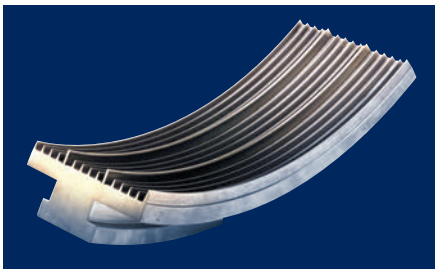
PARTS

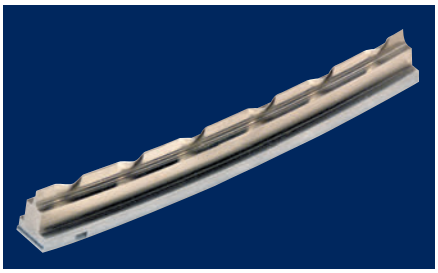
MD&A PARTS DIVISION ADVANCED SEAL SYSTEM

Consisting of the Patented Guardian® & Vortex Shedder® Sealing Technology



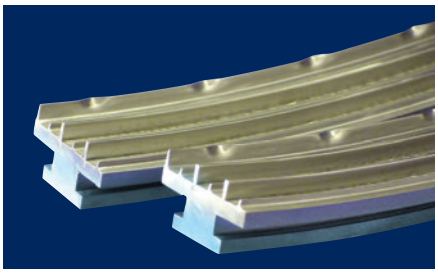
About the Guardian® Packing Ring Technology

Guardian® packing rings are designed to replace any conventional OEM packing rings without modifications to either the holder or the rotor. Unlike the retractable packing ring designs, the Guardian® packing rings maintain a positive radial seal during turning gear, unit start-up, operation, and shut down. The Guardian® "strips" are constructed of a patented, non-galling, low coefficient of friction material. The Guardian® strips are set with a radial clearance 0.005" less than the conventional teeth. Should a rub occur, the Guardian® strips would contact the rotor first, preventing damage to the knife-edged teeth, and thus maintaining the efficiency of the seal. Guardian® packing rings extend the seal efficiency life which helps to maintain the unit heat rate between overhauls.



About the Vortex Shedder® Seal Technology

Vortex Shedder® tip seals, another component of the advanced seal system, can also be installed in any location on any OEM steam turbine. The Vortex Shedder® reduces steam leakage over the rotating blade tips by incorporating a unique engineered shape in the seal. These shapes create small vortices from the axial and radial components of the steam flow creating a pressure barrier at the seal tooth. That barrier then lowers the pressure drop across the seal. Lower pressure drops translate into lower flow across the seal, hence less leakage and therefore longer seal life with increased stage efficiency.



Hybrid Guardian® Vortex Shedder® Seal Technology

The Hybrid Seal joins both the Guardian® protection with the efficiency enhancement of the Vortex Shedder®. It has application as both a tip seal and a rotor body seal depending on the original design of the seal in that area.

This seal may not be applicable for all locations; it is designed to be used in the direct steam path. Please consult our design team experts as to possible applications for your unit. Mitsubishi Power is standardizing this design for all new and upgraded units.

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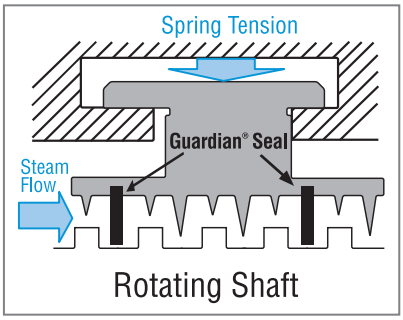
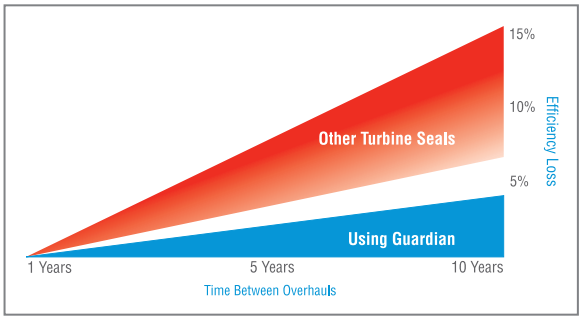
Benefits of Guardian® Packing Rings:

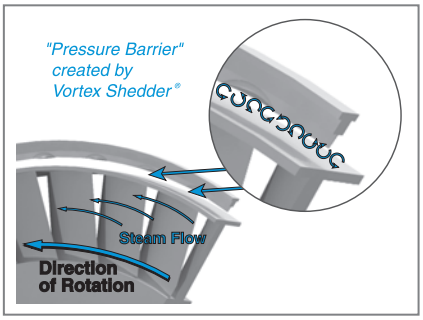
- Proven to prevent or limit damage to delicate teeth during a transient event
- Will work properly in any location, at any temperature, pressure or flow condition
- Extends seal efficiency life
- Improves unit reliability and limits seal degradation
- Contributes to increasing unit efficiency
- Extends unit heat rate between overhauls

Benefits of the Vortex Shedder® Seal:

- Proven to increase unit efficiency above design, by 1.5% to 4.5%
- Reduces the pressure drop across the seal by creating a pressure barrier from the vortices
- Lower pressure drop results in higher efficiency and longer seal life
- Increases unit output above design
- Increased efficiency means lower EPA emissions per megawatt
- Increased unit efficiency also results in lower operating costs







Benefits of the Hybrid Guardian® and Vortex Shedder® Seal:

- All of the benefits listed above for both the Guardian® Packing Rings and the Vortex Shedder® Seals

Custom On-Site Installation Services:

MD&A Parts Division offers custom installation of any packing ring or tip seal. Since our crews are specialized and highly experienced in the installation of turbine seals we can save you time and money. Utilizing a containerized machine shop we are capable of correcting "out-of-round" conditions and in some cases axial offsets that may exist in the stationary fits by adjusting the seals themselves. Based on measurements for your unit, our crews can adjust the seals "round to the rotor."

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