

# AGITATOR ASSEMBLIES

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# MAINTENANCE

## AGITATOR ASSEMBLIES

### 1. LIQUID FEED CLEANING AND ADDING LIQUIDS

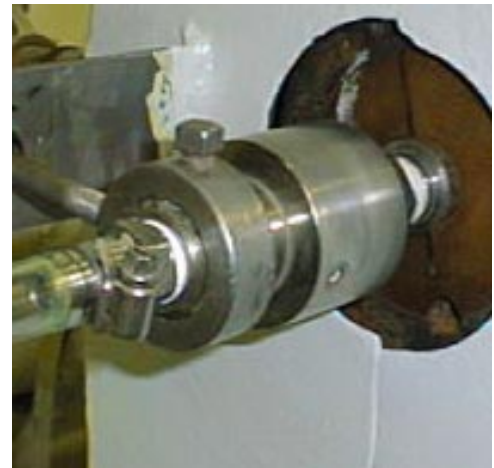
- (A) Are designed for quick removal of dispersion discs from shaft. (Two set screws in each disc hub are loosened to remove complete assembly). (Fig 1-A)
- (B) Use a flexible hose to connect to a liquid feed system or tank. Rigid connections can cause permanent damage to the mechanical seal in the rotary union. (Fig 1-B)
- (C) **CAUTION:** Do not run rotary union dry for long periods of time. Remove union if necessary to run agitator “Dry” for long periods. Liquid acts as a coolant to the union during operation of union. No other maintenance required.
- (D) Internal removable plug allows complete clean out of agitator hollow shaft by flushing or brushing (Fig 1-C). Agitator shaft does not require removal from vessel.
- (E) The vertical liquid feed disc is designed to operate without pressure, unless gravity feed cannot be accomplished due to viscosity of the liquid. If pressure is required, it should be minimal, so that liquid is not forced out through the material being blended. Thicker disc shims should be installed for more viscous liquids.
- (F) The dispersion disc assemblies have an adjustable gap. When the machine was at the factory, .010” shims were installed between the discs., .005”, .015” , and .020” shims are available from GEMCO for adjustment in the field.
- (G) Often, a cleaning liquid introduced through the liquid feed shaft into the revolving agitator will be adequate to clean the inside of the assembly for a more thorough clean up, the liquid discs can be removed.

#### **CAUTION:**

**Do not overfill and submerge agitator bar in cleaning solutions when cleaning vessel.**



(Fig 1-A)

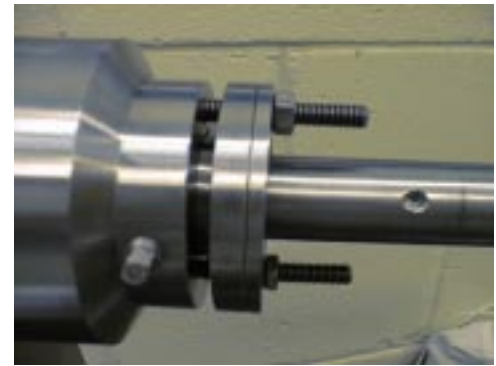


(Fig 1-B)



(Fig. 1-C)

- (H) The location of the dispersion discs is fixed by a set screw and a drill pt. On the agitator shaft (Fig 1-H)
- (I) Always run the blender shell and liquid feed agitator 10-20 seconds after ending liquid injection. Agitator shaft and discs will clear itself of residual liquid.
- (J) A positive shut off should be used between liquid feed inlet to high speed rotary union Fig (1-B) to prevent liquid entering agitator when stopped.



(Fig 1-H)

**DO NOT:**

- ◆ Alter parts. Close tolerance assure proper operation. Alteration can adversely effect the operation.
- ◆ Continue to operate agitator if damaged or distorted. Vibration will damage seals, bearings, and shaft.
- ◆ Operate agitator if packing seal gland is loose, material will eventually filter through the seal packing rings to the bearing causing extensive damage to the unit, as well as costly replacement.
- ◆ Operate agitator without having periodic inspections of the seal rings. Wear or material build up on seal rings require replacement. Changing of seal packing rings is simple and can be done quickly. Failure to renew the rings may result in further damage to components parts.
- ◆ Start agitator before starting blender. Allow blender to rotate, tumbling the material load for a moment before starting agitator. This avoids overloading of the agitator and drive.

**DO:**

- ◆ Make periodic inspections of packing gland and seals. Inspection is easy. Make that periodic check. It can be easily justified. Take up on packing gland to assure tightness of Teflon seal rings. See Maintenance Chart.
- ◆ Take care when removing parts. Close tolerance running fits require the shaft to be wiped clean when removing agitator discs. (Use fine emory sandpaper to clean shaft). Make sure set screws are properly placed in cup points when replacing.
- ◆ Always start blender rotating before starting agitator. Avoid overloading agitator and drive. Be sure to rotate blender a moment before turning on agitator. Blender and agitator should rotate in same direction.

**2. HOW TO INSTALL PACKING SEALS**

- (A) Loosen nuts and remove retaining rings. Remove all old packing from the stuffing box. Clean box and shaft thoroughly and examine shaft for wear or scoring. Replace shaft if wear is excessive. Do not expect packing to act as a bearing. There should be no excessive run out or radial play in the shaft.
- (B) Install one ring at a time. (Fig 2-B) Make sure it is clean and has not picked up any dirt in handling. If clean oil is available, it may be used to lubricate the shaft and the inside of the stuffing box, providing contamination of fluid would not cause a problem.

TFE packing rings should be seated gently, then wrenched in gradually. 3-4 rings are normally provided so that when seated, the nose of the gland contacts the last ring before tightening of the packing gland. Joints of successive rings should be staggered and kept at least 90degrees apart. Tighten packing gland until a slight drag is felt when the shaft is rotated by hand.



(Fig. 2-B)

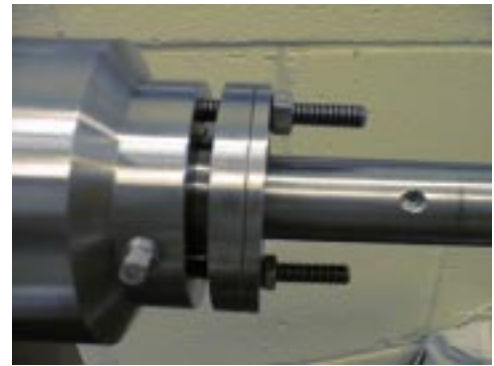
- (C) After the last ring is installed, take up retaining ring bolts finger tight or slightly snug up packing gland. (Fig. 2-C). DO NOT jam packing into place by excessive loading. Run agitator 5-10 minutes. Heat up will be noticed. However, let cool 10-15 minutes, snug up again on gland nuts. Run 5-10 minutes. Less heat build up will be noticed. Continue above 4 or 5 times until packing is set and gland nuts tight. Run agitator in after last snug-up and proceed with blending operation.
- (D) On vacuum tube assemblies, when specified by the manufacturer, provide means of lubricating the shaft and packing through a lantern ring by supplying oil or grease. Fittings for this purpose are standard Alemite. See vacuum dryer manual.
- (E) When air purge is provided, make sure the lantern ring, as installed, is slightly behind the fluid inlet so it will move under the inlet as follower pressure is applied.
- (F) Replace packing when leakage cannot be controlled by further take-up on the follower.

**NOTE:**

Agitators for Pharmaceutical or Food applications have a separate single seal cartridge attached to the Teflon seal ring packing gland. A white dacron felt seal ring is located within seal cartridge to prevent fine sugar carmelization at shaft/Teflon seal area. Dacron seal rings must be replaced daily if high concentration of sugars exist in blends, whenever washing is required, or when changing from one product blend to another product blend. See Maintenance Chart.

**3. SOLIDS-AGITATOR ASSEMBLIES**

- A) Solids agitators **Do Not** require double disc and intervening splash housing. Two or four single discs are provided, depending on unit size. With dispersion blades are standard (Fig 3-A)
- (B) The discs are designed for quick removal from the shaft by means of set screws.
- (C) PACKING -See Section 2 “How to install packing”.



(Fig. 2-C)



(Fig 3-A)

# MAINTENANCE CHART

<b>PART</b>	<b>HOURS</b>	<b>ACTION</b>
Packing Gland	300	Re-pack
Discs	200	Inspect
Blades	200	Inspect
Pharmaceutical Seal	As Required	Change

## NOTES:

- ◆ Packing and wear of internal parts varies from product to product. All hourly recommendations are approximate.
- ◆ Pharmaceutical and food seals must be changed as required.
- ◆ Absolute intervals of maintenance can only be established by the customer and the characteristics of their products.
- ◆ GEMCO can assist you with maintenance frequencies. Please call customer service for assistance.
- ◆ As the internal parts are subject to wear, it is a good practice to stock spare parts.
- ◆ Hours are based upon agitator hours; NOT blender hours.

# Agitator Shaft Removal Procedure

1. Rotate blender to a point of access to manhole.
2. Disconnect power. Enter vessel
3. Remove Hex Head Cap Screws
4. Remove Agitator Disc Assemblies (Shaft must be clean and free of nicks)
5. Remove Felt Retainer, Felt Ring , & Packing Gland

## Out board End of Agitator Drive Shaft

1. Remove Belt Guard
2. Remove Belts
3. Remove Sheave
4. Remove Socket Head set screw
5. Remove Flange Bearing Retainer
6. Remove two Socket Head set screws in flange bearing
7. Remove two Hex Head screws. Use a soft face hammer or a steel hammer and a block of wood.  
Tap Agitator shaft inboard. Inboard double row bearing will come in contact with the packing housing and push packing housing inboard. When both O-rings are clear of trunnion, you will be able to remove packing housing.
8. Remove Socket Head set screws.
9. Remove Bearing Lock Collar (you may have to remove this with bearing).
10. Remove Inboard Bearing (Tap off) Inboard.

# **AGITATOR MAINTENANCE**

## **M575-AMENDMENT A.**

### **COMMON CAUSES OF AGITATOR BEARING FAILURES**

- ◆ **OVERFILLING**  
Fill level for blenders and dryers should be slightly above agitator bar center line. Agitator assembly should NOT be completely submerged in product.
- ◆ **VENTING**  
All agitators build up pressure within the vessel. Unless proper vent through the cover or vacuum tube, products can be “pushed” through the agitator seals into the bearings. Filters should be checked regularly.
- ◆ **EXCESSIVE AGITATOR RUN TIME**  
Agitators are normally designed to be run intermittently throughout blending/drying cycles. Excessive running time can cause packing fatigue and reduced bearing life.
- ◆ **IMPROPER CLEANING PROCEDURES**  
Submerging the bearing area in cleaning solutions and / or forcing or spraying the packing gland area directly with cleaning solutions.
- ◆ **IMPROPER PACKING PROCEDURES**  
Packing should be installed as outlined in Gemco Manual M575. Packing should be rechecked after running in to assure proper seal and cool running agitator.
- ◆ **GREASING**  
Inside bearing should be packed with grease (food grade if necessary), inspected and changed periodically. Also, shielded side of bearing should face packing area.

#### **NOTE:**

- ◆ Seal design is a dust seal. Seal area is not meant to hold back liquids.
- ◆ Due to the nature of various products and particle size; re packing intervals of the agitator bar can vary. Packing glands should be checked regularly to establish maintenance requirements.