

Solutions - Dehumidification Explained

Dehumidification Explained

All materials corrode, which is to say every substance eventually changes from one form to another

Search

- [Advanced search](#)
- [Glossary](#)

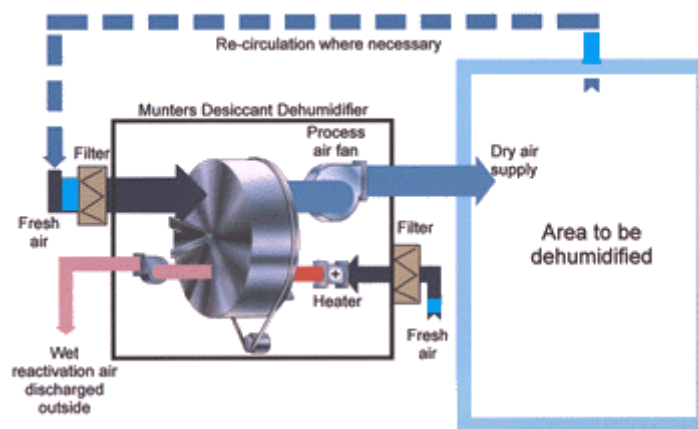
[Login](#) [Register](#)

[Related products](#)

[Product Range](#)

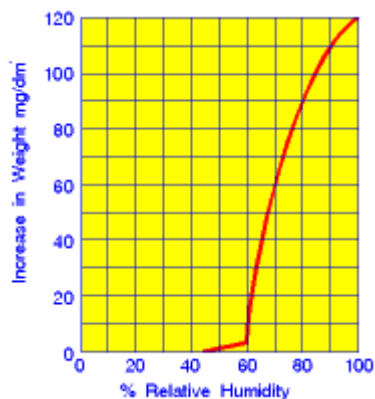
[Food](#)

Munters Desiccant Dehumidification Principle



Corrosion Prevention

All materials corrode, which is to say every substance eventually changes from one form to another through chemical reactions. Many of these reactions, especially those which depend on oxygen, are catalysed and accelerated by moisture. Ferrous metals like iron and steel are well known for their corrosion in the presence of moisture. Less well known is the fact that glass corrodes and cracks at a rate, which varies according to the moisture on its surface. Pure crystals like sodium Iodide and lithium fluoride also corrodes forming oxides and hydroxides in proportion to moisture in the air. In the past, tens of thousands of desiccant dehumidifiers have been used to surround machinery and equipment with dry air, preserving ferrous metal parts from heavy rust.



In the present, dehumidifiers are working to protect materials from more subtle and expensive forms of corrosion. Modern society depends more and more on light equipment like computers, telecommunications gear, light-weight composite materials and high-energy batteries. While these are less subject to gross rusting, they are very sensitive to microscopic-level corrosion. These circuits simply do not have much material to begin with, so small amounts of corrosion create disproportionately large problems. Desiccant systems save owners literally hundreds of millions of

dollars each year by preventing both gross and microscopic corrosion.

Condensation Prevention

When cold surfaces are surrounded by moist air, water vapour will condense on the surface like "sweat" on a cold beer glass in summertime. This can lead to a surprising number of problems. For instance, consumers in a supermarket may not be able to see frozen foods in a refrigerated display case with a glass door. That may mean thousands of dollars in lost revenue. Alternately, condensation can form on hidden aircraft structural members As a plane descends from the cold upper atmosphere into moist environments, which can accelerate stress corrosion, Shortening the life of the airframe. In both of these cases, dehumidifiers are installed to surround the cold surface with Dry air.

Often, condensation control creates economic opportunities rather than simply preventing a problem. For instance, chilled rollers are used in many production processes to cool thin films or coatings. By blanketing the roll surface with dry air, the coolant temperature can be much lower without causing condensation. This means the product can be cooled faster, perhaps eliminating the need for a second machine.

Moisture Regain Prevention

Virtually every substance has some affinity for moisture. Even plastic resins like nylon can collect six to ten percent of their dry weight in water vapour. In many cases, this presents no problem. In others, moisture regain can affect critical dimensions just like thermal expansion, or make products that would otherwise flow freely stick together. The typical home salt shaker illustrates this point-moisture regain on humid day's clogs the shaker holes. On a dinner table, this may be a minor problem. But in packaging machinery, sticky products have major economic consequences. Hygroscopic products are sensitive to high relative humidities rather than absolute humidities, and relative humidity can be high at any time of year. In fact it is often higher in winter than summer. When products are stored at cool temperatures, problems can be especially acute. Desiccant dehumidifiers are effective in controlling humidity at low temperatures, and have been widely applied to prevent moisture regain.

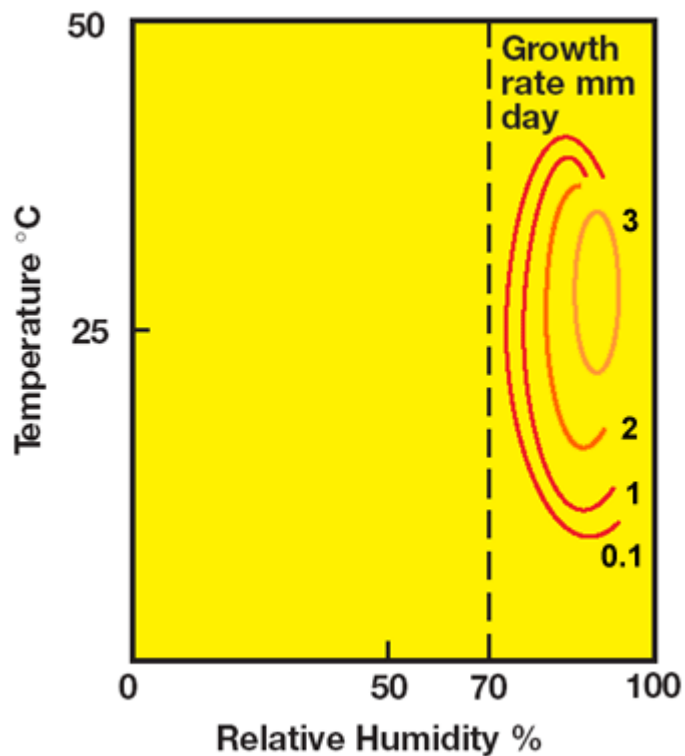
Product Drying

Most products are dried using hot air to vaporise moisture and carry it away, Often, however, hot air is either too slow or results in damage to the product. Enzymes, for instance, are destroyed by heat, and if yeast is dried with very hot air, it cannot work properly. When there is a benefit to drying at temperatures below 120° F, there is generally a benefit to using air, which has been dehumidified rather than just heated. The cooler the temperature, the more the economics favour dehumidifiers. For example in one installation enzymes used in commercial detergents are dried in a fluidised-bed drier. Because of the temperatures involved, the drying capacity of the fluid bed is doubled when the air dewpoint drops from 65° F to 20°. This means the size of the fluid bed can be cut in half.

The range of product drying applications for dehumidifiers has expanded significantly in recent years, as clients examine the positive effects of low temperature drying on product quality. Dehumidifiers allow these quality improvements without sacrificing processing speed.

Mold/Fungus Prevention

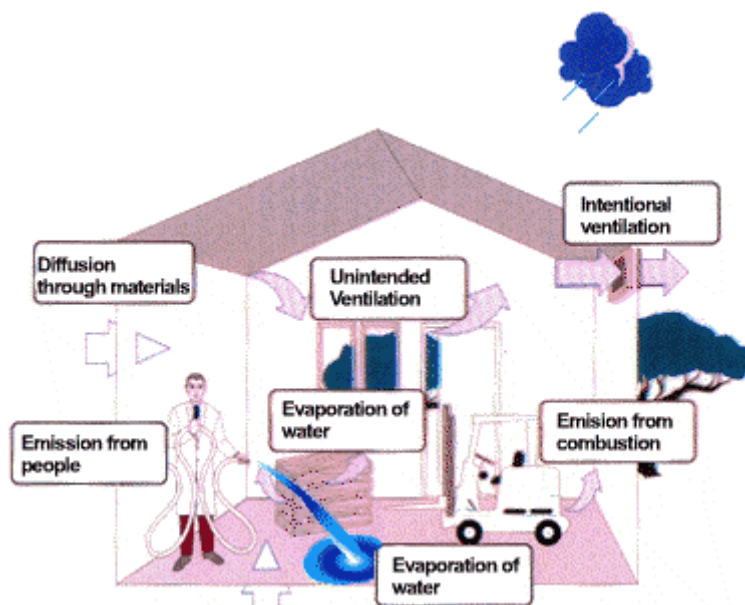
Mold and fungus are present in almost all materials. They can survive without moisture, remaining dormant for decades, even centuries. But when moisture and a food source become available they will multiply rapidly. This moisture does not have to be in liquid form. Microscopic organisms can use moisture present in solid materials because they need so little.



Two classic examples of this phenomenon are the prehistoric cave paintings in Lascaux, France, and the Egyptian artefacts preserved in the pyramids. The cave paintings survived virtually intact for 16,000 years. Then tourists began bringing moisture into the caves in their clothes and through their respiration. The paintings have deteriorated through microbiological attack in less than 40 years. Egyptian artefacts have had the same difficulty, with tragic consequences for history.

Even metals are attacked indirectly by certain bacteria. The U.S. Navy has traced corrosion in ships bilge's to acidic by-products of microbiological metabolism, costing hundreds of thousands of dollars in repair expenses.

So where does moisture come from ?



Munters desiccant dehumidification systems dry the air and remove the enemy: **humidity** in any of the above situations.
