



Is Dehumidification or Heat Better in Construction Drying?

From concrete to wallboard to millwork, materials used to construct buildings absorb moisture. While a small amount of moisture is necessary for materials to cure properly and prevent cracking or distortion, excess amounts pose a variety of risks, including project delays, adhesive and coating failures, and mold growth. To prevent and combat moisture-related problems, contractors look to construction drying solutions, such as heaters and dehumidifiers. By knowing which process is better for your application, your moisture control efforts will be more effective.

Humidity and Drying

When atmospheric conditions are uncontrolled, molecules of water in the air apply vapor pressure on the materials they contact. The warmer the air, the higher the levels of water vapor. Materials that absorb moisture do so at different rates until they reach an equilibrium moisture content, which is when they neither absorb nor release moisture into the air.

When a contractor implements construction drying solutions, the moisture travels from areas with high vapor pressure to areas with lower vapor pressure. As a result, the affected materials desorb moisture vapor and release it into the air. The mechanical drying solution then pushes the moist air of the space via air movement.

Heat versus Dehumidification

Heat

Because it does not reduce vapor pressure, heat is good for temporarily reducing relative humidity levels. Rather than remove moisture from a space, introducing heat without the use of a ventilation system will actually increase humidity levels via combustion, which could exacerbate the problem. As relative humidity levels rise with the introduction of heat, condensation will form on surfaces whose temperature is lower than the dew point temperature.

When warm air enters a space, it will rise toward the ceiling because warm air is lighter in weight than cool air. As the heated air cools down, it rereleases moisture. For this reason, airflow and ventilation are essential. As the warm air traps evaporated moisture, you must remove it from a space and replace with dry warm air.

With the right heating and ventilation equipment, the moisture-removal method can be effective at removing moisture quickly. At a construction site, however, using heat alone may remove too much moisture from the building materials too quickly, causing materials that depend on moisture to dry and cure properly (e.g., drywall mud and concrete) to crack, distort or prematurely fail.

Dehumidification

Dehumidification is a process that involves removing humidity, or water vapor, from the air, keeping the dry-bulb temperature constant. The process involves the use of a coolant or desiccant.

The cooling and dehumidification process, or refrigerant dehumidification, uses a refrigerant to cool the air below the dew point temperature, which reduces the dry-bulb temperature. Eventually, the water vapor in the air turns into dew particles, which form on a surface within the dehumidifier. In essence, the equipment removes humidity via condensation. This is often seen in air conditioners, which are not appropriate for controlling humidity at a construction site.

Desiccant dehumidifiers, which are excellent for construction sites, contain hygroscopic materials that attract and hold moisture from the air that passes through the equipment. The equipment then releases the trapped moisture through an exhaust airstream. Because of the correlation between vapor pressure and moisture, moisture removal using desiccant dehumidification also lowers the vapor pressure in a space. In the end, you're left with arid air that can dry the most saturated materials.

Construction drying solutions often combine heat and desiccant dehumidification because heat alone cannot reduce the vapor pressure in a space. The use of heat not only aids in eliminating moisture, it also helps create environmental conditions that are conducive to drying applications, allowing a project to stay on track at any time of the year.

The Conclusion

To minimize your overhead costs, it's important to specify a construction drying solutions specific to your project that includes monitoring equipment, letting you track conditions and progress in real time. In addition to eliminating excess moisture from a site, forward-thinking contractors use the solutions from the start to create an environment that prevents high relative humidity levels and prevents project delays. Consult a temporary climate solutions provider who can provide a precise solution for your construction needs to keep your project on schedule.