Production of Fibre Glass, Optical Glass and Reinforced Plastics

(Fibre Glass Blown Wool or Insulation Products, Pyrolyzed and Graphitized Plastics, Mandrels, Whiskers, Fibres, Plastic-Ceramic Armor, Aircraft, Tanks, Optical Fibre, Nitric Acid, Solvents, Vinyl Acetate, Acrylonitrile)
Fibre Glass

Fiberglass (or fibreglass) is a type of fiber-reinforced plastic where the reinforcement fiber is specifically glass fiber. The glass fiber may be randomly arranged, flattened into a sheet (called a chopped strand mat), or woven into a fabric. The plastic matrix may be a thermoset polymer matrix—most often based on thermosetting polymers such as epoxy, polyester resin, or vinylester—or a thermoplastic.
Reinforced Plastics

Reinforced plastics are a recent class of composite materials in which the low modulus and temperature limitations of plastic is overcome by reinforcing it with fibres of high modulus.

Reinforced plastics find extensive use in many fields, such as automobiles and corrosion-resistant equipment like fibre-reinforced plastic (FRP) tanks, vessels, etc.
Reinforced plastics, also known as polymer-matrix composite (PMC) and fiber reinforced plastics (FRP), consist of fibers (the discontinuous or dispersed, phase) in a polymer matrix (the composition phase).

These fibers are strong and stiff and they have high specific strength (strength-to-weight ratio) and specific stiffness (stiffness-to-weight ratio). In addition, reinforced-plastic structures have improved fatigue resistance, greater toughness and higher creep resistance than similar structures made from steel.
Although many natural materials were used in the past by man, answering his instinctive urges to prevent heat loss from or entry into his dwellings, no material in modern technology has satisfied the all-around requirements as has fiber Glass. Fiber glass, optical glass and reinforced plastics have important applications and uses in the making of various products. Fiberglass is a lightweight, extremely strong, and robust material.

Although strength properties are somewhat lower than carbon fiber and it is less stiff, the material is typically far less brittle, and the raw materials are much less expensive.
Its bulk strength and weight properties are also very favorable when compared to metals, and it can be easily formed using molding processes. Fibre glass behaves as a thermal insulation because of its entrapment of small cells of air, and prevention of movement of the air in those cells. In acoustical applications, fibre glass presents to advancing sound waves a myriad of small anechoic chambers which reflect the sound inward from many diverse surfaces until it becomes blotted out.

Optical glass is a high glass material that has been seen specifically formulated to possess certain desirable characteristics that effect the propagation of light.
The two primary parameters that define the basic types of optical glass are its refractive index and its dispersion. Transportation on wheel is of special significance to the reinforced plastics industry on a number of counts. Suppliers of reinforced plastics parts are often called upon to furnish prototypes of products being considered for auto, truck and bus applications. Performance and quality demands on materials used in aerospace vehicles have given rise to many plastics developments and have kept profits in the plastics industry at a higher level than those in other major markets.
Market Outlook

The fiber optics market size is projected to reach $5.00 billion by 2021 at a CAGR of 9.8%.

The global fiber glass market is expected to reach $15.57 billion by 2020, at a CAGR of 9%.
The global glass fiber market and specialty synthetic fibers market is projected to register a market size of about $14,240.53 Million by 2020, signifying CAGR of around 6.46% between 2015 and 2020. Glass fiber is made from extremely fine fibers of glass.

The global market for reinforced plastic is projected to reach 9 million tons by 2020.
1. INTRODUCTION

- Product and its applications
- Man Made Fibres: An overview
- History of man made fibres-world view
- Fibres Based on Natural Polymers:
- Fibres based on Synthetic Polymers
- History of man made fibres Indian scene
2. FIBRE GLASS BLOWN WOOL OR INSULATION PRODUCTS AND THEIR APPLICATIONS

- Introduction - parameters and test methods
- Chemical Composition
- Fibre Diameter
- Binders
- Thickness and Density
- Percent shot
- Percent Recovery
- Other properties
- Building Insulation
- Thermal insulation-Homes
- Heat loss data and calculations
- Thermal insulation-Metal Buildings
- Blanket insulation
- Rigid insulation board
- Engineered systems for increased thermal performance
- Insulation of Mobile Homes, Recreational Vehicles, and Packaged Housing
- Acoustical insulation for buildings
- Thermal-Acoustical Batting
- Fibre Glass in Wall Construction for Reduced Sound Transmission
- Thermal-Acoustical insulation or improvement of existing construction
- Additional insulation for acoustical ceilings
- Acoustical ceiling materials
- Materials
- Dimensions and suspending systems
- Aesthetic appearance: Facings, configurations, contours
- Light reflectance
- Acoustical ratings
- Thermal properties of ceiling components
- Integrated systems
- The open office
- Industrial Noise Abatement
- Pipe and air handling insulations
- Pipe insulation
- History and Evaluation
- Manufacture
- Properties and Performance
- General properties
- Specific properties
- Applicable specifications
- Insulation for Air-Handling Systems and Ducting
- Introduction
- External Duct insulation
- Internal Duct insulation
- Faced insulation for duct wrapping
- Fabricated Fibre Glass duct
- Appliance and equipment insulations
- Introduction
- Appliance insulation
- Forms available
- Product properties
- Miscellaneous
- Equipment insulation
- Standard roll-type insulation
- Dual-Density insulation
- Mechanically Bonded Mats
- Thermal insulating Wool
- Mineral Fibre Board insulation
- Double Mesh-Faced Insulation
- Metal-Jacketed Equipment insulation
- Miscellaneous
- Insulation for various transportation modes
- Automotive market
- Automotive insulation-Topliners
- Automotive insulation-Handliners
- Automotive insulation-Molded engine housing
- Insulation for Vans
- Automotive insulation-Miscellaneous components
- Summary
- Marine Products
- Navy Hullboard
- Marine Equipment insulation
- Felted Mineral
- Unbonded Mats or Batting
- Flotation wool
- Aircraft and aerospace insulation's
- Introduction
- Aircraft Frame insulation
- Reusable surface insulation for orbiting space vehicles
- High temperature insulation: Refractory Fibres
- Introduction
- Bulk Fibres
- Felts, Blankets, Boards
- Ceramic Fibre papers
- Ceramic Fibre Textiles
- Vacuum Forming Social Shapes
- Mixes
- Tamping Mixes
- Composite insulation for space firings and launchings.
- Reinforcement of Zirconia and Like foams.
- Filtration
- Introduction
- Condition of Air requiring filtration
- Properties of Glass Fibre as an Air Filter Medium
- Understanding Air-filtration Technology
- Size of inner diameter
- Length
- Wall thickness
- Densities and interleafing
- Binder content
- Grooving
- Fibre diameter
- Advantages of Fibre glass in filtration of liquids
- Testing liquid filtration media
- Degree or fineness required
- Amount of material to be removed and at what rate
- Overall cost
- Applications and performance
- Paints, varnishes and solvents
- Photography processing
- Underground water flooding
- EDM (Electrical Discharge Machining)
- Filtration of Hydraulic oil
- Filtration of swimming pool water
- Absolute liquid filtration
- Filtration of Jet Fuel and the Like
- Fibre Glass Mat and Web products
- Introduction
- Glass Fibre paper
- Shingles and roofing mats
- Shingles
- Built up Roofing
- Industrial Bonded mats
- Pipeline Protection
- Roadbed protection
- Drain-Tile protection
- Backing for floor tile carpeting and wall covering
- Battery retainer mats
- Separator sheets for small batteries
- Laminated battery separator mats for larger batteries
- Verd and surfacing mats
3. MANUFACTURING PROCESSES

- General
- Factors responsible for polymerization
- Co-polymer composition
- Neutral commoners
- Ionic comonomers
- Molecular weight
- Catalyst preparation
- Process parameters
- Polymerization process
- General
- Bulk Polymerization
- Aqueous dispersion/suspension
- Emulsion polymerization
- Solution Polymerization
- Commercial polymerization processes
- Processing and spinning
- General
- Solution dope preparations
- Spinning processes
- Wet spinning
- Dry spinning
- Commercial spinning process
- Comparison of drywet spinning routes
- Special spinning processes
- Special Fibres
- Porous fibres
- Dyning of acrylic fibres
- Pollution control in acroylic fibre plant
- Raw materials
- Acrylonitrile
- Methyl Acorylate and Vinyl Acetate
- Methyl acrylate
- Vinyl acetate
- Ionic co-monomers
- Solvents
• Dimethyl formatted
• Dimethyl acetamide
• Nitric acid
• Major capital equipment
• Suspension polymerization parts
• Solution Polymerization parts
• Dry spinning parts
4. CONTINUOUS FILAMENT FIBRE FORMING METHODS

- Introduction
- Marble melt process
- Direct-melt process
- The stricke and processes
- Fibre production from ceramic crucibles
- Metal coated glass Fibres
- Staple Fibre or sliver
- Production of Fibre optic elements
- Extrusion fusion method
5. PRODUCT APPLICATION

- Optical glass
- Definition
- Types of optical glass
- Internal quality grades
- Optical Fibre
- Types of Optical Fibre
- Application Profile
- Optical glass
- Optical Fibre
6. GLOBAL TECHNOLOGY TRENDS

- Glass fabrication
- Melting
- Continuous process
- Other emerging fabrication methods
- Sol-gel method
- Vapour deposition method
- New Material compositions
- Environmental friendly materials
- IR materials
- UV Transmission materials
- Super flints
- Artificial Crystal materials
- Ophthalmic materials
- Component production
- Machining
- Gradient index materials
- Optical fibres
- Material status
- Optical fibre fabrication
- Fused quart and synthetic fused silica tubes/rods
- Perform fabrication
- Fibre drawing and coating processes
- Furnace designs
- Fibre diameter measurement and control
- Fibre coatings
- High speed drawing and coating
- Fibre opto electronic devices and coupling
- Technology status India
- Optical glass
- Ophthalmic glasses
- BOGL
- Other Glasses at R & D states
- Emerging technology trends
7. TECHNOLOGY EVALUATION

- Optical fibre
- Application viability
- Manufacturing Viability
- Preform Fabrication
- Fibre drawing
- Furnance Designs
8. MARINE APPLICATIONS

- Introduction
- Marine structural laminates
- Resin systems
- Reinforcements
- Production processes
- Laminated Materials
- Response to marine environment
- Effect of extended water exposure on static properties
- Effect of water under pressure
- Recovery of properties of Drying
- Effect of water on Long terms loading properties
- Weathering effects
- Biological attack - fouling
- Design of marine structures
- Applications
- Boat Construction
- Fabrication processes
- Fairings and Housings
- Subnatine fairwaters
- Outer Hull structures
- Shipboard structures
- Tanks
- Structure sonar Domes
- Floats and Buoys
- Protective Coatings
- Current and future developments
- Large surface slips
- Naval construction
- United Kingdom program
- US program
- Deep submergence vehicles
- Properties of competitive
- Effects of operational conditions on properties
- Design concept
- Ring stiffened cylinder
- Sandwich construction
- Hollow glass materials
- Other configurations
- Current Research
- Summation concluding remarks
9. REINFORCED PLASTICS FOR TRANSPORTATION ON WHEELS

- Introduction
- Production versus materials costs
- FRP properties asc related to transportation
- What reinforced plastics to use—where and why
- Low-or-No-Pressure
- Matched Metal Die Molding
- Contains strand mat
- Performs
- Sheet molding compound
- Bulk molding compound (Premix)
- Resins and reinforcements
- The cross over or break even point
- Improved, mechanized, automated equipment
- Mechanization not enough
- Improved equipment
- Low cost high quality auto and truck finishes
- Casers in point
- Mach fender Hood assemblies
- Falcon window frame moldings
- Pressure-molded reinforced plastic reefer panels
- GMC wheelhouse
- International fan shrouds and grille frame
10. PLASTICS IN AIRCRAFT AND AEROSPACE

- Introduction
- Aircraft
- Progress
- Applications
- Plastic-ceramic Armor
- Structural and Nonstructural parts
- The all-plastics airplane
- Costs versus Fabrication
- Changing Environment
- Aerospace
Introduction
Applications
Fibres
Nonwoven structures
Whiskers
Matrix
Re-entry vehicle
Ionizing Radiation
Effects of Vacuum
Use of advanced composites in spacecraft
Material requirements
Outguessing studies for Lunar Module
Conclusions
11. HAND LAY-UP TECHNIQUES

- A simple hand lay-up
- A complex hand lay-up
- Drape molding
- Spray-up
- Wet lay-up low compression molding
- Moldless lay-ups
- Direct lay-ups or one-shot techniques
12. MATCHED DIE MOLDING-FABRIC, MAT AND PREFORM

- Introduction
- Definitions
- Scope
- Molding considerations
- Mat materials for molding
- Continuous Fibre mats
- Mold taper for matched molds
- Chopped glass performs
- Directed Fibre perform process
- Wet slurry process
- Preform screens
- Preform binders
- Molding with fabrics
- Vacuum injection molding
- Displacement of No pressure matched mold molding
- Flexible plunger molding
- Molding Presses
- Nonmetallic mold materials
- Matched metal die molding
- Matched mold materials and mold design
The positive types of molds
- Transfer molds
- Open flash molds
- The cut off mold
- Complex or combination molds
- Resins for pressure molding
- Resins
- Summary
13. STRUCTURAL LAMINATE BAG MOLDING PROCESS

- Introduction
- General description of processes
- The bag molding team
- Material and process Engineer
- Tooling Engineer
- Quality control Engineer
- Production personnel
- Bag molding materials and properties
- Structural property determination and relation
- Typical test data
- Specification values
- Design allowable values
- Bag molding processing specification
- Quality control procedures
- Acceptance testing
- Tool cure cycle determination
- Secondary materials for Bag molding
- Production Surveillance and Corrective Action
- Production procedures
- Bagging Area
- Curing Area
- Autoclave Curing
- Detail curing operation
- Autoclave cure
- Oven Cure
- Part removal and finishing
- Final inspection
- Designer
- Materials and process engineer
- Tooling
- Quality control
- Production
14. REINFORCED MOLDING COMPOUNDS

- Definition
- History
- Premix
- Sheet molding compound (SMC)
- Properties
- Applications
- Materials
- Resin
- Reinforcements
- Fillers
- Curing Agents and inhibitors
- Formulation
- Ingredients
- Premix
- Compounding
- Facility and equipment requirements
- Sheet Molding Compound
- Molding
- Mold Construction
- Release and Ejection of parts form the mold
- Molding presses
- Design
15. FILAMENT WINDING

- Introduction
- Basic material for windings
- Reinforcements
- Resin System
- The winding process
- Head counters
- Mandrels
- Behaviour of filament wound composites
- Netting analysis
- Filament winding machines
- Micromechanics and micromechanics
- Test methods
- Composite Mechanical Properties
- Summary
16. Continuous production methods

17. Ablation

- Analysis
- History
- Applications
- Material characteristics
- Environmental effects
- Pyrolyzed and graphitized plastics
- Modified phenolic ablators
Niir Project Consultancy Services (NPCS) can provide Process Technology Book on

**Production of Fibre Glass, Optical Glass and Reinforced Plastics**

(Fibre Glass Blown Wool or Insulation Products, Pyrolyzed and Graphitized Plastics, Mandrels, Whiskers, Fibres, Plastic-Ceramic Armor, Aircraft, Tanks, Optical Fibre, Nitric Acid, Solvents, Vinyl Acetate, Acrylonitrile)

See more

[https://goo.gl/PUkT12](https://goo.gl/PUkT12)
[https://goo.gl/u6glbu](https://goo.gl/u6glbu)
[https://goo.gl/Xklvzy](https://goo.gl/Xklvzy)

www.entrepreneurindia.co
VISIT US AT

www.entrepreneurindia.co
Take a look at Niir Project Consultancy Services on #Street View

https://goo.gl/VstWkd

 Locate us on Google Maps

https://goo.gl/maps/BKkUtq9gevT2
Our inexhaustible Client list includes public-sector companies, Corporate Houses, Government undertaking, individual entrepreneurs, NRI, Foreign investors, non-profit organizations and educational institutions from all parts of the World. The list is just a glimpse of our esteemed & satisfied Clients.

Click here to take a look

https://goo.gl/G3ICjV
Free Instant Online Project Identification & Selection Search Facility

Selection process starts with the generation of a product idea. In order to select the most promising project, the entrepreneur needs to generate a few ideas about the possible projects. Here’s we offer a best and easiest way for every entrepreneur to searching criteria of projects on our website www.entrepreneurindia.co that is “Instant Online Project Identification and Selection”
NPCS Team has simplified the process for you by providing a "Free Instant Online Project Identification & Selection" search facility to identify projects based on multiple search parameters related to project costs namely: Plant & Machinery Cost, Total Capital Investment, Cost of the project, Rate of Return% (ROR) and Break Even Point % (BEP). You can sort the projects on the basis of mentioned pointers and identify a suitable project matching your investment requisites.

Click here to go

http://www.entrepreneurindia.co/project-identification
Contact us

Niir Project Consultancy Services
106-E, Kamla Nagar, Opp. Spark Mall,
New Delhi-110007, India.

Email: npcs.ei@gmail.com, info@entrepreneurindia.co
Tel: +91-11-23843955, 23845654, 23845886, 8800733955
Mobile: +91-9811043595

Website: www.entrepreneurindia.co, www.niir.org

Take a look at NIIR PROJECT CONSULTANCY SERVICES on #StreetView

https://goo.gl/VstWkd
Niir Project Consultancy Services

AN ISO 9001:2008 COMPANY

www.entrepreneurindia.co
○ 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
- Business Plan
- Industry Trends
- Market Research Reports
- Technology Books and Directory
- 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

1. Requirement collection
2. Thorough analysis of the project
3. Economic feasibility study of the Project
4. Market potential survey/research
5. Report Compilation
Who do we serve?

- Public-sector Companies
- Corporates
- Government Undertakings
- Individual Entrepreneurs
- NRI’s
- Foreign Investors
- Non-profit Organizations, NBFC’s
- Educational Institutions
- Embassies & Consulates
- Consultancies
- Industry / trade associations
Sectors We Cover

- Ayurvedic And Herbal Medicines, Herbal Cosmetics
- Alcoholic And Non Alcoholic Beverages, Drinks
- Adhesives, Industrial Adhesive, Sealants, Glues, Gum & Resin
- Activated Carbon & Activated Charcoal
- Aluminium And Aluminium Extrusion Profiles & Sections,
- Bio-fertilizers And Biotechnology
- Breakfast Snacks And Cereal Food
- Bicycle Tyres & Tubes, Bicycle Parts, Bicycle Assembling
Sectors We Cover

- Bamboo And Cane Based Projects
- Building Materials And Construction Projects
- Biodegradable & Bioplastic Based Projects
- Chemicals (Organic And Inorganic)
- Confectionery, Bakery/Baking And Other Food
- Cereal Processing
- Coconut And Coconut Based Products
- Cold Storage For Fruits & Vegetables
- Coal & Coal Byproduct
Sectors We Cover  cont...

- Copper & Copper Based Projects
- Dairy/Milk Processing
- Disinfectants, Pesticides, Insecticides, Mosquito Repellents,
- Electrical, Electronic And Computer based Projects
- Essential Oils, Oils & Fats And Allied
- Engineering Goods
- Fibre Glass & Float Glass
- Fast Moving Consumer Goods
- Food, Bakery, Agro Processing
Sectors We Cover

- Fruits & Vegetables Processing
- Ferro Alloys Based Projects
- Fertilizers & Biofertilizers
- Ginger & Ginger Based Projects
- Herbs And Medicinal Cultivation And Jatropha (Biofuel)
- Hotel & Hospitality Projects
- Hospital Based Projects
- Herbal Based Projects
- Inks, Stationery And Export Industries
Sectors We Cover  cont...

- Infrastructure Projects
- Jute & Jute Based Products
- Leather And Leather Based Projects
- Leisure & Entertainment Based Projects
- Livestock Farming Of Birds & Animals
- Minerals And Minerals
- Maize Processing (Wet Milling) & Maize Based Projects
- Medical Plastics, Disposables Plastic Syringe, Blood Bags
- Organic Farming, Neem Products Etc.
Sectors We Cover

- Paints, Pigments, Varnish & Lacquer
- Paper And Paper Board, Paper Recycling Projects
- Printing Inks
- Packaging Based Projects
- Perfumes, Cosmetics And Flavours
- Power Generation Based Projects & Renewable Energy Based Projects
- Pharmaceuticals And Drugs
- Plantations, Farming And Cultivations
- Plastic Film, Plastic Waste And Plastic Compounds
- Plastic, PVC, PET, HDPE, LDPE Etc.
Sectors We Cover cont...

- Potato And Potato Based Projects
- Printing And Packaging
- Real Estate, Leisure And Hospitality
- Rubber And Rubber Products
- Soaps And Detergents
- Stationary Products
- Spices And Snacks Food
- Steel & Steel Products
- Textile Auxiliary And Chemicals
- Township & Residential Complex
- Textiles And Readymade Garments
- Waste Management & Recycling
- Wood & Wood Products
- Water Industry (Packaged Drinking Water & Mineral Water)
- Wire & Cable
Contact us

Niir Project Consultancy Services
106-E, Kamla Nagar, Opp. Spark Mall,
New Delhi-110007, India.

Email: npcs.ei@gmail.com, info@entrepreneurindia.co
Tel: +91-11-23843955, 23845654, 23845886, 8800733955
Mobile: +91-9811043595
Fax: +91-11-2385886
Website: www.entrepreneurindia.co, www.niir.org

Take a look at NIIR PROJECT CONSULTANCY SERVICES on
#StreetView

https://goo.gl/VstWkd
THANK YOU!!!