

Production of Titanium Dioxide (TiO₂).



Highly Profitable Chemical Business Ideas



TITANIUM DIOXIDE
POWDER

Introduction

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.



**TITANIUM DIOXIDE
POWDER**

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 to it's high refractive index, hiding power & opacity, low specific gravity and UV protecting properties. Thereby, boosting consumption of titanium Di-oxide across 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.

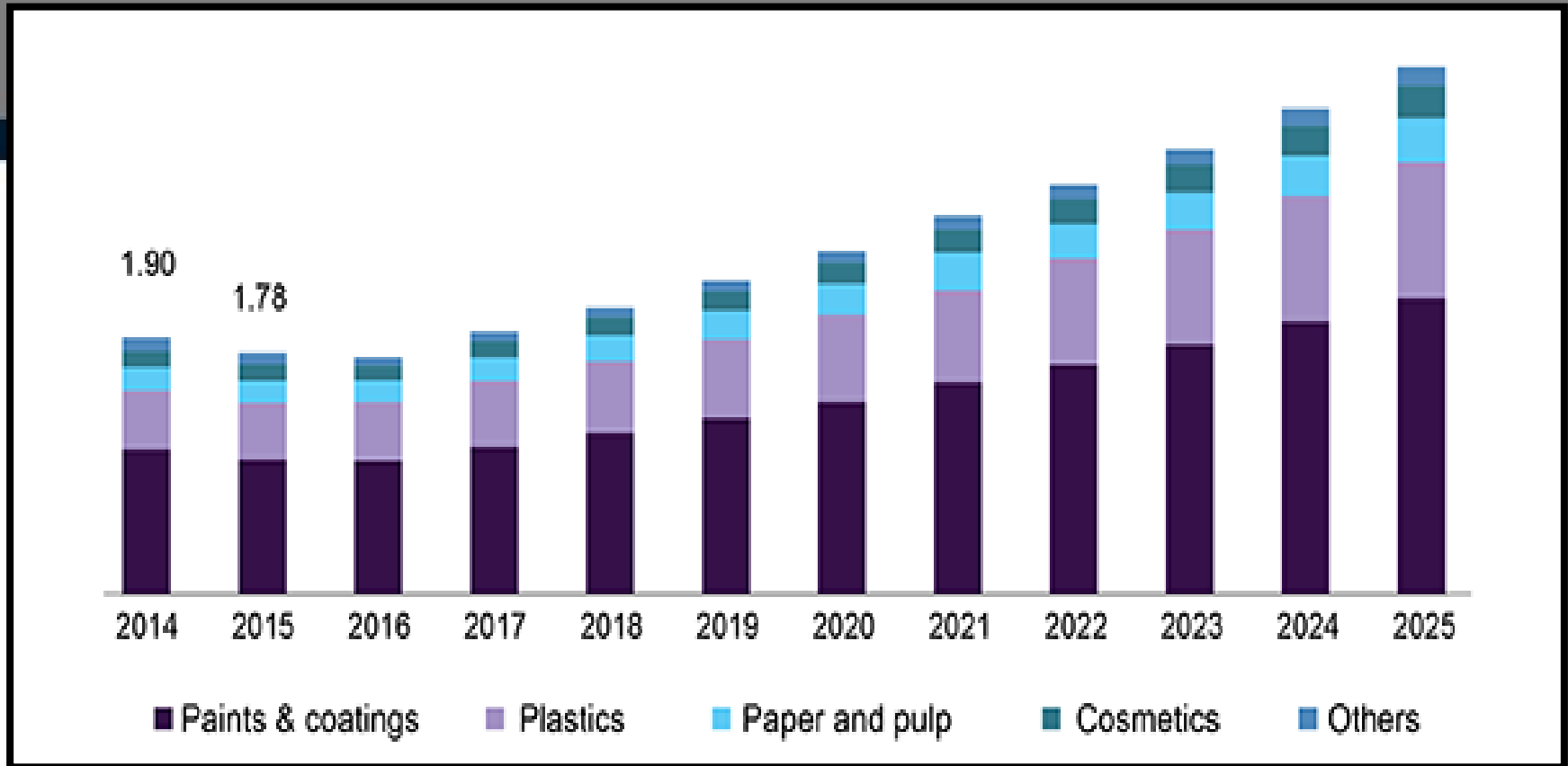
"Paints and varnishes manufacturing industry is the leading consumer of titanium dioxide in India. Paints is one of the mostly used building materials in constructions, furniture, automotive and other industries. Strong growth in construction and automotive industries in India is the major factor propeling 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 (TiO₂) 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.



Titanium Dioxide Market Revenue, by Application, 2014-2025 (USD Billion)



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.

Machinery Photographs

Chlorination Chamber



Distillation Column



Rotary Dryer



Vacuum Pumps



Project at a Glance

PROJECT AT A GLANCE

(` in lacs)

COST OF PROJECT				MEANS OF FINANCE			
Particulars	Existing	Proposed	Total	Particulars	Existing	Proposed	Total
Land & Site Development Exp.	0.00	520.00	520.00	Capital	0.00	925.00	925.00
Buildings	0.00	482.40	482.40	Share Premium	0.00	0.00	0.00
Plant & Machineries	0.00	431.00	431.00	Other Type Share Capital	0.00	0.00	0.00
Motor Vehicles	0.00	25.00	25.00	Reserves & Surplus	0.00	0.00	0.00
Office Automation Equipments	0.00	144.00	144.00	Cash Subsidy	0.00	0.00	0.00
Technical Knowhow Fees & Exp.	0.00	75.00	75.00	Internal Cash Accruals	0.00	0.00	0.00
Franchise & Other Deposits	0.00	0.00	0.00	Long/Medium Term Borrowings	0.00	2775.01	2775.01
Preliminary & Pre-operative Exp	0.00	10.00	10.00	Debentures / Bonds Unsecured	0.00	0.00	0.00
Provision for Contingencies	0.00	40.00	40.00	Loans/Deposits	0.00	0.00	0.00
Margin Money - Working Capital	0.00	1972.61	1972.61				
TOTAL	0.00	3700.01	3700.01	TOTAL	0.00	3700.01	3700.01

Project at a Glance

Year	Annualised		Book Value	Debt	Dividend	Retained Earnings		Payout	Probable Market Price	P/E Ratio	Yield Price/Book Value
	EPS	CEPS	Per Share		Per Share	Per Share		%		No.of Times	%
1-2	7.88	9.43	17.88	24.00	0.00	100.00	7.88	0.00	7.88	1.00	0.00
2-3	9.99	11.35	27.87	18.00	0.00	100.00	9.99	0.00	9.99	1.00	0.00
3-4	12.44	13.64	40.30	12.00	0.00	100.00	12.44	0.00	12.44	1.00	0.00
4-5	14.88	15.94	55.18	6.00	0.00	100.00	14.88	0.00	14.88	1.00	0.00
5-6	17.27	18.21	72.46	0.00	0.00	100.00	17.27	0.00	17.27	1.00	0.00



Project at a Glance

Year	D. S. C. R.			Debt / Equity - Deposits Debt	Equity as-Equity	Total Net Worth	Return on Net Worth	Profitability Ratio					Assets Turnover Ratio	Current Ratio
	Individual	Cumulative	Overall					GPM	PBT	PAT	Net Contribution	P/V Ratio		
	(Number of times)			(Number of times)	%	%	%	%	%	%	%			
Initial				3.00	3.00									
1-2	1.37	1.37		1.34	1.34	10.35	2.40%	1.12%	0.72%	3634.72	3.61%	5.39	1.11	
2-3	1.62	1.49		0.65	0.65	7.31	2.47%	1.23%	0.79%	3758.66	3.20%	5.51	1.13	
3-4	1.97	1.64	1.98	0.30	0.30	5.57	2.51%	1.35%	0.86%	4284.14	3.19%	5.50	1.15	
4-5	2.39	1.80		0.11	0.11	4.44	2.54%	1.44%	0.91%	4809.61	3.18%	5.45	1.17	
5-6	2.89	1.98		0.00	0.00	3.66	2.56%	1.50%	0.95%	5335.09	3.18%	5.38	1.23	



Project at a Glance

BEP

BEP - Maximum Utilisation Year	5
Cash BEP (% of Installed Capacity)	49.52%
Total BEP (% of Installed Capacity)	51.15%
IRR, PAYBACK and FACR	
Internal Rate of Return .. (In %age)	32.05%
Payback Period of the Project is (In Years)	2 Years 3 Months
Fixed Assets Coverage Ratio (No. of times)	144.284

Major Queries/Questions Answered in the Report?

- 1. What is Titanium Dioxide Manufacturing industry?**
- 2. How has the Titanium Dioxide Manufacturing industry performed so far and how will it perform in the coming years ?**
- 3. What is the Project Feasibility of Titanium Dioxide Manufacturing Plant ?**
- 4. What are the requirements of Working Capital for setting up Titanium Dioxide Manufacturing plant ?**

- 5. What is the structure of the Titanium Dioxide Manufacturing Business and who are the key/major players ?**
- 6. What is the total project cost for setting up Titanium Dioxide Manufacturing Business?**
- 7. What are the operating costs for setting up Titanium Dioxide Manufacturing plant ?**
- 8. What are the machinery and equipment requirements for setting up Titanium Dioxide Manufacturing plant ?**

- 9. Who are the Suppliers and Manufacturers of Plant & Machinery for setting up Titanium Dioxide Manufacturing plant ?**
- 10. What are the requirements of raw material for setting up Titanium Dioxide Manufacturing plant ?**
- 11. Who are the Suppliers and Manufacturers of Raw materials for setting up Titanium Dioxide Manufacturing Business?**
- 12. What is the Manufacturing Process of Titanium Dioxide?**

- 13. What is the total size of land required for setting up Titanium Dioxide Manufacturing plant ?**
- 14. What will be the income and expenditures for Titanium Dioxide Manufacturing Business?**
- 15. What are the Projected Balance Sheets of Titanium Dioxide Manufacturing plant ?**
- 16. What are the requirement of utilities and overheads for setting up Titanium Dioxide Manufacturing plant?**
- 17. What is the Built up Area Requirement and cost for setting up Titanium Dioxide Manufacturing Business?**

18. What are the Personnel (Manpower) Requirements for setting up Titanium Dioxide Manufacturing Business?

19. What are Statistics of Import & Export for Titanium Dioxide?

20. What is the time required to break-even of Titanium Dioxide Manufacturing Business?

21. What is the Break-Even Analysis of Titanium Dioxide Manufacturing plant?

22. What are the Project financials of Titanium Dioxide Manufacturing Business?

- 23. What are the Profitability Ratios of Titanium Dioxide Manufacturing Project?**
- 24. What is the Sensitivity Analysis-Price/Volume of Titanium Dioxide Manufacturing plant?**
- 25. What are the Projected Pay-Back Period and IRR of Titanium Dioxide Manufacturing plant?**
- 26. What is the Process Flow Sheet Diagram of Titanium Dioxide Manufacturing project?**

- 27. What are the Market Opportunities for setting up Titanium Dioxide Manufacturing plant?**
- 28. What is the Market Study and Assessment for setting up Titanium Dioxide Manufacturing Business?**
- 29. What is the Plant Layout for setting up Titanium Dioxide Manufacturing Business?**

Table of Contents of the Project Report

1. INTRODUCTION

2. HISTORY

3. USES & APPLICATIONS

4. CONVERSION OF TITANIUM ORE INTO USED FULL PRODUCTS

5. B.I.S. SPECIFICATION

- 5.1. IS: 411 – 1991 TITANIUM DIOXIDE, ANATASE, FOR PAINTS – SPECIFICATION
- 5.2. IS: 2851 – 1983 SPECIFICATION FOR TITANIUM DIOXIDE FOR COSMETIC INDUSTRY (SECOND REVISION)
- 5.3. IS: 6947 (PART II) – 1975 METHODS OF ESTIMATION OF COMPOSITE PIGMENTS IN OIL PASTES, READY MIXED PAINTS AND ENAMELS
- 5.4. IS 8356: 1993 TITANIUM DIOXIDE, FOOD GRADE – SPECIFICATION (FIRST REVISION)
- 5.5. IS: 9788 – 1981 SPECIFICATION FOR TITANIUM DIOXIDE, RUTILE FOR PAINTS

6. MARKET SURVEY

- 6.1. GLOBAL TIO₂ PIGMENT CONSUMPTION
- 6.2. APPLICATION INSIGHTS
- 6.3. REGIONAL INSIGHTS
- 6.4. COMPETITIVE INSIGHTS

7. EXPORT & IMPORT: ALL COUNTRIES

- 7.1. EXPORT: ALL COUNTRIES
- 7.2. IMPORT: ALL COUNTRIES



8. FINANCIALS & COMPARISON OF MAJOR PLAYERS/COMPANIES

8.1. ABOUT FINANCIAL STATEMENTS OF CMIE DATABASE

8.2. PROFITS & APPROPRIATIONS

8.3. TOTAL LIABILITIES

8.4. TOTAL ASSETS

8.5. NET CASH FLOW FROM OPERATING ACTIVITIES

8.6. SECTION – I

8.6.1. Name of Company with Contact Details

8.6.2. Name of Director (S)

8.6.3. Plant Capacity

8.6.4. Location of Plant

8.6.5. Name of Raw Material(S) Consumed With Quantity & Cost

8.7. SECTION – II

8.7.1. Assets

8.7.2. Cash Flow

8.7.3. Cost as % Ge of Sales

8.7.4. Forex Transaction

8.7.5. Growth in Assets & Liabilities

8.7.6. Growth in Income & Expenditure

8.7.7. Incorporation Year, industry Group, Industry Type and Main Product

8.7.8. Income & Expenditure

8.7.9. Liabilities

8.7.10. Liquidity Ratios

8.7.11. Profitability Ratio

8.7.12. Profits

8.7.13. Return Ratios

8.7.14. Stock Price and Ratio

8.7.15. Structure of Assets & Liabilities (%)

8.7.16. Working Capital & Turnover Ratios

9. COMPANY PROFILE OF MAJOR PLAYERS

10. EXPORT & IMPORT STATISTICS DATA OF INDIA

10.1. EXPORT STATISTICS DATA OF TITANIUM DIOXIDE

10.2. IMPORT STATISTICS DATA OF TITANIUM DIOXIDE

11. PRESENT MANUFACTURERS

12. RAW MATERIALS

12.1. RUTILE, ANATASE AND BROOKITE

12.2. PRODUCING NANO-STRUCTURED TITANIUM DIOXIDE

12.3. PROPERTIES OF TIO₂ P25

12.4. PROCESS ADVANTAGES

13. MANUFACTURING PROCESS

13.1. CHLORIDE PROCESSING ROUTE

13.2. THE KROLL PROCESS

13.3. BY PRODUCTS/WASTE

13.4. A TYPICAL POST TREATMENT PROCESS

14. PROCESS FLOW DIAGRAM

- 14.1. TYPICAL CHLORIDE PROCESS
- 14.2. CHLORIDE PROCESS

15. SUPPLIERS OF PLANT AND MACHINERY

16. SUPPLIERS OF RAW MATERIAL

17. PHOTOGRAPHS/IMAGES FOR REFERENCE

- 17.1. PRODUCT PHOTOGRAPHS
- 17.2. MACHINERY PHOTOGRAPHS
- 17.3. RAW MATERIAL PHOTOGRAPHS

18. PLANT LAYOUT

Project Financials

- **Project at a Glance** **Annexure**
- Assumptions for Profitability workings1
- Plant Economics.....2
- Production Schedule.....3
- Land & Building.....4
 - Factory Land & Building
 - Site Development Expenses

- **Plant & Machinery.....5**
 - Indigenous Machineries**
 - Other Machineries (Miscellaneous, Laboratory etc.)**

- **Other Fixed Assets.....6**
 - Furniture & Fixtures**
 - Pre-operative and Preliminary Expenses**
 - Technical Knowhow**
 - Provision of Contingencies**

- **Working Capital Requirement Per Month.....7**
 - Raw Material**
 - Packing Material**
 - Lab & ETP Chemical Cost**
 - Consumable Store**

- **Overheads Required Per Month and Per Annum.....8**
Utilities & Overheads (Power, Water and Fuel Expenses etc.)
Royalty and Other Charges
Selling and Distribution Expenses

- **Salary and Wages9**

- **Turnover Per Annum10**

- **Share Capital.....11**
Equity Capital
Preference Share Capital

- **Annexure 1 :: Cost of Project and Means of Finance**
- **Annexure 2 :: Profitability and Net Cash Accruals**
 - **Revenue/Income/Realisation**
 - **Expenses/Cost of Products/Services/Items**
 - **Gross Profit**
 - **Financial Charges**
 - **Total Cost of Sales**
 - **Net Profit After Taxes**
 - **Net Cash Accruals**

- **Annexure 3 :: Assessment of Working Capital requirements**

- **Current Assets**
- **Gross Working Capital**
- **Current Liabilities**
- **Net Working Capital**
- **Working Note for Calculation of Work-in-process**

- **Annexure 4 :: Sources and Disposition of Funds**

- **Annexure 5 :: Projected Balance Sheets**

- **ROI (Average of Fixed Assets)**
- **RONW (Average of Share Capital)**
- **ROI (Average of Total Assets)**

- **Annexure 6 :: Profitability Ratios**

- **D.S.C.R**
- **Earnings Per Share (EPS)**
- **Debt Equity Ratio**

• **Annexure 7 :: Break-Even Analysis**

- **Variable Cost & Expenses**
- **Semi-Variable/Semi-Fixed Expenses**
- **Profit Volume Ratio (PVR)**
- **Fixed Expenses / Cost**
- **B.E.P**

- **Annexure 8 to 11 :: Sensitivity Analysis-Price/Volume**

- **Resultant N.P.B.T**
- **Resultant D.S.C.R**
- **Resultant PV Ratio**
- **Resultant DER**
- **Resultant ROI**
- **Resultant BEP**

- **Annexure 12 :: Shareholding Pattern and Stake Status**

- **Equity Capital**
- **Preference Share Capital**

- **Annexure 13 :: Quantitative Details-Output/Sales/Stocks**

- **Determined Capacity P.A of Products/Services**
- **Achievable Efficiency/Yield % of Products/Services/Items**
- **Net Usable Load/Capacity of Products/Services/Items**
- **Expected Sales/ Revenue/ Income of Products/ Services/ Items**

- **Annexure 14** :: **Product wise Domestic Sales Realisation**
- **Annexure 15** :: **Total Raw Material Cost**
- **Annexure 16** :: **Raw Material Cost per unit**
- **Annexure 17** :: **Total Lab & ETP Chemical Cost**
- **Annexure 18** :: **Consumables, Store etc.**
- **Annexure 19** :: **Packing Material Cost**
- **Annexure 20** :: **Packing Material Cost Per Unit**

- **Annexure 21** :: **Employees Expenses**
- **Annexure 22** :: **Fuel Expenses**
- **Annexure 23** :: **Power/Electricity Expenses**
- **Annexure 24** :: **Royalty & Other Charges**
- **Annexure 25** :: **Repairs & Maintenance Expenses**
- **Annexure 26** :: **Other Manufacturing Expenses**
- **Annexure 27** :: **Administration Expenses**
- **Annexure 28** :: **Selling Expenses**

- **Annexure 29 :: Depreciation Charges – as per Books (Total)**
- **Annexure 30 :: Depreciation Charges – as per Books (P & M)**
- **Annexure 31 :: Depreciation Charges - as per IT Act WDV (Total)**
- **Annexure 32 :: Depreciation Charges - as per IT Act WDV (P & M)**
- **Annexure 33 :: Interest and Repayment - Term Loans**
- **Annexure 34 :: Tax on Profits**
- **Annexure 35 :: Projected Pay-Back Period and IRR**

Reasons for Buying our Report:

- **This report helps you to identify a profitable project for investing or diversifying into by throwing light to crucial areas like industry size, market potential of the product and reasons for investing in the product**
- **This report provides vital information on the product like it's characteristics and segmentation**
- **This report helps you market and place the product correctly by identifying the target customer group of the product**

- **This report helps you understand the viability of the project by disclosing details like machinery required, project costs and snapshot of other project financials**
- **The report provides a glimpse of government regulations applicable on the industry**
- **The report provides forecasts of key parameters which helps to anticipate the industry performance and make sound business decisions**

Our Approach:

- **Our research reports broadly cover Indian markets, present analysis, outlook and forecast for a period of five years.**
- **The market forecasts are developed on the basis of secondary research and are cross-validated through interactions with the industry players**
- **We use reliable sources of information and databases. And information from such sources is processed by us and included in the report**

Scope of the Report

The report titled “Market Survey cum Detailed Techno Economic Feasibility Report on Titanium Dioxide (Chloride Process).” provides an insight into Titanium Dioxide (Chloride Process) market in India with focus on uses and applications, Manufacturing Process, Process Flow Sheets, Plant Layout and Project Financials of Titanium Dioxide (Chloride Process) project. The report assesses the market sizing and growth of the Indian Titanium Dioxide (Chloride Process) Industry. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line. And before diversifying/venturing into any product, they wish to study the following aspects of the identified product:

- **Good Present/Future Demand**
- **Export-Import Market Potential**
- **Raw Material & Manpower Availability**
- **Project Costs and Payback Period**

We at NPCS, through our reliable expertise in the project consultancy and market research field, have demystified the situation by putting forward the emerging business opportunity in the Titanium Dioxide sector in India along with its business prospects. Through this report we have identified Titanium Dioxide project as a lucrative investment avenue.

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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NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our Market Survey cum Detailed Techno Economic Feasibility Report provides an insight of market in India. The report assesses the market sizing and growth of the Industry. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.



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- **Raw Material & Manpower Availability**
- **Project Costs and Payback Period**

The detailed project report covers all aspect of business, from analyzing the market, confirming availability of various necessities such as Manufacturing Plant, Detailed Project Report, Profile, Business Plan, Industry Trends, Market Research, Survey, Manufacturing Process, Machinery, Raw Materials, Feasibility Study, Investment Opportunities, Cost and Revenue, Plant Economics, Production Schedule,



Working Capital Requirement, uses and applications, Plant Layout, Project Financials, Process Flow Sheet, Cost of Project, Projected Balance Sheets, Profitability Ratios, Break Even Analysis. The DPR (Detailed Project Report) is formulated by highly accomplished and experienced consultants and the market research and analysis are supported by a panel of experts and digitalized data bank.

We at NPCS, through our reliable expertise in the project consultancy and market research field, have demystified the situation by putting forward the emerging business opportunity in India along with its business prospects.....[Read more](#)



Contact us

NIIR PROJECT CONSULTANCY SERVICES

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Niir PROJECT CONSULTANCY SERVICES

An ISO 9001:2015 Company



Who are we?

- *One of the leading reliable names in industrial world for providing the most comprehensive technical consulting services*
- *We adopt a systematic approach to provide the strong fundamental support needed for the effective delivery of services to our Clients' in India & abroad*

We at NPCS want to grow with you by providing solutions scale to suit your new operations and help you reduce risk and give a high return on application investments. We have successfully achieved top-notch quality standards with a high level of customer appreciation resulting in long lasting relation and large amount of referral work through technological breakthrough and innovative concepts. A large number of our Indian, Overseas and NRI Clients have appreciated our expertise for excellence which speaks volumes about our commitment and dedication to every client's success.



We bring deep, functional expertise, but are known for our holistic perspective: we capture value across boundaries and between the silos of any organization. We have proven a multiplier effect from optimizing the sum of the parts, not just the individual pieces. We actively encourage a culture of innovation, which facilitates the development of new technologies and ensures a high quality product.



What do we offer?

- *Project Identification*
- *Detailed Project Reports/Pre-feasibility Reports*
- *Market Research Reports*
- *Business Plan*
- *Technology Books and Directory*
- *Industry Trend*
- *Databases on CD-ROM*
- *Laboratory Testing Services*
- *Turnkey Project Consultancy/Solutions*
- *Entrepreneur India (An Industrial Monthly Journal)*

How are we different ?

- *We have two decades long experience in project consultancy and market research field*
- *We empower our customers with the prerequisite know-how to take sound business decisions*
- *We help catalyze business growth by providing distinctive and profound market analysis*
- *We serve a wide array of customers , from individual entrepreneurs to Corporations and Foreign Investors*
- *We use authentic & reliable sources to ensure business precision*



Our Approach

Requirement collection

Thorough analysis of the project

Economic feasibility study of the Project

Market potential survey/research

Report Compilation

Contact us

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