



Taper-Lok®

(An Ameri-Forge Group Company)

Taper-Lok

INSTALLATION PROCEDURE FOR (MISALIGNMENT/ SWIVEL/ WELDNECK)

Reference

**Used for:
ITF / ConocoPhillips China
Bohai Bay Project**

P.O. No.: _____

Document Number: TLIP-05-4667

Revision No.:	0		
Date:			
Originated by:	RSM		
Checked by:	REA		
Approved by:	EH		
Document Status:	Reference Only		

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

TABLE OF CONTENTS

1. TAPER-LOK MISALIGNMENT FLANGE ASSEMBLY PROCEDURE	-	PAGE 03
2. BOLT TIGHTENING PROCESS USING STUD TENSIONERS	-	PAGE 09
3. CAUTIONARY INFORMATION AND SPECIAL INSTRUCTIONS	-	PAGE 10

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

Prior to assembly, it is important to visually inspect the flanges for any handling damage. The most important areas are Seal Surface Areas shown in Figure 1-A for Misalignment Flange, 1-B for Swivel Flange, and 1-C for Weld Neck connection below. They are the male seal surface (A), the I.D of the tapered seal ring (B), the O.D of the tapered seal ring (C), and the female seal surface (D). **If there is any damage, contact Taper-Lok first for review and assessment.** The methods for repair of minor damage to seal surfaces are discussed in document number **TLFRP-05-4593**. The following steps discuss how to assemble the Misalignment, Swivel and Weld Neck Flange connections.

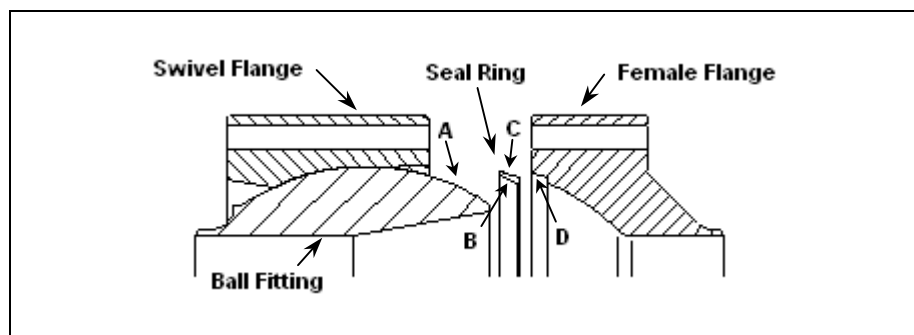


FIGURE 1-A

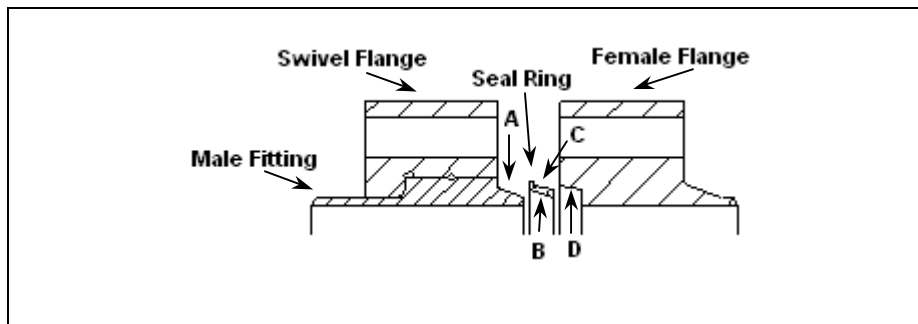


FIGURE 1-B

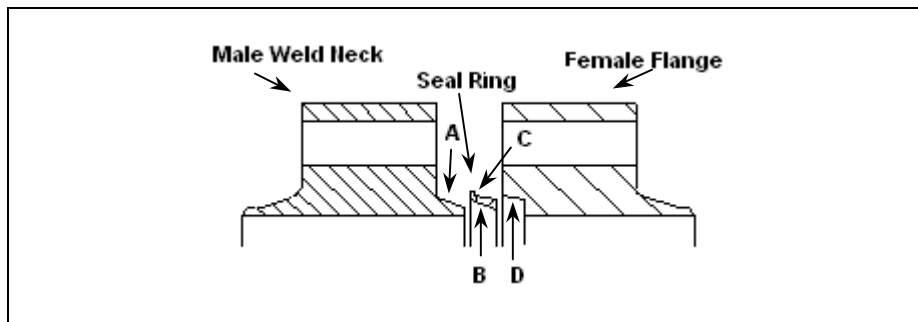


FIGURE 1-C

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

1.1 Apply a light coat of lubricant that is suitable for the application on all seal surfaces. Taper-Lok recommends Loctite Anti-Seize 51605. Apply an even coat to all seal surfaces. The coating should be smooth and uniform, free from runs, drips, nodules, bubbles, foreign matter, and other defects. Do not overuse. The finish coating should be 1-2 mils thick.

1.2 SEAL RING INSTALLATION PROCEDURE

This procedure is for the installation of Taper-Lok Seal Rings.

1.2.1 Safety Requirements

All safety rules are to be observed during installation of seal ring. At a minimum, eye and toe protection is required.

1.2.2 Protection (Wax Coating) Removal (APPLIES TO NEW SEAL RINGS ONLY):

All Taper-Lok Seal Rings are coated to insure lubricity and prevent undue galling during the bolt-up operation. In addition, all seal rings are carefully packaged to avoid damage to the coating during storage or shipment. Packing may include a hot dipped wax coating, which is to be removed prior to installation. Care is to be taken when removing this wax coating.

1. With a small sharp blade carefully cut through the top wax coating at a sloping angle until resistance/contact is made with the seal ring. Note: do not perform any cutting along sealing surfaces, ID or OD, of the seal ring.
2. Continue cutting parallel with the top of the seal ring for approximately two or three inches or until enough material is provided to take-hold and peel the wax coating off. Repeat until all wax coating is removed. This sequence is shown in the figure 1-2, 1-3, 1-4, and 1-5 below.

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		



3. Set seal ring aside on a flat surface until ready to assemble.

1.2.3 ASSEMBLY:

1. Carefully place the seal ring in the female pocket. The female flange should be in the vertical position with the female seal area facing up. Push and rotate the seal ring in the female seal pocket to ensure an even distribution of the lubricant on the seal surfaces. This action will create suction between the seal ring and the female seal that will hold the seal ring in place long enough to mate the female flange with the male flange.
2. Lift and position the Ball and Swivel assembly or Male Fitting and Swivel assembly, or Male Weld Neck on top, perpendicular to the female flange. Once the assembly is in line and in a permanent position, mate the Ball and Swivel assembly or Male Fitting and Swivel assembly, or Male Weld Neck Flange with the seal ring in the female flange.

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

- Contact with seal ring in the female flange should be carefully performed as not to damage the seal surfaces. The lip space between flange face and seal ring should look like the illustration shown in Figure 1-7 below.

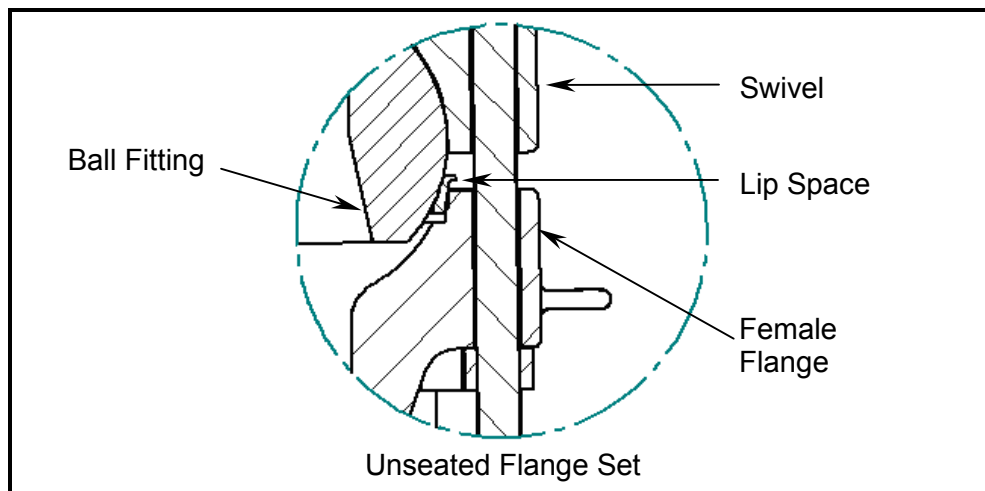


FIGURE 1-7

- Align stud holes by rotating swivel flange or by other means as applicable. Install all studs and nuts and hand tighten. **Proper bolt tensioning is vital to the integrity of the joint. Therefore the use of stud tensioners is recommended to bolt up the misalignment flange connection.**
- All Taper-Lok misalignment flanges are designed to allow for 100% tensioning using stud tensioners. The use of stud tensioners ensures that the seal ring is compressed evenly throughout the operation and all the bolts will have the same residual bolt load.
- As the tension is applied to the studs, the seal ring lip and the female flange come together until there is no space between them as shown in Figure 1-8 below. This will indicate that the seal ring is installed and seated properly.

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

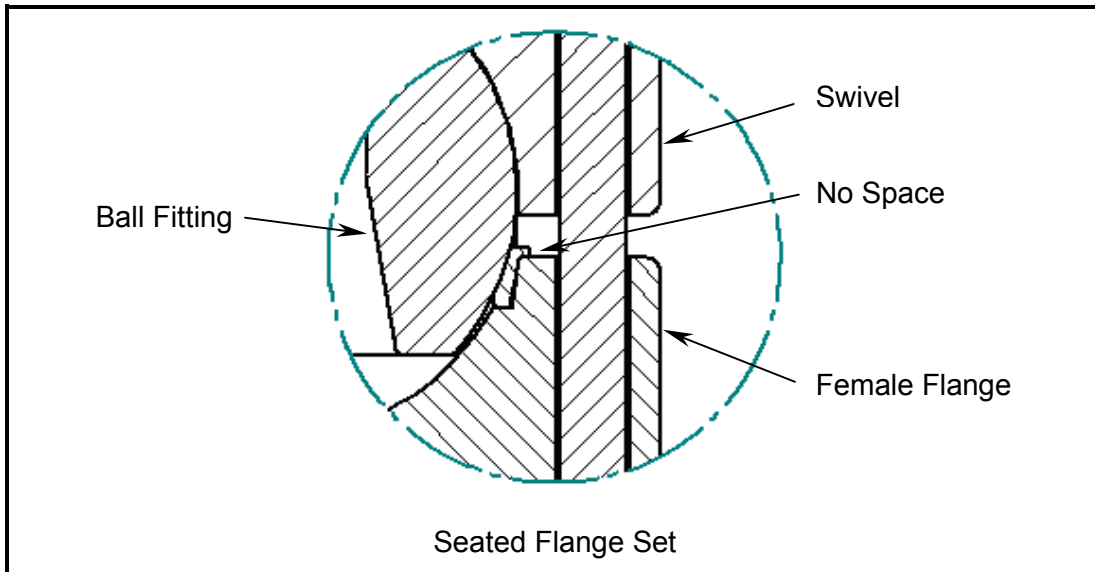


FIGURE 1-8

7. The bolt preload stress for 28-inch misalignment assembly, unless otherwise defined is 25ksi. When using stud tensioners, install tensioners using standard practices as provided by the tensioner's supplier. Section 2 provides more information regarding stud tensioners and their use.

8. Assembly Instructions mentioned above thus far can be repeated for the Male Fitting and Swivel assembly and Weld Neck connectors. Please note that the bolt preload stress for both Swivel and Weld Neck assemblies is 25ksi.

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

1.2.4 FIELD - SEAL RING RECOATING PROCEDURE

The following procedure is to be used for recoating Taper-Lok seal rings after they have been in service. After the seal ring has been removed from the flange, recoat as follows:

1. Using a clean, soft rag, wipe all foreign material from the surface of the seal ring. Inspect all surfaces for any sign of damage.
2. Using the brush applicator in the container, apply a thin coat of Loctite Anti-Seize 51605 to both the ID and the OD seal surfaces (shown in Figure 1-A, 1-B, and 1-C above) of the seal ring. The seal ring is now ready to be installed.
3. Prior to reinstalling the seal ring, using the brush applicator in the container, apply a thin coat of Loctite Anti-Seize 51605 to both male and female flange seal surfaces (shown in Figure 1-A, 1-B, and 1-C above).
4. Reinstall the seal ring per the prescribed procedure as applicable in section 1.2 above.

Recoat the seal ring, male and female flange seal surfaces whenever seal ring is removed from flange.

2. BOLT TIGHTENING PROCESS USING STUD TENSIONERS

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

It is widely recognized that bolting practices play a large role in determining whether or not a flanged joint will operate as intended, i.e., “LEAK FREE”. Any deviation in the initial bolt load conditions, especially in lubrication can have a considerable effect on the resultant bolt stress. **In view of the potential inaccuracies associated with bolt stressing through torque values, Taper-Lok recommends 100% bolt tensioning.** While the Taper-Lok connection functions properly under a wide range of bolt loads and bolting practices, it is still important to follow specified guidelines for flange assembly in order to avoid potential problems caused by unforeseen transient operating conditions.

- 2.1 Before set up for tensioning, ensure that there is no presence of burrs or nicks, grit, chips, and dirt on the threads of the bolts and nuts. In addition, verify the relative condition of the seating surface on the flange face against which the nut is rotated.
- 2.2 Given the geometry of the misalignment flanges, the stud tensioners are expected to be set up as follows. The stud tensioners will be installed on every other stud on both sides of the connection to avoid interference between the tensioners. They are then interconnected by means of a harness assembly to a single pump unit. This allows each tool to be pressurized simultaneously providing accurate residual bolt loading and uniform compression of a joint. Figure 2-1 below shows an illustration of a typical tensioning application set up.

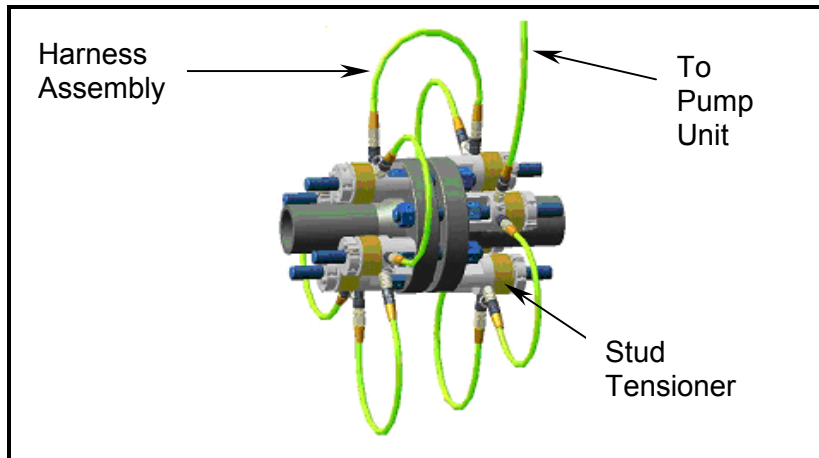


FIGURE 2-1

- 2.3 Follow the stud tensioner supplier guidelines and instructions in order to successfully complete the stud tensioning process.
- 2.4 Taper-Lok suggests one of the following vendors, Hydratight Sweeney or Integra Technologies for this bolt-up operation.

3. CAUTIONARY INFORMATION AND SPECIAL INSTRUCTIONS

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

- 3.1 Ensure to protect sealing surfaces of all components of Misalignment, Swivel and Weld neck connections.
- 3.2 When disassembling flanges that have been together for sometime, the seal ring will often remain lodged in the female pocket. Do not attempt to pry the seal ring out of the female pocket. To remove the seal ring, lightly strike the seal ring perpendicularly on the lip with a blunt soft metal rod. **Caution! Seal ring could quickly spring out causing personal injury.** To avoid such an accident, place a metal rod such as a crowbar (shown in Figure 3-1 below) inside the seal ring before striking. Make sure to place the metal rod away from the point of strike as shown in Figure 3-1 below. This will direct the seal ring to be sprung away from the point of strike.



FIGURE 3-1



FIGURE 3-2

- 3.3 **Do not hang seal ring for storing purposes.** It must be set-aside on a clean flat surface until it is ready to be installed.

Project: Bohai Bay	INSTALLATION PROCEDURE	Doc No.:
Job No.:		Revision No.:
P.O. No.:		Date:
Client:		

- 3.4 When installing seal ring for the first time or for reassembly, **do not use any type of glues, tie wraps, and tapes to hold the seal ring in place.** Also, prior to assembly, check to ensure that the sealing surfaces are clean.
- 3.5 The Taper-Lok misalignment flanges are not designed to rotate in the tightened condition.
- 3.6 **Do not use the eyebolts to lift the piping.** The eyebolts are not designed for that purpose. They are designed to lift the misalignment flange assembly only.
- 3.7 Ensure that equipment for stud tensioning is calibrated prior to use.
- 3.8 **If there is any damage to sealing surfaces, Taper-Lok shall be contacted before taking any actions for repair.** After review and assessment of the damage, Taper-Lok will advise due course of actions that must be taken to repair the damage.