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Production of Titanium Dioxide (TiO2)

Capacity:	0
Plant and machinery cost:	0.00 Lakh
Working Capital:	0.00 Lakh
Rate of return(ROR):	0.00 %
Break Even Point (BEP):	0.00 %
TCI:	0.00 Lakh
Cost of Project:	0.00 Lakh

Production of Titanium Dioxide (TiO2). Highly Profitable Chemical Business Ideas

Titanium dioxide (TiO2) is a naturally occurring mineral that is mined from the earth, processed and refined, and added to a variety of foods, as well as other consumer products. White in color, it is used to enhance the color and sheen of certain foods and is also key for food safety applications. In its natural state it exists in different bulk crystalline forms, such as anatase and rutile, but during processing it is ground into a very fine powder.

It is naturally opaque and bright, which makes it useful for use in paper, ceramics, rubber, textiles, paints and cosmetics. It is also UV-resistant, and is used widely in sunscreens and pigments that are likely to be exposed to light. It is used in a wide variety of personal care products, including color cosmetics such as eye shadow and blush, loose and pressed powders and in sunscreens.

Uses & Benefits:

The main use of titanium dioxide (TiO2) is as a white powder pigment because of its brightness and very high refractive index. This means that relatively low levels of the pigment are required to achieve a white opaque coating.

Pure titanium dioxide is a fine, white powder that provides a bright, white pigment. Titanium dioxide has been used for a century in a range of industrial and consumer products, including paints, coatings, adhesives, paper, plastics and rubber, printing inks, coated fabrics and textiles, as well as ceramics, floor coverings, roofing materials, cosmetics, toothpaste, soap, water treatment agents, pharmaceuticals, food colorants, automotive products, sunscreen and catalysts.

Titanium dioxide is produced in two main forms. The primary form, comprising over 98 percent of total production, is pigment grade titanium dioxide. The pigmentary form makes use of titanium dioxide’s excellent light-scattering properties in applications that require white opacity and brightness. The other form in which titanium dioxide is produced is as an ultrafine (nanomaterial) product. This form is selected when different properties, such as transparency and maximum ultraviolet light absorption, are required, such as in cosmetic sunscreens.

In the pharmaceutical industry, titanium dioxide is used in most sunscreens to block UVA and UVB rays, similar to zinc oxide. It is also commonly used as pigment for pharmaceutical products such as gelatin capsules, tablet coatings and syrups. In the cosmetics industry, it is used in toothpaste, lipsticks, creams, ointments and powders. It can be used as an opacifier to make pigments opaque.

Titanium dioxide is seeing growing demand in photocatalysts due to its oxidative and hydrolysis properties. As a photocatalyst, it can improve the efficiency of electrolytically splitting water into hydrogen and oxygen, and it can produce electricity in nanoparticle form. Applications include light-emitting diodes, liquid crystal displays (LCDs) and electrodes for plasma displays.

Titanium dioxide (TiO2) is derived from ilmenite a mineral found in the metamorphic, plutonic igneous rocks and beach sands in India. It can be classified into anatase, rutile and brokite, of which only anatase and rutile are commercially important. TiO2 is consumed across paints, plastics, paper and many other end use segments.

The titanium Di-oxide market in India is projected to exhibit a CAGR of 3.98% during 2016-2025, owing to broad growing applications of titanium Di-oxide in paints, rubbers, plastics, textiles, cosmetics, pare & printings, etc. Titanium is the ninth most commonly found element in the earth's crust and is chemically inert in nature. Titanium Di-oxide is an oxide of titanium metal, which occurs naturally in several types of mineral sands and rocks. Minerals, metals and chemicals manufacturing industries majorly produce titanium Di-oxide in two grades namely, Rutile Grade and Anatase Grade titanium Di-oxide, owing toit's high refractive index, hiding power & opacity, low specific gravity and UV protecting properties. Thereby, boosting consumption of titanium Di-oxideacross various downstream industries such as paints, paper,

rubber, textiles cosmetics etc. Furthermore, increasing awareness among consumers regarding the physical and chemical properties of titanium Di-oxide is further projected to drive India titanium Di-oxide market in the coming years.

"Paints and varnishes manufacturing industry is the leading consumer of titanium dioxide in India. Paints is one of the mostly used building materials in constructions, furniture, automotive and other industries. Strong growth in construction and automotive industries in India is the major factor propeling demand for titanium dioxide pigments in paints and coatings production industry. Over the past few years, India paint market grew at a rate of around 15% and is expected to grow at the same pace in the coming years as well.

The global titanium dioxide (TiO_2) market size was valued at USD 13.3 billion in 2015. The market is expected to witness growth at a CAGR of over 8.9% from 2016 to 2025, owing to increasing demand from end-user industries. Usage of the product as pigments in paints & coatings formulation is expected to fuel industry growth over the next few years.

The major growth drivers for this market are growing demand for titanium dioxide in end use industries like coatings, plastics and others. Technological innovations aimed at improving manufacturing processes to increase product yield with higher quality is expected to have a positive impact on the titanium dioxide pigment market.

Within the global titanium dioxide market, the coatings segment is expected to remain the largest market. Increasing demand for architectural and industrial coatings in the developing countries of Asia Pacific, particularly China and India, has presented sound opportunities for titanium dioxide in the coatings industry, which would spur growth for this segment over the forecast period.

Based on grade type, the global titanium dioxide market has been segmented into rutile and anatase. The anatase grade type segment is projected to grow at the highest CAGR from 2016 to 2021. Anatase grade titanium dioxide is preferred in the manufacturing of paper, as it is less abrasive to the papermaking machinery. The market for anatase segment is also expected to witness high growth owing to the increasing demand for the anatase grade of titanium dioxide in the paints & coatings application from the construction industry.

Global titanium dioxide market is mainly driven by increasing demand for lightweight vehicles in the automobile industry especially in the developed countries like US, Germany and France. Rising demand for lightweight automobiles is expected to play a vital role in growth of global titanium dioxide market. Materials such as polycarbonates are used in manufacturing of lightweight automotive which have low scratch resistance value. Also, the product is used in various industries such as chemical intermediates, fiber, technical titanium, inks for printer and rubber.

Paper industry is the third largest user of titanium dioxide and contributed 10.4% in terms of revenue globally. Titanium dioxide is used in manufacturing of decorative papers, these are used in manufacturing of flooring, furniture and wallpapers. Demand for high end furniture is increasing which is expected to boost the demand for titanium dioxide. The paper industry is expected to contribute about 10.4% during the forecast period.

The Chloride Process:

There are two main stages:

a) The conversion of rutile to titanium (IV) chloride

b) The oxidation of titanium (IV) chloride

(a) The conversion of rutile to titanium (IV) chloride

The rutile is fed into a heated bed together with a source of carbon, usually coke. Chlorine is fed into the bed and the reaction takes place to form titanium (IV) chloride in the vapour form which is removed from the bed. Iron and other metals in the ore are chlorinated and also leave the bed in the vapour state. The oxygen in the ores is combined with the carbon to form carbon monoxide and dioxide. The vapour stream is

cooled and the metal chlorides other than titanium (IV) chloride are condensed and solidified. The titanium (IV) chloride vapour, which contains almost pure titanium (IV) chloride and has a lower boiling point, is then condensed and stored as liquid. It is then reboiled and distilled to give a purer product to feed to the next stage.

(b) The oxidation of titanium (IV) chloride

Liquid titanium (IV) chloride is vaporized and burnt in oxygen, together with a hydrocarbon fuel source (for example, methane) to a high temperature to initiate the reaction and keep the temperature high enough for the reaction to proceed:

The titanium dioxide is formed (by adding seed crystals) as a fine solid in the gas stream and is filtered out of the waste gases using cyclones or filters. Once again control of crystal growth is important to give particles of the correct size for pigments. This is done by adding nucleating agents to the gas stream (e.g. water or Aluminium chloride) and by cooling the products. The chlorine in titanium (IV) chloride is released and recycled to the chlorination stage of the process above.

The product contains small amounts of absorbed chlorine gas which are removed. The product is washed and dried before milling and surface treatment in an identical manner to that used in the Sulfate Process described.

Tags

Titanium Dioxide (Tio2) Production and Manufacturing Process, Manufacture of Titanium Dioxide, Titanium Dioxide, Tio2, Essential Chemical Industry, Manufacture of Titanium Dioxide, Production of Titanium Dioxide, Commercial Process for Producing Titanium Dioxide, Manufacturing Process of Titanium Dioxide, Process for Production of Titanium Dioxide, Titanium Dioxide Manufacturing Process Pdf, Titanium Dioxide Production Chloride Process, Titanium Dioxide Process Flow Diagram, Titanium Dioxide Properties, Process for Manufacturing Titanium Dioxide, Titanium Dioxide-Tio2, Chloride Process for Titanium Dioxide, Process for Producing Titanium Dioxide, Titanium Dioxide & Titanium, Titanium Dioxide Production, Titanium Dioxide Manufacture, Titanium Dioxide Processing, Preparation of Titanium Dioxide (Tio2), Titanium Dioxide Industry, Titanium Dioxide Manufacturing Plant, Titanium Dioxide (Tio2) Industry in India, Chemical Business, Titanium Dioxide Production Business, Titanium Dioxide Plant, Project Report on Titanium Dioxide Manufacturing Industry, Detailed Project Report on Titanium Dioxide Manufacturing, Project Report on Titanium Dioxide (Tio2) Production, Pre-Investment Feasibility Study on Titanium Dioxide (Tio2) Production, Techno-Economic feasibility study on Titanium Dioxide (Tio2) Production, Feasibility report on Titanium Dioxide (Tio2) Production, Free Project Profile on Titanium Dioxide (Tio2) Production, Project profile on Titanium Dioxide (Tio2) Production, Download free project profile on Titanium Dioxide (Tio2) Production, Titanium Dioxide (Chloride Process), Chloride Process, Chloride Process for Titanium Dioxide

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