



# Fire Pumps



## Hidden Damage in Fire Pumps

Fire pumps, unlike other pumps are not used continuously. They are generally tested regularly to insure performance, should they be needed. They are mandated to be sealed with mechanical packing in most cases, which can be detrimental to the life of the pump due to corrosion and wear.

Corrosion is an oxidation reaction which occurs when moisture and oxygen contacts the metal pump casing and impeller. We see the effects as iron oxide which is also known as rust. The cycle of performance testing allows fluid and air (which contains oxygen) to cycle within the pump via mechanical packing. Mechanical packing is used to seal the pump shaft but can enable corrosion.

The rate of corrosion and resulting damage is difficult to gauge **unless the casing is removed**. If corrosion compromises the casing shape, the pumps performance will decline. Corrosion can also occur in the pump's stuffing box making successful shaft sealing difficult or impossible.

Mechanical packing mounted inside the stuffing box (See figure 3) must be loaded with a packing "gland" to enable intimate contact with the pump sleeve. This intimate contact causes wear on the pump sleeve over time. If the sleeve is substantially worn, then it must be replaced to effect a seal.



Figure 1 – Horizontal Split Case Pump Inspection



Figure 2 – Horizontal Split Case Pump Assessment

## Determining Repair

In order to determine if the pump is damaged, **the pump casing must be dis-assembled** and examined for corrosion and wear (See figure 2). Metal surfaces must be cleaned and the pump sleeve outside diameter must be checked to determine if it meets manufacturers specification. If it does not, it must be replaced.

Mounted on each side of the impeller (See figure 3) are wear rings which are designed to inhibit re-circulation from the pump discharge to the pump suction. Corrosion around and erosion between these wear rings can allow re-circulation which will reduce pump performance. In this case these rings and the pump bearings must be replaced to re-establish the pumps performance. If the casing is badly corroded, pump replacement may be necessary.



Figure 3 – Horizontal Split Case Pump Repaired

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