

Standard Pumps Syringe Seals

Material: The seal is made with PTFE piston backed with a silicon rubber O’ring. The PTFE is used because it is chemically inert, has a low coefficient of friction and conforms to the glass syringe barrel surface. However, due to the relatively low abrasion resistance, this material will wear with use and must be replaced on a periodic basis to ensure proper pump operation. The period of time between piston changes is application dependent.

How the Syringe Works & Wear Characteristics: The PTFE piston has an interference fit with an inner diameter of the glass barrel. This is required to achieve a seal. Much like a windshield wiper, every time the piston “wipes” against the glass, a very thin, almost imperceptible, layer of liquid is left behind. The residual fluid layer is not a leak and does not affect the precision or accuracy. Depending on ambient conditions (heat & humidity) and operating characteristics (i.e., duty, cycle, liquids and speed) of each individual application, this evaporation can be rapid or non-existent. In those cases where evaporation rates are slow, an accumulation of fluid may develop below the piston. This is not an indication of piston failure. Small amounts of wetted surfaces within the syringe barrel are normal and do not generally cause any problems, except when dealing with *PARTICULATE REAGENTS* (see below). Occasionally, a condition known as “peeling” may occur during normal use. It is characterized by thin PTFE skins collecting around the sealing area (O’ring) of the piston. “Peeling” does not have any obvious effect on the life (when leakage occurs) or ability to withstand backpressures. If desired, the plunger/seal assembly may be removed, cleaned and reinserted.

Particulate Reagents: Salt solutions, or any reagents containing particulates, present special problems for syringe seals. When the residues from these reagents dry on the surface of the glass barrel, the crystals left behind are very abrasive. These residues tend to accelerate wear. If there are large enough crystals, it will score the seal, causing an immediate leak path.

There is nothing that can be done to completely eliminate the accelerated wear but its effects can be minimized with special care and cleaning. Often times, the added cost of maintenance is more than the cost of replacing the syringe seals on a more frequent basis. Your own testing and market requirements are the only way to determine what is best for you.

Standard Pumps Syringe Seals *(cont.)*

Replacing Plunger & Seal Assemblies: The piston does not need replacement until:

- Syringe pump performance is affected, or
- Air bubbles are entering the syringe from seal during aspiration, or
- Fluid is dripping from syringe body.

Note: It is critical that testing be done with your application, to establish the proper interval for seal replacement for adequate preventative maintenance.

The following procedure should be followed to prevent damage to your pump, syringe or new plunger/seal assembly:

1. Move syringe to “home” position.
2. Remove tubing from fittings (optional, if service loop is adequate to facilitate remainder of procedure).
3. Completely loosen the captive screws that hold the syringe holder to the panel.
4. Grasp the syringe holder with the thumb and index finger of the right hand and place the first finger of the left hand behind the plunger, just above the follower. Pull the syringe holder straight from the panel and pull the plunger simultaneously.
5. Grasp the end of the plunger/seal assembly in one hand and the syringe barrel in the other. Pull the plunger out of the barrel. Discard the plunger/seal assembly.
6. Clean the glass barrel of the syringe using DI water and a lint-free swab to remove any particulate matter that may have accumulated on the barrel.
7. Clean new plunger tip with a lint-free wipe moistened with alcohol or DI water.
8. With the tip still “wet,” insert the tip of the new plunger into the syringe barrel.

Caution: To prevent damage to the seal of the new plunger/seal assembly, use gentle but firm pressure combined with a slight “twisting” motion to work the seal into the syringe barrel. Care must be taken to avoid damaging the seal.