

Bentonite Desiccants

Environmentally Friendly & Cost Effective Desiccant Solutions



Desi Pak® and Desi Can® Bentonite Desiccants

Desi Pak® and Desi Can® Bentonite Desiccants are ideal for use in a variety of packaging applications needing protection from the damaging effects of moisture. The benefits of Bentonite Desiccants from AGM Container Controls (AGM) include:

- ✓ Bentonite Desiccants offer higher adsorption capacity than silica gel in the most common packaging environments.
- ✓ Bentonite Desiccants are often less costly than equivalent silica gel desiccants.
- ✓ AGM has access to both U.S. and global Bentonite reserves.
- ✓ Production of Bentonite Desiccants has less impact on the environment: no harsh chemicals used in production, no overseas transport and utilize less energy in production.

Use in Healthcare Packaging

Bentonite desiccants have been successfully used to protect pharmaceutical, nutraceutical and diagnostic products from moisture degradation and extend shelf life. In fact, in the most common package environments Bentonite Desiccants offer a higher adsorption capacity than silica gel desiccants.

Desi Pak and Desi Can products meet all relevant sections of 21 CFR and US and European Pharmacopeia standards for use in pharmaceutical and food applications.

Use in Cargo and Device Protection

Bentonite desiccants are widely used in a variety of industrial and technology packaging applications. Desi Pak bags meet all JEDEC requirements for the packaging of semiconductors, as well as meet all relevant MIL-Spec requirements for military and defense applications.



Desi Pak® and Desi Can® products are ideal desiccants offering both cost and environmental benefits.

Product Configurations

AGM offers its full line of bentonite desiccants for the pharmaceutical, nutraceutical, electronics and logistics industries.

- ▶ **Desi Can® Canisters** are designed for high speed, automated insertion, primarily in pharmaceutical and nutraceutical applications
- ▶ **Desi Pak® Packets** are an economical solution, especially for manual insertion into product packaging.
- ▶ **Desi Pak® Continu-Strip® Packets** are designed for automated insertion at slow to medium line speeds, and feature a hole in each seal for accurate cutting.
- ▶ **Desi Pak® Bags** are used in bulk packaging and storage for the prevention of moisture degradation of a variety of products.

Bentonite Desiccants

How the Raw Materials are Produced

Bentonite Clay



- ▶ Bentonite clay is mined from underneath 40 feet of overburden (Süd-Chemie utilizes common reclamation measures to minimize environmental impact and promote return of native vegetation).
- ▶ For US production, for example, Bentonite is shipped from within the U.S., usually from mine site in Arizona to New Mexico plant site.
- ▶ Bentonite is dried on site to approximately 2 percent residual moisture and separated into different mesh sizes.
- ▶ Utilized to produce packaging products on site.

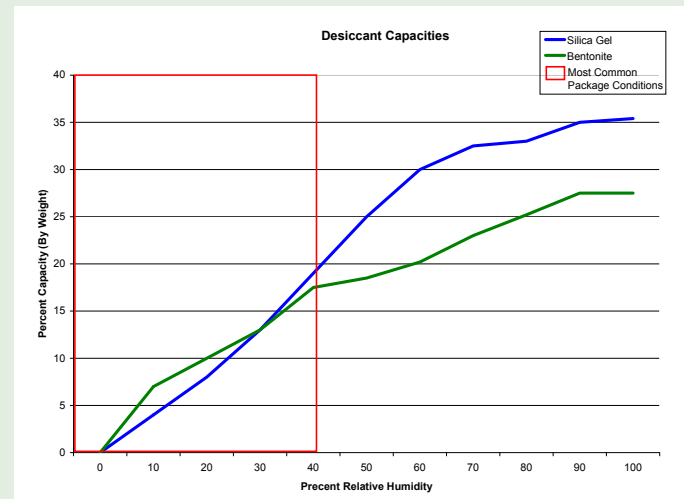
Silica Gel



- ▶ Sand is mined, often from beaches and inland dunes or dredged from ocean or river beds.
- ▶ Sodium silicate produced by fusing sand and sodium carbonate in various proportions (energy intensive).
- ▶ Sodium silicate and sulfuric acid reacted together making reaction products sodium sulfate (Na_2SO_4) and amorphous silica gel (SiO_2)_x.
- ▶ Product settles to the bottom of a tank, and the effluent is decanted off.
- ▶ Effluent must be neutralized to acceptable Ph levels and removed and disposed of, usually by local municipality.
- ▶ Silica gel is washed to a desired conductivity level and dried to less than 3% residual moisture.
- ▶ Silica gel is collected and bagged.
- ▶ Silica gel is shipped to end user, usually via overseas transport (most common sources of silica gel for desiccants are in China).
- ▶ Utilized to produce packaging products.

Bentonite Performance

Desiccant Capacities: Bentonite & Silica Gel



Performance Second to None

A chemically inert, natural, calcium-rich montmorillonite clay, Bentonite's layered structure attracts and binds water molecules to its vast inner and outer surface area. Even at full water vapor capacity, Bentonite remains dry and free-flowing with no apparent change in size, shape or texture.

Bentonite's adsorption capacity and rate are ideal for most packaging applications. The adsorption capacity of Bentonite is considerable and even higher than silica gel at low humidity levels and increases as relative humidity rises. In fact, Bentonite has a higher capacity for moisture adsorption than silica gel in conditions having less than 30 percent relative humidity, which is the case for most packaging environments.

Conversion to Bentonite

AGM Container Controls works with customers to facilitate the change from silica gel to Bentonite, providing all necessary technical assistance, documentation and test results to ensure a cost-effective transition.



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