

Micro-Pak Dri Clay® Kraft vs Silica Gel Environmental Impact & Sustainability Comparison

MICRO-PAK DRI CLAY®



Ingredient

All Natural, Plastic-Free & Biodegradable

Micro-Pak Dri Clay® is a 100% natural desiccant made of high grade bentonite clay, a widely available and effective desiccant material. Dri Clay® is packed in Kraft paper that is plastic-free, biodegradable and Forest Stewardship (FSC) certified.

Production Process

No Chemicals or Water. Low Energy

Bentonite clay is a naturally occurring mineral. The simple production process consists of extracting, drying and grading the minerals before packaging them. This process requires zero chemical inputs or additives, no water consumption, and uses minimal energy resulting in a small carbon footprint. The bentonite clay is responsibly extracted at partner-owned mines throughout the world and processed in partner-owned facilities. Once extraction is complete, the sites are restored and re-cultivated to an equal or better state than when operations began. Dri Clay® has a clear chain of custody from the mine to the consumer package.

SILICA GEL



Ingredient

Synthetic. Made from Chemicals

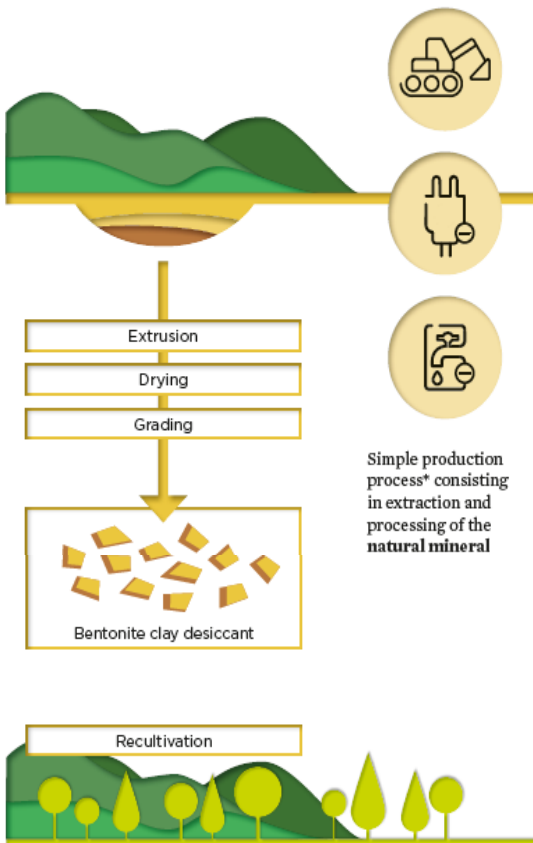
A synthetic material made from sodium silicate or other chemicals depending on the desiccant type.

Production Process

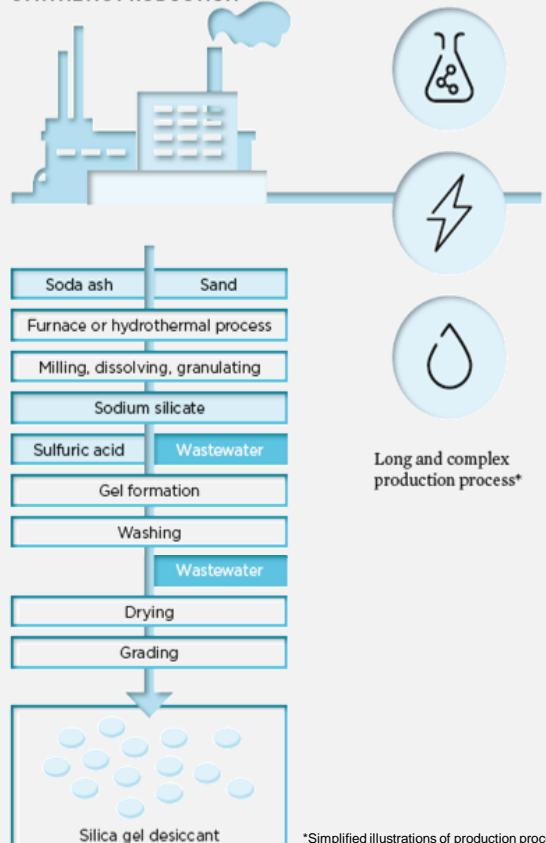
Chemicals. Energy & Water Intensive

The production of silica gel uses a far more complex, multi-step process that requires significant chemical and water inputs, and results in high levels of pollution and wastewater. The process begins with a raw material, sand, plus sodium carbonate, a chemical feedstock. These are combined in an energy intensive furnace or hydrothermal process, followed by additional processing to produce an intermediate material—sodium silicate. The sodium silicate is then combined with sulfuric acid in a reaction vessel to produce sodium sulfate and amorphous silica gel. Following removal of the sodium sulfate and process effluent and subsequent extensive washing, the remaining silica gel is ready for processing into desiccant material. It is washed down with water to a desired conductivity level, heat-dried to a moisture content of 3% or less, and then graded prior to packaging.

Calcium-rich montmorillonite clays
PROCESSING OF A NATURAL MINERAL



Silicon dioxide
SYNTHETIC PRODUCTION



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*Simplified illustrations of production process

Micro-Pak Dri Clay® vs Silica Gel Desiccants Environmental Impact & Sustainability Comparison

MICRO-PAK DRI CLAY®

Packaging

Plastic-Free & Biodegradable

Dri Clay® is packaged in Kraft paper sachets that are plastic-free, biodegradable and chemical-free (sealed with a water-based adhesive). The Kraft paper is responsibly sourced from a Forest Stewardship (FSC) certified manufacturer.

Disposal & End of Life

Both the ingredient and the packaging of Dri Clay® need to be taken into account to determine safe disposal and end of life. The ingredient is the same naturally occurring mineral as originally mined which is non-toxic and chemically inert, and can be disposed in any soil or landfill without impact. On disposal the clay is returned back to the earth.

The Kraft paper packaging is Forest Stewardship (FSC) certified, plastic-free, chemical-free and biodegradable so can also be safely disposed in landfill. As both the ingredient and the packaging are chemical free and biodegradable, they will not release harmful chemicals or toxins into the soil and will not contaminate water systems

Product Safety

- ✓ All natural and non-toxic
- ✓ No chemicals or additives
- ✓ Meets, exceeds or is exempt from international regulations
- ✓ Clear chain of custody from consumer packaging back to the mine. We therefore know exactly what ingredients are used.

Regulatory Compliance

- ✓ USA - EPA compliant
- ✓ Europe - REACH exempt but nevertheless passes all tests for REACH's Substances of Very High Concern (SVHCs)
- ✓ AFIRM compliant
- ✓ DMF-free
- ✓ RoHS compliant

SILICA GEL

Packaging

Plastic. Not Biodegradable

Commonly packaged in Tyvek spun-bonded polyolefin, a high density plastic barrier, and sealed with chemical-based adhesives. The packaging is not biodegradable and the plastic-barrier makes recycling difficult.

Disposal & End of Life

Both the ingredient and the packaging of silica gel need to be taken into account to determine safe disposal and end of life. Silica gel and the polyolefin packaging are both made from chemicals and are not biodegradable. They will remain in landfill indefinitely and may release harmful chemicals and toxins (particularly silica gels with additional chemical additives) into the soil and then into the groundwater, potentially contaminating our water systems. The Tyvek packaging can technically be recycled, but desiccant packs are normally too small to be economical for recycling facilities to recycle and few facilities will accept them.

Product Safety

- ❖ Synthetic product made from chemicals
- ❖ Some silica gels contain DMF (banned in Europe) and cobalt chloride indicators (a possible carcinogen)
- ❖ No chain of custody meaning customers have no clear information on ingredients or harmful substances.
- ❖ Highly polluting industry. The Chinese government is actively shutting down thousands of silica gel factories.

Regulatory Compliance

- ❖ Subject to REACH reporting
- ❖ Check with your suppliers if the silica gel is REACH certified in addition to passing all tests for REACH's Substances of Very High Concern (SVHCs). Also check if it is EPA compliant and DMF-free.

Consumers demand increasingly higher standards of sustainability from brands but your sustainability efforts are undermined every time a customer unpacks your product and finds a silica gel or synthetic desiccant inside the packaging. Dri Clay® presents a sustainable, eco-friendly brand message to your customers.

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Quick Overview

Micro-Pak Dri Clay®	Silica Gel and Synthetic Desiccants
Ingredient <ul style="list-style-type: none"> 100% natural bentonite clay 	Ingredient <ul style="list-style-type: none"> Synthetic. Made from chemicals
Packaging <ul style="list-style-type: none"> Plastic-free and biodegradable Kraft paper that is Forest Stewardship (FSC) certified 	Packaging <ul style="list-style-type: none"> Commonly Tyvek. Made of plastic and not biodegradable
Low Impact Production Process <ul style="list-style-type: none"> No chemical use and no additives or solvent No water and low energy use means low carbon footprint Sun drying is used where possible to further reduce energy use Responsible mining at partner-owned sites that are restored to an equal or better state than when operations began 	High Impact Production Process <ul style="list-style-type: none"> Chemical, water, and energy intensive Large volumes of wastewater generated Made synthetically from sodium silicate or other chemicals depending on desiccant type A highly polluting industry. China is the world's largest silica gel producer and the Chinese government is actively shutting down thousands of silica gel factories.
Chain of Custody <ul style="list-style-type: none"> Clear chain of custody from consumer packaging to the mine. Know exactly what ingredients are used 	Chain of Custody <ul style="list-style-type: none"> No chain of custody No clear information on ingredients or harmful substances
End of Life <ul style="list-style-type: none"> Both the ingredient and the packaging are plastic-free, non-toxic and biodegradable No impact to soil or water systems 	End of Life <ul style="list-style-type: none"> Both the ingredient and the packaging are made from chemicals, contain plastics and are not biodegradable. Will remain in landfill indefinitely and can release harmful chemicals and toxins into the soil and water systems
Chemical Management <ul style="list-style-type: none"> Meets, exceeds or is exempt from international regulations Contains no chemicals or chemical additives REACH exempt and passes all SVHC tests EPA compliant Clear chain of custody 	Chemical Management <ul style="list-style-type: none"> Some silica gels contain DMF (banned in Europe) and cobalt chloride (a possible carcinogen) Subject to annual REACH reporting. Check that it is REACH certified in addition to passing SVHC tests No chain of custody