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We have now been in production with Milnor Single Stage presses for over 10 years! And like everything, the longer you live with something the more you learn about it.

The following information will help you and your technical staff better understand the Single Stage Press and take appropriate maintenance steps.

1. The main hydraulic cylinder will require service during its life span as the internal parts wear and require replacement.
 - a. These cylinders have replaceable parts at the piston and the rod end. The most common replacement component is the rod gland. This is located at the lower end of the cylinder and prevents fluid from leaking around the rod. Some think that the wiper seal (which is visible from the outside of the cylinder) actually provides an oil seal. Contrary to this belief, there is a multi-part seal (known as Vee Packing) about 6 inches above the wiper seal which is responsible for keeping oil in the cylinder. The visible wiper seal only wipes water and any contaminants off the rod as it retracts.
 - b. Immediately above the wiper seal is another oil seal which helps contain any oil that may leak past the Vee Packing. This oil is ported back to the tank. Because this seal runs dry, its life expectancy is short, possibly as short as 6 months. The negative consequence of this seal failure is minimal at best.
 - c. Over time the rod gland or "Vee Packing" will require replacement. The utility afforded by using Vee packing, as opposed to a "U cup" is that the seal elements can be cut at 45 degrees and stacked in an offset manner which allows replacement without removing the hub and platen from the rod end. These seals can be changed in as little as 2 hours without major disassembly.
 - d. The most valuable part of the cylinder assembly is the chromed rod itself and the bore of the main cylinder. These cannot be rehabilitated without complete rework at a specialized machine shop. So, protect the rod at all cost! If a careless act with a tool nicks or chips chrome from the rod, the rod will ultimately be scored due to this damage.
 - e. We have also recently learned that over tightening the Vee packing can also lead to chrome damage and result in a scored rod. So, be cautious about tensioning the Vee packing to help stop a leak.
 - i. Vee-packing can be tensioned to provide a tighter seal. When initially assembled, the proper fit of the Vee-packing is a "zero-clearance" fit. This implies that the packing is not "compressed". As the seal wears, it is possible to tighten the packing. At most, the seal packing gland should be tightened by removing a ½ shim (1/16"). If all the shims on the gland ring are full shims (1/8") then secure an appropriate amount of ½ shims before proceeding.
 - ii. For reference, the half shim part number is 07 10237 and the full shim part number 15U314C.
 - iii. If removing a 1/2 shim does not cure a leak then replace the seals rather than over-tightening the seals and causing rod damage!
 - iv. Some oil leakage from the ram Vee Packing is tolerable. If needed, use an oil mop (absorbent sock that does not absorb water but only oil) and wrap this around the bottom of the rod to absorb any oil that may pass

the seals. Look for these on the web at www.newpig.com – model 104PS or equivalent.

- v. Our cylinder vendor has reported that extreme tension on the Vee Packing can pull chrome off the rod. The chrome embeds in the Vee Packing and then scores the rod. The longer this condition exists, the more damage the rod endures. The only solution then is to rework the rod by removing the entire cylinder and replacing it with a new or reworked cylinder.
 - vi. Milnor has an exchange program for hydraulic cylinders. However, the net cost of a cylinder replacement, with reworked parts and labor, can easily exceed \$50,000. So, protect the rod at all cost!
2. Any contamination in the hydraulic oil system can cause rod chrome scoring and other component damage.
 - a. Parts of the hydraulic cylinder can never be evacuated without complete disassembly. For example, if a metal particle (or any other abrasive) flows into the bottom of the hydraulic cylinder, it will settle in the bottommost recesses and never flow out again. So, if a hose is replaced and contamination is in the replacement hose, fittings, hands or tools and ultimately invades the oil system, it may become lodged in a wearable area. Use extreme caution to avoid contaminants when working on the hydraulic oil system!
 3. Replacement hydraulic pumps need to be primed with oil before starting.
 - a. When a hydraulic pump is replaced, it must be filled with oil before starting or the pump can be permanently damaged in the first few minutes of operation. The installation technician should also remove the compensator cap and fill the cavity with oil.
 - b. New presses, tested at the factory, have pumps that were primed at the factory and do not require priming at startup.
 4. Breather elements should be 25 micron.
 - a. When the single stage press performs a ram up or ram down command, a large amount of fluid moves into or out of the hydraulic tank and air displaces the oil. The tank is equipped with a breather element or "air filter" to keep airborne contamination out of the oil when air is drawn into the tank.
 - b. For years we used a 10 micron element in the filter application and have recently changed to a 25 micron element. This helps eliminate any pressure buildup in the tank when air is evacuated.
 - c. If you attempt to buy the 10 micron filter from Milnor the 25 micron element (27E7104D) is automatically provided.
 - d. Do not install after-market breather/driers.
 - e. We have seen after-market filters and driers installed in the breather application. In one case, the restriction to air flow was so great that the tank itself was damaged due to the air pressure buildup inside the tank when fluid returned to the tank and the vacuum created when fluid left the tank. Milnor recommends that you not use any filter or drier that in any way obstructs or further restricts airflow to the tank.

5. Always replace o-rings when opening hydraulic fittings.
 - a. Never reuse o-rings when breaking apart hydraulic fittings.
 - b. Always keep a supply of o-rings used in the system on hand for emergencies. The press was shipped with a bag of o-rings (usually found in the air valve box) for your use. New o-rings are available from Milnor in kit KYSSORNG01 or sold individually.
 - c. Some fittings allow the use of two wrenches while tightening. One wrench holds the fitting body (to prevent movement) while the other tightens the nut. This prevents movement of the fitting against the o-ring while tensioning to avoid o-ring damage.

6. Always filter new fluid added to the system.
 - a. A quick-connect fitting is provided on the recirculation filter to allow any new fluid to pass through the recirculation filter before entering the tank. It is best to pump new fluid through this fitting to prevent contaminants from entering the tank.