

Understanding the different types of compressed air dryers

Compressed air dryers are vital to a number of industrial manufacturing processes. Food and beverage manufacturing, compound synthesis, pharmaceuticals and oil and gas exploration are just a few of the industries that require dry compressed air for optimum productivity. This article will further describe the different types of air dryers that can be used.

What is a compressed air dryer?

A compressed air dryer is a piece of equipment that removes water vapour from air that has been pressurised for various industrial purposes. Compressed air dryers are almost indispensable in many moisture-sensitive applications. How do air dryers work? Air dryers are available in a variety of configurations and operate in different ways.

Types of compressed air dryers

The following is a description of the most commonly used air dryer systems.

Refrigerated air dryers

Dehydrated Air Dryers

Desiccant Air Dryers

Chemical Air Dryers

Membrane Air Dryers

Refrigerated Air Dryers

These dryers operate on the principle of condensation. The refrigerated air dryer cools the compressed air to a very low temperature, causing the water suspended in the air to condense into liquid form. Once the water has been removed, the dry air stream can continue to flow to the application that requires it.

There are two types of freeze dryers, recirculating and non-circulating. Circulating freeze dryers operate similarly to a standard refrigerator, providing variable cooling based on demand. Non-circulating units provide constant cooling independent of demand, but this makes them a less efficient option.

Applications

Freeze air dryers are a popular choice for a number of manufacturing and service applications where the absence of detectable moisture in the compressed air is required. However, they are not suitable for highly sensitive applications where even small amounts of water can cause damage.

Advantages and disadvantages

The advantages of refrigerated air dryers include

Low installation costs

Low operating costs

Resistant to airborne particles

Disadvantages include

Not suitable for operation at sub-zero temperatures

Has marginal dew point capability

Dehydrated Air Dryers

These dryers have an absorption mechanism that helps to remove moisture from the air passing through them. In addition, degassing dryers use hygroscopic salt flakes which need to be replaced when saturated.

Applications

Degassing dryers can be effectively deployed in hazardous, remote areas where dry, pressurised air is required. Examples of applications that benefit from degassing dryers include landfills, wood and asphalt manufacturing industries.

Advantages and disadvantages

Key benefits of using a tidal dryer include

It is easy to use in special conditions where contaminated air/exhaust gases are handled

Minimal maintenance requirements

No electricity required to operate

The disadvantages of tidal air dryers are as follows.

hygroscopic drying material must be replaced regularly, resulting in increased maintenance costs

Dew point varies with air temperature

Desiccant air dryers

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