

TSB DXX 0005

TECHNICAL SERVICE  
BULLETIN

# INSTALLING PUG SHANKS AND PUG KNIVES



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## SAFETY

J.C. Steele and Sons equipment is designed to process large amounts of heavy products. To accomplish many of the required operations of our customers, high horsepower and heavy components are required. A great deal of time and effort has been invested into our equipment to make them as safe as practically possible. The safety features are no substitute of caution and common sense. A careless moment is all that is needed to cause a serious accident. Please refer to the machine's Owner's Manual for a detailed list of safety precautions.

## GENERAL DESCRIPTION

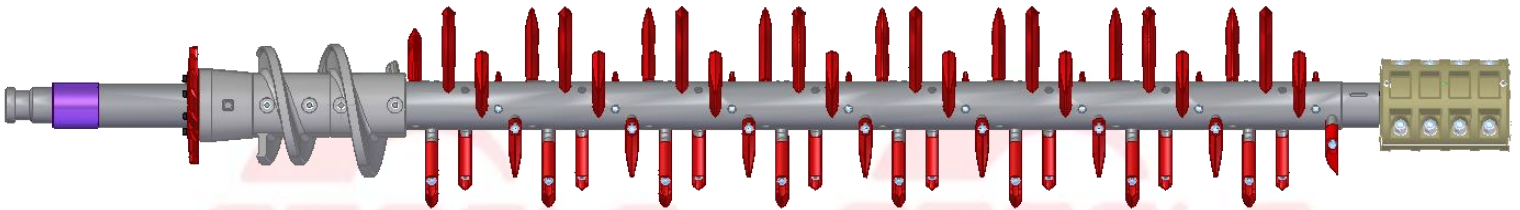


FIG 1: Side view of 90BDPS pug shaft

This Technical Service Bulletin outlines the procedure to install pug shanks and pug knives on any pug sealer.

## SPECIAL TOOLS NEEDED

- ¼" (6mm) thick spacer
- Loctite Anti-Seize
- Silicon caulk
- Framing square

## MANPOWER ESTIMATE

This procedure will require 2 men for 2 hours, depending on ease of access and maintenance state of equipment.

## PROCEDURE

1. Assemble the **pug knife casting** onto the **pug shank**.

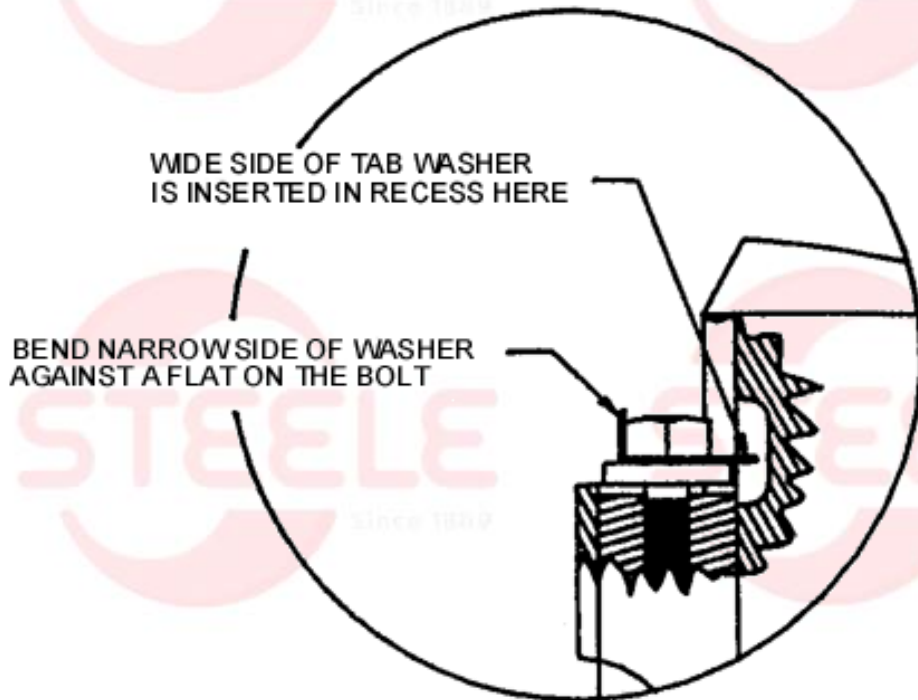
- **Loctite Anti-Seize** can be applied to the shank where the knife casting is installed to make it easier to remove the knife for replacement.
2. **Tighten the bolt** holding the **knife** to the **shank** to a torque of **130 ft. lbs.** (176 Nm)
- The **tab washer flat** should be bent upward to lock this **bolt** after tightening.



FIG 2: Tightening the bolt



FIG 3: Bending the tab washer flat upward



WIDE SIDE OF TAB WASHER  
IS INSERTED IN RECESS HERE

BEND NARROWSIDE OF WASHER  
AGAINST A FLAT ON THE BOLT

FIG 4: Diagram of bolt installation

3. Coat the lower portion of the **pug shank** where the **shank** contacts both the **split tapered bushing** and the **shaft**, and the threads of the **cap screw** with **Loctite Anti-Seize Lubricant** or an equivalent product.

- Alternatively, **water-resistance grease** can be used, though it's not as effective.



FIG 5: Applying Anti-Seize



FIG 6: Loctite copper-based Anti-Seize lubricant

4. Loosely assemble the **split-tapered bushing**, **bolt**, and **hardened steel washer** on the pug shank.

- **Silicon caulk** can be applied between the **hardened washer** and **split-tapered bushing** to prevent water and material ingress. This will make future removal of the shank easier.



FIG 7: Assembled split-tapered bushing, bolt, and hardened steel washer



FIG 8: Pug shank and pug knife assembly

5. Turn the **pug shaft** until the **shank hole** is conveniently positioned at the top for inserting the **pug knife assembly**.
  - The **pug shank holes** are shouldered in the bottom to prevent insertion of the **pug shank** from the wrong end.
6. Insert the **pug shank assembly** from the top and **hand-tighten** the **bolt** from the bottom. Do not overtighten.
  - On older pug shafts where **round tapered pins** were used to secure the **pug shank**, insert the **pug shank** into the end of the hole where the large end of the **tapered slot** is. Turn the split in the bushing so that it does not align with the slot.
  - **Silicon caulk** can also be applied around the **shank hole** before installing the **knife assembly** to prevent water and material ingress. This will make future removal of the shank easier.



FIG 9: Inserting pug shank assembly



FIG 10: Inserted pug shank assembly

7. Place a **1/4" (6mm) thick spacer** under the **pug knife blade** and **tighten the bolt** until the **bushing** firmly grips the **shank hole** and the **pug shank** cannot slip down into the hole.
  - The **tapered bushing** will not slide after it grips the **pug shank hole**, so to properly tighten, the **shank** must pull into the **bushing**. Therefore, clearance between the **pug knife** and the **pug shaft** must be provided before final tightening.
  - A simple **1/4" (6mm) thick spacer** inserted between the **knife** and the **shaft** prior to **tightening** to grip will provide adequate space.



FIG 11: Using a spacer to tighten the bolt

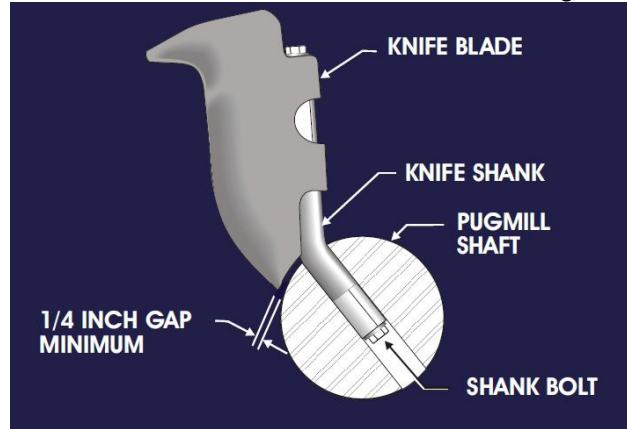


FIG 12: Diagram of pug shank assembly

8. To set the **knife pitch**, start by placing the **short leg** of a **framing square** against the wall of the **pug tub** and the **long leg** against the **auger side** of the **knife**. Since the **knife** is tapered,  $\frac{1}{8}$ " (**3mm**) must be added to the **desired pitch setting**.
9. **Turn the knife** until the **trailing edge** is touching the **square** and the **leading edge** of the **knife point** is  $\frac{1}{8}$ " (**3mm**) plus the **pitch** from the **square**.
  - For **reverse pitch** place the **square** on the opposite side of the **knife** and add  $\frac{1}{8}$ " (**3mm**) to the **desired reverse pitch setting**.



FIG 13: Setting the knife pitch

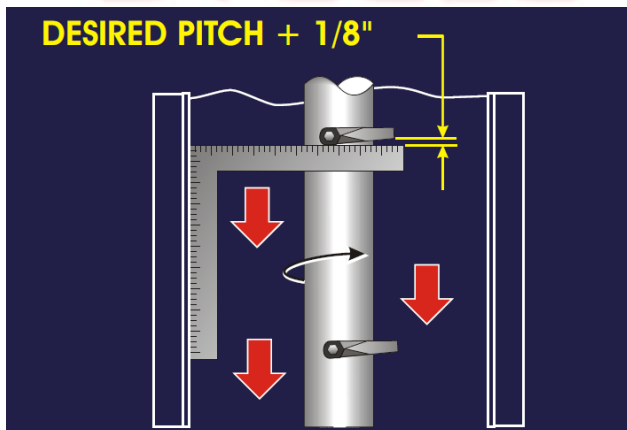


FIG 14: Using the framing square to set the desired knife pitch

10. When installing the **rear knife**, it is important that the **knife tip** nearly touches the **rear bulkhead**.
  - This will ensure the most effective **elimination** of **material build-up** at the **bulkhead**.

- The angle of a **properly installed rear knife** is quite steep to achieve an approximate  $\frac{1}{8}$ " (3mm) **clearance** between the **knife tip** and **bulkhead face** as shown in Figures 15 & 16.



FIG 15 & 16: Photos of a properly installed rear pug knife

11. The **front knife** should be pitched at an **angle** which is a continuation of the **sealing auger wing entrance angle** as shown in Figure 17.

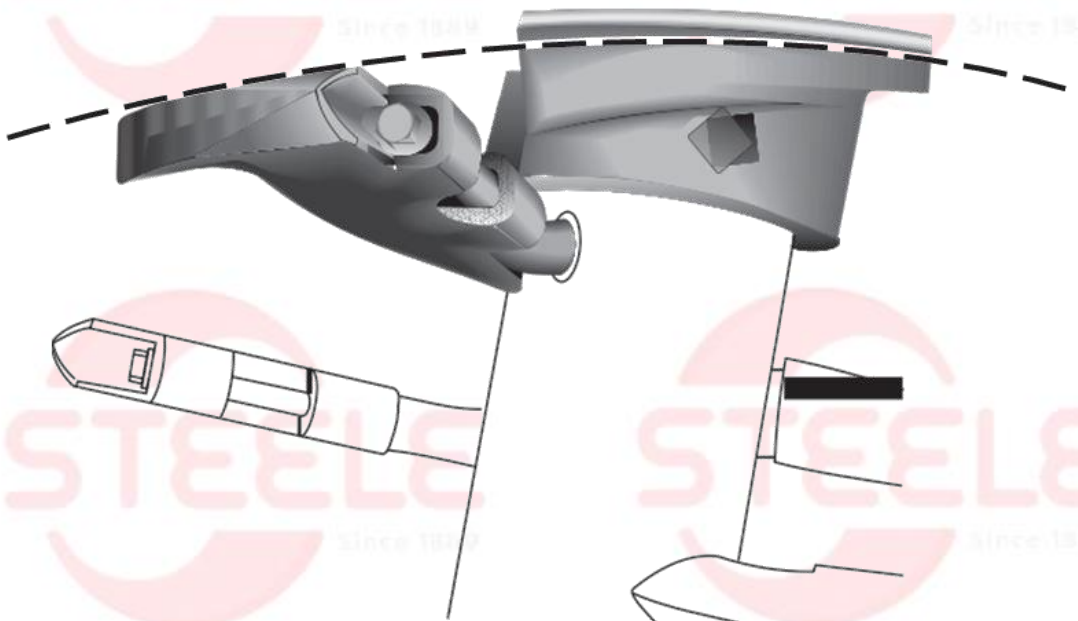


FIG 17: Using the sealing auger wind angle as a reference for the front knife angle

12. Apply **225 ft. lbs. (305 Nm) torque** to the shank bolt.

- Ensure that the **minimum 1/8" gap** is maintained between the **pug shaft** and the **pug knife blades** after tightening the shank bolt.



FIG 18: Torqueing the shank bolts

13. **Rotate the pug shaft** by hand to make sure that no knives make contact with the pug tub.

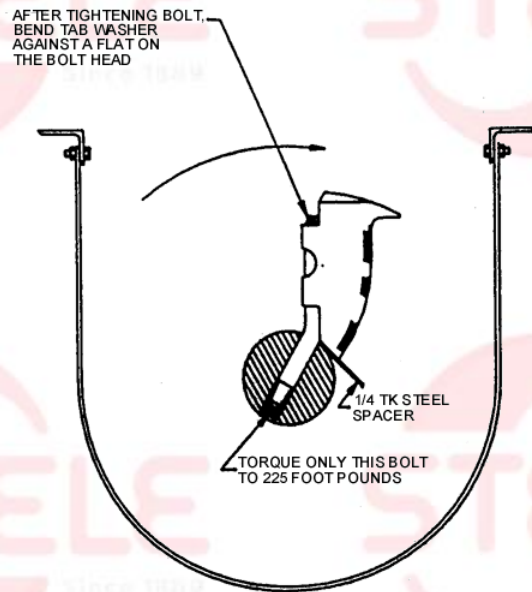


FIG 19: Torqueing the shank bolts then rotating shaft by hand

14. Fill the **pug tub** to a level about **3" to 4"** (75 to 100mm) below the tips of the **pug knives** when they are in the upper vertical position.



15. **Run the machine** and **watch the level** of the clay.

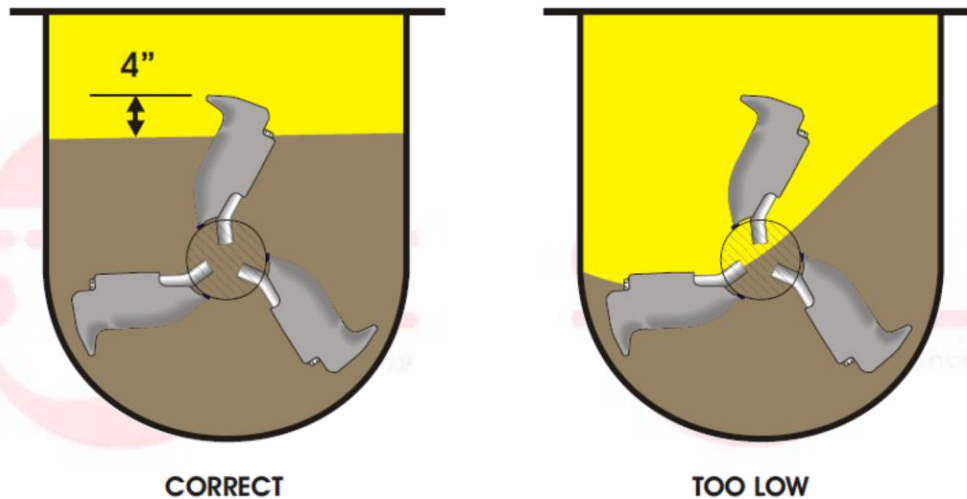


FIG 20: Pug tub clay level

16. Adjust the **pug knives' pitch** by first **loosening the pug shank bolt** and **tapping** on them with a **hammer** until the **pug knife assembly** can be turned.

17. Reset the **pitch** using the procedure outlined earlier.

18. Run the pug mill for 1 hour and **retighten the shank bolts** to a torque of 225 ft. lbs. (305 Nm).

- This should be **repeated** every 1,000 hours of operation.
- These **shanks** are designed to be **permanent** and do not require replacement for wear.
- The **pug knives** are designed to be the **wear parts** and should be replaced as needed to protect the shanks from wear.