



BENTONITE AND ITS USES

The Bentonite range of products produced by JNJ Resources Company is a quality sodium bentonite comparable to the best of the known deposits in Australia.

Bentonite is a generic name given to a family of naturally occurring colloidal aluminium silicate clays, which invariably contain a substantial proportion of montmorillonites. These montmorillonites are a wide range of chemicals based on aluminium silicate with other metals, notably magnesium, sodium, potassium and calcium in combination as silicates, in a wide range of proportions.

Most bentonitic clays contain a proportion of sodium, calcium and magnesium simultaneously with minor percentages of other metals as ion exchange elements, but it is the relative proportion of these main exchange ions which is a major factor in determining the physical properties of the clay. Sodium montmorillonite is characterised by having a high ion exchange capacity, high moisture retention properties, and on dispersion in water, an extremely high surface area.

Bentonite is used for:

Animal Feeds

Dam Sealing and Industrial landfill

Landfill Lining and Capping

Industrial Absorbents

Agriculture and Horticulture

Beauty Products

Animal Feeds

Lot-Feeding

For lot-fed cattle the main benefits resulting from the addition of sodium bentonite to grain based rations are:

Improving the efficiency of the digestive process

Bentonite forms a gel in the digestive system to slow down the digestive process. The bentonite coats the feed particles, slowing the rate of release of fermentation products into the fluid phases. By providing a more even release of these products, the spiral into acidosis is avoided.



Buffering capacity

The buffering capacity of bentonite is related to the cation exchange capacity, or the ability to bind hydrogen ions. If cattle are fed on carbohydrate-rich food such as a high grain ration, they tend to over-eat, fermentation of the carbohydrates occurs, lactic acid is produced (pH falling to between 3.0 and 4.0), resulting in ruminal acidosis which severely affects animal performance and in severe cases can cause death.

The cation exchange capacity of bentonite buffers (neutralises) the effect of lactic acid and thereby prevents ruminal acidosis.

Bentonite is typically mixed with the grain and other mineral supplements at about 4% for starter rations and 2% for finisher rations.

The properties of Bentonite are such that optimum performance is probably achieved in the range 1.0% to 2.0% for starter rations.

Binding of protein

Bentonite can protect proteins from ruminal degradation, which allows digestion more efficiently further down the digestive tract..

Bentonite binds urea to provide a slow release in the rumen, which reduces the risk of ammonia toxicity and promotes a more efficient conversion to protein by the ruminal flora.

Bentonite also increases the saliva flow to the rumen. The bicarbonates and phosphates present in the saliva acts as a buffer in the digestive system.

Pelletising

Sodium bentonite is used as an effective pellet binder in the stockfeed industry.

Australian nutritionists have proven that a pelleted feed is more efficient in animal production than a powdered feed or mash. This increase in efficiency is due to the elimination of respiratory problems associated with fines in a ration.

When sufficient moisture is added to sodium bentonite through proper conditioning, a pliable or plastic clay-water system is developed. This hydrate acts like a putty which fills spaces between feed particles upon compression of the mesh in the pellet mill die. It has a lubricant-like slipperiness and can extend die life.

Bond strength potential is influenced by the development of maximum surface area of the bentonite. The finer the sizing distribution of the product the greater is the surface area.

General

The considerable benefits of using Bentonite in animal rations also apply to poultry, pigs, dairy cattle, horses, sheep and deer.

Three standard product grades are supplied to the stockfeed industry, namely, fine powder, granular and superfine grades at competitive market pricing.

Dam Sealing and Industrial Landfill

Sodium bentonite is a naturally occurring clay material composed predominantly of the active constituent montmorillonite. On exposure to water, bentonite exhibits high swelling properties. Use is made of this in the sealing of porous soils where the swollen mass fills the voids and binds the soil particles to create an impermeable seal.

Sodium bentonite is best suited to in-corporation in coarse textured soils of clay content less than 10% because of the relatively easy workability. In high clay soils, incorporation is more difficult, both with respect to the placing of sodium bentonite, and to ensuing compaction.

The two most common application methods are:

MIXED BLANKET AND PURE BLANKET METHODS

As a general rule, the above usage rates are recommended for the MIXED BLANKET method where sodium bentonite is accurately mixed into a 100mm layer of soil, followed by wetting and compaction.

Mixed Blanket Usage Rate

Soil Type	Bentonite
Course sand no fines	30 kg/m ²
Sand - 10% max fines	20 kg/m ²
Sandy loam	15 kg/m ²
Clayey sand	10 kg/m ²

SEDIMENTARY METHOD

This method can be successfully employed for the repair of a leaking dam which is full or partly filled with water.

The principle involved is that when the granular grade sodium bentonite is sprinkled on the water surface, the product sinks to the bottom and is drawn into the leaking zones by the movement of the water. This method is only recommended where emptying the dam is impractical and the location of the leaking zones can be reasonably accurately assessed. Because this method involves no mixing and compaction, a minimum treatment of 25 kg per square metre is required.



LANDFILL LINING AND CAPPING



Sodium bentonite has an important role in lining of landfill sites to prevent permeation of leachates and for capping of sites as part of rehabilitation / remediation programs.

Sodium bentonite can be applied for either direct lining or a component for geosynthetic liners.

The standard grades of fine powder, granular and superfine are used for these applications. These grades are available in either bags (40kg or 1200kg) or as bulk product.

INDUSTRIAL ABSORBENTS



Independent laboratory tests have proven that Bentonite absorbency properties are also suitable for absorbing industrial wastes.

The typical application is for oil spills (and other petroleum wastes) on workshop floors.

With the increasing emphasis on environmental controls for industrial wastes, Bentonite provides an effective and inexpensive industrial absorbent.

The product grade is specially sized granules to optimise performance for this application.

Agriculture and Horticulture



Many of Australia's soils are difficult to manage and have problems with the soil structure, resulting in restricted pasture and crop yields.

The role of bentonite in the agricultural and horticultural industries is not as a fertiliser, but to improve water retention and to act as a catalyst for trapping nutrients that pass through the soil. The use of bentonite in conjunction with a

fertiliser program makes the use of fertiliser more efficient and cost effective.

Bentonite is also ideal in potting mixtures and compost by retaining moisture, thus helping bacterial growth and the breakdown of compost components.

The fine powder grade is recommended for these applications and the product is available in bags (40 kg or 1200 kg) or as bulk product.

Beauty Products

Sodium bentonite is used extensively through the cosmetic industry for clay face and body masks.

Clay Resources Company produces a superfine product with a talcum like texture which is ideal for this type of face or body mask.

The product grade meets a special size specification of nominal -40 micron, and is now available in bag sizes from 0.5 to 5 kg.

