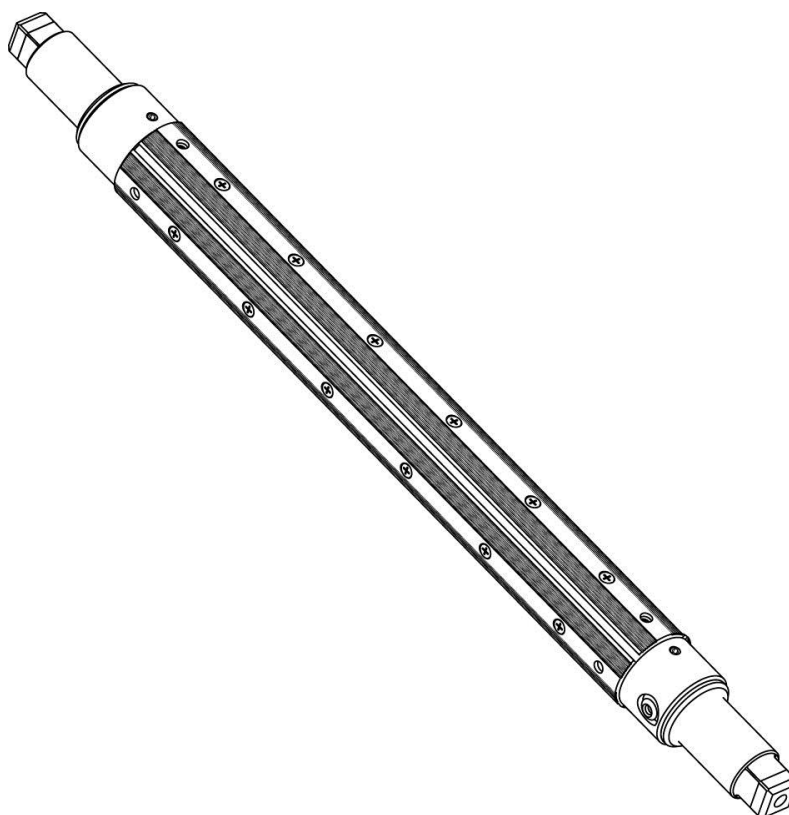




Tidland Leaf Shaft

User Manual



IMPORTANT SAFETY INSTRUCTIONS

When using this Tidland product, basic safety precautions should always be followed to reduce the risk of personal injury. Your company's safety instructions and procedures should always be followed. When using this product with any other equipment or machinery, all safety requirements stipulated by that equipment or machinery manufacturer must be followed. Compliance with local, state, and federal safety requirements is your responsibility. No part of these or the following instructions should be construed as conflicting with or nullifying the instructions from other sources. Be familiar with the hazards and safety requirements in your work environment and always work safely.

Read and understand all instructions and shaft design application limits before operation.

Never use this product for a purpose or in a machine that it was not specifically designed for. See Product Safety Data Sheet (PSDS).

Do not exceed the operation loads for this shaft as noted on its PSDS, Product Safety Data Sheet.

Follow all warnings and instructions marked on the product and on the PSDS.

Do not use fingers or other objects to deflate the shaft; Tidland recommends using the Tidland Air Release Tool (see page 5).

Inspect the shaft for wear and/or other safety and functional deficiencies daily, before each use.

Wear safety glasses or proper eye protection when inflating or deflating or otherwise operating the air system.

Do not remove or otherwise alter any setscrews or fastening devices prior to using this product.

Do not operate this product if any setscrews or fastening devices are missing.

Do not lift shaft manually if it is beyond your capacity. Loads over 1/3 your body weight may be prohibitive. Consult your company safety policy.

When lifting a shaft, use proper lifting techniques, keeping back straight and lifting with the legs.

Do not carry or lift this product over wet or slippery surfaces.

Use appropriate mechanical lifting devices, such as a hoist or shaft puller, for heavier shafts.

When performing maintenance or repair procedures, do not pressurize the shaft if journal setscrews are loose or missing.

When performing maintenance procedures, do not pressurize the shaft if the journal is missing.

All replacement parts used on this product should be made to original Tidland specifications.

All maintenance and repair procedures performed on this product should be done to Tidland specifications by qualified personnel.

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CAUTION

Wear eye protection when using tools or compressed air.



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or to submit an electronic Return Material Authorization Request.
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RECOMMENDED TOOLS

- Clean, non-lubricated air supply: 80-120 psi (5.5-8.3 bar) for proper operation.
- Tidland Inflation Tool (Part No. 128052)
- Tidland Air Release Tool (Part No. 111630)
- Pincers for removing hose clamps, if installed. See page 10.
- LOCTITE® 222, 242
- Dow Corning Molykote® 55 o-ring grease

MAINTENANCE SCHEDULE

Daily

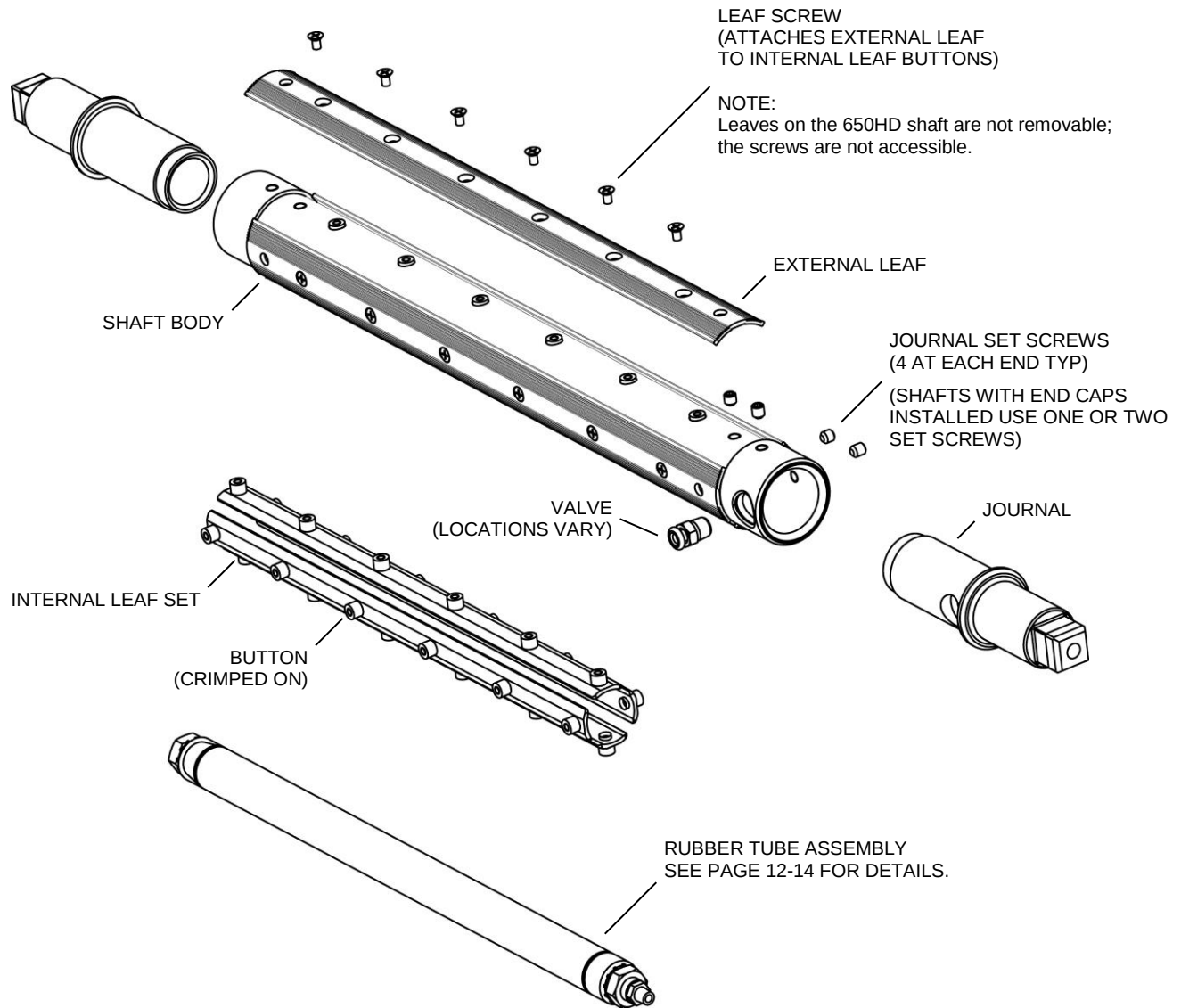
Keep shaft clean and dry.
Remove dust and debris buildup with compressed air.

Periodically

Inspect journals for wear.
Check for bent external leaves.

ASSEMBLY DIAGRAM AND PARTS

Shaft configurations vary. When ordering replacement parts, please have your serial number ready.



See page 15 for end view of internal parts.

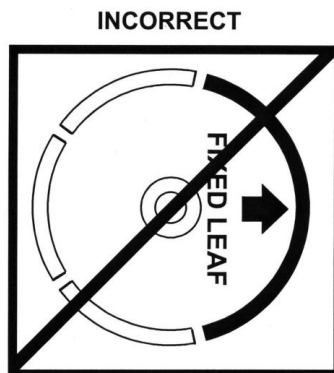
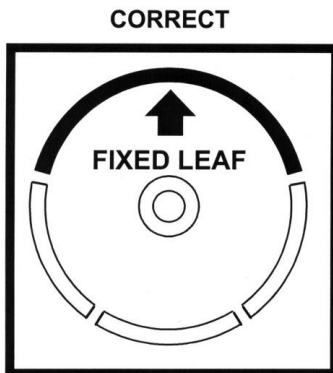
SHAFT INSTALLATION AND OPERATION

Standard Leaf Shaft

1. Install shaft as required for your machine application.
2. Slide the core onto the shaft.
3. Inflate rubber tube to 80-120 psi (5.5-8.3 bar) and begin winding.

Fixed Leaf Shaft

1. Install shaft as required for your machine application.
2. Rotate the shaft so that the fixed leaf is at the top; slide the core onto the shaft.
3. Inflate rubber tube to 80-120 psi (5.5-8.3 bar) and begin winding.

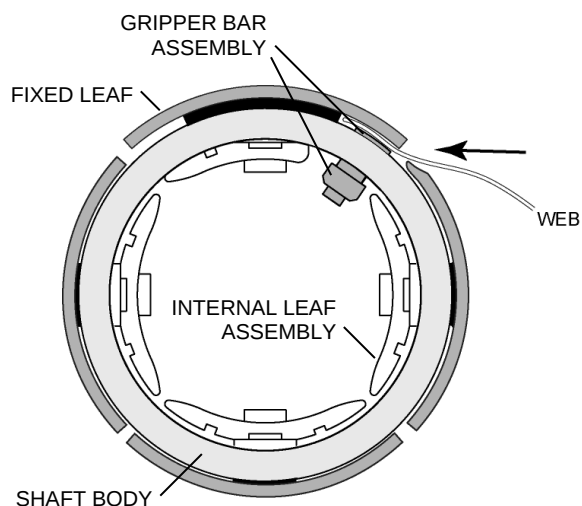


Positioning the fixed leaf at the top allows the internal rubber element to expand more uniformly, and prevents the internal element from having to lift the weight of the material roll.

Inflating the shaft with the fixed leaf down or to the side can lead to excessive element wear and premature failure.

Coreless Gripper Leaf Shaft

1. Install shaft as required for your machine application.
2. Make sure shaft is completely deflated.
3. Make sure fixed leaf is in the correct position.
4. Lay web along the length of the shaft, sliding it into the gap between the fixed leaf and the gripper bar.
5. Inflate rubber tube to 80-120 psi (5.5-8.3 bar), securing the web between the leaves.
6. Begin winding operation.



Replacing a Valve

Shaft configurations vary. Valve may be installed in the end of the shaft or along its face.

1. Deflate the shaft. Remove all air.
2. Locate and remove the valve.
3. Apply thread sealant (according to manufacturer's directions) to the threads of the valve (unless the sealant is pre-applied) and reinstall.

NOTE: Valves with pre-applied thread sealant are good for multiple uses. Always inspect the valve threads for sufficient sealant; do not reuse more than six times.

4. Screw the valve into the shaft and torque to 8.8-10 ft·lbs (12-13.6 Nm).

Rubber Tube Fitting Designs

If your replacement rubber tube assembly looks like this =====>>>

Remove your old rubber tube assembly (page 11) and install the new one, pushing the tube assembly firmly onto the o-ring connector in the journal.

If you are using re-using your tube fittings with bulk rubber tube material, see instructions starting on page 12.



If your replacement rubber tube assembly looks like this =====>>>

=== it is directly interchangeable with older shaft designs. There are fewer parts: rubber tube, tube fitting and hose clamp, pictured at right.

Remove your old rubber tube assembly (page 11) and install the new one, pushing the tube assembly firmly onto the o-ring connector in the journal.

See page 10 for using the hose clamp design with bulk rubber tube material.



New shaft design

Tidland's new shaft designs have a hole bored in the journal to accept the rubber tube assembly with a male o-ring connector, pictured at right.

Remove your old rubber tube assembly (page 11) and install the new one, pushing the tube assembly firmly into the socket in the journal.

See page 10 for using the hose clamp design with bulk rubber tube material.



Using the new fitting design with bulk rubber tube material

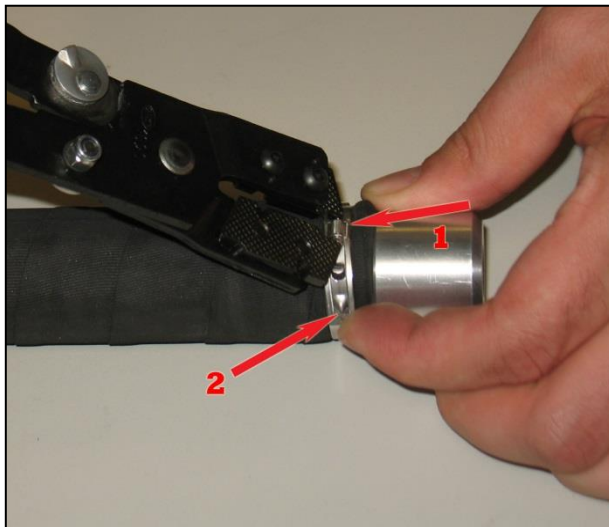
Removing the hose clamp

Tidland recommends the use of a pincer for safe and easy removal of the hose clamp.

Standard pincer Tidland Part No. 778957

Spring return pincer Tidland Part No. 778958

1. With the pincer, squeeze the tangs **(1)** on the hose clamp until you can lift the load retaining hook **(2)**, and then release the pincer.
2. Remove the fittings and use them again with new rubber tube material. (Remember to reinstall the tube stiffener, if needed.)
3. To close the clamp, squeeze the tangs until you can snap the load retaining hook into place.



Assembly Rubber Tube Maintenance

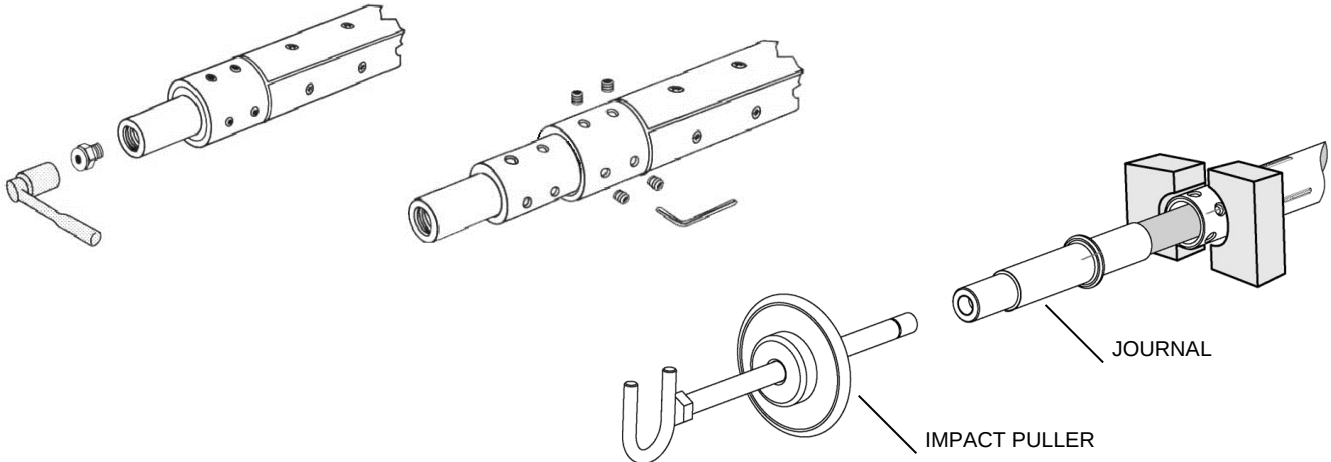
Removing the Rubber Tube

Cantilevered shafts: Rubber tubes can be replaced without removing shaft from machine. It is not necessary to remove the shaft leaves for rubber tube maintenance.



Pinch Hazard.
Keep fingers away from moving leaves.

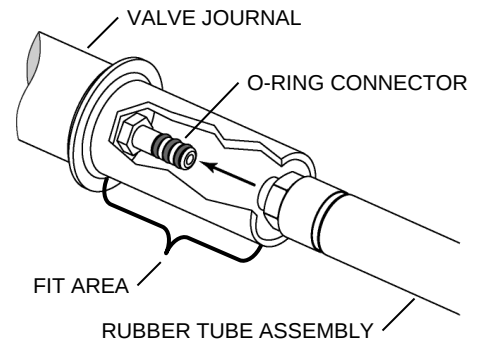
1. If the tube will still hold air, inflate it enough to raise the shaft leaves; wedge the leaves in the inflated position. This lifts the internal leaves off of the rubber tube assembly, allowing for easier removal.
2. With the leaves wedged in lifted position, remove all air from the shaft. Use the Tidland Air Release Tool for safety and best results.
3. For cantilevered shafts, remove the end cap and valve, if installed. Go to Step 8.
4. For shafts with journals, match mark the journal and body before removing the set screws; remove the set screws.
5. Remove valve.
6. Using a round clamping fixture to protect the shaft body, lock the shaft in a vise.
7. Remove the journal: Attach the impact puller/slide-hammer to journal end and strike the weight against stop.
8. Grasp rubber tube assembly firmly and pull from shaft.
9. Rubber tube fittings can now be disassembled and reused, if replacing only the tube material.



Installing the Complete Rubber Tube Assembly

Note: O-ring connector configurations vary. Make sure there is an o-ring in each groove before re-assembly.

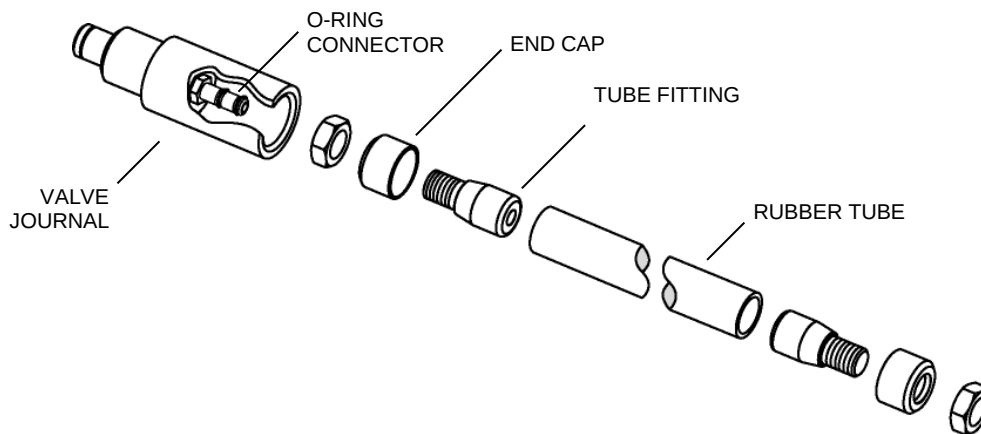
1. Apply o-ring grease to the o-rings on the o-ring connector. Push the valve end tube fitting fully over the o-ring connector in the valve journal.
2. Insert the non-valve end of the rubber tube assembly into the shaft. Slide it all the way in until it seats in the recess in the non-valve journal.
3. Apply o-ring grease to the fit area of the valve journal.
4. Align the match marks on journal and shaft and tap the journal into place with a rubber mallet.
5. Apply small amount of *low-strength* threadlocker to threads of the journal screws. Reinstall the set screws and torque according to chart on page 14.
6. Reinstall the valve:
 - a. Apply a thread sealant (according to the manufacturer's directions) to threads of the valve.
 - b. Screw the valve into the shaft and torque to 8.8-10 ft·lbs (12-13.6 Nm).



Disassembling a Rubber Tube Assembly

- The standard rubber tube assembly, shown below, fits onto an o-ring connector that remains screwed into the valve journal.
- In some shaft designs, the o-ring connector is installed in the rubber tube assembly.
- Your rubber tube assembly may have a tube stiffener installed inside the rubber tube.
- Disassembly is similar for both configurations.

This rubber tube assembly consists of four basic parts: element, element fitting, end cap and jam nut. (Older models may have a washer installed: it is no longer necessary with the use of *Loctite 242*.)



Note the difference in tube fittings:

- Valve end fittings are bored through for air passage; non-valve fittings are solid.

Note: O-ring connector configurations vary. Make sure there is an o-ring in each groove before re-assembly.

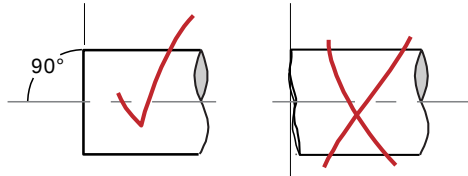


Do not inflate rubber tube assembly outside of the shaft.

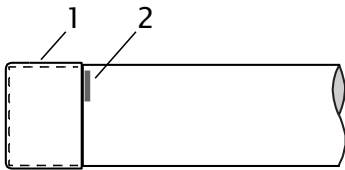
Tube fittings could disengage from assembly and become dangerous projectiles.
Can result in serious injury.

Building the Rubber Tube Assembly

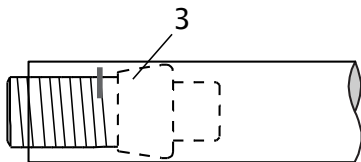
- When cutting rubber tube to length, it is very important to cut the ends square, without nicks or wavy edges. Heavy tin snips work well. Any uneven cuts will not let the rubber tube seat properly in the end cap, resulting in an unreliable assembly subject to failure under pressure.
- Before assembly, clean ends of rubber tube inside and out to make sure all mold release agents or other foreign coatings are removed. This will help prevent the rubber tube from squeezing out of the cap when the retaining nut is tightened.



1. Cut rubber tube square at each end.



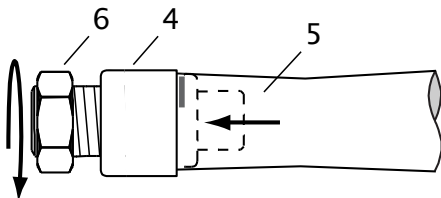
2. Install the end cap (1) on the rubber tube and mark its position on the tube (2). Remove the end cap.



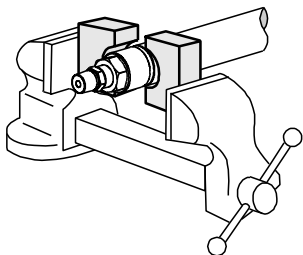
3. Insert the tube fitting (3) deep inside the rubber tube.

NOTE: If the assembly uses a tube stiffener, insert it into the rubber tube first and attach it to the tube fitting. Then insert the fitting into the rubber tube.

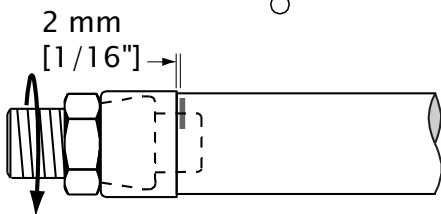
For rubber tube diameters 11/16" and under, reinstall the wooden dowel inside the tube. (This will aid in loading the tube into the shaft.)



4. Fit the end cap (4) over the tube.
5. Squeeze the tube (5) to force the tube fitting back toward the end.
6. Apply Loctite to the tube fitting threads and install the nut (6). Do not tighten.



7. Secure the shaft in a round clamping fixture.



8. Tighten the nut to draw the tube fitting out until fully seated in the end cap.
9. Tighten the nut to torque specified on page 14.
10. The end cap must be within 2 mm of the mark on the rubber tube. Tube fitting threads should be perpendicular to the rubber tube. If crooked, loosen the nut and repeat the procedure.
11. Repeat the procedure for the non-valve end.

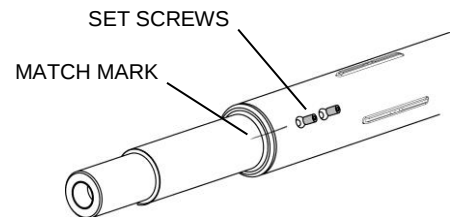
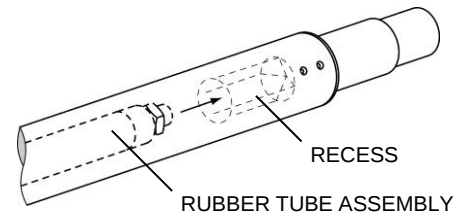
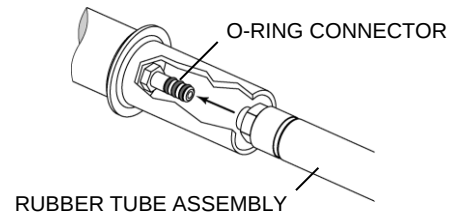
Reinstalling the rubber tube assembly; page 12.

MAINTENANCE

Shaft Assembly Sequence

Note: O-ring configurations vary. Make sure there is an o-ring in each groove before re-assembly.

1. Apply o-ring grease to the o-rings on the o-ring connector.
2. Insert the rubber tube assembly into the valve journal and push the valve end tube fitting fully over the o-ring connector in the valve journal.
3. Apply o-ring grease to the fit area of the valve journal.
4. Insert the non-valve end of the rubber tube assembly into the shaft. Slide it all the way in until it seats in the recess (tube socket) in the non-valve journal.
5. Align the match marks on valve journal and shaft and tap the journal into place with a rubber mallet.
6. Apply small amount of *low-strength* threadlocker to threads of the journal set screws. Reinstall the set screws and torque as shown in the chart below.
7. Reinstall the valve:
 - a. Apply a thread sealant (according to the manufacturer's directions) to threads of the valve.
 - b. Screw the valve into the shaft and torque to 8.8-10 ft-lbs (12-13.6 Nm).



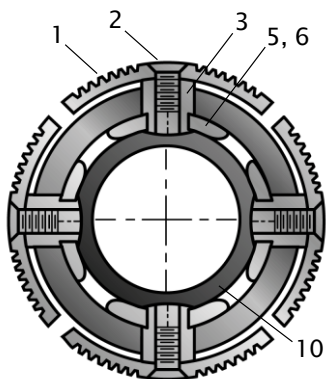
Torque Requirements

Setscrew Torque Requirements					
Size US	ft-lbs steel body	ft-lbs aluminum body	Size Metric	Nm steel body	Nm aluminum body
1/4"	6-7	2-3	M6	9-10	3-4
5/16"	12-14	4-5	M8	16-18	5-6
3/8"	22-24	7-8	M10	30-32	10-11
1/2"	47-52	15-17	M12	62-69	20-23

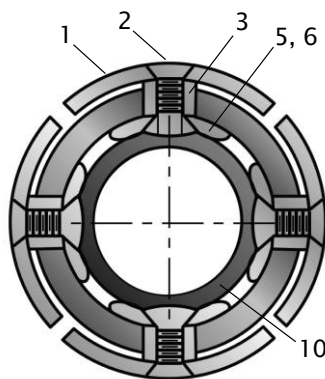
Assembly Torque Requirements for Standard Tube Fittings			
Tube O.D.	ft-lbs	Tube O.D.	Nm
1-1/4"	28-30	32mm	38-41
1-3/8"	38-40	35mm	51-54
1-1/2"	43-45	38mm	58-61
1-5/8"	43-45	41mm	58-61
1-7/8"	48-50	48mm	65-68
2-1/8"	53-55	54mm	72-75
2-3/8"	58-60	60mm	79-82
3-3/8"	63-65	86mm	85-88
4"	68-70	102mm	92-95
4-3/8"	78-80	111mm	105-108
4-1/2"	78-80	114mm	105-108

Leaf Assembly

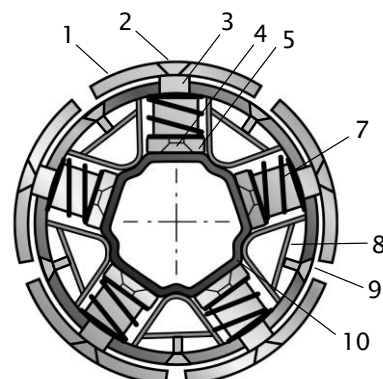
Leaf Assembly Components



650 LEAF SHAFT W/ BUTTONS



650HD HEAVY DUTY LEAF SHAFT



750 LEAF SHAFT

Item	Description
1	External leaf
2	External leaf fastener *
3	Leaf button
4	Internal leaf fastener
5	Internal leaf
6	Foam spring
7	Leaf spring
8	Rubber tube filler
9	Rubber tube filler fastener
10	Rubber tube

* 650HD shafts may have plugs installed that block access to these fasteners. Call Tidland Customer Service for assistance.

Replacing the Leaves



Match mark external and internal leaves to body before removing to ensure they are reinstalled in their original positions. This will help maintain balance and expanded diameter as manufactured.



If using *Loctite*:
Use *Loctite 222* on fasteners smaller than 1/4".
Use *Loctite 242* on larger sizes.

External Leaves

1. Inflate the shaft enough to lift the external leaves. This prevents collapse of the internal leaves.
2. Remove all fasteners from external leaves. (Leaves were installed using *Loctite 242*; you may need to use heat or an impact wrench to break the seal.)
3. Align the new leaves on the shaft.
4. Use the new fasteners supplied with your shaft to install the external leaves. (Note: If the new fasteners do not have a pre-applied threadlocker, use a small amount of *Loctite* on the threads.) Install the screws in the leaves and tighten.
5. Deflate the shaft completely.

Internal Leaves

1. Remove the rubber tube assembly from the shaft (p. **Error! Bookmark not defined.**).
2. Remove one external leaf at a time and pull out the matching internal leaf until all leaves are removed. (If leaves were installed using *Loctite 242*; you may need to use heat or an impact wrench to break the seal.)
3. Use the new fasteners supplied with your shaft to install the external leaves. (Note: If the new fasteners do not have a pre-applied threadlocker, use a small amount of *Loctite* on the threads.) Reinstall one internal leaf and its matching external leaf, one at a time, until all leaves are reinstalled.
4. Tighten all fasteners.
5. Reinstall the rubber tube assembly (p. 12). If necessary, lift the external leaves and wedge them open to ease insertion of the rubber tube.

Replacing Springs

Tidland no longer supplies the steel springs; you can replace them with Poron® microcellular urethane (foam-like) springs for the same results.

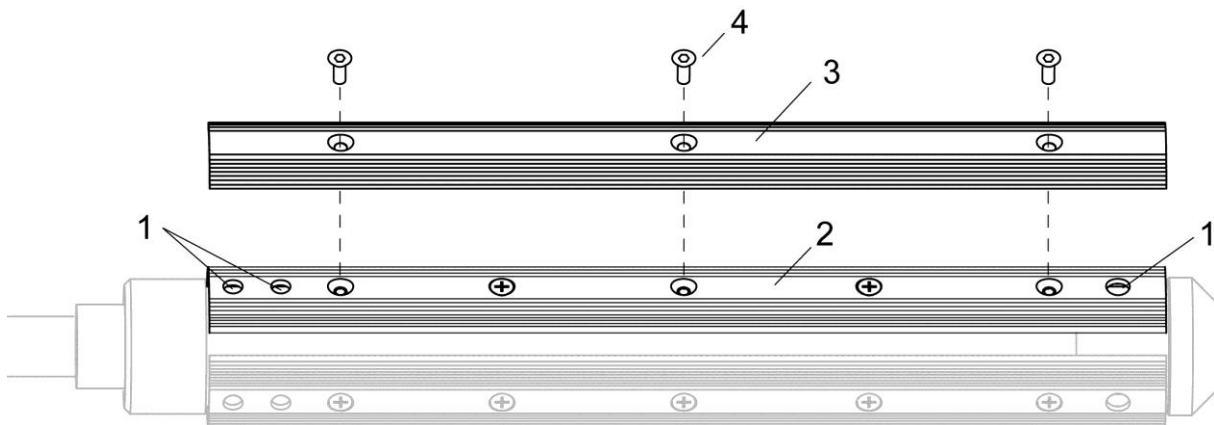
Note that slots must be at least .25-inch wide for standard Poron spring Tidland part number 564892. For leaf sets that have narrower slots than .25 inch, call Tidland for assistance.

1. Remove internal leaves.
2. Remove springs:
 - Steel springs:** Remove all steel springs from leaf set. Grind or file edges of slots where steel springs were crimped to remove sharp edges.
 - Poron® (foam) springs:** Remove all of the spring material from the slot.
3. Clean slots with isopropyl alcohol (rubbing alcohol) to remove any contamination; let dry.
4. Remove adhesive liner from back of Poron springs and place the spring into the slot, adhesive side down. Press the spring in place.
5. Place one Poron spring at every other space between buttons for button or leaf shafts.
6. Reassemble the leaf shaft.

Installing Add-on Leaves

Add-on leaves are manufactured with the correct number of bolt holes required for proper installation. Installing the leaves requires longer bolts, which are also supplied.

1. Align one add-on leaf with a leaf on the shaft.
2. Remove only the bolts from the existing leaf that correspond with the holes in the add-on leaf. **Do not remove the existing leaf.**
3. Set the add-on leaf on top of the existing leaf and install the **longer bolts** that were supplied with your add-on leaves.
4. Torque the bolts according to the chart below.
5. Repeat procedure for all existing leaves.



1	Set screw clearance holes (for journals)
2	Existing leaf
3	Add-on leaf
4	Soc head flat screw (bolt)

Bolt size	Torque spec
1/4-20 UNC – 2B threads	10-12 ft·lbs (13-16 Nm)
3/8-16 UNC – 2B threads	20-25 ft·lbs (27-33 Nm)

TROUBLESHOOTING

Problem	Possible Cause	Recommended Solution
Shaft will not inflate or hold air	Leaking rubber tube assembly	Disassemble shaft and replace rubber tube assembly
	Valve leaking	Remove valve and apply a thread sealant according to manufacturer's directions. Reinstall valve and torque to 8.8-10 ft·lbs (12-13.6 Nm). Replace valve if necessary.
	Rubber tube fitting slips off o-ring connector	O-ring connector configurations vary. Make sure there is an o-ring in each groove. Use o-ring grease. Always use a thread sealant when replacing or reinstalling o-ring connectors.
	Hose clamps not secure (new design, p. 9)	Make sure the load retaining hook is locked. (p. 10)
Leaves not collapsing/ Core difficult to remove	Rubber tube cold flow	Replace tube assembly
	Springs worn or broken	Replace springs (p. 16)
	Leaves contaminated with paper debris, adhesive, or damaged by sharp objects causing burrs	Keep leaves free of dust and debris; clean with isopropyl alcohol. Remove burrs with an abrasive hand pad. (Files may be used on steel leaves.)
Cores slipping	Low air pressure	Operate shaft at 80 psi minimum (5.5 bar) for optimal performance.
	Air leak	Check rubber tube assembly for leaks and replace or repair as needed. Check valve for leaks. Remove valve and apply a thread sealant according to manufacturer's directions. Reinstall and torque to 8.8-10 ft·lbs (12-13.6 Nm). Replace valve if necessary.
	Other	Call Tidland for assistance.
Journals wear prematurely	High loads or speeds	Check PSDS specifications for your shaft application. Verify that journals are hardened.
Excessive shaft vibration	Shaft imbalance	Return shaft to Tidland for dynamic balancing.



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