Micro Motion® Coriolis Meters Replace Turbine Meters in High Purity Water Application

RESULTS

- Saved nearly $12,000 per year in meter replacement, maintenance and calibration costs
- Eliminated hazard of metal filings being introduced into product by a damaged meter
- Gained more accurate and reliable usage data for internal cost allocation

APPLICATION

High purity water is a vital raw material in the manufacture of prescription drugs. USP 24 provides guidance related to water purity for applications where water (or water for injection) will be a component in the finished drug. Complex purification equipment and processes are used to produce and ensure final water purity.

A large prescription drug manufacturer purchases vapor compression stills (VCS) from an outside supplier to produce water for injection (WFI). The entire water purification system, including the VCS and ancillary equipment, must meet 3A hygienic requirements.

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This drug manufacturer has approximately 25 vapor compression stills in its midwest U.S. manufacturing and R&D facilities. When purchased, each vapor compression still includes a hygienic turbine meter. The flow measurement is primarily used to ensure that the VCS is functioning properly. In addition, this flow measurement is used to bill individual process units for their WFI usage.

CHALLENGE

The turbine meters have produced significant reliability concerns and issues. WFI is a non-lubricating and corrosive fluid. Turbine meter components can break down over time due to contact with this water. The bearings wear from contact with the water. Plus, the leading edges of the rotors can corrode, causing their rotational characteristics to change. Frequent routine maintenance must be performed to ensure the performance of turbine meters in this environment.

With no moving parts to wear or fail, Micro Motion meters pose no contamination hazard.

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Meter calibration is one important and routine function within any drug manufacturing facility. The turbine meters on the vapor compression stills are calibrated four times each year. On an annual basis, these labor costs are approximately $6500.

Throughout the company's facilities, approximately four to six turbine meters fail on the VCS each year and must be replaced. The total annual cost for meter replacement (purchase and installation) is approximately $5400. This does not include the cost of downtime while the meters are replaced.

To ensure the system's water purity, technicians steam clean the vapor compression stills once a week for a minimum of two hours. During the cleaning process the turbine meters must be either removed from the line or "blocked in" to prevent their rotors from being damaged by over-rotation. In some cases, the meters have actually disintegrated, causing system contamination and additional time for cleaning and system inspection.

Contaminating the purified water system with metal filings is a major concern in any prescription drug manufacturing facility.

SOLUTION

To improve process quality and reduce costs, the facilities replaced each turbine meter on their vapor compression stills with a Micro Motion® hygienic Coriolis meter. Micro Motion Coriolis meters have no moving parts that can wear or fail with time, so they are virtually maintenance free and pose no contamination hazard. This eliminated the need to replace meters as well as the need to schedule and pay for the associated maintenance personnel.

These Micro Motion hygienic meters can also be cleaned in place. Eliminating the need to remove meters during steam cleaning has significantly reduced the time needed to clean.

During their first year of operation, the new meters are scheduled to be calibrated four times. However, Micro Motion's extensive experience in similar applications predicts that the trial calibration data will demonstrate no shift in meter performance. If that is the case, the calibration frequency will be lowered to once per year. This will provide additional on-stream hours for the vapor compression stills and costs for calibration and maintenance will be reduced significantly.

Finally, the Micro Motion meters will provide much more accurate and reliable billing metrics. The company's Utilities department will be able to assess more accurately WFI usage throughout their facilities.

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