



Controlled Humidity
Environment

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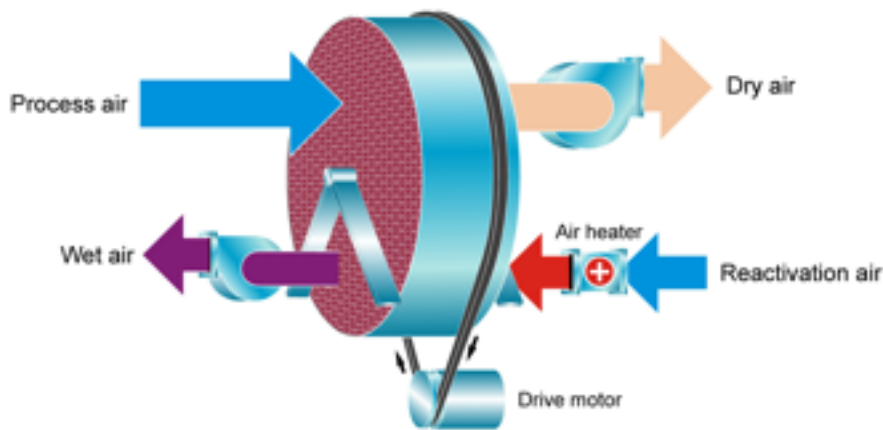
All around us in the air that we breathe is water, although it is invisible to the eye, it is there in the form of vapour suspended in the air as a gas.

Water in the air is measured in Relative Humidity, which simply means the amount of water suspended in relationship to the temperature and the maximum holding capacity being 100%.

Many places in the world suffer from humidity levels greater than 80% for the majority of the year and this includes the UK. This level has various effects in industry from corrosion of steel, glass, aluminium, electronics malfunction, fungus and mould to breakdown of some rubber and plastics.

Principal of DryAir Dehumidification

The process air, which requires dehumidification, is passed through a slowly rotating rotor. This rotor is constructed using a heat resistant material which is then corrugated, producing a matrix of flutes.



Silica Gel is bonded to the surface of the rotor under extremely high temperature; this unique process gives the rotor a strong hygroscopic surface and a very high water absorbing capacity. A small section of the rotor (usually about 25%) is used in the regeneration process to rid the rotor of water.

Heated air is passed through this section in a counter flow direction to the process airflow and the moisture contained in the Silica Gel is evaporated and exhausted to the outside of the building via ductwork. Prior to heating, the airflow is passed through the prepurge section of the rotor to rid the process air of any cross contamination, cool the rotor and pre - heat the regeneration air. This process of dehumidifying and regeneration is done continuously and automatically as shown in the diagram above.

Application Examples



In Defence, humidity should be taken very seriously. Defence equipment will always be a huge outlay of capital expense for any government and needs to be protected when not in use.

Equipment from a MBT to Landrover or an aircraft carrier to a Euro fighter will remain in a state of readiness but may not be protected from the elements such as ambient humidity.

Defence equipment can remain unused for years but if not stored correctly, humidity can be the cause of mechanical & electrical problems encountered by many of the Armed Forces worldwide.

Here at Desiccant Dryair Systems Ltd we have a proven track record of protecting equipment for the Army, Airforce and Navy, also for Rolls Royce, Jaguar and Aston Martin and many more.



With our desiccant dehumidifier, we can remove the water in the air to a level that slows or totally stops corrosion; this in turn means fewer break downs and the monthly service will be replaced with much longer periods between inspections & service.

This also means less time required by trained technicians to carry out needless servicing and thus fewer components need changing meaning lower costs over the life of the equipment.

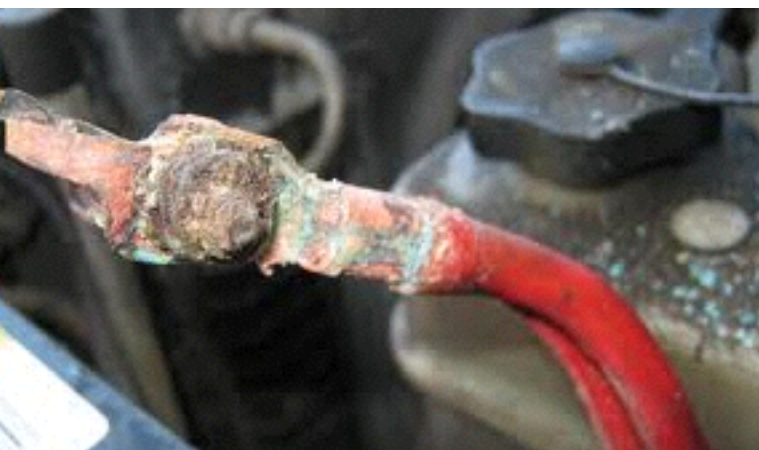
Cost reduction

In all storage applications operational costs can be greatly reduced by the reduction of the relative humidity over the ambient conditions. It will directly reduce the amount of damage and corrosion derived from high moisture content in the air. There are two ways of reducing relative humidity, one is to heat the air and the other is dehumidification.

By heating the air, the air volume expands and the humidity level indirectly becomes lower. The problem occurs when the air has to be heated over ambient temperatures all year round. This method does not remove any water from the air and is very expensive. Our method is to directly remove the problem, this being the water in the air. It has many advantages such as cheaper running costs it also provides a more comfortable working environment for staff.

In the early 1920's work carried out by Vernon showed that there is a direct relationship between the corrosion of steel and relative humidity and on a graph it is known as Vernon's Curve as the corrosion accelerates vertically when humidity reaches 55%. We carried out research in the early 1990's with the former British Steel at their research facility in Ebbw Vale in South Wales, this was in relation to a customer request for the storage of automotive steel. We were the first to implement a system of Dryair over a preferred method of dry heat to lower the relative humidity. Widnes Steel Storage facility has been running since 1993 originally for Ford but now Jaguar and Landrover with £90 million of steel through put per year, with no corrosion ever recorded.

Protect electronics from corrosion



Electronics have a high failure rate when high humidity is present in the air especially when the circuitry has no current passing through to generate small amounts of heat which would dissipate the moisture. Humidity accelerates electrolytic corrosion to the soldered joints in many cases causing a dry joint where the corrosion prevents a good connection.

Very high humidity can cause arcing across the components causing the board to become

unrepairable and generating a fire hazard. Dryair prevents these problems and eliminates many of the nuisance fault conditions that can occur.

High humidity and temperature is a necessity for the growth of Fungus and moulds that attack many items like fabrics, leather and wood which can be present in many military vehicles. We have supplied many units for applications to prevent mildew on seats and interiors of vehicles, in particular Ferrari in Hong Kong. By lowering the humidity to 45 - 50%, the growth of fungus is prevented and usually eliminated.

State of readiness

Vehicles and equipment that are stored in Controlled Humidity Environments are always at a state of readiness. They can be kept at a high quality without any degradation for long periods of time when incorporated with a battery maintenance system.

Maintenance periods can be greatly extended without fear of failure when required. No background heat is required so it is cost effective and assured.



Chemical break down



Chemical breakdown can also be attributed to high humidity. Explosive material can become volatile meaning that the ammunition has only a certain life span before it has to be taken away, made safe and replaced with new.

There is also a problem that occurs with the projectile coming loose due to corrosion between the dissimilar metals of the projectile and the casing. Electrolytic corrosion is a major problem for any dissimilar metals where high humidity is present. Dryair can prevent this, which means shell life expectancy is greatly increased.

Navy ships

We provide our units to the Navy and merchant naval companies. With the variance in sea temperature occurring as a vessel sails from one country to another, Dryair is used to eliminate condensation forming below the waterline and in cargo holds. Also it can be used to protect control rooms, ammunition magazines, engine rooms and used when a vessel is put into storage.

The entire ship is filled with Dryair in a re circulation mode to eliminate corrosion for long periods of time.



Aircraft

Aircraft use Dryair storage in both closed and open CHE. While on the pan or in a hardened shelter the aircraft is supplied with an open CHE. Dryair is blown into the vulnerable areas of the aircraft such as engines and fuselage, usually by a small machine with a high IP rating and a total loss system.

This prevents condensation forming after the aircraft has been in operation and is cooling down. Closed CHE is used when the aircraft is put into a

building for a period of extensive maintenance as in a total strip down. This would be a re circulating system and thus larger in size.



The **Dryair dehumidifier** can be used anywhere, as required we can build it into an existing system or deliver a bespoke unit to produce exact conditions.

We are one of the preferred suppliers to the **MOD** for companies like **AWE**, **DSTL** and others that require a high standard and consistent conditions. For these special applications we have a purpose built test facility that we can use to simulate most conditions around the World, to test the machine operation. We also provide these units to food and pharmaceutical companies.

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