

# Pharmaceutical Company Improves Air Flow Control with Conditioning Orifice Flowmeter

## RESULTS

- Improved accuracy and reliability of air flow measurement
- Improved performance of the air handling units
- Reduced installation and maintenance costs

## APPLICATION

Mass flow measurement of sterile air

## CUSTOMER

A pharmaceutical company in the Northeast United States

## CHALLENGE

In the pharmaceutical industry, there are many tough and challenging applications when it comes to the production of various products. Precise measurements are required for control and accuracy throughout the production processes.

A pharmaceutical company recently installed new air handling units to monitor the precise air flow measurement into the production area for the coating process. The customer's new production unit contained four coating suites, each of which contained four coating pans (which resemble front-loading clothes washing machines). The coating suites are separated into three areas, with the central area being the coating pan. Thousands of uncoated tablets are loaded into a rotating drum and are constantly tumbled and rotated while a coating is sprayed in the pan. At the same time, sterile air is admitted under controlled mass flow and temperature conditions. Reliable and accurate flow measurement is required to distribute and control sterile air during the coating process.

The original measurement, which was a thermal mass flowmeter, was unable to accurately measure the temperature operating range for the coating pans which fluctuated from room temperature to 185 °F (85 °C). The thermal mass flowmeter was not temperature compensating and was only accurate at one measurement point. Calibration of the unit could not be performed on site, which caused additional maintenance issues.

In addition, the thermal mass flowmeters were installed approximately 2D after two in-plane elbows with a control valve 2D downstream of the installation, providing virtually no pipe straight-run for adequate measurement.



*With the improved performance and low pressure loss from the Conditioning Orifice Meter, the air handling units now were able to deliver the full-range capacity for an increased process efficiency.*



Figure 1. Conditioning Orifice Mass Flow Meter (1595 conditioning orifice plate with 3095 multivariable transmitter)

**SOLUTION**

Emerson was able to provide a reliable solution with the Rosemount 1595 Conditioning Orifice Plate, which can be installed with only two pipe diameters from an upstream flow disturbance and only two pipe diameters on the downstream side. A Rosemount 3095 MultiVariable™ Transmitter was supplied along with the 1595 Conditioning Orifice Plate to provide mass flow measurement in a fully integrated direct-mount flowmeter solution. Using an existing RTD and with a Rosemount 333U Tri-loop, the temperature and mass flow measurements were provided in a single output.

Permanent pressure loss was also a concern for the customer due to the low process pressure in the air handling units. By using Emerson’s sizing program (Instrument Toolkit), the customer was able to see how much permanent pressure loss would be produced with the conditioning orifice meter. With the conditioning orifice meter installed in a 10" 316SS schedule 10 pipe at a maximum flow rate of 1000 SCFM, 1.2" H<sub>2</sub>O PPL would be created, which was sufficient for meeting their process requirements.

To determine if the Conditioning Orifice Meter was performing accurately, it was compared to the reference meter downstream. This reference meter is a custom flow measurement device consisting of a flow straightener, averaging pitot tube element, RTD and flow computer. Every three months this custom reference meter was sent out to a flow lab for re-calibration.

After several days in service, the Conditioning Orifice Meter and the custom flow measurement device were compared. A report showed the Rosemount 3095 and 1595 Conditioning Orifice Mass Flow Meter matched within 0.5% to the customer’s calibrated flow meter.

With the improved performance and low pressure loss from the Conditioning Orifice Meter, the air handling units were able to deliver the full-range capacity for an increased process efficiency.

The customer was pleasantly surprised and shocked with how well the conditioning orifice meter performed and has since replaced all of the thermal mass flowmeters with the conditioning orifice measurement.

**RESOURCES**

**Rosemount 1595 Conditioning Orifice Plate**

<http://www.emersonprocess.com/rosemount/products/flow/m1595.html>

**Rosemount 3095 MultiVariable™ Mass Flow Transmitter**

<http://www.emersonprocess.com/rosemount/products/flow/m3095mv.html>

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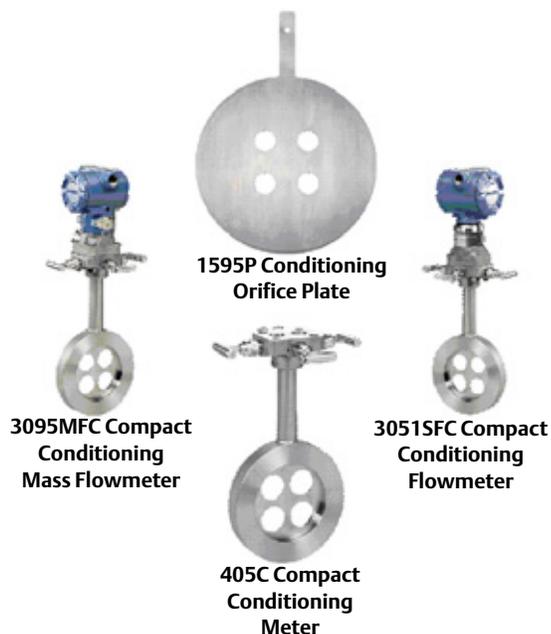


Figure 2. Conditioning Orifice Meter Family