

Assembly Instructions

for Key-Lock™ mechanical joints in sizes 2 to 40 inch (50-1000 mm)

Introduction

This guide provides recommendations for the installation of Bondstrand™ piping systems using the Key-Lock mechanical joint. Many of the skills, techniques and principles of steel pipe installation also apply to Glassfiber Reinforced Epoxy (GRE) piping. As you work with Bondstrand GRE piping, you will find that it weighs much less than steel and that it is more flexible, but it must be handled more carefully than uncoated and unlined carbon steel pipe. In addition, GRE pipe often needs protection against abrasion at points of support.

To accommodate the characteristics of Bondstrand GRE piping, the following installation recommendations should be followed. You are encouraged to contact NOV Fiber Glass Systems or your NOV Fiber Glass Systems representative for more help on specific problems or questions.

Tooling

Check the presence and quality of joint materials (keys and O-ring) material and equipment (Photo 1).

The tooling and joint material listed below are, as a minimum, required to make a Key-Lock joint. All items are available from NOV Fiber Glass Systems, with the exception of items 6, 7 and 8. Installation equipment like cranes are to be determined by installation contractor.

Joining System

Key-Lock joint

2-40 inch (50-1000 mm)



Key-Lock

Joint assembly

When ready to join the pipes, remove the end protection from both the male pipe end and female pipe end (Photo 2). End protection, supplied by NOV Fiber Glass Systems, should be removed just prior to assembly to keep joining surfaces and grooves clean.



Photo 2

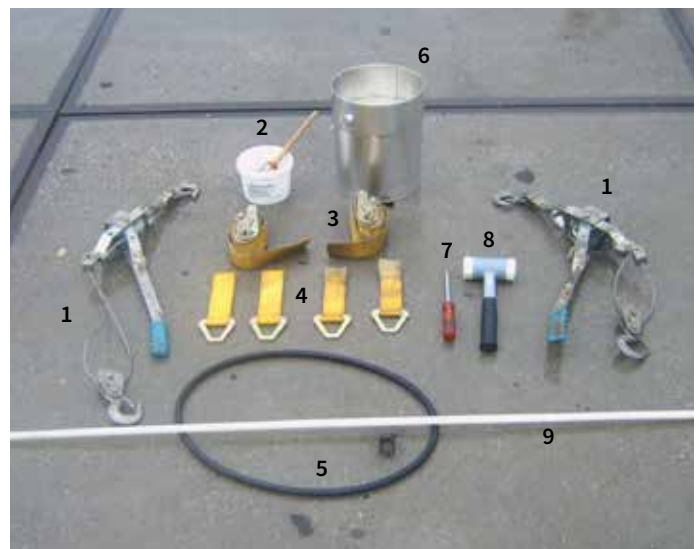


Photo 1

- | | |
|-----------------------|----------------------|
| 1. Powerpull (2x) | 6. Bucket with water |
| 2. Joint lubricant | 7. Screw driver |
| 3. Band clamps (2x) | 8. Hammer |
| 4. Pulling Rings (4x) | 9. Key |
| 5. O-ring | |

Clean the grooves and sealing surface of the female pipe end or fitting, using clean dry rag or a clean paintbrush (Photo 3).

Clean the grooves (both key and O-ring) of the male pipe end.



Photo 3

Brush, or rub a layer of joint lubricant into the O-ring and key grooves of the male pipe end (Photo 4).



Photo 4

Lubricate the inside of female pipe end and locking key groove with ample amounts of lubricant (available on order NOV Fiber Glass Systems - Photo 5). Note that the pipe already in place has been properly rotated so the keyhole of the joint is conveniently positioned.

Apply lubricant only when you are ready to complete the joint.

Keep lubricated surfaces clean and free of sand and dirt as contamination is likely to interfere with joining and sealing. Proper lubrication of the O-ring and joint surfaces is important to avoid cutting the O-ring or rolling it out of place during assembly.



Photo 5

O-ring placement

Clean the O-ring with water or a clean rag (Photo 6).

Check O-ring for damages and correct size.

Lubricate entire surface of the O-ring and slip it into the first endmost groove (= O-ring groove) on the male end.



Photo 6

Distribute the O-ring evenly in the groove by slipping a screwdriver under it and sliding the screwdriver around the joint (Photo 7).

Be careful not to damage the O-ring. A sound O-ring is the key to a watertight joint.



Photo 7

Pipe spigot insertion

Rotate the pipe so that the key holes in the female pipe end are in the proper position for assembly (usually pointing "up"). Align the male pipe end against the female pipe end already in place for a straight concentric entry. Proper alignment is essential for joining (Photo 8). Deflect the joint to conform to the actual horizontal and vertical alignment of the trench only after the joint is fully assembled in the straight position.



Photo 8

Place the band clamps (available from NOV Fiber Glass Systems) on each side of the joint. It is often convenient to place one band clamp just behind the female end or coupling and the other about 1.5 meter (4.5 ft) from the male end. Make sure the pulling rings are positioned at 3 o'clock and 9 o'clock (Photo 9).



Photo 9

Powerpulls (available from NOV Fiber Glass Systems) are recommended for joint assembly. Connect the power pulls to pulling rings attached to the band clamps on either side of the pipe and pull the pipes together (Photo 10).



Photo 10

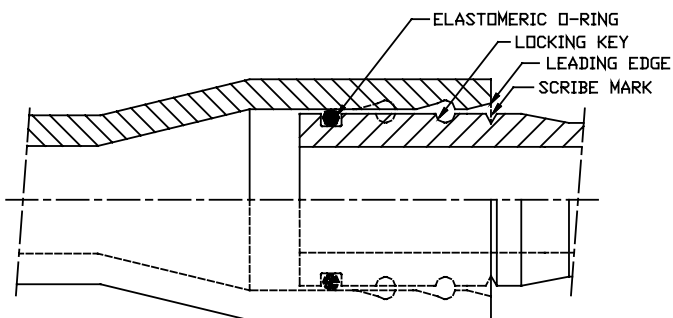
Tighten the powerpulls evenly on both sides so the O-ring enters smoothly and without being pushed or rolled out of its groove.

Insert the male pipe end until the scribe mark is in line with the leading edge of the female pipe end (Drawing). To prevent slipping of the bandclamps, one may choose to use rubber pads under the band clamps. Do not overtighten the band clamps as this may crush the pipe wall. Rubber pads or saddles may be placed underneath the band clamp to prevent pipe crushing. Saddles can be made from left over pipe pieces (cut in 90° pieces).

Straightness of entry adds significantly to the ease of assembly.

Look along the pipes and carefully observe concentricity and uniformity of entry.

Keep keys ready for insertion when the scribe mark is about 6 mm away from the leading edge of the female pipe end.



Driving the Keys

Check key(s) for damage and correct sizes.

Lubricate the locking key(s) (supplied by NOV Fiber Glass Systems) at leading end before insertion (Photo 11).

Place lubricated locking key(s) into the insertion keyhole(s) and slowly pull the pipes together until the key(s) slip(s) into the keyway(s).

Check the pipe alignment again by looking along the pipe and by aligning the scribe mark on the male pipe end with the edge of the female pipe end.

Use a hammer or mallet (wooden hammer) to drive the locking keys through the insertion holes and into the keyways (Photo 12) until the leading end can be seen in the insertion hole.

Approx. 75 to 100 mm (3 to 4 inch) of the key(s) will stick out of the key hole.

Caution: Drive the key only until you can see its leading end through the insertion hole.



Photo 11



Photo 12

After driving the key(s), remove power pulls and band clamps (Photo 13).



Photo 13

For above ground joints that have to be disassembled in the future for maintenance or other reason, the following is applicable:

1. Protect the projecting key(s) of piping exposed to sunlight or other ultraviolet radiation from embrittlement.
2. Spray all exposed key surfaces with a black acrylic coating, or wrap them with duct tape within several days after installation.

Positioning and aligning the joined pipe

After driving the key(s) and removing the power pulls and band clamps, deflect the joint to fit the supports or trench bottom. With the pipe fully supported in its final position, release the lifting straps.

NOTE:

When installing buried pipe in sag vertical curves, it may be necessary to leave the lead lifting strap in position to align the next joint during assembly.

To avoid excessive movement and bending at turns and branches during the hydrostatic test, pull straight sections of joined pipe forward as assembly progresses, using a power pull or other means to remove play in the joints.

Cutting pipe to length

Special pipe lengths are frequently required for fit up. When pipe is shortened by cutting-off factory prepared ends, new male ends must be furnished by bonding on end adapters. Cutting and bonding often can be avoided by using factory made short lengths (pups) with male ends. Special tools, equipment and assembly instructions are available from your NOV Fiber Glass Systems representative.

Connections to other piping and/or equipment

Bondstrand GRE pipe may be connected to either metallic, or thermoplastic piping using flanges drilled to ANSI Standard B16.5 Class 150. Other flange drillings are available on special order. Bondstrand filament-wound flanges (Photos 14 and 15) may be bolted directly against raised-face steel flanges, provided a torque wrench is used. These flanges also seal well against lined steel configurations. Use a full-faced 3-mm (1/8 inch) thick elastomeric gasket with a Shore A hardness of 60+5 for best results. Consult NOV Fiber Glass Systems literature for complete flange assembly instructions.

Important:

Where Bondstrand piping is connected to metallic pipe, anchor the metallic pipe securely at the point of connection so expansion and contraction of the metal line is not transferred to the Bondstrand line.



Photo 14 - Key-Lock flange



Photo 15 - Taper flange

Safety

Wear suitable protective clothing, gloves and eye protection at all times (Photo 16).



Photo 16

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