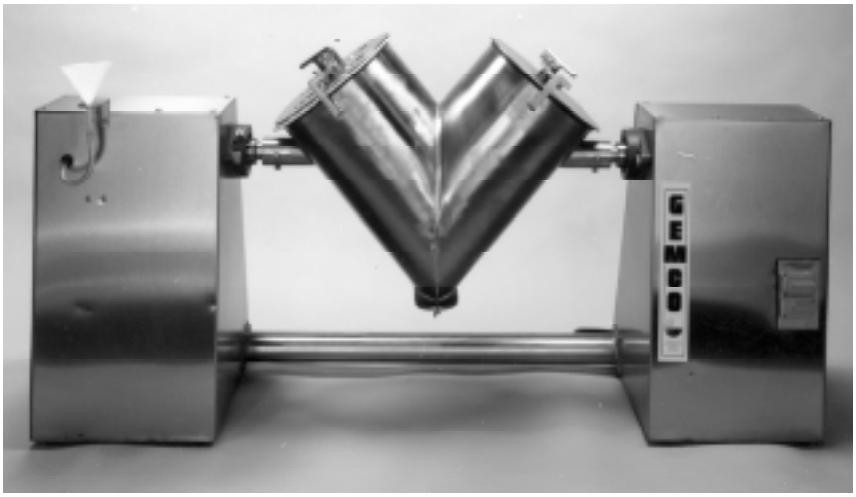
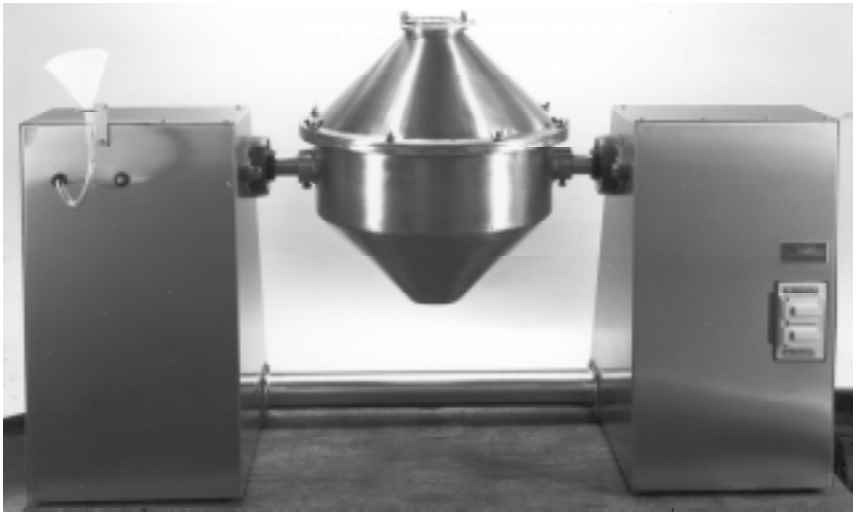
OPERATING INSTRUCTIONS





Gemco Laboratory Blenders

INITIAL RECEIPT

Inspect equipment carefully to detect damage which might have occurred during shipment. The machine was thoroughly inspected; damage should be reported immediately to the transportation company.

GENERAL

Gemco Lab Blenders are available in double cone, slant cone and V-shape design, with shells of stainless steel, Hastelloy or transparent plastic (Plexiglas). Typical sizes range from four quart working capacity to 32 quart capacity with special sizes being made routinely. All blenders will be provided with fractional horsepower gear/motors for the main vessel drive, rotating the vessel through a chain and sprocket arrangement. Liquid-feed agitators will rotate at 3300 ft/min linear peripheral tip speed, using a V-belt drive arrangement.

Typical controls are mounted in the front of stainless steel support enclosure. Both blender and agitator typically rotate in the same direction.

All lab blenders are shipped pre-assembled as a unit.

OPERATION

Charging the Dry Material

The charge level should be at the top of the agitator shaft so that the shaft is completely covered with material when rotating. Some materials may fluff (aerate) considerably and fill the shell after a few moments of operation; in this case, the charge should be reduced. Material may expand or contract excessively after liquid is introduced; in this case, the charge level must be adjusted.

It is important to remember that a full charge should adequately cover the shaft and splash housing but not the tips of the dispersion blades. Over filling can inhibit the flow of material during operation and potentially result is poor and inconsistent blends. Excessive charges could also cause overloading of the agitator motor. Note that under filling the unit below the agitator blades will result in only a tumble blend as the agitator will not touch the product during the blending operation.

FEEDING THE LIQUID

Refer to the INTERNAL AGITATOR cutaway illustration at the end section for relative locations of the parts mentioned in the text.

A. Using Dispersion Disc Assembly:

Gemco provides a stainless steel high-speed rotary union mounted to the hollow agitator liquid feed shaft to permit clamping a non-rotating, flexible tube and funnel (not depicted in the illustration) for introducing liquids to the reservoir (splash housing or spool piece) located between the dispersion discs.

The dispersion disc assemblies have an adjustable gap. When the blender was at the factory .010” shims were installed between the discs; .005”, .015” and .020” shims are available for adjustment in the field. Typically a small gap will provide a fine dispersion and a wide gap will provide a coarser dispersion with a more rapid liquid feed rate. It is the combination of the liquid’s viscosity and surface tension along with the shim thickness that determine the liquid feed rate and atomization droplet size. Droplet size in turn can have a great effect on the granule size produced by the liquid

Viscous liquids that will not flow by gravity may require the use of a pump or pressure pot at pressures to 2-3 psi. However, pressurized liquid can cause "sheeting" instead of atomization and coat the surfaces of the blender shell. Generally, rate of flow is determined by the maximum amount of liquid which can be introduced without throwing it against the shell wall overcoming the fine atomization desired and the capacity of the liquid assembly. Flow rate has an effect on the degree of dispersion. Low feed rates produce fine dispersion; high feed rates produce coarse dispersions.

CAUTION: When ever a pressure pot is used to push liquid into the vessel, be sure that the liquid does not run out allowing pressurized air into the vessel. The vessel is not pressure rated and would cause a significant mess if not a a potentially hazardous situation with the cone and or cover(s) partially or completely being blown off the vessel.

B. Airless No. 1 Spray System:

Gemco can provide another method of introducing liquids into the blender by using an internal stationary spray nozzle in conjunction with an airless pump system. Spray nozzle size can be changed for fine (to 6 microns) or coarse openings depending upon the liquid viscosity and liquid extension required. Due to the greater liquid extension you may find it possible to reduce the amount of liquid introduced, yet end up with duplicate end results as achieved with the dispersion disc assembly. The airless #1 spray system permits introduction of heavy viscous liquids, i.e., molasses, heated lard or waxes, and mercury, thereby increasing your scope of operations.

NOTE: Request Gemco Airless #1 Spray System for additional details.

All blenders using high speed agitators, with or without liquid addition, cause pressure build-up. The pressure increases from the work energy input of the blender being converted to heat which causes the air in the blender to expand. When liquid is added it further exacerbates the situation by direct compression of the air due to the volume displaced by the liquid. The pressure build-up requires a relief vent or powder will be forced along with the air through the only passage available, along the agitator shaft and into the seal assembly during rotation. The mechanism provided to relieve the pressure build up is the vented cover with filter cloth. It is imperative that the vent and filter cloth be kept clean and allow free release of the pressure build up in order to prevent premature seal and bearing failure.

SERVICING THE AGITATOR SHAFT SEAL ASSEMBLY

All agitator model blenders require shaft seals to keep materials from reaching the shaft bearings. Gemco uses sealed ball bearings exclusively on all agitator shafts to achieve a true-running spindle. All Gemco agitators are cantilevered, designed for critical speed and material impact. Only one (1) seal assembly is required. Laboratory Blender agitator seals consist of 2 to 3 felt packing rings with 1 sponge rubber ring in between to allow for compression when stainless steel packing gland is tightened. All packing rings are located inside seal housing, NOT exposed to the product. All seals must be checked periodically.

To replace seals loosen disc assembly set-screws move complete assembly out. Remove four (4) packing gland bolts, slide packing gland out no shaft, remove packing rings. Replace rings in same order, i.e. felt ring-rubber ring-felt ring. An extra felt ring may be necessary to provide required compression when packing gland is bolted up against seal housing. Allow at least 1/8" of last ring to be exposed from seal housing to allow compression before packing gland is brought against seal housing when bolted. Do not use excessive tightening of bolts after bottoming.

Replacement seals should be ordered for stocking.

OPERATING SEQUENCE

Charge dry material into the vessel to the proper level. The material bulk density rating on the nameplate should not be exceeded; lowering the charge level will not compensate for heavier densities.

Should a number of dry ingredients be added they should be fully blended prior to adding the liquid. Once the liquid is added, it "freezes" the mix as it is. Typically no further blending can occur after the liquid is introduced. After the dry ingredients have been fully blended, with or without the agitator as required, the liquid can be added. After all the liquid has been introduced, continue the blending operation with the agitator on for a short time (30 seconds or longer a depending on liquid characteristics) to allow liquid reservoir to clear itself of residual liquid. In few situations, additional post-liquid addition mixing can improve dispersions.

Only generalizations can be offered to achieve the most suitable combination of liquid feed rate, charge level and blending time to produce a desired blend since it is dependent upon material characteristics. If agglomerating, you find granules not large enough, additional tumbling only (agitator off) will often build-up the granule size.

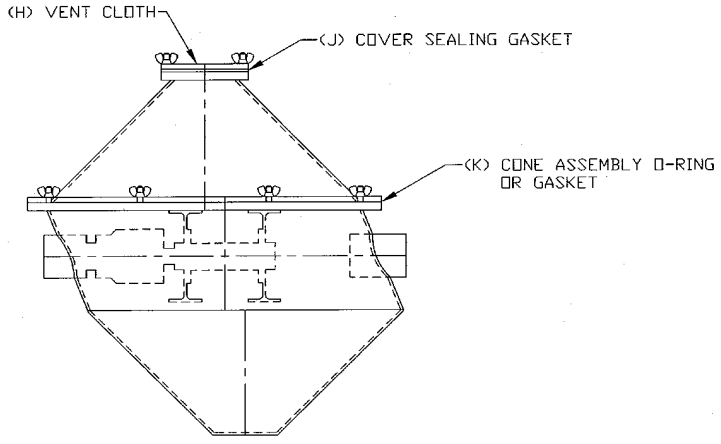
CLEANING THE BLENDER

Introducing a cleaning liquid (water, detergent, solvent) through the agitator shaft into the rotating liquid-feed dispersion assembly is adequate to clean the inside of the liquid-feed assembly. Removal of stainless steel plug at internal end of shaft allows thorough cleaning of liquid feed shaft. However, it is recommended to remove the liquid-dispersion disc assembly frequently for a more thorough clean-up.

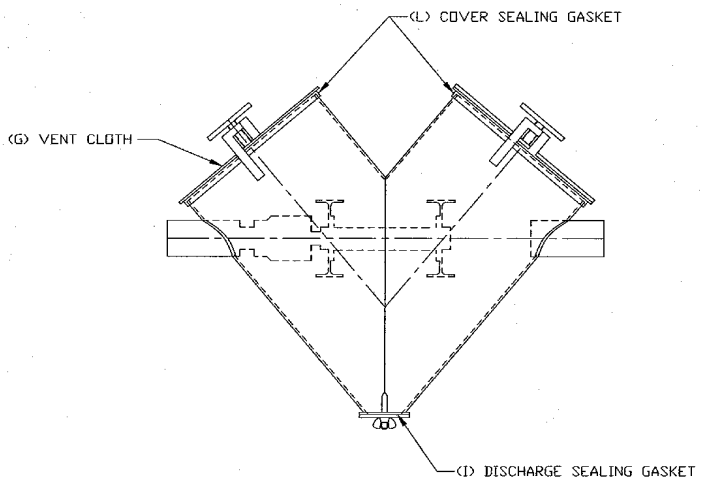
The liquid dispersion disc assembly is removed from the agitator shaft by loosening two (2) set screws on each dispersion disc hub using in most cases an allen wrench. Remove outer disc assembly from shaft; remove splash housing tube; remove last disc assembly.

After liquid disc assemblies are removed they can be dismantled by removing the four (4) nuts, lock-washers and bolts holding the discs together.

NOTE: Upon re-assembly, each disc assembly must be relocated on the agitator shaft into its original position. You will note drill set points in shaft. Set screw holes must be located over these set points so the set screws will bottom into drill point insuring solid anchoring of each disc assembly.



Slant Cone

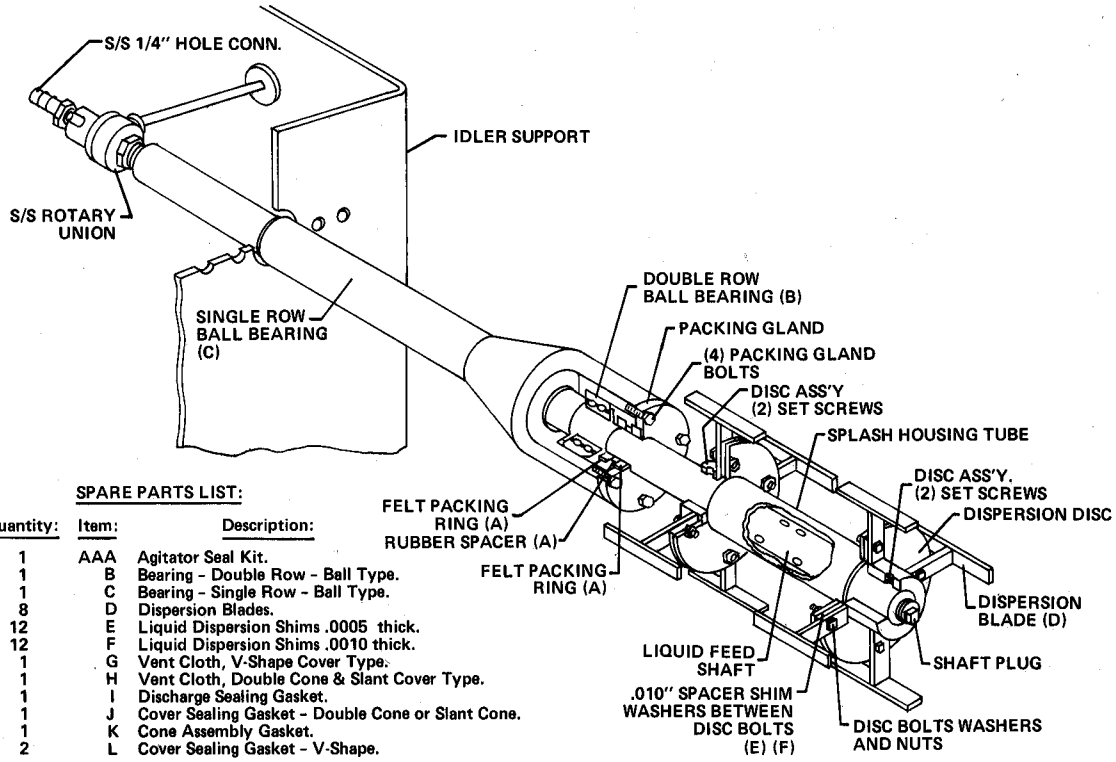


V-shape

CAUTION: When removing each bolt from the dispersion discs be sure you do not lose the .010" shim washers as supplied with machine. Shim washers installed on bolt between the discs for gap spacing. Replace shim washers on bolts in same location, between discs, upon re-assembly.

Re-assemble disc assemblies and splash housing tube in same position as when removed. Replace agitator shaft plug into end of internal shaft.

INTERNAL AGITATOR



SPARE PARTS LIST:

Quantity:	Item:	Description:
1	AAA	Agitator Seal Kit.
1	B	Bearing - Double Row - Ball Type.
1	C	Bearing - Single Row - Ball Type.
8	D	Dispersion Blades.
12	E	Liquid Dispersion Shims .0005 thick.
12	F	Liquid Dispersion Shims .0010 thick.
1	G	Vent Cloth, V-Shape Cover Type.
1	H	Vent Cloth, Double Cone & Slant Cover Type.
1	I	Discharge Sealing Gasket.
1	J	Cover Sealing Gasket - Double Cone or Slant Cone.
1	K	Cone Assembly Gasket.
2	L	Cover Sealing Gasket - V-Shape.