

How to Maximize Plunger Packing Life

Plunger packing used in a positive-displacement homogenizer or pump is a normal wearing part, which requires regular checking and occasional replacement.

Packing life is variable and is largely dependent upon such factors as the presence of corrosive or abrasive elements in the product being processed, the operating temperature, special requirements for sterility or the need to safeguard against normal leakage, processing pressure requirements and machine operating speed.

The higher the machine operating speed, the higher the eccentric-shaft speed will be, the more often each plunger must cycle and the faster the packing will wear.

APV Gaulin homogenizers and pumps have been long acclaimed for their slow-speed design, one of the features which gives the machines their superb ability to provide dependable service over long periods of continuous operation.

When designing a processing system, it is recommended that an APV Gaulin machine frame size be selected which will permit operation at the lowest speed possible. This recommendation may indicate the need for a larger frame size than absolutely necessary, and the resulting increase in initial investment should be weighed against the lower projected cost of maintenance labor and material.

To help you optimize the life of the packing in your APV Gaulin homogenizer or pump, here is a checklist of some major causes of premature packing failure and their respective remedies. A more detailed summary appears in the attached article reprint, "Getting More Life Out of Your Pump Packing".

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CAUSES OF FAILURE	REMEDIES
Chemical attack caused by product reaction with the elastomer or elastomeric binder or the fabric found in composition materials.	<ul style="list-style-type: none"> a) Examine the selection of packing material. Remember that maximum chemical resistance does not always match maximum resistance to abrasive wear. b) Eliminate the use of overly strong cleaning agents. c) Try to minimize the elevation of product temperature.
Degradation by heat, either from friction or from product being pumped.	<ul style="list-style-type: none"> a) Do not attempt to stop any slight leakage of the product through the packing. Some leakage is functional, because it helps to lubricate the packing material. b) Install only the correct number of packing rings, as specified in the operating manual. c) Dissipate heat by a liquid stream directed onto the plunger, whenever possible. d) During the cleaning cycles of aseptic-type pumps, circulate cold water through the seals after shutting down the steam. e) Use packing of temperature-resistant material.
Abrasion or shredding due to rough plunger surfaces and/or abrasive particles in the product.	<ul style="list-style-type: none"> a) Polish or replace any plungers showing scored, nicked or pitted sealing surfaces. b) Examine plunger material for compatibility with packing material. c) Eliminate any coarse particles from the product, before it enters the machine.
Packing extrusion, either away from the pressure side (due to poor packing support) or toward the pressure side (due to inadequate loading on the packing). NOTE: Extrusion sometimes "channels" which results in instantaneous and excessive leakage of product.	<ul style="list-style-type: none"> a) If the clearance between the plunger and the packing adjusting ring exceeds 0.005 inch (about 0.13 mm), the plunger or ring should be replaced. b) Replace the plunger packing adjusting spring, as soon as it takes a permanent set. c) Check plunger alignment and correct, if necessary.
Improper installation or adjustment.	<ul style="list-style-type: none"> a) Assemble plunger rings, packing rings and adjusting rings on the plunger as a unit, then install in the cylinder. b) Lubricate plunger packing with silicone grease or other fatty substance prior to assembly on plunger. c) Keep the same plunger/plunger ring assemblies in the same location. d) Avoid damage to the plunger shoulders when disassembled. This might cause plunger misalignment.
Improper handling in storage.	<ul style="list-style-type: none"> a) The packing material has limited shelf life. It should be stored in a cool, dry place away from sunlight and for periods not to exceed one year. b) Avoid storage contact with sharp objects, which would cause deformation. c) Avoid long periods of soaking composition-type packings.
Improper machine operation or maintenance.	<ul style="list-style-type: none"> a) Avoid product starvation when running, since this will cause damaging pressure spikes. b) Do not run the machine in a dry condition. c) Replace worn packing in time to prevent accelerated wear of plungers and other plunger assembly parts.

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