



**PARAG**  
Since 1987



**Parag Energy Efficient Axial Flow FRP Fans**

## *Mission*

With a commitment to quality and efficiency in our products and cater to the clients with an exclusive mark of excellence by always incorporating the latest innovations of our own Research & Development.

## *The Company*

Parag Fans and Cooling Systems Ltd. is a world leading manufacturer of High Efficiency Axial Flow FRP (Fibre Glass Reinforce Plastic) Fans and other related components. The company stretches itself on an 8 acre site in Dewas (Madhya Pradesh), India. Established in 1987, Parag Fans and Cooling Systems Ltd. houses state-of-the-art manufacturing facilities, test laboratory and a computer aided design center which enables it to manufacture High Performance Axial Flow Industrial FRP Fans. At Parag, R & D is a perpetual process which results in continuous improving & expanding of product lines, thus vividly satisfying the changing needs of customers. Adhering to its commitment towards providing quality products & services, since its inception, Parag has become the most reliable and cost effective manufacturer of Axial Flow Industrial FRP Fans in the world.



## *Technology*

Upgrading technology at regular intervals and incorporating the latest techniques to offer the ultimate fan, places Parag an edge over others. With the technology in use, Parag strives to achieve zero variability and eliminate rejections at all stages.



## *Manufacturing Facilities*

Meeting its commitment to provide quality and high standard products, Parag's state-of-the-art manufacturing facilities are fully loaded with all the modern and necessary equipment. Electric Oven, especially developed to accommodate Fan blades as required for 34 Feet diameter Fans, is utilised for curing of FRP Fan blades. Static / Dynamic Balancing Machine ensures proper balancing and vibration free operation of the Fan assemblies. Similarly, the Match Moment Machine is an electronic equipment used to synchronize the moment value of different fan blades of specific size. To ensure higher laminate strength and higher productivity, the mechanised process of resin transfer moulding is used which is made available with the help of RTM Equipment. Then for compression moulding of smaller / solid fan blades and allied components, the Hydraulic Press is utilised. The end result is Parag Fans with better performance and lower noise. Thus perfectly manufactured Parag Fans offer superior performance, increased efficiency and ease of installation as compared to conventional metallic Fans.



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## *Testing Facilities*

Each Fan model is rigorously tested to ensure that specified performance and quality standards are met. The Fan Performance Test Rig is a facility in accordance with accepted standard ANSI / AMCA 210-85 which is used to evaluate Aerodynamic Fan Performance. Another is the Universal Testing Machine to test mechanical properties of different material. Other facilities include: Heat Distortion Test Equipment to study the behavior of composite laminate at higher temperature, Muffle Furnace to ascertain the glass content of the glass fibre laminate, Cantilever Test Fixture to assure structural strength of FRP Fan blades, Pendulum Impact Tester, Hardness Tester, Sound Meter, Anemometer and Power Analyser. All these facilities are regularly upgraded to meet the required standards, thus providing the accurate test results and high quality products.



## *Products*

### *Energy Efficient Axial Flow FRP Fans*

Axial Flow FRP Fans from Parag incorporate the latest techniques in its manufacturing process as well as superior designing that results in high efficiency of the Fans. The efficiency difference with respect to low efficiency Fans is the cause of **Energy Saving**. The Fan blades are made up of light weight, corrosion resistant. Fibre Glass Reinforced Plastics (FRP) using Polyester or Epoxy Resin. Light weight FRP Fans also ensure a low moment of inertia, minimum wear & stress on motor, bearing and drive system. Due to the hollow construction of FRP blades they incorporate low drag aerofoil shape, greater blade twist, wider chord width & superior surface finish that result in excellent performance and high level of efficiency. These Fans incorporate a unique & optimum computer generated aerofoil design. Aerofoil design of Fan impellers ensures lower noise levels & less power consumption thus resulting in higher efficiency. The aerodynamically designed Fan blades, fabricated by composite material is an excellent alternative to ensure enhanced efficiency & critical advantages. They are also available with automatically adjustable pitch design to conserve further energy if required.

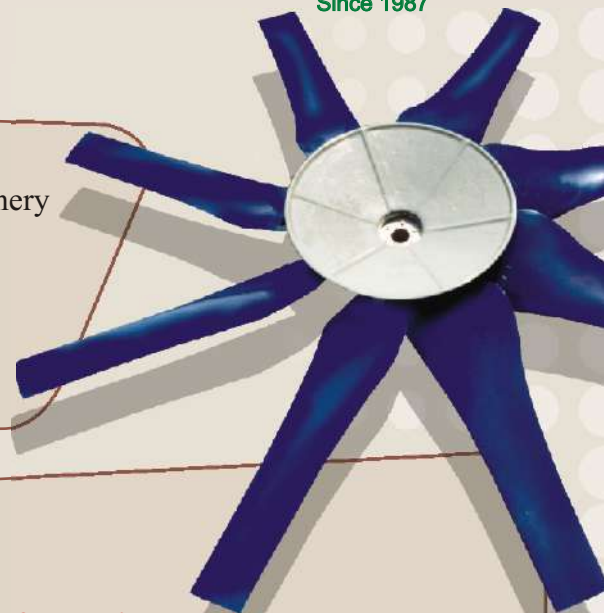
### *Applications*

- Cooling Towers
- Air Cooled Heat Exchangers/Condensers
- Mine Ventilation
- Radiators
- Industrial Ventilation & Exhaust
- Humidifiers
- Withering Troughs in Tea Industries

### *TIFAC Assistance*

The Advanced Composite Mission, a National Level Programme launched by TIFAC, Department Of Science & Technology (Govt. of India) has provided technology development assistance for developing FRP Axial Flow Fans with high efficiency to save precious energy for various industrial applications.





## Industries Served

- Power Plant
- Fertilizer Plant
- Pharmaceutical
- Steel Plant
- Oil/Gas Production, Processing and Transportation
- Chemical & Process
- Cement
- Textile
- Mine
- Petrochemical/Refinery
- HVAC
- Food Processing
- Tea

## Why Parag Axial Flow FRP Fans?

**Design :** Parag Fans are designed by utilizing the latest aerodynamic profiles. The Fan's tapered and twisted aerofoil design results in high efficiency.

**Energy Efficient :** More air with less power means less operating costs. Parag Fans provide 20 - 40% power saving as compared to conventional Metallic/GRP Fans. The installation of Parag Fans in newly constructed equipment reduce initial equipment and operational costs.

**Light Weight :** Parag Fans are lightweight and allow easy handling and maintenance, resulting in less down time. Further more the life of the gear box, motor and bearing is extended.

**Tough :** Fibre glass reinforced plastic construction of Parag Fans provides resilient, dependable blades with high fatigue strength.

**Low Noise :** Parag's unique aerofoil design reduces the operational Fan noise level considerably, as compared to conventional Metallic/GRP Fans.

**Corrosion & Erosion Resistance :** Since Parag Fans are made up of Fibre Glass Reinforced Epoxy or Polyester material, they are immune to corrosion. These Fans have in-built leading edge protection that prevents erosion from impinging water droplets. Even the hub assemblies, consisting of M.S. Hot dipped Galvanized/S.S. Plates with S.S. Hardware and C.I. Bushings, are corrosion resistant and provide years of trouble free service, even in severely contaminated environment.

**Durable :** Parag FRP Fans have a very high strength to weight ratio compared to conventional materials such as Aluminum and steel. This ensures longer life and durability of the Fans.

**Vibration Free :** Parag Fan blades are moment balanced for ease of installation. This also ensures their direct interchangeability. The hub assemblies are statically/dynamically balanced to ISO standards ensuring vibration free operation for years to come.

## Fan Technical Specifications

### Performance & Operating Ranges

<b>Fan Diameter</b>	: 600 mm to 10360 mm (2 ft. to 34 ft.)
<b>No. of Blades</b>	: 3 to 12
<b>Air Flow</b>	: 5 to 700 m <sup>3</sup> /sec
<b>Pressure</b>	: 40 to 1600 Pa
<b>Speed</b>	: 90 to 2500 RPM
<b>Power Rating</b>	: 1 to 1000 kW
<b>Operating Temp.</b>	: -20°C to +120°C

### Standard Features

Built-in Lead Edge Protection  
Ultraviolet Protection

Standard taper lock bushings or center bush as per user requirement

### Material of Construction

<b>Blades</b>	: Fibre Glass Reinforced Plastic Material Using Polyester or Epoxy Resins
<b>Hub Plates</b>	: Hot Dipped Galvanized Mild Steel or as per users specifications
<b>Blade Holding</b>	: Cast Aluminum Alloy Grade LM-6 or Cast Iron Grade FG200
<b>Blocks</b>	
<b>Seal Disk</b>	: Fibre Glass Reinforced Plastic
<b>Fasteners</b>	: SS-304
<b>Center Bush</b>	: Cast Iron Grade FG200

\* Fan Selection Software is available on request.

\* For any specific duties, application, sizes or special material of construction that are not covered in above range, please contact sales office.

\* Specifications are subject to change without prior notice.

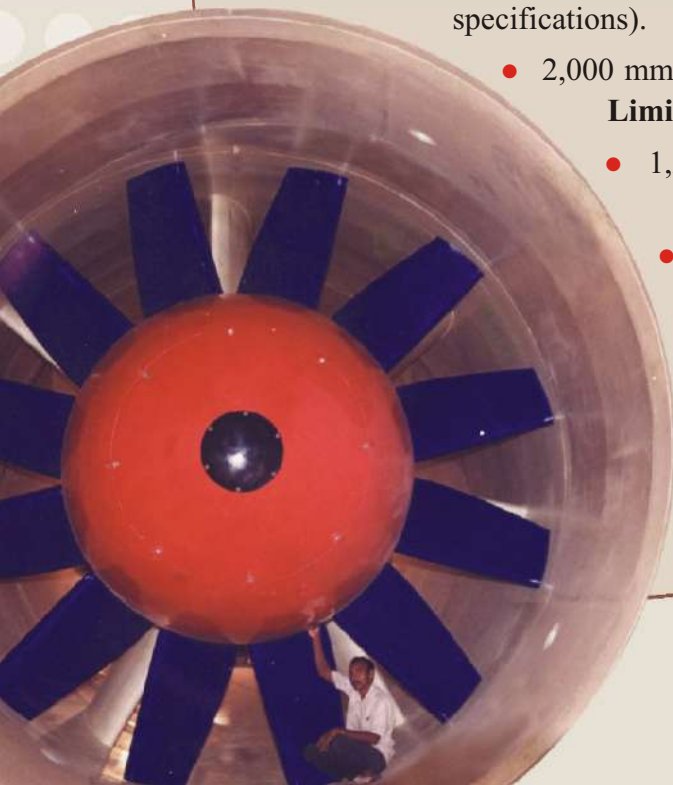
## *Research & Development*

At Parag innovation is the driving force behind the Company's success. Here R & D is continuous which results in improving and expanding the product lines by developing new and innovative products and manufacturing techniques. **The R & D at Parag is in association with the Department of Aerospace Engineering, Indian Institute of Technology, Bombay.** Because of its extensive R & D efforts, the company tackled some of the most challenging Fan applications including the following :

- Development of 4622mm Diameter FRP Fan along with Nose Spinner for the 'National Wind Tunnel Facility Project' of Department of Aerospace Engineering, **Indian Institute of Technology, Kanpur** (Fan was developed for their state-of-the-art low speed, closed circuit wind tunnel). The Fan is powered by 1000 kW motor.
- 'Development of Energy Efficient Axial Flow FRP Fan's in association with the **Technology Information, Forecasting & Assessment Council, (TIFAC) Department of Science and Technology (Government of India), New Delhi and Department of Aerospace Engineering, Indian Institute of Technology, Bombay.**

Five Fans of following specific applications were designed, developed and tested successfully in the project.

- 1,680 mm diameter Fan for Indian Railways Diesel Locomotive (as per **Research, Design & Standards Organisation, Ministry of Railways, Government of India** specifications.)
- 10,000 mm diameter Fan for Cooling Tower (as per **BDT** specifications).
- 4,267 mm diameter Fan for Air Cooled Heat Exchanger (as per **Engineers India Ltd.** specifications).
- 2,000 mm diameter Fan for Mine Ventilation (as per **Western Coalfields Limited** specifications).
- 1,200 mm diameter Fan for Humidification (as per **Ahmedabad Textile Industry's Research Association** specifications).
- 'Development of Energy Efficient Axial Flow FRP Fan System' in association of **Department of Scientific and Industrial Research (Government of India), New Delhi and Ahmedabad Textile Industry's Research Association, Ahmedabad.**



## *Parag's Worldwide Fan Installations*

Parag, through its High Performance Energy Efficient Axial Flow FRP Fans, has served many valued clients all over the world and successfully installed more than 12000 fans worldwide. These Fans are exported to countries like USA, South Africa, New Zealand, Australia, Thailand, Sharjah, Srilanka, Indonesia, Malaysia etc.



## *Quality Policy*

Keeping our customers as the nucleus of our business, we are committed to deliver quality products & services. We will strive to win customers utmost satisfaction & delight through competitive costs, superior quality products, prompt delivery and after sales services. Going through continuous R & D, innovations & product value analysis, we ensure that our products & services meet customers' present & future needs.

## *Technical Support*

Whether the requirement is from Retrofit or OEM Market, Parag application engineers can provide technical assistance as well as a cost-benefit analysis to determine the most optimum Fan selection for your requirement. We also offer on-site test and analysis services to evaluate fan performance.

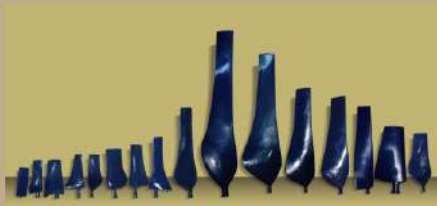
## *Service Support*

Our highly qualified and responsive service support team is available for on-site consultation, installation and repair.

## *How to Select*

Select the appropriate Parag Fan model from our technical catalog or Fan Selection Software that best suits your particular Fan duty requirements. Alternatively, you may contact our Sales Department for assistance. Please provide the following information when requesting a Fan model recommendation :

- **Application/Equipment**
- **Fan Diameter**
- **Required Airflow**
- **Static Pressure**
- **Fan RPM**
- **Motor kW (HP)**
- **Operating Temperature**
- **Elevation Above Sea Level**
- **Gear Box /Pulley Type & Ratio**
- **Shaft Bushing Details**
- **Fan Stack/Casing Details**
- **Inlet shape**



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