

California Earth Minerals

ION-MIN Standards for Brands

Terramin[®], Terrasilk[™], Terrapak[®], Terrabathe[™], Terrapond[™], Nutramin[™], Earthfood[™]

Classification

Calcium Montmorillonite is a clay mineral compound that is a member of the Smectite family. Typical to montmorillonites, it is formed in micro sized thin sheet shaped platelets. It is a 2:1 clay, meaning that it has 2 tetrahedral sheets sandwiching a central octahedral sheet, with trace mineral anions bound to the surface areas.

Chemically it is hydrated calcium aluminum silicate hydroxide with many other elements including potassium, iron, magnesium, phosphorus, manganese and over 50 more mineral elements. It is part of the earth's crust along with volcanic ash, hydraulic river action, pyrogenesis and other weathered elements.

ION-MIN Specifications

Color can be beige neutral, cream, brown, gray
Luster is dull.
Transparency crystals are translucent and masses are opaque.
Octahedral Crystal Lattice Structure for Maximum Surface Area
Cleavage is perfect in one direction, basal; not seen in massive specimens.
Fracture is uneven to lamellar.
Hardness is 1- 2
Specific Gravity is variable from 2.3-3 in compressed powder form
Weight is approximately 8 lbs. per gallon – pH is 8.3

ION-MIN Calcium Montmorillonite clays have a number of unique and beneficial properties.

1. The best deposits of CM are among the most powerful detoxifying natural substances on earth. They also have a zeta potential and a high drawing power of toxic substances and many other harmful elements from our bodies and many areas of the environment.
2. The clay compound can act as an efficient delivery vehicle for mineral nutrients to the skin and body when applied topically and ingested in tablet/caplet or powder forms.
3. Hydrated to a paste, it can draw oils and toxins from the skin and hair.
4. It is a powerful adsorbent that can attract heavy metals and toxic cations onto the clay particle interior, neutralizing harmful particulates, pathogens, and toxins.
5. It tends to have a relatively neutral to high pH factor.
6. Its particle size includes fine grained colloids and electrolytes.
7. Certain superior deposits contain a portfolio of macro, micro and trace minerals such as calcium, magnesium, iron, potassium, silica, copper, chromium, and zinc, etc., all in bio-available form.

ION-MIN[®] brands: Terramin[®], Terrasilk[™], Terrapak[®], Terrabathe[™], Terrapond[™], Nutramin[™], Earthfood[™]

Description

California Earth Mineral's clay compounds are branded ION-MIN. It is mined in the Desert area in the Colorado River Delta basin in southern California. USA It is made, Mined and packaged in the United States of America. As such, it qualifies for export under the terms of many recent open trade treaties. Each of our desert brands is a high grade, ultra-fine form of premium calcium montmorillonite clay in an active, open ionic state. This material is a free flowing powder containing low swelling properties, high thermo-stability, high plasticity and tensile strength that provides excellent health and healing benefits.

Sold Under Other Brand Names – Private Labels

ION-MIN is sold under various consumer brands through dealers and distributors. It is also sold in bulk quantities to national and international formulators, private label manufacturers, agricultural markets and OEM partners.

No Additives

ION-MIN powders in its final, consumer-ready forms contain no additives, colors, or fragrances. Zero pathogens, toxins, or allergens. It is not altered in any way. It is 100% natural.

Technical Data

The molecular formula for Calcium Montmorillonite is usually identified $(M+x \cdot nH_2O) (Al_2yMgx)Si_4O_{10}(OH)_2$, where $M^+ = Ca^{2+}$ (Brindley & Brown, 1980). Ideally, $x = 0.33$.

The **CAS registry number** for Montmorillonite is **1318-93-0**.

The **EINECS number** for Montmorillonite is **215-288-5**

The following table represents a summary of the available packaging for ION-MIN powder and pills.

PRODUCT CONTAINERS AND SIZES

PRODUCTS	CONTAINERS	SIZES
TERRAMIN POWDER	Jar, Pouch, Box & Bag	1 lb., 2 lb., 4 lb., 8 lb., 20 lb., 50 lb.
TERRAMIN TABLETS - 1000 mg	Jar	250 ct and 500 ct
TERRAMIN CAPLETS - 1500 mg	Jar	150 ct and 300 ct
TERRASILK POWDER	Jar, Pouch, Box, Bag	8 oz., 2 lb., 4 lb., 8 lb., 20 lb., 50 lb.
TERRAPAK POWDER	Pouch, Box, Bag	4 lb., 8 lb., 20 lb., 50 lb.
TERRABATHE POWDER	Pouch, Box, Bag	5 lb., 20 lb., 50 lb.
NUTRAMIN POWDER	Jar, Pouch, Box, Bag	8 oz., 2lb, 4 lb., 8 lb., 20 lb., 50 lb.
TERRAPOND POWDER	Pouch, Box, Bag	2 lb., 4 lb., 8 lb., 20 lb., 50 lb.
EARTHFOOD POWDER	Bag, Box	9 lb., 20 lb., 50 lb.
BULK POWDERS - Bulk is one pallet minimum – one pallet is 50 of the 50 lb. poly seal bags		

Color

ION-MIN is a neutral, light reddish beige, darker when wet.



Standards for Grades

ION-MIN is much finer than many other clay mineral compounds on the market. However, size can be misleading. ION-MIN grades contain a very high percentage of extremely small, micron-sized particulates and even sub-micron sized clay platelets. With over 80% of our mid-grade product under 2 microns.

ION-MIN Average Particle Size

87% 01 microns or less

10% 02 – 05 microns

01% 15 – 20 microns

02% 20 – 250 microns

1% over 250 microns “Standard Test Method for Particle Size Analysis”. This standard method is used in the 2009 analysis mining batch 042308 from the mine area. Study conducted and reported by **Dr. David Fairhurst, Colloid Consultants, Congers, NY. 10920 PHD, CSci, C Chem, FRSC**

We Produce 3 Grades of ION-MIN Desert Brands

1. **Grade A₁: Terrasilk** - Ultra-Fine, the powder is under 450 mesh; 89% of the compound consists of sub-micron sized (< 1 microns) platelet shaped clay particles from the deepest pristine layers of our mine. Used for human oral, facial and skin applications.
2. **Grade A₂: Terramin** - Extremely Fine, the powder is below 350 mesh; 87% of the clay compound consists of sub-micron-sized particles (< 1 microns). From deeper strata's and more protected layers of our mine. Used for human ingestible nutrient/detoxifying supplement.
3. **Grade A₃: Terrapak, Terrabathe, Terrapond, Nutramin and Earthfood** - Very fine, the powder is under 200 mesh; 60% of the compound consists of sub-micron-sized particles (< 2 microns). Used for water detoxification, clarification, cancer patients pain relief poultice and bathing products.

Applications

- Human Nutritional supplements
- Poultices and Body Wraps
- Cosmetics and cosmeceuticals
- Adsorbent – Removes Heavy Metals
- Anti-Bacterial
- Animal Feed Supplement
- Environmental remediation
- Plant and Soil enrichment
- Water detoxifier and clarifier

Process

ION-MIN compound is carefully extracted from a subsurface private location mine site and processed using industrial crushing, grinding and milling equipment. The material is then air particle separated into fine powders of several size grades and packaged in vapor-resistant, tamper-proof bags. It is then transported to final packaging operations as powder to make caplet and tablets. All mining operations are eco-friendly and the land is returned to original pre-extraction contours.

US FDA: Generally Regarded as Safe (GRAS rating)

- All ION-MIN produced for resale is additive free and contains no toxins or pathogens. Calcium Bentonite/ Montmorillonite is Generally Regarded as Safe (GRAS) by the FDA and is classified by the USDA as one of only a few non-agricultural ingredients allowed for certified organic foods.
- OSPAR offshore treaty considers this material to pose little or no risk to the environment when released into the ocean.
- Made in USA. No animal testing. All-natural final products contain no chemical additives, preservatives, colorants or non-natural substances. Product is neither heated nor irradiated.

Heavy Metal Limits

Of concern is the amount of heavy metals in each product. The most respected and hardest to satisfy are the standards set by the USP. The United States Pharmacopeia has tests that reveal a set of standards for what is considered an acceptable allowance of the more dangerous heavy metals that occur in natural montmorillonite products.

Standards set by the USP Monographs

ITEMS	SPECIFICATIONS
Appearance	Reddish-Beige
Odor	ND
Mesh	≤ 325 Mesh
PH	9-10
Heavy Metals (as Mercury)	≤ .001 ppm
Heavy Metals (Total)	≤ 20 ppm
Heavy Metals (as Pb)	≤ 10 ppm
Total Plate Count	≤ 1,000 cfu/g
Yeast & Mold	≤ 100 cfu/g
E. Coli	ND
Salmonella	ND
Staphylococcus Aureus	ND
Pseudomonas Aeruginosa	ND
Food Dyes	ND

California Earth Minerals certify that from mining batch 042308, Both Terramin and Terrasilk meet all the standards. The other clays do not meet the mesh standard but do in all other values.

Terramin and Terrasilk, both have a high permanent negative charge on its platelets of its 1344 sq.ft/gr of surface created by its montmorillonite crystalline lattice. Over 98% of these products are chemically calcium montmorillonite. The mesh size, swelling value, and acceptable levels of heavy metals insures this clay conforms to Chinese medicine montmorillonite standards.

Certificate of Analysis – Mining batch #042308

INERT ELEMENTS

California Earth Minerals

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Element	Formula/Symbol	Ratio
Aluminum Oxide	Al ₂ O ₃	18.30%

BIOAVAILABLE ELEMENTS

Element	Formula/Symbol	Ratio	Element	Formula/Symbol	Ratio
Manganese	Mn ₂ O ₃	0.04%	Iodine	I	< 1.0 ppb
Sulfur	SO ₃	0.05%	Lithium	Li	< 1.0 ppb
Iron Oxide	FeO	0.14%	Palladium	Pd	1.0 ppb
Phosphorus	P ₂ O ₅	0.15%	Silver	Ag	1.0 ppb
Titanium	TiO ₂	0.68%	Holmium	Ho	1.04 ppm
Sodium	Na ₂ O	1.13%	Europium	Eu	1.1 ppm
Potassium	K ₂ O	2.80%	Terbium	Tb	1.3 ppm
Magnesium	MgO	2.88%	Germanium	Ge	10.0 ppm
Ferrous Oxide	Fe ₂ O ₃	4.35%	Rubidium	Rb	129.0 ppm
Calcium	CaO	4.69%	Scandium	Sc	16.0 ppm
Silica	SiO ₂	55.30%	Niobium	Nb	17.0 ppm
Barium	BaO	461.0 ppm	Beryllium	Be	2.4 ppm
Bismuth	Bi	5.0 ppm	Thulium	Tm	2.8 ppm
Boron	B ₂ O ₃	108.0 ppm	Ytterbium	Yb	2.8 ppm
Bromine	Br	6.0 ppm	Gallium	Ga	21.0 ppm
Cesium	Cs	12.0 ppm	Yttrium	Y	28.0 ppm
Chromium	Cr ₂ O ₃	100.0 ppm	Erbium	Er	3.0 ppm
Cobalt	CoO	28.0 ppm	Selenium	Se	3.0 ppm
Copper	CuO	34.8 ppm	Tungsten	W	3.0 ppm
Gold	Au	5.0 ppb	Hafnium	Hf	4.0 ppm
Lanthanum	La	45.0 ppm	Dysprosium	Dy	4.8 ppm
Molybdenum	Mo	3.0 ppm	Neodymium	Nd	42.0 ppm
Nickel	NiO	51.0 ppm	Arsenic Oxide	As	5.0 ppm
Platinum	Pl	11.0 ppb	Cadmium	Cd	5.0 ppm
Strontium	SrO	205.0 ppm	Lead	Pb	5.0 ppm
Tantalum	Ta	2.0 ppm	Gadolinium	Gd	5.6 ppm
Thorium	Th	15.0 ppm	Samarium	Sm	6.8 ppm
Tin	Sn	5.0 ppm	Cerium	Ce	79.0 ppm
Vanadium	V ₂ O ₅	127.0 ppm	Praseodymium	Pr	9.1 ppm
Zinc	Zn	97.3 ppm	Mercury	Hg	None
Zirconium	ZrO ₂	143.0 ppm	Nitrate	NO ₃	None

Analysis provided by XRAL Laboratories/SGS Group using MGS, SRG, and other analysis. 2009
Measured as a percentage of product dry, however all packaged products will contain some moisture.
Product is 100% natural and contains no additives, preservatives, biotic organisms or pathogens.
(California Earth Mineral provided classification of inert and bio-available minerals) for this document)

International Shipping - Harmonized Code

Shipping is the responsibility of the importer. California Earth Minerals recommend that importer purchase insurance for the purchase cost of the freight. International shipping is improving but many things can occur when shipping internationally. Product ships using H/S 250840 - Other Clays.

Quality Control Protocol

California Earth Minerals has vast experience in understanding the science of montmorillonite clays. We have spent years researching the properties of clays using extensive testing to determine what physical properties a clay must have in order to provide benefits for a recommended application. California Earth Minerals uses this, "lab protocol" to select premium montmorillonite clays we sell. We use the properties of our original ION-MIN branded product to determine the quality scale.

Company

California Earth Minerals develops and distributes ION-MIN premium mineral products for people, animals, and environmental health worldwide. Our products are made from a clean "rare-earth" source of Premium Calcium Montmorillonite. ION-MIN is our brand name for the naturally-fine- powdered clay-based, inorganic compounds we sell. All of our products are used as an excellent nutrient source, to cleanse and detoxify, make people and plants healthy, also to help heal the environment.



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