Pump Stuffing Box (See Fig. 1):

1) Ensure that the shaft and stuffing box cavity surfaces are clean and free from burrs.
2) Confirm shaft and stuffing box cavity dimensions are within OEM specifications.

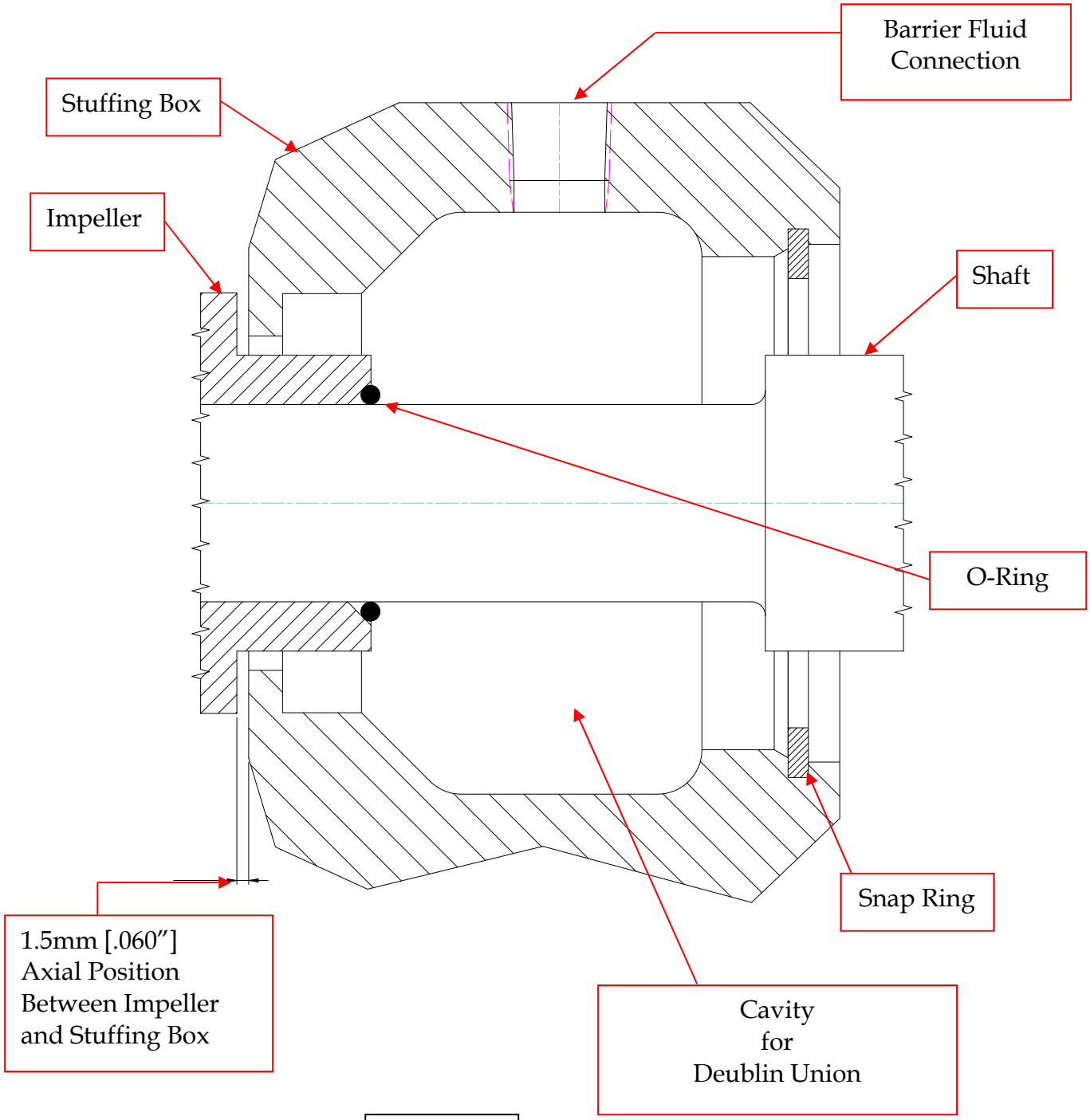

Fig. 1

Deublin Union #SP0475 (See Fig. 2):

1) Ensure Union is clean and free from debris.
2) Apply silicone grease to O-Rings.

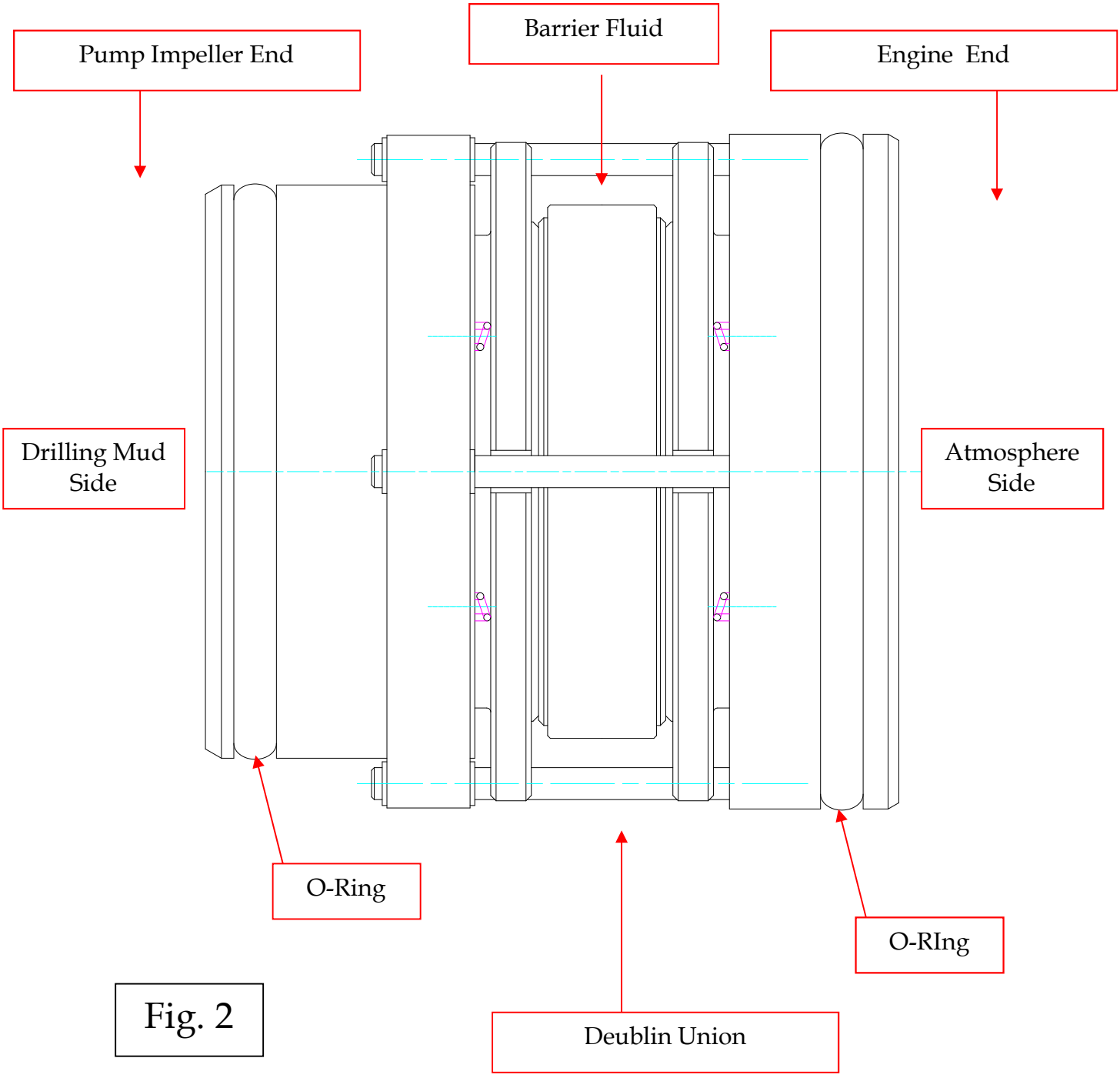

Fig. 2

Pump Operating Parameters:

1) Media: Drilling Mud
2) Speed: 3600 rpm
3) Press.: 40psi
4) Temp.: 176F
5) Barrier Fluid
   a) Media: Dexron VI ATF
   b) Press.: 0.0psi

Union Operation:

1) Union is designed to prevent Drilling Mud from leaking to atmosphere.
2) Union contains Two Mechanical Seals arranged so as to create a Barrier Fluid Cavity.
   a) Pump Impeller End Seal seals Drilling Mud on the inside of the Seal.
   b) Engine End Seal seals Barrier Fluid on the outside of the Seal.

WARNING

3) Union Seals are **NOT** to be **RUN DRY**.
   a) In those cases, where the pump is being operated without the presence of Drilling Mud, the Barrier Fluid will serve to lubricate the Two Mechanical Seals
      i) Barrier Fluid Level **MUST** always be present in order to ensure Union is not Exposed to Dry Run condition.

WARNING

4) Barrier Fluid Cavity.
   a) Mechanical Seals operate with a minor amount of leakage
      i) Leakage serves to lubricate the Sealing Surfaces preventing Dry Run condition.
         (1) Drilling Mud Leakage into Barrier Fluid Cavity
            (a) Due to Drilling Mud pressure being Higher than Barrier Fluid Pressure
               (i) As a result, the Barrier Fluid will be Contaminated with Drilling Mud
                  1. Not Cause for Equipment Shutdown, can effect long term performance of Union
         (2) Barrier Fluid Leakage to Atmosphere.
            (a) Due to 0 psi Barrier Fluid pressure, leakage is expected to be Minimal.
5) Examples of Barrier Fluid Monitoring Devices, **See Fig. 3**
   a) Externally mounted (**Vented**) Sight Glass
      i) To be installed by Customer

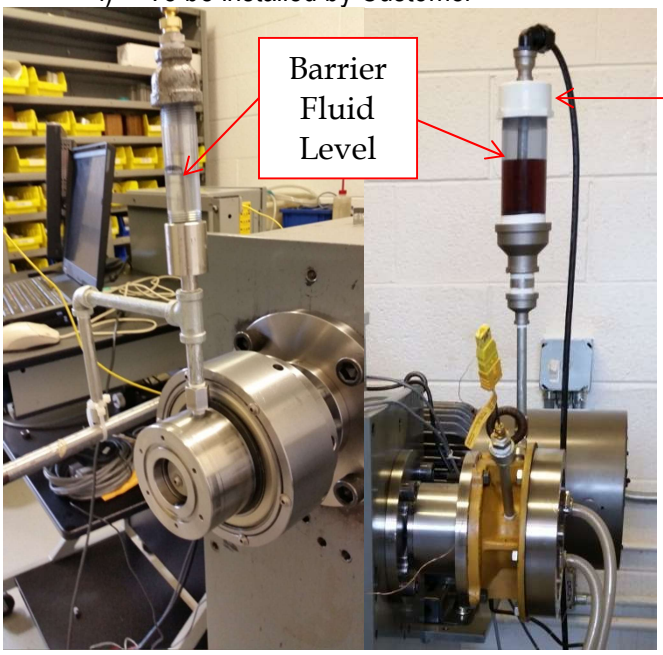

Fig. 3

Union Maintenance w/Sight Glass:

1) Regularly monitor Barrier Fluid Level
   a) If Barrier Fluid is not present
      i) Not Cause for Equipment Shutdown but can effect long term performance of Union
      ii) Fill Sight Glass with specified Barrier Fluid
         (1) Low Barrier Fluid levels maybe due to Engine End Seal leakage
            (a) Excessive amount of leakage maybe an indication of a Failed or Damaged Seal
               (i) Seal should be removed and inspected
   b) If Barrier Fluid has changed consistency to that of Drilling Mud
      i) Not Cause for Equipment Shutdown but can effect long term performance of Union
         (1) Concern is water content of Drilling Mud might create a Freezing Situation in Cold Weather Operation
      ii) Drain Stuffing Box Cavity
      iii) Fill Sight Glass with specified Barrier Fluid
      iv) Barrier Fluid contamination is probably due to Pump Impeller End Seal Leakage
         (1) Excessive amount of leakage maybe an indication of a Failed or Damaged Seal
            (a) Seal should be removed and inspected
         (2) If Stuffing Box Cavity Drain is not available continue to operate until Union Leakage to Atmosphere becomes unacceptable.
2) Barrier Fluid monitoring without an externally mounted Sight Glass is **Not Recommended.**
   a) Any attempt to monitor the Barrier Fluid level via the Stuffing Box could result in injury, as the cavity will provide expose to rotating elements.