# Application Guide Series

## Dryers

### Benefits

- *Improve product quality*
- *Improve product consistency*
- *Increase production rates*
- *Fuel cost savings*

### Industries

- *Pharmaceutical*
- *Food and Beverage*
- *Chemical*
- *Petrochemical*
- *Mining*
- *Pulp and Paper*

### Process Equipment

- *Fluidized Bed Dryers*
  - *Agglomeration*
  - *Coating*
  - *Granulation*
- *Flash Dryers*
- *Rotary Drums*
- *Calciners*
- *Kilns*


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## Controlling Airflow Within Tight Tolerances Saves Money

Millions of dollars are wasted every day in drying and coating processes in the pharmaceutical, food and beverage, chemical, petrochemical and mining industries - in fluidized beds, rotary drums, flash dryers, kilns and similar processes. Failure of these devices due to improper air and product feeds can cause issues with validation, causing downtime, re-validation, and loss of both products and profits. Controlling airflow through these devices is critical.

## The Problems

How can a continuous air mass flow at a controlled air temperature be provided to critical processes and equipment that need to operate within tight tolerances over a wide operating range?

### *1) Improving Production Efficiency*

Off-specification product must be recycled or wasted. This is extremely costly, especially in the validated industries. Precise control of air flow and air temperature is important to maintain high product quality, reduce waste and increase uptime. The performance of many processes would benefit from measuring the mass flow of process air. In addition, limited flow meter turndown often constrains operational flexibility - especially when requirements cover a wide range of operating conditions.

### *2) Dealing with Limited Straight Pipe Runs*

Air flow meters incorporated into process equipment are often not accurate due to short upstream and downstream straight pipe run. The installation of sufficient straight run can quickly become difficult in tight quarters, so other solutions are needed.

### *3) Reducing Plugging and Coating*

The majority of process equipment designs do not include relatively dirty exhaust flow measurements, even though these measurements can provide significant operational benefit. They are often not included because exhaust flow meters can become coated and plugged when particulates are present — reducing flow meter accuracy.

## The Air Monitor Solution

Air Monitor products have been designed specifically to address these problems by helping you improve the reliability of your air flow meters by improving their accuracy over a wide range of flow rates. This can potentially improve process quality, improve product consistency, increase production rates and reduce fuel expenditures.

### *1) Improving Production Efficiency*

Air Monitor ACCU-flo/NP and LO-flo/SS products can be applied for high accuracy flow measurements to achieve more precise control and more consistent product. Air Monitor's differential pressure transmitters provide accurate flow measurements at extremely low differential pressures. These transmitters are automatically zeroed to periodically eliminate signal drift from thermal, electronic and/or mechanical sources. This maintains accurate flow measurements while reducing calibration

requirements and improving reliability. Air Monitor products are designed to measure temperature input and absolute pressure of the process accurately which enables an accurate and reliable mass flow rate through its temperature and pressure compensation algorithms.

### *2) Reducing Error from Limited Straight Pipe Runs*

The Air Monitor Combustion Airflow (CA) Station, ACCU-flo, and LO-flo/SS products with a multi-point sensing array are utilized in applications with high temperature and high accuracy requirements in small, medium, and large size ducts. Accurate flow measurements can often be obtained within less than two diameters of straight pipe which is a significant improvement over the performance of insertion flow meters installed with limited straight run.

### *3) Plugging and Coating*

Plugging and coating can be mitigated by incorporating an Air Monitor AUTO-purge III that periodically clears the flow meter sensing elements with clean compressed air to ensure reliable flow meter operation when particulate is present.

## What The Tech?

Air Monitor's products rely on two technologies for measuring air flow that allow for accurate readings, which are essential in drying. Pitot Averaging Technology is a multi-point self-averaging technique that measures true velocity pressure, not just a reference pressure. When drying, users can be assured that true velocity pressure (total pressure minus true static pressure) is being calculated, resulting in the highest quality products with less product loss. It also uses the Fechheimer method of true static pressure measurement, ensuring an accurate velocity pressure measurement. This can be modified depending upon specific drying needs.

Differential Pressure Technology also translates to accuracy through the drying product range, especially when measuring air flow over a large velocity range. This improves drying efficiencies. The technology is based on using an extensive selection of differential pressure (DP) transducers that have multiple upper range limits (URLs) to precisely match the application. Air Monitor couples ultra-low range (0.05" w.c.) sensing capability with an auto-zero function. This means a highly accurate DP measurement.

### Precision and accuracy are paramount at Glatt

Major pharmaceutical companies where solid dosage processing is required for making powders or contents of pills, tablets, and capsules have a unique need for accuracy. Glatt Air Techniques Inc. sells its equipment to such pharmaceutical companies and makers of vitamins and nutraceuticals because they are the leaders in accuracy.

***"Glatt products are bought by customers to be used for the processing of very high-value products. Accuracy is key."***

Glatt must build its pharmaceutical processing equipment for extreme precision because of the high dollar value of the powders that are processed in its equipment.

During the buying stage, Glatt explored several technologies. Thermal measurement couldn't accommodate straight pipe run requirements. Space is a premium and installations are tight on the fluid bed towers (FBTs) that Glatt manufactures. Vortex flow measurement couldn't meet the pressure requirements and had limited line sizes, topping out at 12" or 16". In terms of pressure rating of the transmitter, Air Monitor's products could withstand a high-pressure event - a critical factor. Max pressure within the unit must be able to withstand 10-12 bar rated.

Airflow management is critical for ensuring high quality distribution of any ingredients and the technology used in Air Monitor products met all their high demands. The Air Monitor products at work in Glatt's equipment are the VELTRON-II transmitter and the LO-flo/SS pitot traverse probe air flow measurement station. With a dual-range transmitter like the VELTRON-II, Glatt is able to measure a 25:1 turndown and the pitot static grid technology was best suited for their needs.

***"The way Air Monitor products are calibrated is probably the best in the industry for precision."***

Glatt's equipment can be as small as a 1 kilogram processing vessel (lab-sized equipment for R&D work) up to 1,000 kilograms for industrial-sized equipment. The smallest Air Monitor equipment Glatt requires is 4". The largest is a 24". Air Monitor's wide size range allowed Glatt to have the most options and the engineering support they received from Air Monitor helped tailor their specific measurement needs to their high-value product line.

***"Air Monitor's products are highly engineered and extremely reliable. They have great service and support."***

Glatt measures airflow in two places in the process: the airflow into the fluid bed tower (FBT), which is the processing unit; and upstream measuring total airflow to the process. They have trusted Air Monitor measuring equipment at these key points because accuracy and function must be spot on and Air Monitor products have met that challenge consistently for over two decades.