



ABSORTECH

Calcium Chloride: A Superior Choice Over Silica Gel

Calcium chloride is one of the most potent moisture absorbing compounds found in nature. As the second most commonly occurring substance in seawater next to salt, calcium chloride is also non-toxic and environmentally friendly. Calcium chloride is the active compound in Absortech products.

Until recently however, calcium chloride has been considered a challenging material to employ in packaging and shipping applications, due to its property of deliquescence which causes it to turn from solid to liquid as it absorbs water. This has made silica gel a common alternative despite a much lower absorption capacity by comparison.

Absortech products solve the complications presented by calcium chloride in shipping and packaging applications, through innovative design and engineering. Absorpole and Absortop both trap water in a membrane-protected chamber, which prevents captured water from spilling or re-evaporating into the surrounding air. The resulting combination of calcium chloride's aggressive moisture absorption and Absortech's patented design is protection at a level of performance demonstrably superior to silica gel.

Mechanisms of absorption

Calcium chloride and silica gel are both hygroscopic materials, meaning that they readily absorb moisture from their surrounding environment. Each however owes its hygroscopicity to different natural principles.

Deliquescence, previously mentioned, is the property of calcium chloride that causes it to attract moisture and dissolve itself during the process into a watery brine. Silica gel on the other hand attracts moisture through the process of adsorption (with a "d"), in which water is attracted to glassy surfaces exposed by pores throughout the

material. Water attaches itself to the silica surfaces but does not alter them.

For the sake of convenience below and on the reverse page, we will refer to both of these hygroscopic processes as "absorption" (with a "b").

Superior by nature

Calcium Chloride dissolves into a liquid brine partially due to the fact that it is able to attract several times its own weight in water. In contrast, silica gel remains dry to the touch even at full absorption capacity, because it is only able under ideal circumstances to hold a maximum of 40% of its weight in water within its internal pore structure. In practice, the amount absorbed may be even lower than this, depending on temperature and relative humidity.

The data provided on the reverse side of this sheet offer a side-by-side comparison of both materials, and illustrate calcium chloride's superior performance in moisture protection for shipping. Please review the information to see why Absortech products are the smart choice for protection of your precious cargo.

Contact us today

At Absortech, we welcome your questions and feedback. To learn more about our products, contact us using the information below.

Weatherly Japan K.K.

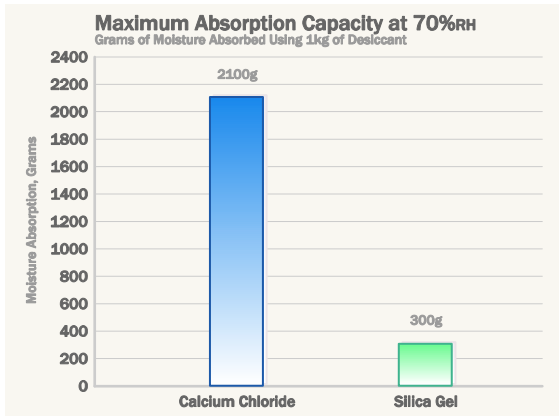
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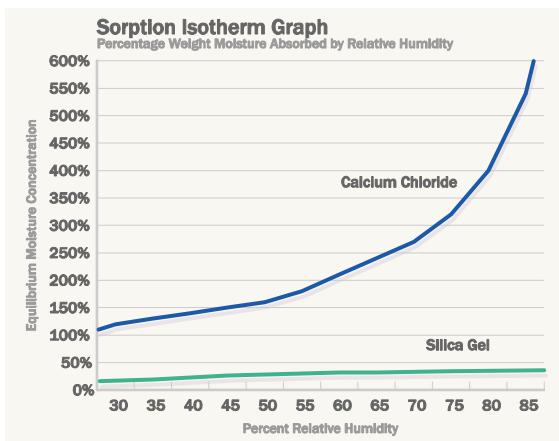


Comparison Data

The charts and tables provided below offer comparison information for calcium chloride and silica gel relevant to performance in the area of moisture protection for shipping container cargo.



At 25 degrees Celsius and 70% relative humidity, calcium chloride absorbs seven times as much water as silica gel.



Calcium chloride's moisture protection abilities begin to work even at low relative humidity, and increase exponentially as humidity rises. Silica gel on the other increases its absorption only slightly by comparison.

Comparison Table

	Calcium Chloride	Silica Gel
Absorption Capacity Desiccant materials absorb greater amounts 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 Exhaustion Some absorbers can exhaust 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 desiccant.	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 classified as toxic.	Yes Absortech products contain only calcium chloride, a naturally occurring 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.