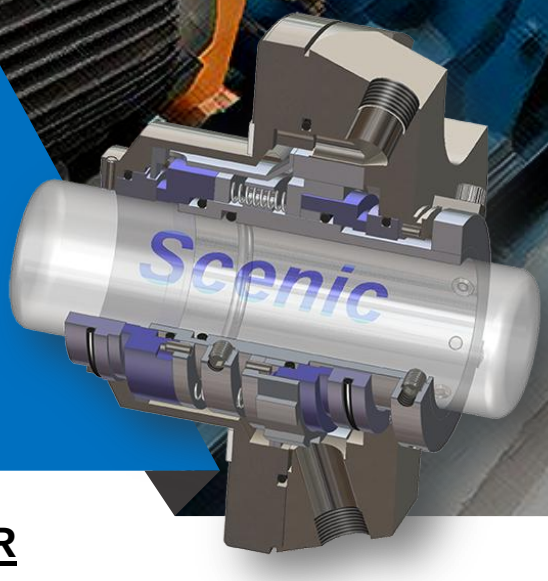
Scenic®

Scenic Precise Element Inc.

Case Study

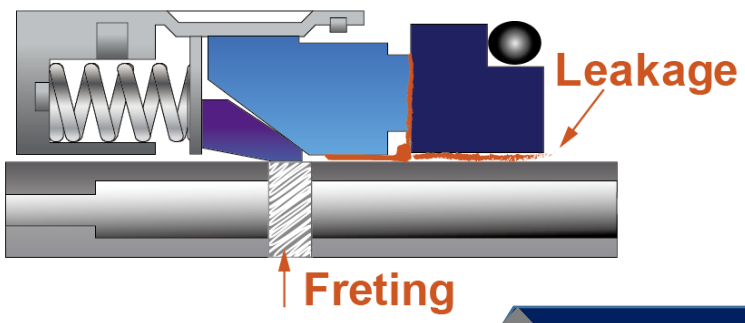
Sealing Improvement for SIHI® Vacuum Pump

Industry	Chemical & Petrochemical
Equipment	SIHI® Vacuum Pump
Temperature	47°C
Process Fluid	13% Saline Solution + 87% Chlorine Gas
Rotating Speed	1000RPM
Shaft Diameter	108MM
Sealing Type/Piping Plan (Before)	Back-to-Back Unbalanced Wedge Seal/ Plan 54
Sealing Type/Piping Plan (After)	Dual Cartridge Seal APD®302™/ Plan 53A



BEFORE

- Piping Plan: API Piping Plan 54
- Seal Type: Wedge seal with multi springs and unbalanced back-to-back structure
- Usage Cycle: 1 to 2 months
- Failure Analysis:
  - Springs breakage and wear on the wedge and sleeve
  - The vacuum pump vibrates significantly, creating substantial amplitude during operation, leading to increased axial displacement of the wedge seal and wear on the sleeve.
  - The unbalanced wedged structure can only withstand unidirectional pressure.
  - Difficulties in disassemble and assemble the wedge component seal, resulting in high maintenance costs.



AFTER

- Piping Plan: API Piping Plan 53A
- Seal Type: Dual cartridge seal APD® 302™, a balanced back-to-back structure
- Starting Date: AUG. 2009
- Usage Condition: Extended lifespan requiring disassembly the seal for maintenance once every 3 years. The cartridge type allows for easy disassembly, significantly reducing maintenance costs.

APD® 302™

SEALING SOLUTION & HIGHLIGHT

- Cartridge structure allows easy disassembly and maintenance.
- Patented baffle ring optimizes cooling effect.
- A back-to-back integral structure with shared springs stabilizes the sealing faces.
- The balanced structure achieves advanced sealing effect by balancing the pressure from pump's vibrations and the inner pressure of the seal.
- Outer pumping ring promotes heat exchange efficiency.
- Self-alignment capability tolerates seal run-out up to ±0.5mm.