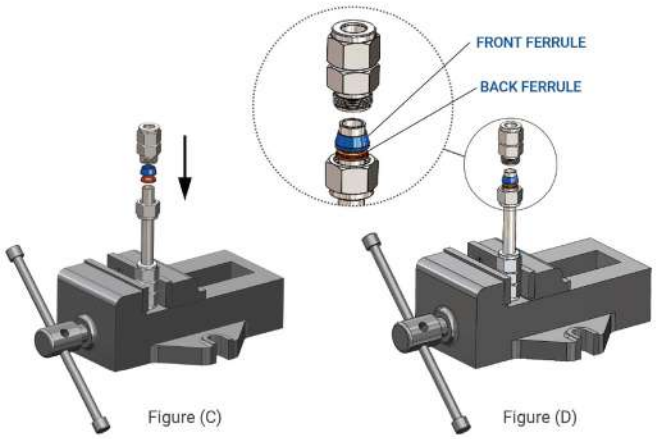


Figure (C)

Figure (D)

1-1/4 Turns of nut required for 1/4" and higher
3/4 Turns of nut required for 3/16" and lower

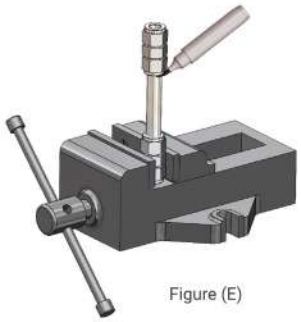


Figure (E)

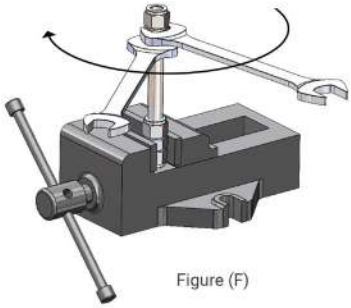


Figure (F)

DISASSEMBLY & REASSEMBLY

The ease of assembly and disassembly is one of the reasons why compression fittings are so widely used. Disassembly involves simply loosening the compression nut. Reassembly can be accomplished in a similar manner to the initial assembly, although typically fewer turns of the nut are required, since the ferrule is already swaged to the tubing.

TUBE SELECTION

Tube OD & wall thickness should be as given in ASTM A269/213 standard. Tube End should be squarely cut, to allow the tubing to sit symmetrically in the fitting body & remove burr using burr tool Fig. (G). Hardness of tube should not be more than Rockwell HRB 90 for SS316 MOC for other MOC contact to Valves.

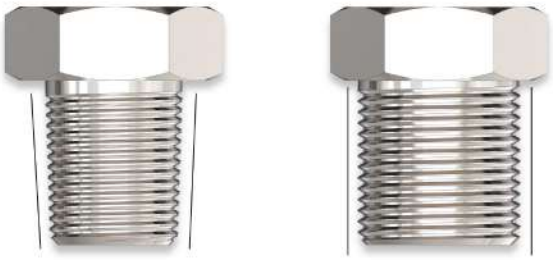
Note: The hardness & the required fittings varries with respect to change in MOC & its hardness of tube.


Figure (G)

PIPE FITTINGS INSTALLATION PROCEDURE

TECHNICAL STANDARDS

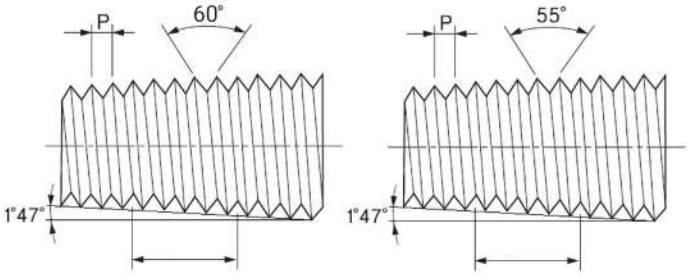
Pipe, is a hollow elongated metallic structure used to carry fluids. Wall thickness of pipe is designated by a Schedule Number. The greater the wall thickness, the higher the schedule number and the higher the pressure rating of the pipe. The most common method of joining pipe with threads. There are in general only two primary types of thread, Straight Thread and Taper Thread



Taper Straight

TECHNICAL STANDARDS

ISO 7-1 Tapered Pipe Thread



60° Thread Angle
Taper Angle 1° 47'

NPT - Pipe Thread

55° Thread Angle
Taper Angle 1° 47'

BSPT - Pipe Thread

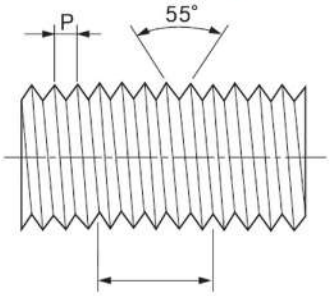
TAPERED THREAD

Tapered threads are the most common type of thread used in Pipe Fittings and Tube Fittings. As the name. implies, they have a slight taper. When mated together and tightened, the threads compress and may form a seal with the application of thread sealant. The most widely used pipe taper threads are NPT and BSPT.

STRAIGHT THREAD

Straight Threads are used for joining purpose only. Sealing is accomplished by means of a gasket or O-Ring. As the name implies, they are Straight or parallel. The most widely used pipe parallel threads are BSPP, Metric and UNF.

ISO 228-1 Parallel Pipe Thread



55° Thread Angle

BSPP - Pipe Thread

PROCEDURE OF THREAD IDENTIFICATION

A. Determine if the thread is tapered or straight (parallel).

B. Measure the thread diameter and thread pitch.

C. Determine the thread standard

D. Identify the end connection

Threads can be inspected by using thread gauges (GO & NOGO), Thread Profile Gauges and Profile Projector. Inspection by using thread gauges (GO & NOGO) is the most simple and effective method of inspection.

PIPE FITTINGS INSTALLATION PROCEDURE

THREAD INSPECTION

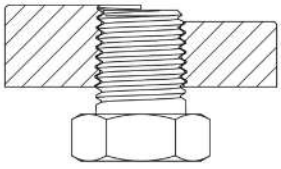
Types of Thread Gauges,

- Types of Thread Gauges,
- Types of Thread Gauges,

INSPECTION OF TAPER THREAD

FOR 2 STEP GAUGE

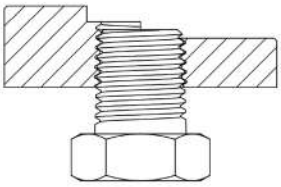
The Taper Thread can be inspected using 2 step & 3 step gauges. The initial thread level should be between the first and last step of the gauge.



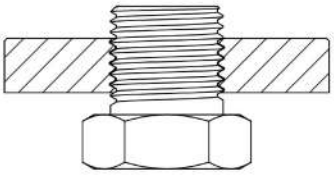
2 Step Ring Gauge

FOR 3 STEP GAUGE

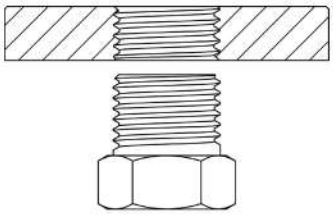
The Initail thread level should be in line with the middle step of the gauge which is the nominal position.



3 Step Ring Gauge



Ring Gauge - GO



Ring Gauge - NOGO

INSPECTION OF STRAIGHT THREAD

There are seperate GO and NO-GO Gauges. To inspect straight thread check using both GO and NO-GO Gauges. GO Gauge should mate fully and the NO-GO Gauge should not answer beyond one turn.

SEALING FOR TAPER THREAD

A sealant/lubricant is highly recommended. First, it enhances sealing by filling any gaps in the threads. Second, it reduces the potential for galling or seizing if the threads are forced together by over-tightening. If galling occurs, the threads are damaged and may not seal. This damage also prevents disassembly and reassembly. Recommended sealant/lubricants are graphite impregnated Teflon tape.

If using tape, wrap the tape in the thread direction so it does not come unwrapped during installation. Ensure, at a minimum, one complete wrap of the tape around the thread. Be sure the tapes does not overhang the first thread otherwise the tape could deteriorate and contaminate the fluid system.