

# PROCESS HEATING

Innovative and Energy-Efficient  
Process Heating Solutions

## About Pennar

Pennar Industries Limited, a public Limited Company listed on the Indian bourses is headquartered in Hyderabad. Since its inception in 1988, the Pennar group has diversified into an Engineering conglomerate with interests spanning Engineering Services, Construction, Engineering Design, Solar & Aerospace and Enviro Business Unit.

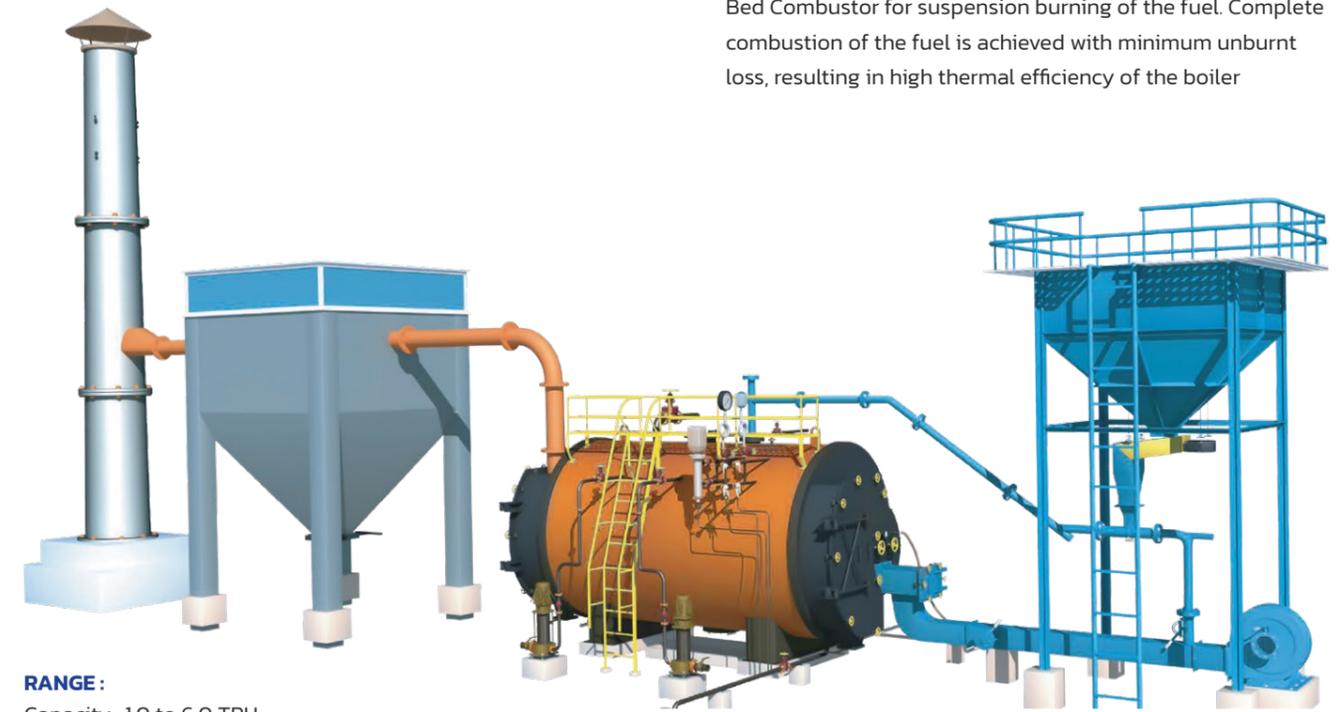
## TURBOSTEAM

### Fully Automated Pneumatic Drop Feed Husk Fired Boiler

Turbosteam Boiler has been designed specifically for the Rice Mill Industry. Over 2000 boilers working successfully, both in India and overseas are a testimony to the quality and reliability of our product design and manufacturing.

Husk is conveyed pneumatically from the bunker to the boiler furnace through a fuel feeding nozzle and a spreading cone arrangement.

The furnace is provided with a specially designed Bubbling Bed Combustor for suspension burning of the fuel. Complete combustion of the fuel is achieved with minimum unburnt loss, resulting in high thermal efficiency of the boiler.



**RANGE:**

Capacity : 1.0 to 6.0 TPH

Pressure : 10.54 / 17.50 Kg/Cm2 (g)

### Salient Features



Three Pass Integral Furnace  
Fully wet back boiler



Compact Foot Print



Multi Fuel Capability



Highly Efficient and  
Fully Automatic



Specially designed honey comb wall in furnace increases fuel retention time in furnace ensuring maximum combustion



Special design on distribution of Secondary and Tertiary combustion air for fuel combustion



Quality Components like Forged Steel Valve



Thorough Fuel and Air Mixing Ensures Minimum Unburnt loss



Quick Response to Fluctuating Steam Demand



Minimum Site Work and Very Low Refractory

## Turbosteam Installations

India		Overseas	
State	Qty	Country	Qty
Telangana / AP	614	Sri Lanka	28
Tamilnadu	582	Bangladesh	13
Chattisgarh	375	Nepal	3
Karnataka	257	Nigeria	2
Odisha	244	Thailand	2
Maharashtra	72	Indonesia	1
West Bengal	69	Ethiopia	1
Kerala	56		
Uttar Pradesh	12		
Gujarat	10		
Punjab	9		
New Delhi	9		
Madhya Pradesh	5		
Jharkhand	5		
Bihar	4		
Pondicherry	3		

This boiler comes with a flexibility for different biomass based fuels (Woodchips, Crushed Briquettes) and Sized Coal on a specially designed grate in furnace.

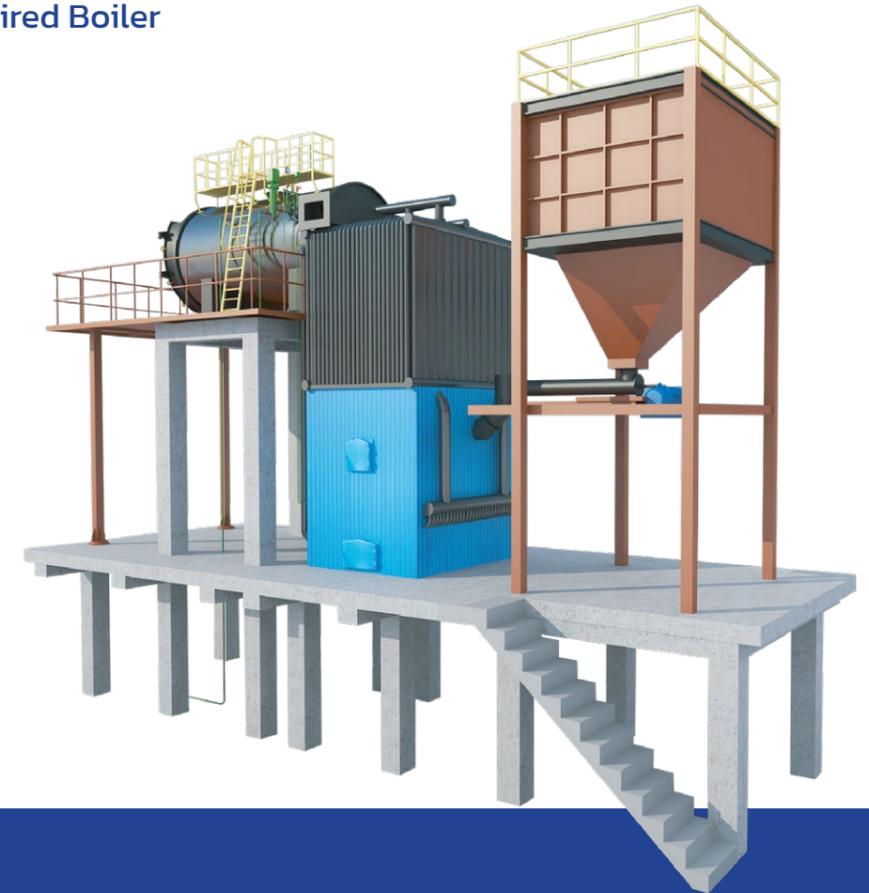


Description	UOM	POF-10	POF-20	POF-30	POF-40	POF-50	POF-60
Boiler Capacity (F&A 100°C)	Kg/hr	1000	2000	3000	4000	5000	6000
Design Pressure	Kg/cm2	10.54/17.5					
Fuel Firing Options		Rice Husk					
Firing System		Bubbling Bed					
Efficiency	%	80 + 2%*					
<b>Connected Electrical Load</b>							
For Rice Husk	KW	7	10	15	21	29	34
For Husk & Wood	KW	11	15	21	28	36	43
Recommended Chimney top Dia	mm	350	500	600	750	900	1000
Recommended Duct size	mm	273	400	500	650 x 450	750 x 500	1000 x 600
<b>Boiler House Dimensions</b>							
Length	mm	15,000	20,000	22,500	24,000	25,000	26,000
Width	mm	7,500	8,000	8,000	10,000	10,000	13,000
Height	mm	9,000	9,000	10,000	10,000	10,000	12,000

## ECOSTEAM

### A Truly Versatile Multi-Fuel Fired Boiler

The spiraling cost of Oil and Gas has led to the need to look at alternate source of fuels which can drastically cut down the energy costs for the industry. Ecosteam has been designed keeping this primary objective in mind – lower operating cost by using the best technologies for the combustion of solid fuels like Biomass and coal.



## Key Features



Combines the advantage of a smoke tube boiler with a water tube boiler- Ruggedness with high efficiency



Unique five sided membrane water wall with two pass shell configuration ensures better heat absorption.



Available with Multiple Combustor Options



Compatible for high pressure and superheated steam for Cogeneration systems



Liberally designed Shell for large water hold up to cater to fluctuating steam demand from the process



Gas tight Fin welded membrane furnace ensures minimum air ingress leading to less excess air and high efficiency

# COMBUSTORS FOR ECOSTEAM

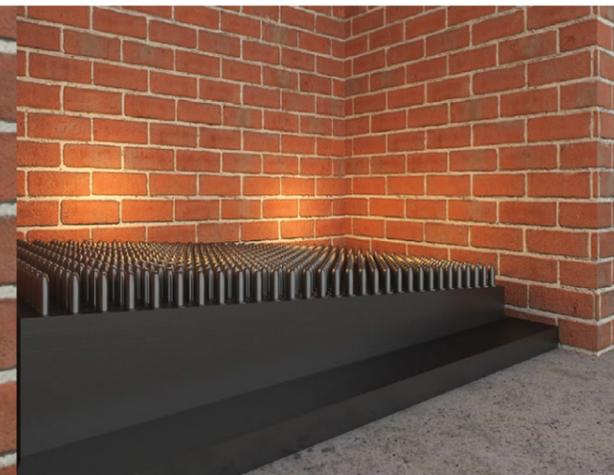
## Stationary Grate

The fuel here burns on a stationary flat grate. The fuel feeding can be either manual for low capacities or automated for higher capacity. Suitable for Wood & wood Chips/Coal/Coconut Shells/GN Shells

- Capacity - 2-10 TPH**
- Pressure - 10.54/17.5 kg/cm2(g)**
- Auto feeding option available**



Stationary Grate Combustor



Budding Bed Combustor

## Bubbling Bed Combustor

This combustor is designed to perform at higher efficiencies without the provision of Bed coils and is suitable for burning husk/coal/Crushed Briquettes. It is easy to operate and has less maintenance as compared to fluidized bed combustors.

- Capacity - 2-10 TPH**
- Pressure - 10.54/17.5 kg/cm2(g)**
- Auto feeding option available**



Reciprocating Grate Combustor

## Reciprocating Grate

This combustion system is primarily suited to burn high moisture woody biomass with low bulk density, like wood chips and briquettes. This is a fully automated system where the fuel moves on an inclined grate due to movement of alternate sets of grate bars. This action ensures continuous exposure of the fuel to air, and combined with a high residence time in the furnace ensures complete combustion of fuel.

The grate movement and combustion air for each zone can be regulated independently based on the fuel characteristics and this feature enables the boiler to adapt to any seasonal variations in the fuel properties.

- Capacity - 6 - 16 TPH**
- Pressure - 10.54/17.5 kg/cm2(g)**
- Higher capacity and pressure on request.**

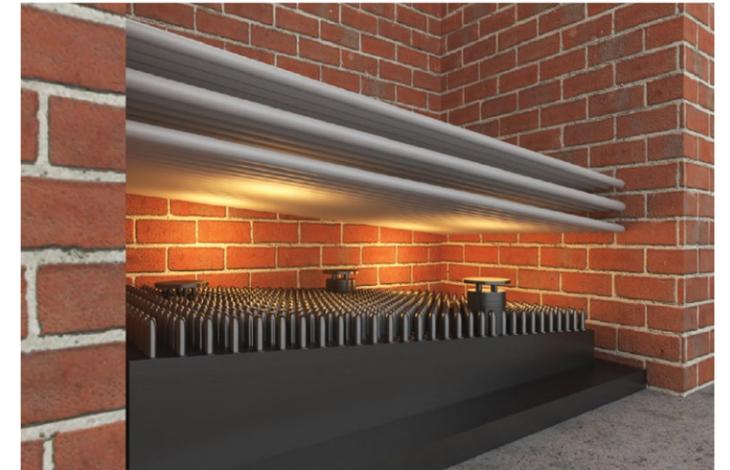
## Atmospheric Fluidized Bed Combustor (AFBC)

Fluidized Bed Combustion is best suited to burn high ash low grade fuels like Rice Husk, Coal, etc. Sized fuel particles are fed into the furnace either by a screw feeder in case of Over bed feeding system (typically for rice husk) or by pocket feeders in case of Under bed feeding system (for Coal).

This design has the ability to burn fuels with high moisture content and higher fine particles like imported coal.

Complete mixing of Air and sized fuel takes place in a turbulent bed and ensures complete combustion of fuel and low unburnt.

Large furnace volume and bed area is provided to efficiently burn a wide variety of fuels.



Fluidized Bed Combustor

- Capacity - 5 - 16 TPH**
- Pressure - 10.54/17.5 kg/cm2(g)**
- Temperature - Saturated / Superheated**
- Higher capacity and pressure on request.**

## TECHNICAL DATA SHEET FOR ECOSTEAM WITH AFBC

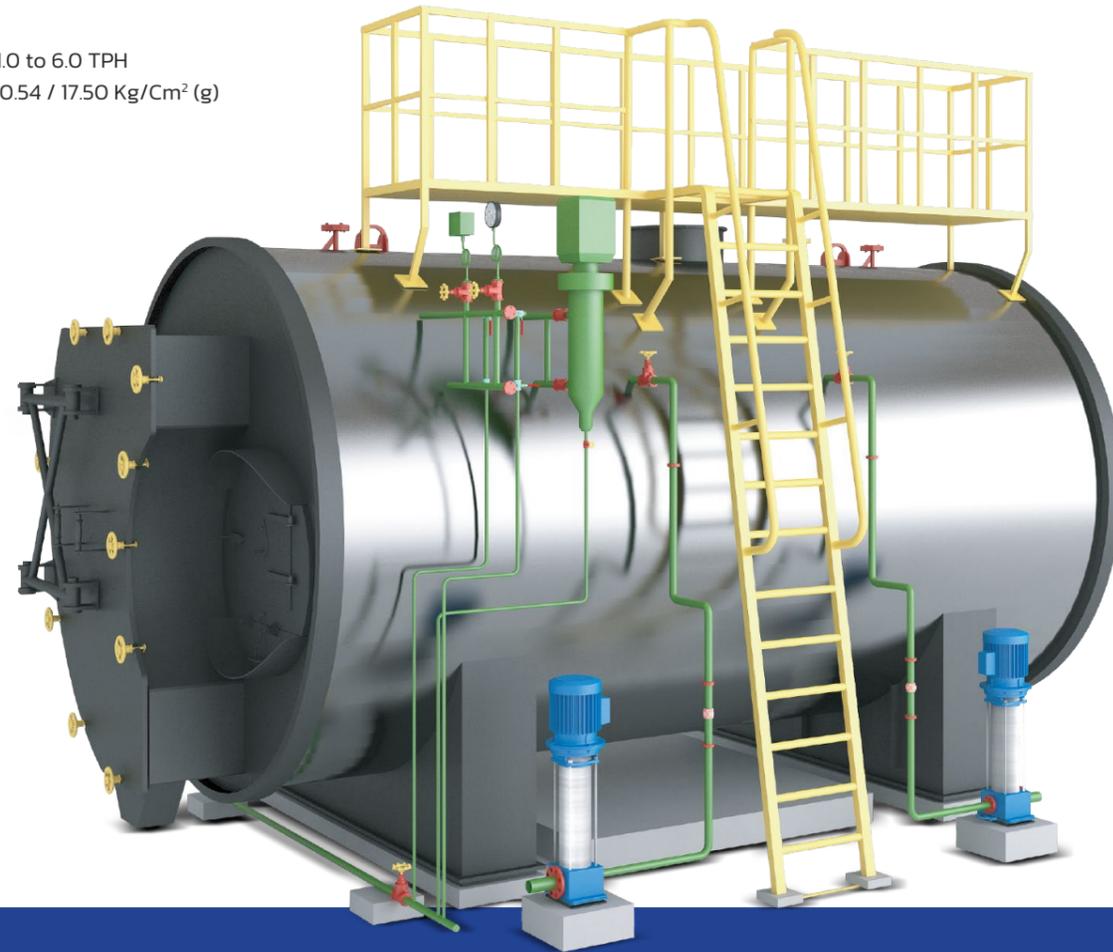
Description	UOM	5 TPH	6 TPH	8 TPH	10 TPH	12 TPH	14 TPH	16 TPH
Design Pressure	Kg/cm2	10.54 / 17.50						
Fuel		Rice Husk - Overbed Indian Coal/Indonesian Coal/Lignite - Underbed						
Efficiency on NCV Basis (Underbed/Overbed)	%	Rice Husk - 85/84   Indian Coal - 86.5/85.5   Indonesian Coal - 86.5 / NA   Lignite - 84.6 / NA*						
No of Compartment (Over bed-Husk)		One			Two			
No of Compartment (Under bed-Coal)		One	Two	Three				
Total Connected Load (Over Bed)	KW	41	53	65	81	100	112	122
Total Connected Load (Under Bed)	KW	54	66	85	111	126	143	161
Boiler House Dimensions								
Length	mm	23,000	25,000	25,500	26,000	26,000	27,000	27,000
Width	mm	8,000	8,500	9,500	10,000	11,000	11,500	12,000
Height	mm	10,000	10,000	11,000	11,000	11,000	11,500	11,500
Recommended Chimney Top Diameter	mm	650	700	800	900	1,000	1,100	1,200

# ULTRASTEAM

The High Efficiency, Packaged Solid Fuel fired Boiler

**RANGE :**

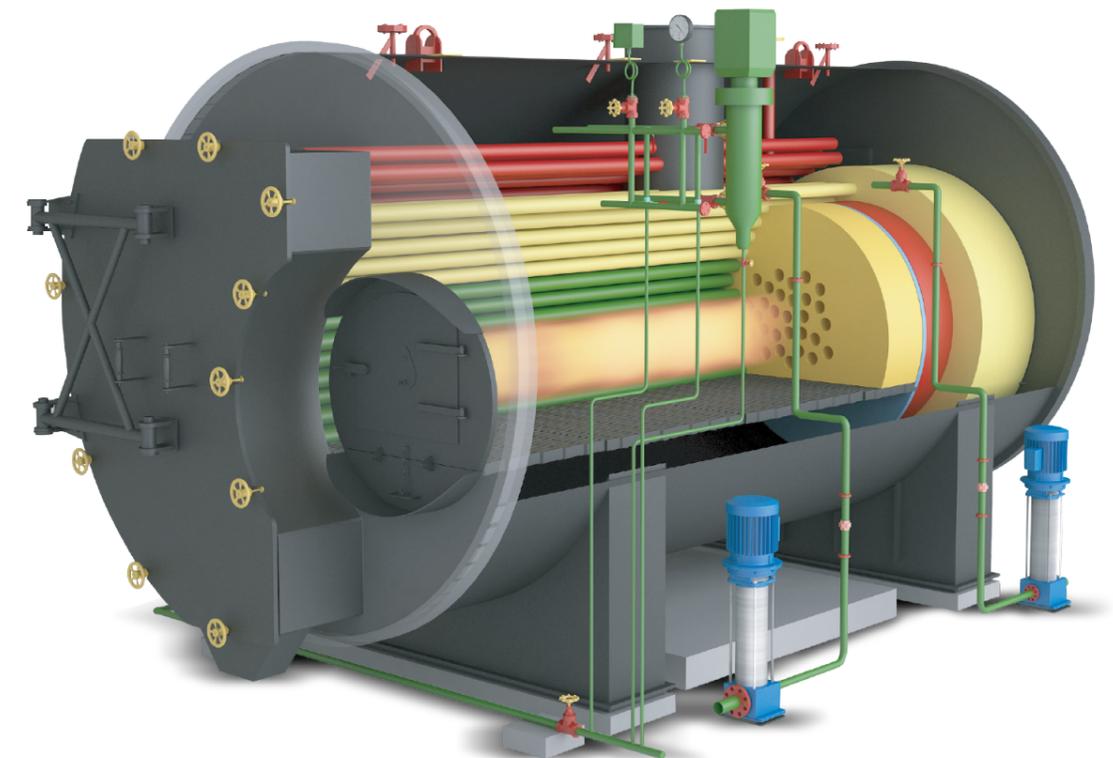
Capacity : 1.0 to 6.0 TPH  
 Pressure : 10.54 / 17.50 Kg/Cm<sup>2</sup> (g)



- Ultrasteam Boiler has been the workhorse for a wide variety of industries, delivering quality process steam at the best efficiency
- Ultrasteam is a Three Pass, Integral Furnace Boiler with a fully wet back design that avoids back-end refractory issues and prevents heat loss
- Compact footprint with minimum site work ensures less time for Installation and Commissioning
- Large Furnace diameter and Volume ensures easy charging of fuel into the furnace, and higher residence time for the fuel to burn completely
- Large Grate area ensures complete combustion of fuel with minimum unburnts
- Liberally designed pressure part provides adequate water holding capacity for quick response to fluctuating steam demands
- Lower elevation ash door permits easy ash removal from the furnace
- Capable of firing a wide variety of fuels like Wood/Coal/ Briquettes/Coconut shells/Ground Nut Shells, etc
- Option for Air Preheater / Water preheater as a heat recovery system to improve efficiency

## TECHNICAL SPECIFICATIONS

Description	UOM	IFS-10	IFS-20	IFS-30	IFS-40	IFS-50	IFS-60
Boiler Capacity (F&A 100°C)	Kg/hr	1000	2000	3000	4000	5000	6000
Design Pressure	Kg/cm <sup>2</sup>	10.54/17.5					
Firing System		Fixed Grate					
Fuel Firing Options		Wood Logs, Briquettes, Indian Coal.					
Efficiency (with HRU) (APH/WPH)	%	83.00%* (Coal) 82.00%* (Wood/Briquettes)					
<b>Connected Electrical Load</b>							
For Wood	KW	6.7	8.2	11.6	13.4	13.4	16.8
For Coal	KW	6.7	11.9	19.0	24.6	26.5	33.6
Coal with APH & MDC	mm	8.2	15.7	20.9	26.5	30.2	37.3
Recommended Chimney Top Dia	mm	354	500	650	750	800	900
Recommended Duct size (Dia)	mm	273	400	500	550	600	650
<b>Boiler House Dimensions</b>							
Length	mm	11,000	11,500	13,200	13,500	15,700	17,000
Width	mm	6,000	6,000	8,000	8,000	9,600	11,000
Height	mm	6,000	6,000	6,000	6,000	6,000	6,000

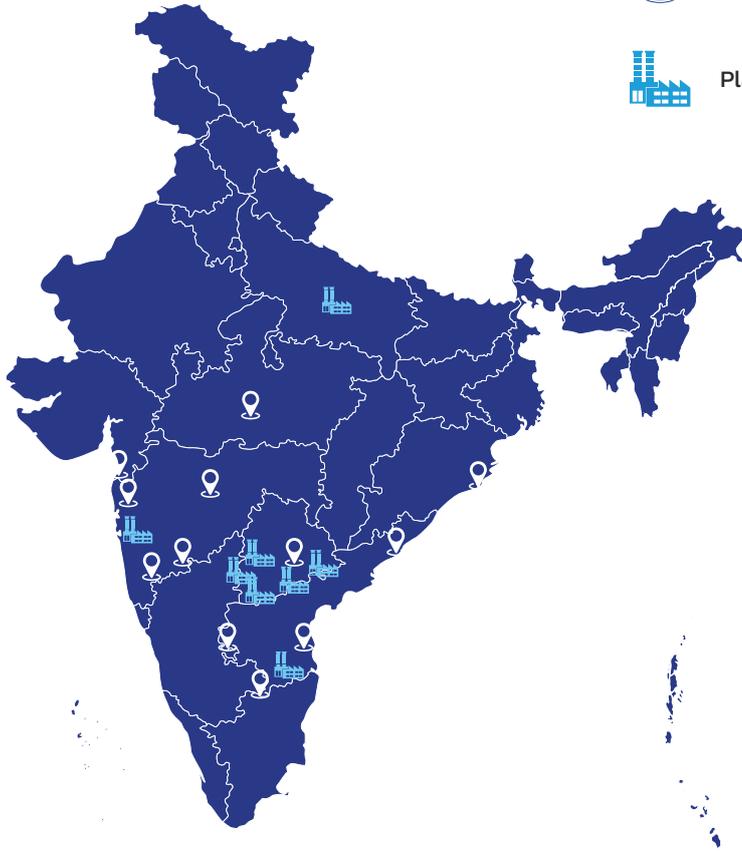




Sales Network Presence



Plants



**Telangana**

Patancheru  
Velchal  
Isnapur  
Sadashivpet-1  
Sadashivpet-2

**Maharashtra**

Tarapur

**Tamil Nadu**

Chennai  
Trichy

**Hyderabad**

Mallapur

**Uttar Pradesh**

Raebareli



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