

DOLOMITE



Dolomite lumps



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Dolomite is the name for a mineral composed of calcium magnesium carbonate ($\text{CaMg}(\text{CO}_3)_2$) and for a sedimentary rock that has this mineral as its chief constituent. The rock was given this name first, but to avoid confusion it is sometimes known as **dolostone**. The pure mineral is white, but traces of impurities can give it a range of colors, including pink, yellow, brown, and gray.

Dolomite is a double carbonate of Magnesium and Calcium ($\text{CaCO}_3 \cdot \text{MgCO}_3$). Theoretically, it contains 21.7 MgO and 30.4 % CaCO_3 , and the remaining being CO_2 . However in nature much variation takes place in the composition. It is sedimentary origin and is supposed to have been formed due to alteration of Calcium Carbonate sediments or rocks, by seawater rich in magnesia.

There are various types of rocks found in nature, such as igneous, metamorphic and sedimentary rocks. Their origin or the kind of formation they undergo is the criteria that divide them into these categories. Igneous rocks are formed from the lava or magma of volcanoes. Metamorphic rocks, as the term suggests are igneous or sedimentary rocks that undergo transformation over a span of time.

Sedimentary rocks are formed due to layers or sediments of various materials such as earth and deposits from water bodies. These sedimentary rocks contain many mineral and organic deposits. There have been examples of fossils being found in these rocks. Limestone is a sedimentary rock that mainly consists various forms of calcium carbonate such as calcite or aragonite. Dolomite is also a sedimentary rock that consists mainly of magnesium calcium carbonate salts. Magnesium is the main mineral found in dolomite. **Sometimes, limestone gets substituted by dolomite.** These rocks are known as **dolomitic limestone**.

Dolomitic Limestone: Dolomitic limestones are rocks in which limestone is substituted with dolomite. This type of rock is very useful in agriculture as a fertilizer.

Facts about Dolomitic Limestone

These rocks contain 10 to 50 percent of dolomite and more of calcite which varies from around 50-90 percent. This is a natural process, probably one of the many types of chemical reactions that lead to formation of dolomite within limestone. The exact reason behind this is not very clear. A rock is referred to as dolomite limestone only when the dolomite percentage is more than 10 percent and less than 50 percent. The United States Geological Survey initially named this rock magnesium limestone, as it contained magnesium. However, now it is also known as dolostone or dolorock.

Decomposition of this rock is a very complex process that is studied in chemistry and to an extent in geology. It requires higher temperatures for decomposition wherein it first forms a salt of calcium carbonate and magnesium oxide and then decomposes to calcium oxide and magnesium oxide. At each stage there is formation of carbon dioxide gas.

Dolomitic Limestone Fertilizer

There are a various uses of limestone that are known to many. But if you are into agriculture or even gardening for that matter then you need to know about dolostone. It is one of the main ingredients of many fertilizers. The purpose behind including this is the presence of macro-nutrients, magnesium and calcium. These are usually present in soils, but when the soil is too acidic and lime is used to adjust the pH, addition of these nutrients is necessary. Thus its fertilizer has it all; lime to maintain the pH at optimum levels, calcium and magnesium. Addition of this rock raises the pH of acidic soils to a preferred range of 6 to 6.5, which is on the higher acidic pH side on the pH scale. The advantage of adding this particular ingredient to fertilizer is that when the pH of the soil is adjusted by the lime, the nutrients become more readily available for absorption. This range is also suitable for microbial growth in soil to convert elemental nitrogen to forms that can be absorbed by the roots. It also improves the texture and quality of soil with respect to aeration and water absorption.

Many a time, dolostone is available in various forms to as an additional ingredient to your fertilizer. Studies have shown that the smaller or powdered form of this is more effective than the coarser particles. Pelletized form is also available in the market which are first crushed into powder as fine as flour and then made into pellets for fertilizers which dissolve due to moisture.

Certain types of lime stones have a higher content of calcium. This is known as high calcium limestone. This limestone is used in agriculture but also has an industrial application. High calcium limestone is used as raw material in the precipitated calcium carbonate markets, (PCC) which is used to make good quality paper. It also finds an application in the sugar industry.

The products of these rocks are not that expensive and are therefore extensively used in agriculture.

Typical Applications

It is widely used in paints as extender in water based paints like Emulsions, dry distempers, primers etc. It is also used in Wall putty.

It is consumed in steel plants for steel melting shop.

It is also used in glass industry, Soap industry and Chemical industry.

Dolomitic Lime stone: Dolomitic lime stones are rocks in which limestone is substituted with dolomite. This type of rock is very useful in agriculture as a fertilizer.

The mineral dolomite, commonly found in deposits of a sedimentary rock called dolostone, was named after the French mineralogist Deodat de Dolomieu. Basically, there are two types of materials referred to as dolomite: a true chemically uniform calcium magnesium carbonate with the chemical formula $\text{CaMg}(\text{CO}_3)_2$, and a dolomitic limestone – an irregular mixture of calcium and magnesium carbonates.

It is believed that dolomite was formed by replacement of some of the calcium in a calcium carbonate limestone deposit with magnesium while the sediment was undergoing lithification, being transformed from layers of dead clam and other sea animal shells into crystalized calcite or calcium carbonate. The resulting dolomite mineral, $\text{CaMg}(\text{CO}_3)_2$ is a real double salt.

In dolomite, the calcium and magnesium ions exist in separate layers in the crystal matrix, thus allowing several dolomite uses. The mineral has a calcium layer, then a magnesium layer, then a carbonate layer, and so on. Moreover, dolomite is both harder and denser than the calcite form of calcium carbonate or limestone, and is more chemically inert and more impervious to acid attack.

The several dolomite uses are driven by the inherent differences between dolomite and calcite. For instance, among the main dolomite uses, construction and building product applications are probably the most common, due to the mineral's increased hardness and density, while asphalt and concrete applications prefer dolomite as filler for its strength and hardness.

Industrial Applications

Dolomite is chiefly used as refractory, ramming, and fettling material in steel melting shop, and as fluxing material in blast furnace operation in secondary steel and ferromanganese manufacture. To a lesser extent it is used in the glass industry especially in sheet-glass manufacture. It also finds use in the manufacture of mineral wool.

Dolomite decomposes completely above 900°C . The product resulting from this relatively low-temperature calcination is highly porous and reactive and is known as 'calcinated dolomite'. Dolomite is sometimes used both in the raw and calcined form as refractory material for hearth maintenance and for banking door in open hearth furnaces.

For most refractory uses, it is desirable to subject the dolomite to a heat treatment at a high temperature of the order of 1700°C , to shrink the material thoroughly and render it less reactive. Dead burnt (D.B.) dolomite is the term generally used for the refractory made by firing dolomite, with or without additives, at high temperature to produce dense, well-shrunk particles.

In basic converters the bricks employed are generally of D.B. dolomite and sometimes also of D.B. magnesite. Dolomite bricks are kept in the outer lining because it has lower thermal conductivity than magnesite.

Some of the major areas where the range is used in are:

- Detergents
- Paints
- Plastics
- Steel plants
- Ceramic tiles
- Paper industry
- Linoleum & rubber flooring

Dolomite is used for a variety of purposes as it is a versatile rock. It is mainly used in the construction industry and is often used as a substitute for limestone. Industrial uses of dolomite include the manufacturing of glass (the glass manufacturing industry uses pre-calcined dolomite, which theoretically contains about 21.8% magnesium oxide or MgO). It is used in certain industries, such as the iron and steel-making industries, as a refractory and

also as a flux. Dolomite is burnt, hardened and then made into small pellets and heated again. These pellets of dolomite are then used in the manufacture of blocks of dolomite refractory. Calcined dolomite with added iron oxide is used to repair the inner linings of furnaces. It is crushed into a fine powder called aglime, which is used for agricultural purposes (it reduces the acidity of the soil), and in the filler-making industry.

Dolomite is used as an ornamental stone and for many practical applications. For instance, it is a raw material for the manufacture of cement, and a source of magnesium oxide. It is an important reservoir rock for petroleum, and a host rock for ores of metals such as lead, zinc, and copper. In horticulture, dolomite may be added to soils and potting mixes to lower their acidity.

Dolomite is the near twin-sister rock to limestone. Like limestone, it typically forms in a marine environment but also as has a primary magnesium component. Dolomite is used in agriculture, chemical and industrial applications, cement construction, refractories, and environmental industries.