The Enemy Within: Protecting Shipments from Condensation

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EXECUTIVE SUMMARY

The distribution environment has many hazards. Bumps, drops, falls and vibration usually are thought of first. But, condensation can be an equally hostile force. When is it a hazard? How can you protect your product? Moisture-absorbing desiccants are one solution. Here are answers to questions commonly asked about using desiccants to combat condensation.

What happened? Your product is packed to withstand the rigors of distribution yet has just been rejected as damaged. Some of the labels have peeled off; the rest are wrinkled. Many of the cans are rusted.

The culprit? Condensation.

TRIP #1

Product: Bagged fructose

Season: Summer

Trip: California to Japan

Transport: 40-foot container on ship

Door to door: 6 weeks

Desiccant needed: 64 bags

1. **What causes condensation?**

   Transporting product during a trip of several days through different regions exposes items to varying temperatures and humidities and can set up conditions for condensation to develop within an enclosed trailer, rail car or shipping container.

   Extreme environmental changes make condensation largely inevitable. All air contains moisture or humidity. The warmer the air, the more moisture it can hold. As air cools, the relative humidity increases. If the temperature drops to the dew point - the point at which the air cannot hold the amount of moisture present - then the moisture condenses, coating available surfaces.

2. **How can condensation damage products?**

   Absorption of water due to high moisture levels caused by condensation leads to deterioration of product and product packaging. When condensation becomes trapped in an enclosed vehicle, it coats or is absorbed by neighboring dry items such as metal, wood, corrugated, your product, etc. Absorbed moisture can cause corrugated shippers to weaken and collapse. Such moisture also can rust metal cans, wrinkle paper labels and loosen adhesives so labels peel.

   This kind of damage often means returns, something every packager works to avoid. Returned merchandise can cost far more than the price of the replacement. There are the delays and extra paperwork involved in reshipment, plus the negative effect on cash flow since goods must be received and accepted before payment is authorized. In the worst case, of course, the damage goes further than the shipment, reaching all the way to company reputation and customer relations.

3. **Are certain products more susceptible to damage from condensation?**

   The extent of moisture-induced damage usually can be attributed to the hygroscopic or moisture-absorbing properties of a given material.

TRIP #2

Product: Canned pet food

Season: Winter to Summer

Trip: Australia to Houston

Transport: 20-foot container on ship

Door to door: 7 weeks

Desiccant needed: 48 bags

Organic products, such as the wood-fiber in corrugated cases, are particularly vulnerable. Non-hygroscopic products such as steel do not absorb moisture but can be negatively affected due to the formation of rust and corrosion.

4. **Does the length of the trip make a difference?**

   Yes. A trip overseas can take months, including weeks over salt water followed by weeks of warehouse storage. Shipping containers sometimes are even stored outside. A long sea voyage exposes the cargo to a higher risk of condensation damage than a trip of shorter duration over dry land, thus increasing the need for container protection.

5. **What about season and climate?**

   Absolutely. Condensation is caused by shifts in temperature.

   This fluctuation can occur when the product is shipped from a cold- to warm-weather port or from the desert to the ocean. Sometimes, the temperature fluctuation between day and night is sufficient to cause condensation. That's why we see dew or frost on the grass and rooftops some mornings.

6. **How can you protect your products from condensation?**

   The solution is to provide condensation-absorbing 'tapestry' container linings, glued-paper ceiling linings or moisture-absorbing desiccant bags.

7. **Are there advantages/disadvantages to these methods?**

   Tapestries are quite labor intensive to install. Glued-paper ceiling linings also are labor intensive and sometimes do not adhere reliably. Desiccant bags such as Container Dri from United Desiccants are simply placed among packages along the edges and bottom of the container as cargo is loaded.

8. **How much desiccant is needed?**

   Although each application is customized depending on variables such as the product, the length of the trip, climatic conditions likely to be encountered and mode of transportation, United Desiccants' rule of thumb is to use 35 500-gram bags of Container Dri per 20 feet of container.

9. **How much condensation can be absorbed?**

   Each 500-gram 10-by-5 3/4-by-1-inch bag can absorb more than 250 grams of moisture.

TRIP #3

Product: Bottled fruit juice

Season: Spring

Trip: Southern Florida to northern Maine

Transport: Truck

Door to door: 1.5-2 days

Desiccant needed: 32 bags

10. **Is Container Dri reusable?**

    No.

11. **Who disposes of the desiccant and how?**

    The desiccant bags are disposed of according to local regulations when the container is unloaded. Since the Container Dri consists of 80% clay/20% calcium chloride, it is considered biodegradable.

Need to protect your products from condensation? Desiccants can be a packager's best insurance against image-damaging returns.

Matthew Rix is technical director of United Desiccants, maker of Container Dri and other desiccant products.