

CALCIUM CHLORIDE VERSUS SILICA GEL: THE KEY DIFFERENCES

Not everyone in the logistics sector is aware of the risks associated with sea transport. Annually, \$500 billion worth of goods is lost due to container damage, with at least 10% of this loss attributed to moisture. Many companies are already taking action to combat moisture issues. They wrap products in special foil or use desiccants that absorb moisture to prevent it from affecting the products. Desiccants come in various forms and sizes, and they can be made from different materials. In this article, we discuss the key differences between silica gel-based desiccants and calcium chloride-based desiccants.

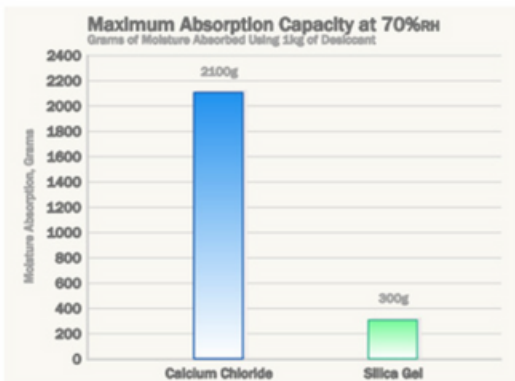
Absorption Process

Calcium chloride and silica gel are both hygroscopic materials, meaning they absorb moisture from the environment based on their natural properties. Calcium chloride has the property of liquefying, meaning that the absorbed moisture dissolves it, turning it into a gel. Silica gel, on the other hand, is composed of a porous substance in which moisture accumulates without penetrating the granules.

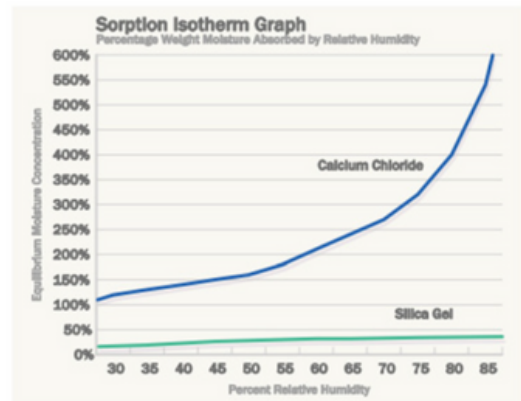
Calcium chloride dissolves into a gel, partly because it can attract several times its own weight in water. Silica gel remains dry to the touch, even at full absorption capacity, as it can retain 40% of its weight in water within its pore structure under ideal conditions. In practice, the amount of absorbed moisture is often lower, depending on the temperature and relative humidity.

Comparison Data

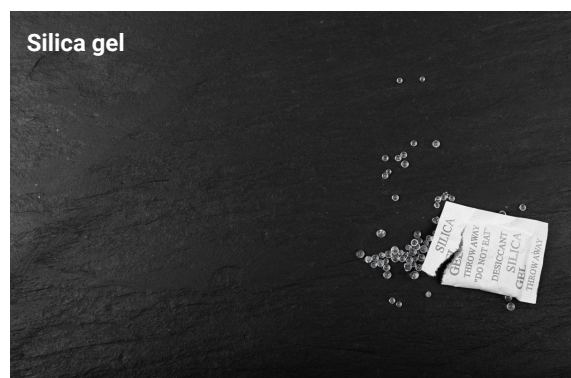
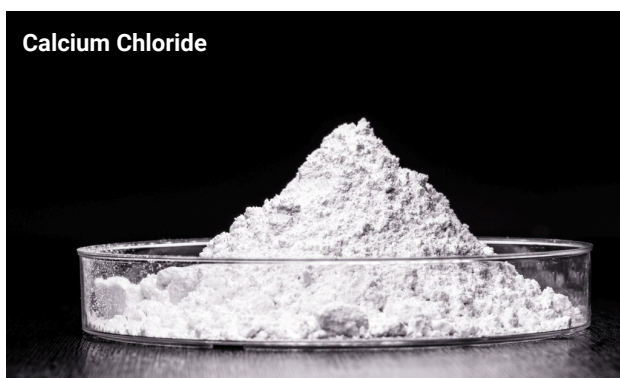
The tables and graphs below compare calcium chloride and silica gel. These figures are relevant to the effectiveness of moisture protection during container shipments.



At a temperature of 25°C and a relative humidity of 70%, calcium chloride absorbs seven times more water than silica gel.



Calcium chloride starts working at a low relative humidity and exponentially increases its absorption as moisture levels rise. Silica gel, in comparison, only slightly increases its absorption.



Comparison Table

	Calciumchloride	Silicagel
Absorption Capacity Desiccant materials absorb greater amount of moisture when the relative humidity of the surrounding air is higher.	150% At a relative humidity (RH) of only 50%, calcium chloride's moisture absorption is 150% its weight in water. Its absorption increases exponentially as RH rises, to 600% at 85% RH.	25% Silica gel absorbs poorly at low RH, trapping only 25% of its weight at 50% humidity. Unlike calcium chloride's exponential curve, silica gel's absorption is more linear - Only 36% at 85% RH
Safe Against Exhouston Some absorbers can exhouston themselves before the voyage has completed, due to temporary humidity spikes.	Yes Calcium chloride is self-limiting, allowing it to continue protecting for long periods without running itself out during short periods of high RH. Spikes are dampened but without saturating the dessicant.	No Silica gel absorbs water into microscopic pores. If a short spike in humidity is encountered early in the voyage, all pores can physically saturate, leaving cargo unprotected.
Safe Against Re-Evaporation If absorbed moisture is re-released when humidity drops a "pumping" effect can be created, intensifying damage.	Yes Absortech products capture used calcium chloride and absorbed water into a chamber that prevents moisture from leaking into the cargo space or re-evaporating back into the air.	No Silica gel's moisture absorption pores breathe water back into the air just as easily as they take it in, depending on shifts in temperature and relative humidity.
Environmentally Safe Many absorption materials contain moisture indicator additives that are classifies as toxic.	Yes Absortech products contain only calcium chloride, a naturally occuring compound abundant in seawater. Non-toxic, it can be disposed with regular wastewater.	No Many silica gels contain cobalt compounds, that are considered carcinogenic and require special disposal using hazardous waste procedures.

Conclusion

Based on the comparison table we can acknowledge that dessicants based on calcium chloride have a higher absorption capacity that rises when the RH gets higher. Calcium chloride is also capable to absorp, while silica gel has a maximum of absorption capacity with the result that the freight may not be protected though the whole journey. Calcium chloride captures absorbed water into a chamber that prevents moisture from leaking into the cargo, space or re-evaporating back into the air. Also calcium chloride is environmentally safe. It contains a naturally occuring compound abundant in seawater and can be disposed with regular wastewater. Silicagel contain compounds that require special disposal using hazardous waste procedures.

It's clear that we plead for dessicants that exist of calcium chloride. We have found it in the products of Absortech. We would like to advise you about moisture problems during container transport in general and how Absortech dessicants can help prevent wastage of goods. Please contact us for more information about how you can protect your shipment against moisture problems.

