Container Dri II Application

CLARIANT

what is precious to you?

CLARIANT

Intermodal Transport

Packaging Deterioration

Mold, Fungus, caking

Warping

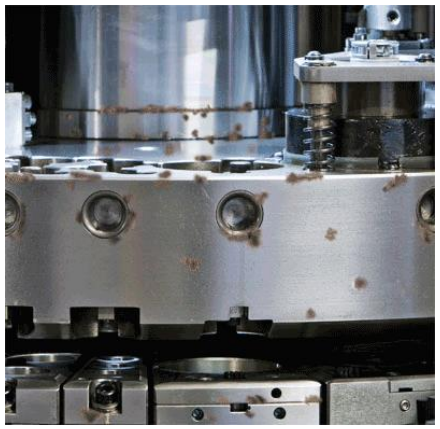
Peeling Labels

Corrosion, rust

- 90% OF THE WORLD TRADE IS DONE BY A SEA CONTAINER, RAIL CAR, OR CARGO TRUCK
- SOME OF THESE SHIPPING METHODS DEVELOP HARMFUL MICRO-CLIMATES THAT CAUSE CONDENSATION WHICH THEN FORMS INTO “CONTAINER RAIN”
- EXPOSING THE CARGO TO MOISTURE DAMAGE

CLARIANT

Intermodal Transport
CHALLENGES – KEEPING RELATIVE HUMIDITY LESS THAN:



- RH <100% Prevents condensation
- RH <75 % Prevents mould growth
- RH <40% Prevents corrosion

** Examples based on closed CTUs (Cargo Transport Units) cargo's water content and associated packaging and dunnage with a stable temperature inside a container, does not take changes in temperature during transport into consideration.*

Source: Transport – CTU Code, IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units, Annex 3. Prevention of condensation damages, 3 Mechanisms of condensation - 3.1, available online at https://www2.unece.org/

Intermodal Transport
SOLUTION

ECOTAIN®

Intermodal Transport
SOLUTION - CONTAINER DRI II®





CONTAINER DRI® II ABSORBS UP TO THREE TIMES, OR MORE, OF ITS WEIGHT IN MOISTURE FROM THE AIR INSIDE THE CONTAINER DURING TRANSPORT AND TRAPS THE MOISTURE AS A THICK, NO-SPILL GEL:

- **PREVENTING CONDENSATION**
- **PREVENTING CARGO SWEAT**
- **REDUCING RH DOWN TO LEVELS BELOW <40% (*WHEN NEEDED*)**
- **PROTECTING SHIPMENTS FROM START TO FINISH**

Clariant's Container Dri II® is made up of :

- **Anhydrous Calcium Chloride** – act as absorbing material. 80% of Container Dri II® is made up of Anhydrous Calcium Chloride with 95% purity. This makes Container Dri II® a superior product when it comes to moisture absorption.
- **Starch** – a modified food starch which act as a binding or gelling agent that gives a high viscosity once Container Dri II® has absorbed moisture.
- **Tyvek® Film** – a porous film/paper developed by DuPont which serves as the packaging of Container Dri II®. The humid air can pass through the porous film but it traps liquid which turns into gel, preventing it from any leakage.

CLARIANT

Intermodal Transport
BENEFITS - CONTAINER DRI II®

- SAFE FOR DIRECT USE WITH FOOD PRODUCTS
- RECOMMENDED BY THE WORLD FOOD PROGRAMME (WFP) & THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID) CONTAINER LOADING SPECIFICATION
- DIMETHYL FUMARATE FREE (DMF) – NON-TOXIC
- SAFE & EASY TO HANDLE
- DISPOSE WITH NORMAL INDUSTRIAL WASTE*
- BEST PERFORMANCE IN THE MARKET
- COST-EFFECTIVE
- MEETS NEW FCC GUIDELINE RECOMMENDATION FOR SHIPMENT OF COCOA BEANS IN CONTAINERS
- CLARIANT ECOTAIN® DISTINCTION

* Disposal in accordance with applicable local or country regulations

Intermodal Transport

HOW DOES MOISTURE ENTER YOUR CONTAINER?

- All air contains moisture (water vapor), the amount it can hold depends on the temperature.
- Warm air holds more water than cool air, even if they are the same volume.
- When the moisture is condensed, the same volume of warm air will contain more condensation (liquid water) than cool air.
- Therefore all containers have moisture inside, even before loading.
- Other factors include:

Intermodal Transport

HOW DOES MOISTURE ENTER YOUR CONTAINER?

- Loading in humid environments (moist air, also known as vaporized water, remains inside when the doors are closed).
- Not all containers are airtight allowing for moisture ingress.
- Products with high moisture content (green coffee, cocoa beans, agricultural products…).
- Packaging and dunnage with a high moisture content, including moisture from a container's wood floor.

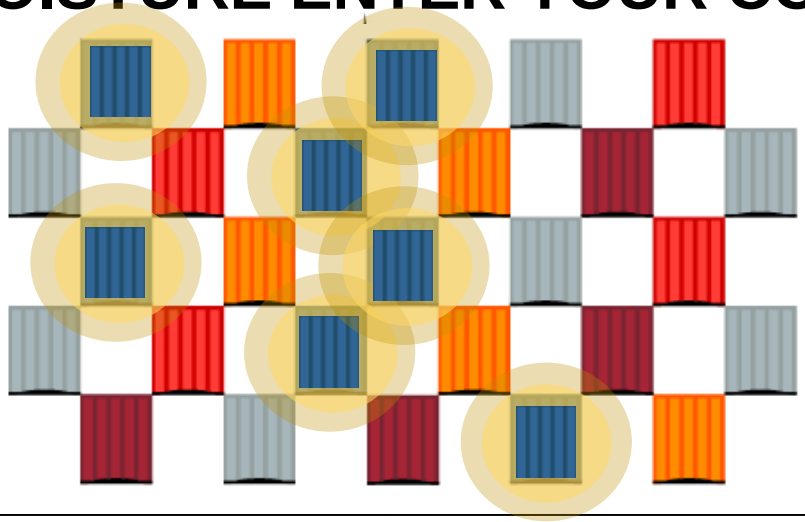
Intermodal Transport

HOW DOES MOISTURE ENTER YOUR CONTAINER?

- Once the container doors are sealed the temperature inside the container will begin to fluctuate. ***Most containers will experience extremely diverse temperature changes while on land during storage and inland transit.***
- When exposed to heat from outside, while waiting in port, a container's inside temperature will rise, and the air's capacity to absorb water vapor will increase.
- The inside cargo, including packaging and dunnage, may start to desorb - releasing their moisture into the air as water vapor, further increasing the water vapor in the air. *This can continue at anytime during voyage also causing* ***CARGO SWEAT.***

Intermodal Transport

HOW DOES MOISTURE ENTER YOUR CONTAINER?



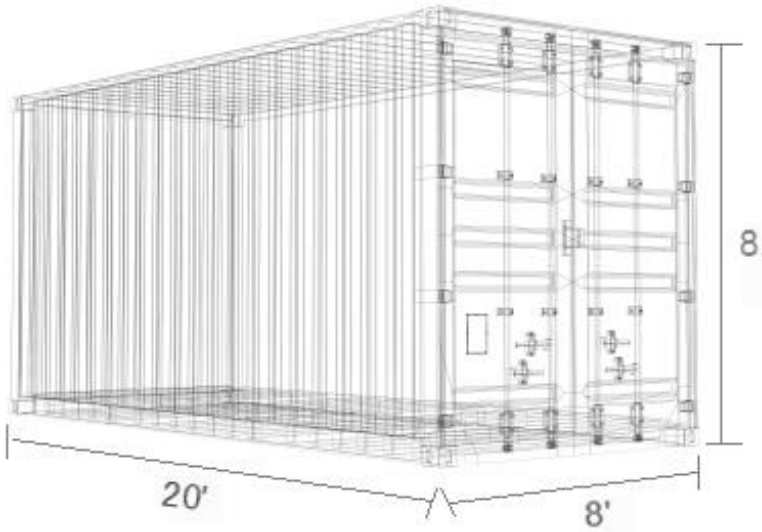
- The position of the shipping container when it is loaded will also affect the climate inside, both when waiting at port, and in transit.
- Containers loaded in the under-deck stowage may experience a milder climate than those loaded above deck.
- Color of the shipping container may also affect the climate inside, with darker colors absorbing more light wavelengths and converting them to heat than those of a lighter color.

Intermodal Transport

HOW DOES MOISTURE CAUSE CONTAINER RAIN?

- If the temperature outside drops, such as night time cooling, or cold storms, the warm moist vaporized water inside the container hits the cooled surfaces and will start to **condensate**, concentrated on the roof of the container, and the side walls.
- Ultimately, raining on the cargo "**container rain**". Container rain can happen before transit!

Intermodal Transport
CONTAINER DRI® II - HOW DOES IT WORK?



- Proper dosage and configuration of Container Dri® II bags are determined
- Prepare container with Container Dri II
- Load container with goods

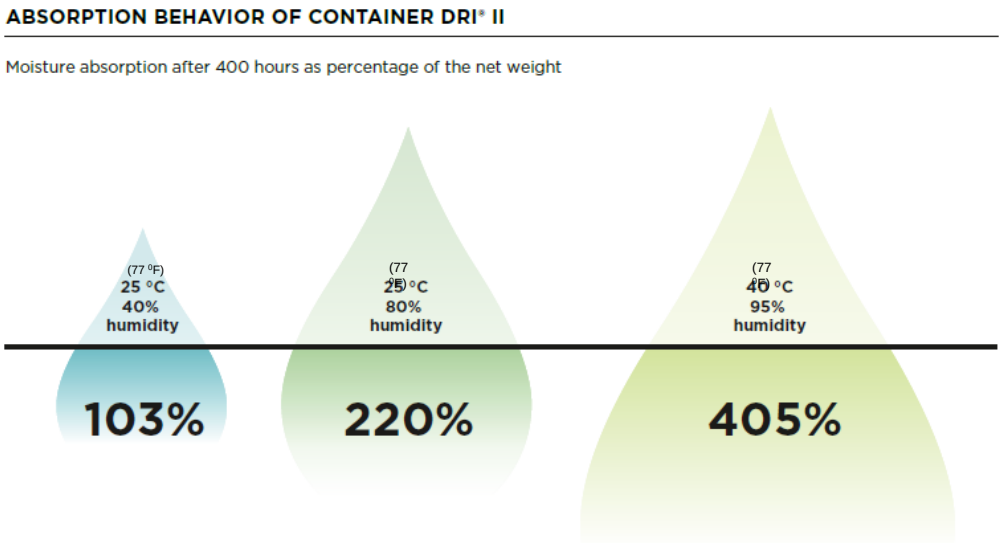
Intermodal Transport

CONTAINER DRI® II - HOW DOES IT WORK?

- Once in transit, Container Dri® II alters the moisture content in the air by aggressively absorbing any present water vapor (moisture) from the air. This dehumidification prevents the air from water vapor saturation. It continues absorbing through all temperature ranges and relative humidity variances.
- The water vapor (moisture) is then trapped as a thick, no-spill gel and contained within the bag until disposal (with regular waste).

CLARIANT

Intermodal Transport
CONTAINER DRI® II - HOW DOES IT WORK?



- Container Dri II provides the highest moisture absorption of any calcium chloride-based product.
- Container Dri II absorbs up to three times it's weight in water (using a significantly lower amount of gelling agents compared to other competing products)
  - Under certain conditions Container Dri II can absorb even more than 400 percent its own weight in moisture – higher the moisture = more aggressive absorption

Intermodal Transport
CONTAINER DRI® II – AVAILABLE CONFIGURATIONS

Container Dri® II is available in several configurations to best accommodate different modes and methods of shipping.

The number may vary depending on shipping conditions and the nature of the products being protected. Clariant works with customers to determine the optimal number of bags needed to protect goods for the duration of their journey.

Easy to use, and safe to dispose

CLARIANT

Intermodal Transport
CONTAINER DRI® II – INDIVIDUAL BAGS

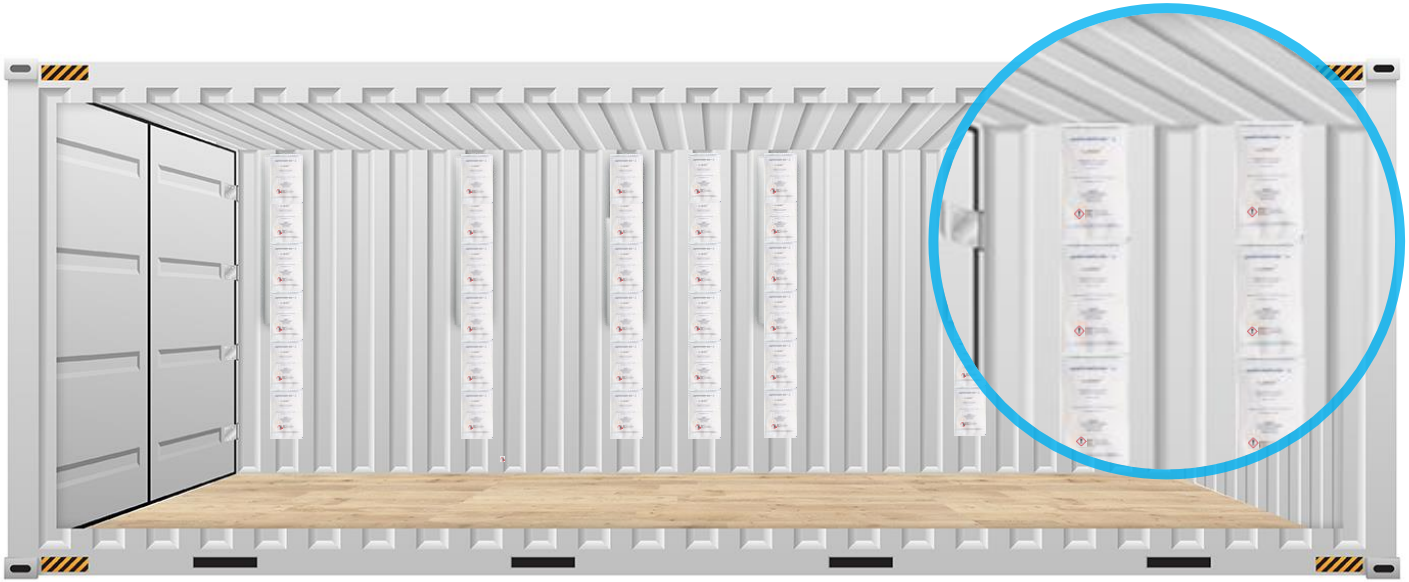
Container Dri® II individual bags - with or without adhesive backing, can be placed inside corrugated grooves or spread throughout the container or adhered to cargo or slip sheets and easily placed atop cargo.

Weight:	125G	
Dimensions:	5.25” x 10.5”	
Usage rec:	20ft Cont.	40ft Cont.
	32-36	64-72

CLARIANT

Actual Customer Application

Intermodal Transport
CONTAINER DRI® II – ADHESIVE STRIPS



Container Dri® II Strip - adhesive strips for installation onto the walls of shipping containers. The design fits nicely within the corrugated wall panels inside the shipping container. Ideal for fully loaded containers. ..\..\Catalogs\Clariant Brochures\Container-Dri-Desiccant-Adhesive-Strip-Horizontal-Installation-Sheet.pdf

Weight:	750G	
Dimensions:	5.25” x 63”	
Usage rec:	20ft Cont.	40ft Cont.
	5-6	10-12

CLARIANT

Actual Customer Application

CLARIANT

Intermodal Transport
CONTAINER DRI® II – POLE

Container Dri® II Pole – configured in a hard shell for easy hanging inside shipping containers.

Weight:	500G/560G	
Dimensions:	5.25” x 39.75”	
Usage rec:	20ft Cont.	40ft Cont.
	5-6	10-12

CLARIANT

Actual Customer Application

Intermodal Transport
CONTAINER DRI® II – BLANKET

Container Dri® II Blanket (adhesive) - configured as a “blanket” to lay on top of cargo
..\..\Catalogs\Clariant Brochures\Container-Dri-Desiccant-Blanket-Installation-Sheet.pdf

Weight:	1500g (3 x 4 125G)	
Dimensions:	430mm x 235mm	
Usage rec:	20ft Cont.	40ft Cont.
	3-4	5-8

CLARIANT

Actual Customer Application

Intermodal Transport
CONTAINER DRI® II – PLUS

Container Dri® II Plus - configured with a hook and strap (carabineer) to be hung and suspended high in a container.

Weight:	1500G	
Dimensions:	20.5” x 22”	
Usage rec:	20ft Cont.	40ft Cont.
	3-4	5-6

CLARIANT

Actual Customer Application

Intermodal Transport
CONTAINER DRI® II – PACK

Container Dri® II Pack - configured in a hard shell to be hung and suspended high in a container.

Weight:	750G		1500g	
Dimensions:	430mm x 235mm		430mm x 475mm	
Usage rec:	20ft Cont.	40ft Cont.	20ft Cont.	40ft Cont.
	5-6	10-12	3-4	5-6