Type WPR Shaft Seal

The WPR Type Seal is suitable for all types of turbines, including reversible pump turbines and as face loading is remotely controlled by water pressure it is particularly suited to turbines where there is no access to the seal for adjustment after installation.

All WPR Type Seals are custom designed and are fully split for ease of installation and maintenance. The main wearing face is made from a special composite material that will regenerate mutually conforming seal faces if damaged by abrasive particles.

The design can be adapted to suit either horizontal or vertical shafts, and is capable of operating at circumferential velocities up to 30 m/sec (100 ft/sec), and pressures up to 10 bar (150 p.s.i.). With hydrostatic feed these parameters can be increased.

Referring to the sketch (fig 1): (click here for pdf of fig 1)

The composite fibre End Seal (A) is secured to the turbine shaft/flange/nut cover by a Retaining Ring (B), and rotates with the shaft.

The Stationary Seat (Piston) (C) is loaded by water pressure in the Operating Chamber, and slides axially between the O-Rings (F & G) in the Inner (D) and Outer (E) Housings, to compensate for wear.

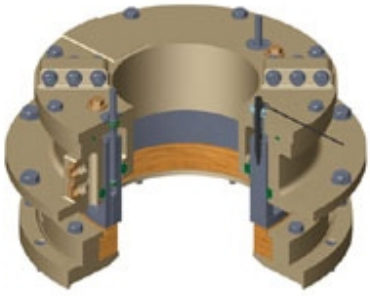
The operating chamber is pressurised by connecting it to either a header tank, the chamber around the seals via a control device or a separate water source through a custom built control circuit through a regulator.

Typically the Outer Housing (E) is bolted to either a Support Housing (L) or directly on to a radial flange on the turbine head cover.

The Wear Indicator Rod (J) can be linked mechanically to a gauge panel or electronically to a digital display unit (electronic version shown).

All metallic components can be supplied in a choice of materials to suit individual applications.

Cooling water, which can be unfiltered penstock water, must be supplied to the seal under all working conditions (whenever the shaft is rotating) if hydrostatic feed is not utilised. If hydrostatic feed is incorporated into the seal, the water supply to this feed needs to be filtered to 25 microns (100 mils).



Benefits

- Positive Sealing - Hydraulically balanced faces dimensioned to suit the application to give minimum leakage.
- Long Life - Seal life is built in and this combined with a wear indicator facilitates planned maintenance. Seal face life in excess of ten years has been achieved.
- Non-Clogging - Smooth contours and no springs in the water prevent clogging in silty conditions.
- Durable Materials - All wetted components are manufactured from corrosion resistant materials.
- Robust - The composite wearing face can be dropped without damage unlike carbon. It can also withstand vibration and abrasives without permanent damage.
- Space Saving - Custom designed seals can usually be engineered to fit into the available space allocated for the main shaft seal.
- Easy Maintenance - Simple robust components are easier to handle and fit than multi-segment carbon glands, thereby, reducing downtime and maintenance costs.
- Flexible Design - Can accommodate axial and radial shaft movements without special precautions.