Trace Moisture Measurement in Compressed Air

Application Note

SHAW MOISTURE METERS

Compressed air is a vital utility in many industries, powering tools, automation systems, and processes. However, moisture in compressed air can cause significant problems, including equipment damage, product spoilage, and increased maintenance costs.

Dewpoint measurement is essential for ensuring air quality and protecting downstream equipment.

What Are Compressed Air Dryers?

Compressed air dryers are devices designed to remove water vapor from compressed air. When air is compressed, its ability to hold moisture decreases, causing condensation. If not properly managed, this moisture can lead to corrosion, blockages, and system failures.

Different Types of Compressed Air Dryers

There are several main types of compressed air dryers, each with unique advantages and applications:

Refrigerated Dryers: Cool the air to condense and remove moisture. Suitable for general-purpose applications where a dewpoint of around +3°C to +10°C (37°F to 50°F) is sufficient.

Desiccant (Adsorption) Dryers:
Use materials like silica gel or activated alumina to adsorb moisture, achieving much lower dewpoints (as low as -40°C to -70°C (-40°F to -94°F)). Ideal for critical applications requiring very dry air.

Membrane Dryers: Use selective permeation through a membrane to remove water vapor. Best for point-of-use drying and small flow rates.

Deliquescent Dryers: Use chemicals that absorb moisture and dissolve. Simple and low-maintenance, but with limited dewpoint control.

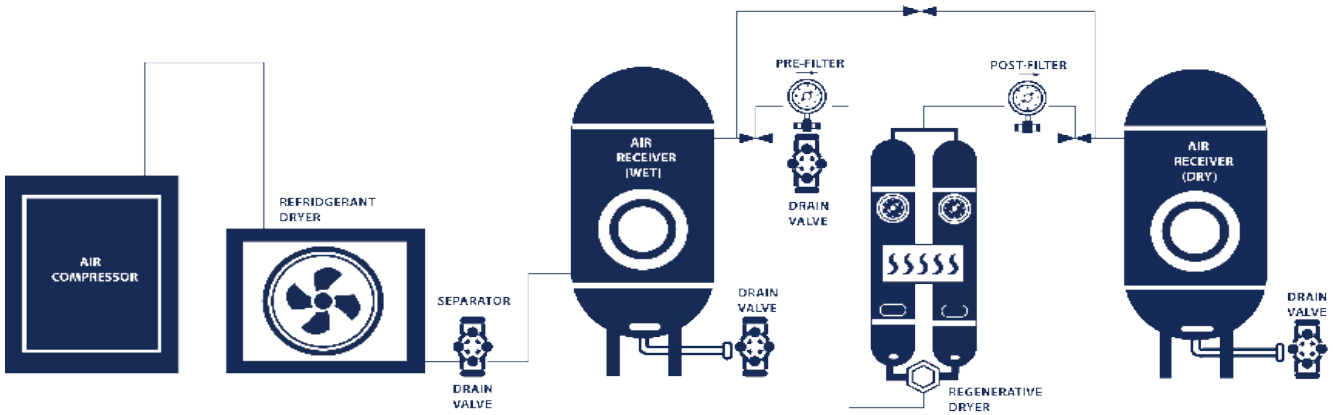


Moisture Problems in Compressed Air Systems

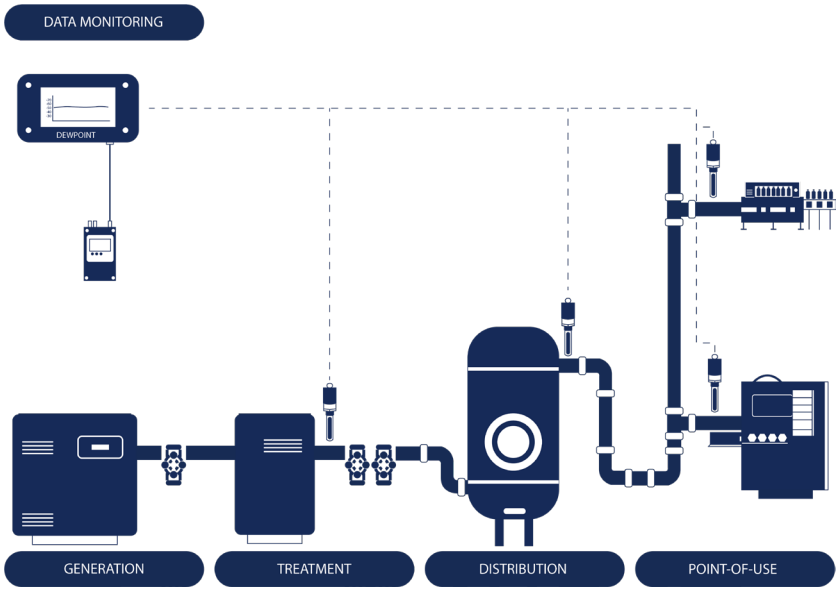
Excess moisture in compressed air can cause:

- Corrosion of pipes, valves, and tools
- Freezing in outdoor lines during cold weather
- Product contamination in food, pharmaceutical, and electronics industries
- Reduced efficiency and increased maintenance costs

Typical Compressed Air Drying System



Typical Dewpoint Transmitter Installation in a Compressed Air Drying System

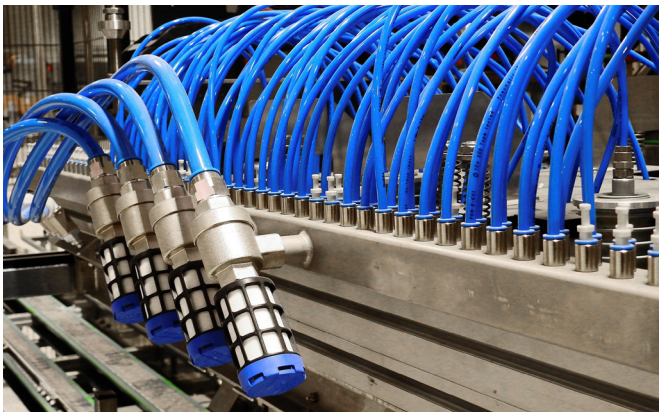


The Role of Dewpoint Measurement

Dewpoint is the temperature at which air becomes saturated with moisture and water begins to condense.

Continuous dewpoint monitoring allows operators to:

- Verify dryer performance
- Detect dryer malfunctions early
- Ensure compliance with industry standards (e.g., ISO 8573-1 for compressed air quality)
- Optimize maintenance schedules and reduce downtime.



Solutions for Dewpoint Measurement

- Install dewpoint sensors downstream of compressed air dryers for real-time monitoring.
- Use portable / handheld instruments for spot check measurements at multiple sample points across the compressed air system.
- Perform regular maintenance on dryers and sensors.
- Follow applicable standards such as ISO 8573-1 for air quality and ISO 7183 for dryer performance.

Dewpoint measurement is therefore essential for ensuring the reliability and efficiency of compressed air systems.

By selecting the right dryer, monitoring dewpoint, and adhering to standards, industries can prevent moisture-related issues, reduce costs, and maintain high-quality operations.

References to Applicable Standards

- ISO 8573-1: Compressed air
  Contaminants and purity classes
- ISO 7183: Compressed air dryers
  Test methods for measuring dewpoint

Suitable Products



Dewpoint Transmitters



Handheld Hygrometers



Portable Sample System

We design and manufacture dewpoint instruments for many different applications.

For advice, choosing the right product for your application, please contact us:

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