

Dynamic Seal: Maintenance Free Shaft Sealing for Centrifugal Pumps

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ABSTRACT

Development of Dynamic Seal has led to the leak free and maintenance free operations of Centrifugal Pumps. The need for Sealing Liquid have been practically eliminated. This paper discuss the concept of Dynamic Seal and its advantages & applications.

INTRODUCTION

Until now, the shaft seal has been the most maintenance intensive component of a centrifugal pump. While the use of a mechanical seal instead of a packed stuffing box for stock and other difficult liquids has brought considerable improvements, significant operating and maintenance problems remain. Conventional cord packings as well as mechanical seals wear due to mechanical friction during running and eventually form a leak path. These seal types require a steady supply of sealing liquid for lubrication and cooling and often this liquid comes from an outside source. Therefore frequent maintenance is a necessity and the selection of mechanical seals, e.g., for stock pumps, has to be done very carefully.

Mechanical wear, leakage and the need for sealing liquid have been practically eliminated with the introduction of new Dynamic Seal for Process Pumps. The Dynamic seal is used not only for paper stock but also for other difficult liquids containing solids.

More than 19000 Process Pumps, equipped with Dynamic Seals are successfully running in the pulp

and paper industry worldwide since 1987.

DYNAMIC SEAL AND ITS OPERATING PRINCIPLE

The Dynamic Seal consists of an expeller preventing the pumping liquid from leaking out, and of a static seal which is a flexible plate pressed against the thrust ring. The components and the operating principle of Dynamic Seal is shown in following figures 1.

The expeller generates centrifugal forces which form a liquid ring in the expeller seal chamber when the pump is running. This liquid ring acts as a shaft seal and prevents leakage.

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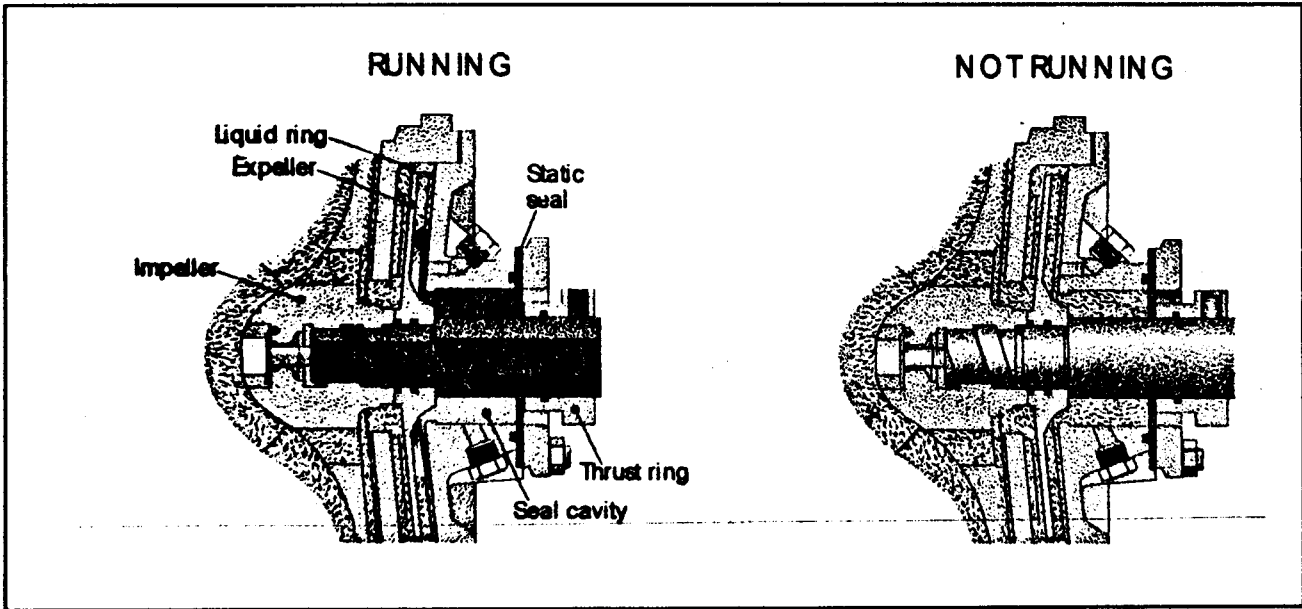


Fig. No. 1 : Operating Principle of Dynamic Seal.

The expeller rotates freely in its chamber without any mechanical wear. when the pump stop, the liquid fills the seal cavity and presses the flexible disc against the sleeve.

When the pump starts again, the expeller generates a liquid ring in the expeller seal chamber and removes the liquid from the seal cavity. The flexible disc is not longer pressed against the sleeve.

The Dynamic Seal doesn't require any sealing liquid as there is no mechanical friction involved. Flushing is however possible if required. This Seal also doesn't require any special start-up or operational measures.

ADVANTAGES

The Dynamic Seal offers the following advantages over the conventional gland packings and mechanical seals.

- No mechanical wear
- No sealing water needed
- No leakage
- Practically maintenance free

- Very little attention needed
- Easy to install

Due to above advantages the Dynamic Seals has proven to be very successful shaft seal arrangement and more and more Pulp & Paper Mills world over are converting to Dynamic Seals.

APPLICATIONS

Dynamic Seal has been designed for wide applications like:

- Paper stock up to 8%
- Black liquors
- White liquors
- Sugar juices
- Acid slurries and process chemicals

DYNAMIC SEAL RETROFIT

We have developed a special conversion kit by means of which existing Ahlstrom process pumps type APP, WPP and NPP originally installed with mechanical seal or stuffing box packing, can easily

be converted to the Dynamic Seal. All that is required is an interchange of parts. No machining is necessary. Overall, pump dimensions are the same, so the pump and the motor remain in the installed position.

The conversion kit includes expeller, casing cover, seal chamber, complete static seal and all necessary O-rings and gaskets.

CONCLUSION

Our experience with Dynamic Seal arrangement has shown that this arrangement not only offers leak free and environmental friendly pumping operation but it is also possible to extend Mean Time Between Planned Maintenance (MTBPM) while reducing the maintenance cost.