HWM2 Successfully Replaces Problematic High-Speed Integral Gear Pump

ISO 13709/API 610 (OH6) Vertical, In-line Pump

The Challenge: A chemical plant located in eastern Texas was experiencing repeated difficulties with a pump being used for oxo catalyst recirculation. This poorly performing ISO 13709/API 610 (OH6) high-speed integral gearbox driven in-line pump was displaying extreme sensitivity to off-peak or upset conditions. With its demanding operational requirements, the pump was being moved significantly away from its best efficiency point (BEP) and was requiring constant maintenance. The plant was experiencing high repair costs with recurring gearbox failures, catalyst carry-over events and equipment downtime. The plant needed to reduce these costs and its escalating catalyst carry-over expenses and to improve equipment availability.

The Solution: Flowserve recommended installation of its dimensionally interchangeable HWM2 model pump as a replacement for the OH6 pump. The HWM/HWM2 pump line features interchangeable flange to flange dimensions requiring no piping or modifications necessary for installation. These ruggedly designed pumps operate over a wide flow range and are extremely tolerant of upset conditions. Since its installation in the chemical plant, the pump has experienced no further catalyst carry-over events and maintenance costs have been reduced by nearly 80 percent.

An eastern Texas chemical plant was experiencing difficulties with a pump being used for oxo catalyst recirculation. Driven at 7026 rpm via an in-line gearbox, the ISO 13709/API 610 (OH6) pump was designed with an inducer to handle lower NPSH requirements. The combined operation at high suction specific speeds and usage of the inducer were forcing the pump significantly away from its designed BEP, narrowing the window of reliable operation.

The plant experienced high repair costs due to repeated gearbox failures and catalyst carry-over events that caused downtime of the OH6 unit. The catalyst carry-over expenses averaged from $140 000 to $250 000 per year, depending on the fluctuating price of catalyst per troy ounce. Annual maintenance costs were approximately $120 000.

Recommendation:

As a replacement for the OH6 pump, Flowserve recommended installing its two-stage HWM2 pump, a space-saving, vertical in-line pump engineered for low-flow, medium to high head operation services. This “drop-in” pump features interchangeable flange to flange dimensions requiring no piping or installation modifications, minimizing set-up costs.

Also available in a one-stage configuration, this ruggedly designed pump is highly capable of handling upset conditions. Benefits of the HWM/HWM2 pumps include:

- A simple design for reduced maintenance and lower overall life cycle costs compared with integrally geared equipment
- ISO 21049/API 682 compliant seal chambers which accommodate a wide variety of seal configurations, including dual pressurized and unpressurized cartridge types for the most severe services
- A dynamically balanced impeller that limits vibration and ensures smooth operation over a wide flow range

The Flowserve model HWM2 also features two Barske radial blade impellers that provide a continuously rising performance curve with low flow stability. Built with the identical bearing housing as Flowserve conventional OH3 pump models, the pump is designed for direct drive 2-pole or 3600 operation.

With its rugged construction and lower speed performance parameters, the pump can perform down to 15% of the pump’s BEP, making it an ideal solution to handle upset and off-peak flow conditions.

Results:

The HWM2 pump replacement has significantly impacted pump availability and reliability at the chemical plant. Since the installation, the new Flowserve pump has been trouble free and the plant has not experienced any catalyst carry-over events or incurred any related expenses. The annual maintenance costs have been reduced to approximately $25 000.

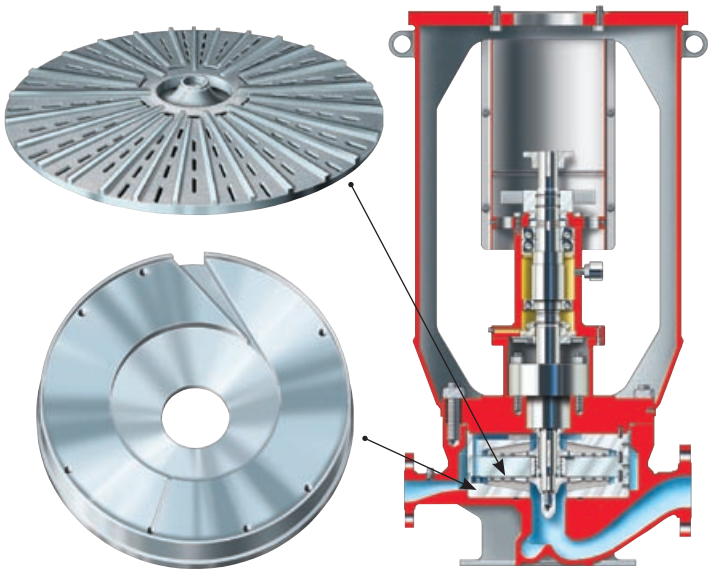
FINANCIAL BENEFITS

Original Yearly Expenses

Operating Costs Due to Catalyst Carryover Events	USD 140 000-250 000
Maintenance Costs	USD 120 000
Total Expenses	**USD 260 000-370 000**

HWM2 Annual Expenses

HWM2 Operating Costs Due to Catalyst Carryover Events	USD 0
HWM2 Maintenance Costs	USD 25 000
Total Costs Savings	**USD 235 000-345 000**



Barske Impeller and Volute Combination Shown in Two-stage Unit

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FINANCIAL BENEFITS

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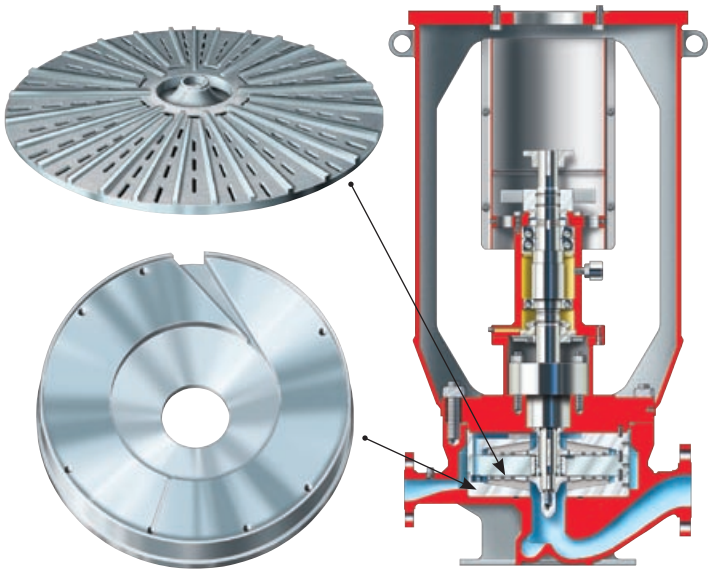

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