

Introduction:

Now a day's all type of products and goods are packed in a Container and exported to all over the world by sea voyage which was completely travelling in the sea water for days in a vessel containing several hundreds of the containers. During the sea voyage due to temperature and climatic changes the condensation inside the container will be formed and will damage the cargo.

Whoever has opened a shipping container only to find his valuable cargo rusted, moldy and dripping with water can readily appreciate the dangers of moisture in container transports. Most cases of moisture damage are far less severe –peeling labels, spotted surfaces or soggy packaging-, but are none the less unacceptable. Every year thousands of shipments arrive damaged, causing losses of millions of dollars from lower quality as well as additional costs for handling and administration. In most cases such damage is not even covered by the insurance.

Cause for Moisture Problems:

The root cause of moisture damage in container transport is the simple fact that warm air can hold more moisture than cold air. Take the dewy grass in the morning after a cool summer night as an example. Moisture gets into the air in the container from the outside or by evaporation from the cargo. When the temperature in the container changes or there is a difference in temperature between different parts of the cargo, damaging moisture conditions arise. There are a lots of reason for condensation like the hygroscopic property of the stuffed goods, climatic changes during transport , rain water leakage, temperature variations , moisture content of dunnage and pallets, etc.

Moisture damage happens even where there is no condensation. Many grades of steel will start to corrode at a relative humidity of about 70%. Mould growth could begin after even a short period over 80%. The only remedy is to keep the air inside the container dry. The first thing to do is to ensure that the cargo and all the packaging are as dry as possible. A wet container floor or some pallets stored in the rain may be enough to ruin a cargo.

Container Breathing:

No container is airtight whatever you do, - it will “breathe” as a result of temperature cycles. When the air inside the container cools, the pressure drops. Air –and moisture – moves in from the outside to equalize the pressure. The opposite happen when the air inside the container heats up, but it is easy to show how a repeating cycle of breathing can cause a buildup of moisture inside he container, especially if there is absorbing packing materials. Using a container with good seals and vents taped shut will slow down, but not stop- the “container breathing”.

Packaging and wrapping the goods in plastic foil will not necessarily help. Moisture migrates quite quickly through most types of plastic foil. Even if a moisture proof foil is used, there could still be a problem since the sealed package then in effect becomes a “mini-container” subject to the same processes as the container.

Desiccants:

Substances that remove moisture from the air are called “desiccants”. The most widely used desiccants are probably “silica gel”, a kind of porous glassy substance that adsorbs moisture well under the right conditions. When used in containers they are fatally flawed in that they work best at room temperature, and not at all at the much higher temperatures often found in containers. Other widely used desiccants based on dried clay work to a little higher temperature, but then similarly fail in an even more dramatic way. The worst case is when the desiccant is already fully charged and then meet high temperature, followed by low temperature, eg as a result of a day and night cycle when the container is on the quayside. Much of the moisture absorbed is then first re-evaporated and then rained out. Sometimes the container will look as someone threw a bucket of water inside the container, and wet moldy desiccant bags are a common sight.

Advantages of Dry Air Container Desiccants:

Dry Air Desiccants are specially designed and formulated with food grade ingredients for shipping containers, which is based on calcium chloride, have a vigorous absorption over a large temperature range. Only calcium chloride absorbers, such as Dry Air desiccant, that sequester the absorbed moisture to keep it from contact with the air are free of this problem. The absorption capacity of the Dry Air desiccants is 8 – 10 times more than the silica gel. The Dry Air Desiccant will absorb the moisture and will hold inside the packets in the form of a thick gel which will not return the moisture to the air at even high temperatures at the time of sea voyage.

The Dry Air Desiccants are well packed in the special material called Tyvek which is a best Product from DUPONT and with PP spun bond nonwoven. The absorbed moisture will be stacked inside the Dry Air Packets which will not be let off due to the nature of the Tyvek and having a high surface contact with air. Also the installation of the desiccants is very simple as just simply hang on the side of the inside container walls with its secure hook. This can be disposed as a normal waste after its usage.

The container voyage is often only a part, albeit usually the worst part, of the logistic chain. It is often necessary to put desiccants inside the package as well as in the container. Since the packages are usually less subject to extreme temperature conditions, silica gels and dried clay desiccant will work well inside the packages. The amount required depends on the outside moisture conditions and the surface area of the package.

The important thing to remember is that a small package has a greater surface area in relation to its volume than a large package has and thus requires relatively more desiccants. Putting boxes into a pallet, creates a large package from many small packages, and thus greatly reduces the required quantity of desiccants.

Conclusion:

To design an efficient moisture protection requires finding the most economic balance between packaging, container desiccants and in-packaging desiccants, taking into account not only the individual package, but how it is stuffed and combined throughout the logistic chain. Dry Air Desiccants we are currently expending a lot of effort to better learn how moisture processes outside and inside the packages interact. But we already know one thing - the conditions within a container are usually so severe, that the starting point must always be to moderate the conditions in the container. The dry air desiccants and the proper method containerization of the goods are the best way to lower the losses and damage of goods due to moisture .