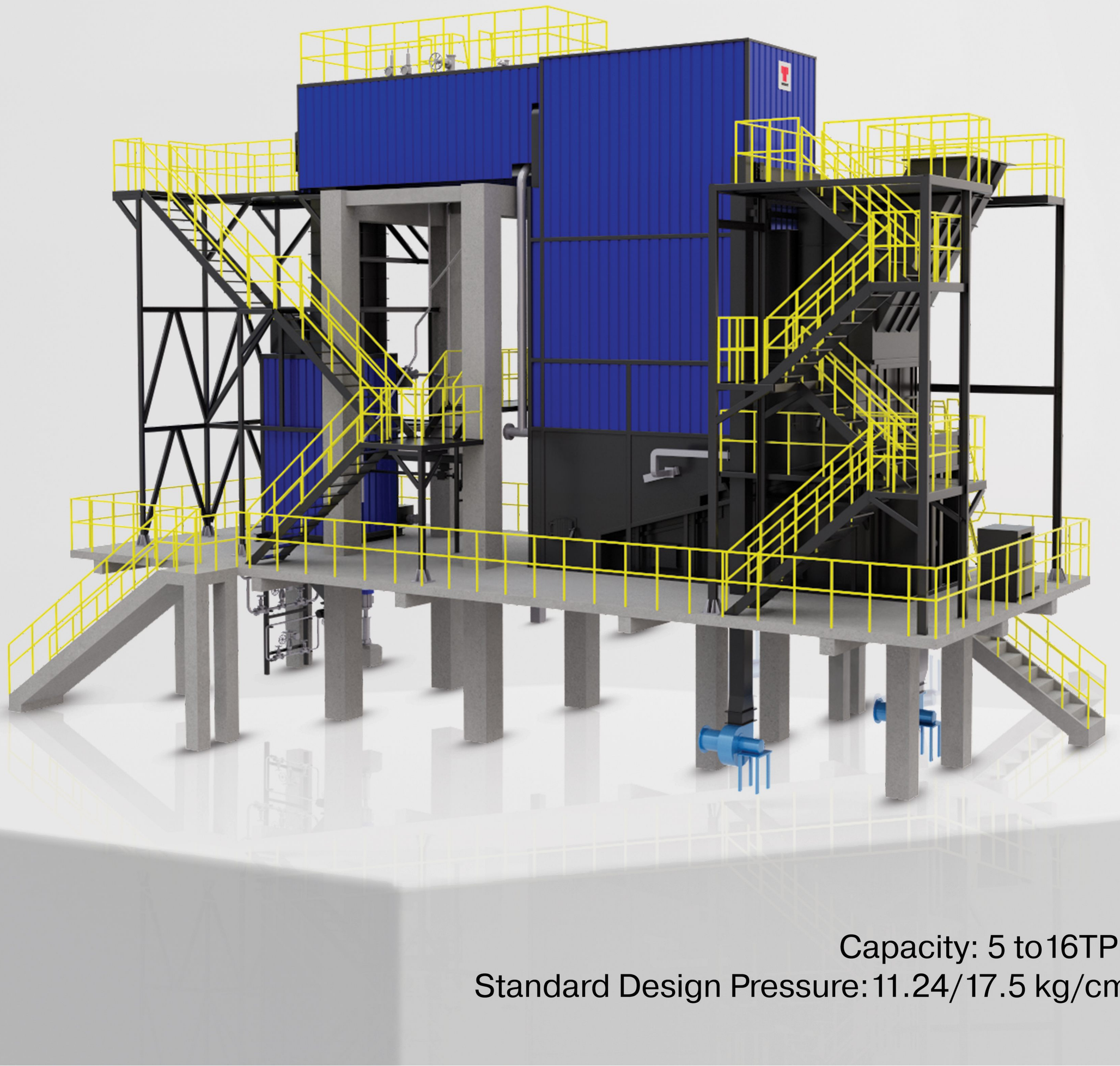
Process Heat Solutions

THERMAX

GreenPac™

Sustainable Boiler Solution with Universal Biomass Fuel Flexibility



Capacity: 5 to 16TPH

Standard Design Pressure: 11.24/17.5 kg/cm²

Conserving Resources, Preserving the Future.

Thermax provides systems and solutions in the critical domains of energy and environment. The products and services developed by Thermax help industries achieve better resource productivity and improved bottom lines, while maintaining a cleaner environment. The company's vision for the future is firmly anchored in the belief that, to stay competitive, business houses need to adopt sustainable practices.

Thermax's product portfolio covers heating, cooling, water and waste management, and specialty chemicals. The company also designs, builds and commissions large boilers for steam and power generation, turnkey power plants, waste-to-energy systems and air pollution control projects.

Unlocking the Power of Raw Biomass for Sustainable Energy

As the world seeks to balance economic growth with environmental sustainability, renewable energy solutions are essential. Biomass as an energy source is one of the key levers in the ongoing energy transition, offering a sustainable means of reducing emissions and converting waste into valuable energy.

However, using certain biomass fuels in its raw form bring challenges. Its low bulk density and calorific value, compared to fossil fuels, mean that larger volumes are required to produce the same energy, making transportation, storage, and handling more difficult. Using biomass in its natural form—without converting it into briquettes—presents a clear benefit by avoiding the energy-intensive briquette-making process, especially since briquettes are often crushed before use in boilers and heaters.

For small to medium capacity boilers and heaters, these challenges become more pronounced. Biomass varies in size, moisture content, and availability, making combustion less predictable. This highlights the need for specialised technologies that can handle the diverse nature of raw biomass efficiently. By leveraging these technologies, industries can benefit from a cleaner and more sustainable energy source, without compromising on performance.

GreenPac™

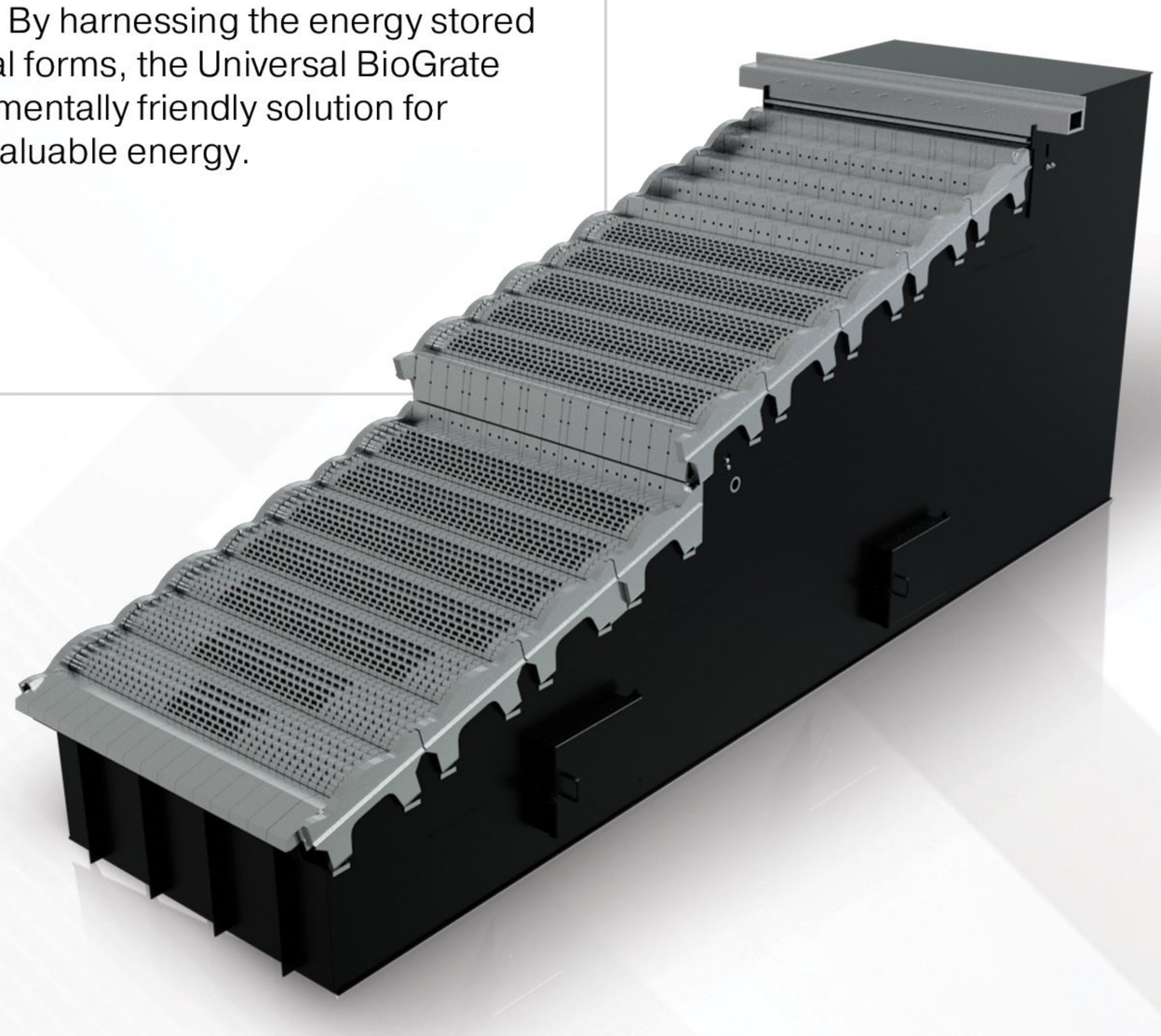
GreenPac is a hybrid smoke cum water tube boiler featuring a novel Universal BioGrate combustor, which offers multi-fuel flexibility, high uptime, and fully automatic, hassle-free operation. Specifically designed for efficiently burning various low-density, low calorific-value biomass fuels in their raw form, GreenPac provides a cost-effective and environmentally friendly approach to converting agricultural waste into useful energy. This robust product is modular, offered with pre-engineered layouts and balance of plant components, reducing site activities and installation time.

Features

- Combustion technology for efficiently handling biomass combustion challenges, especially those of voluminous and low bulk density biomass
- Multi-fuel flexibility, capable of burning low-grade biomass in its raw form, resulting in significant fuel savings
- Unique heat exchanger design to ensure high uptime, even with fouling fuels
- Silent combustion to reduce carryover and ensure lower emission
- Fully automatic operation for minimal manual intervention
- Fuel feeding mechanism designed to ensure hassle-free and safe fuel feeding
- Pre-engineered BOP designed for ergonomic, aesthetic & safe installation

Universal BioGrate

The Universal BioGrate is an innovative technology specifically designed for small to medium-sized boilers and thermic fluid heaters. Leveraging advancements in reciprocating grate technology, it enhances fuel flexibility to efficiently handle extremely low-bulk-density, fibrous biomass. By harnessing the energy stored in diverse biomasses in their natural forms, the Universal BioGrate offers a cost-effective and environmentally friendly solution for converting agricultural waste into valuable energy.



Features

- Independent control of grate speed & air for multi-trolley universal biograte
- Designed to operate with variable grate speed optimised to manage fuel layer thickness as well as to ensure complete combustion
- Designed with multiple trolleys and sharp steps between trolleys to improve the intermixing of fuel and combustion on grate
- Special arrangement using multiple casting design with a combination of sharp edged block grate bar, full nozzle & no nozzle casting, improves mobility of fuel & maximise combustion
- Special secondary air arrangement to increase turbulence in the freeboard area/furnace

Benefits

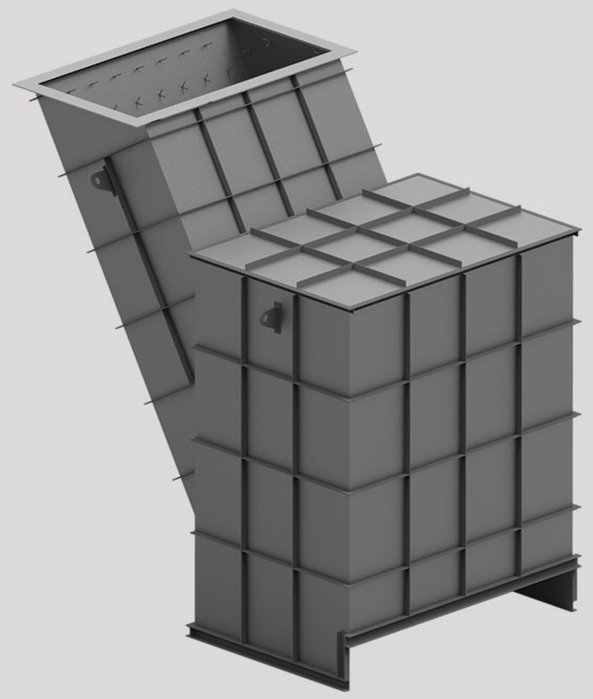
- Ability to efficiently burn low calorific value and voluminous fuels
- Accommodate low-grade fuel in "As Is" condition leading to significant fuel savings
- Improved combustion efficiency
- Silent combustion to reduce carryover & ensures lower emission

Key Components- Features & Benefits

Fuel Feeding Mechanism

Incorporates the double-flap mechanism and refractory-lined angular feeding chute to allow a smooth entry of fuel into the furnace. The innovative de-volatilisation chamber accelerates the release of volatile matter & accommodates combustion to prevent backfiring.

- Liberally sized chute with optimal inclination accommodates voluminous and non-uniform fuel to help prevent chocking
- Separate space for release & burning of volatile ensures effective utilisation of the grate and improves safety
- Double-flap mechanism ensures modulation of fuel as per process needs and helps prevent backfiring

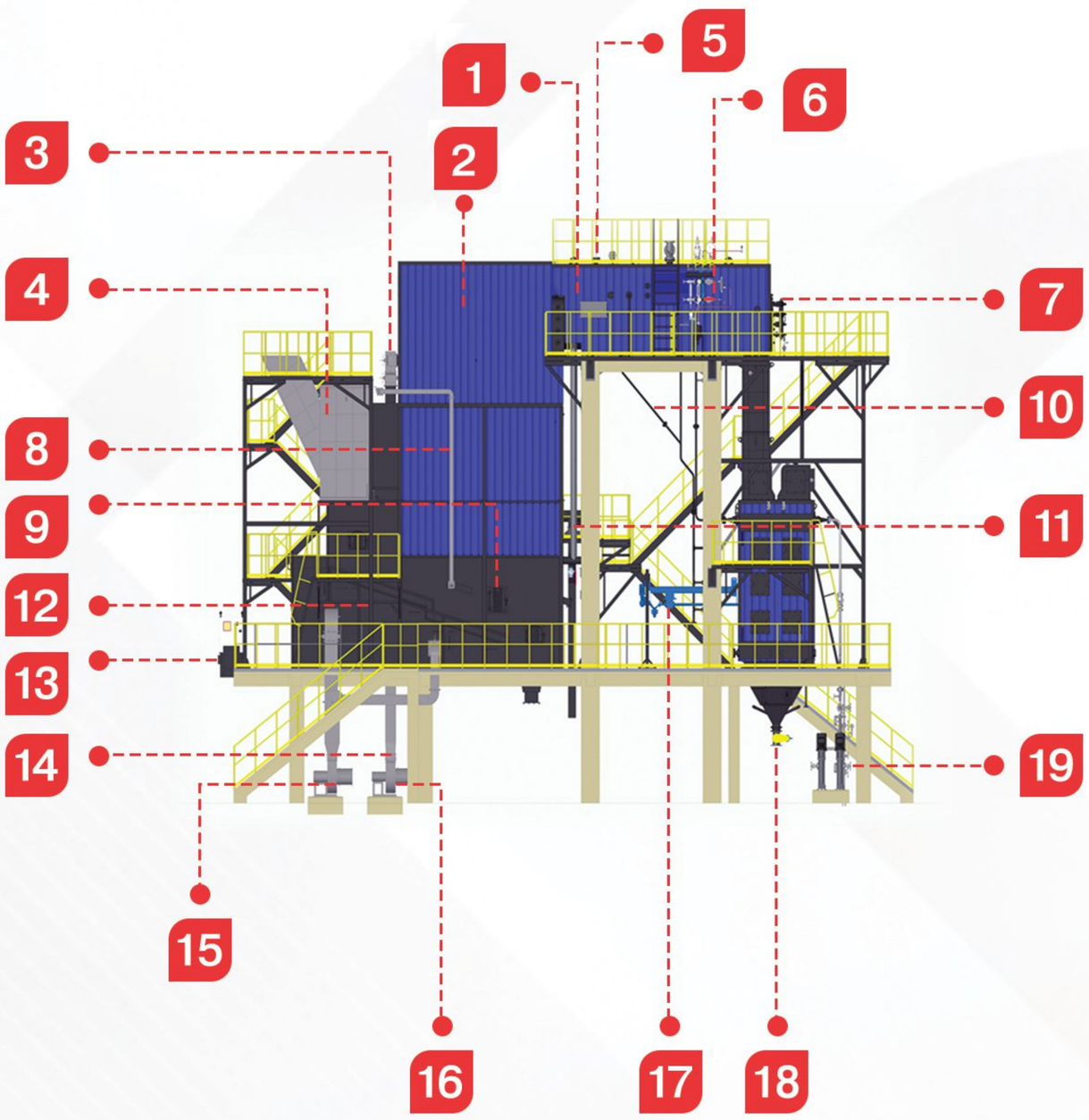


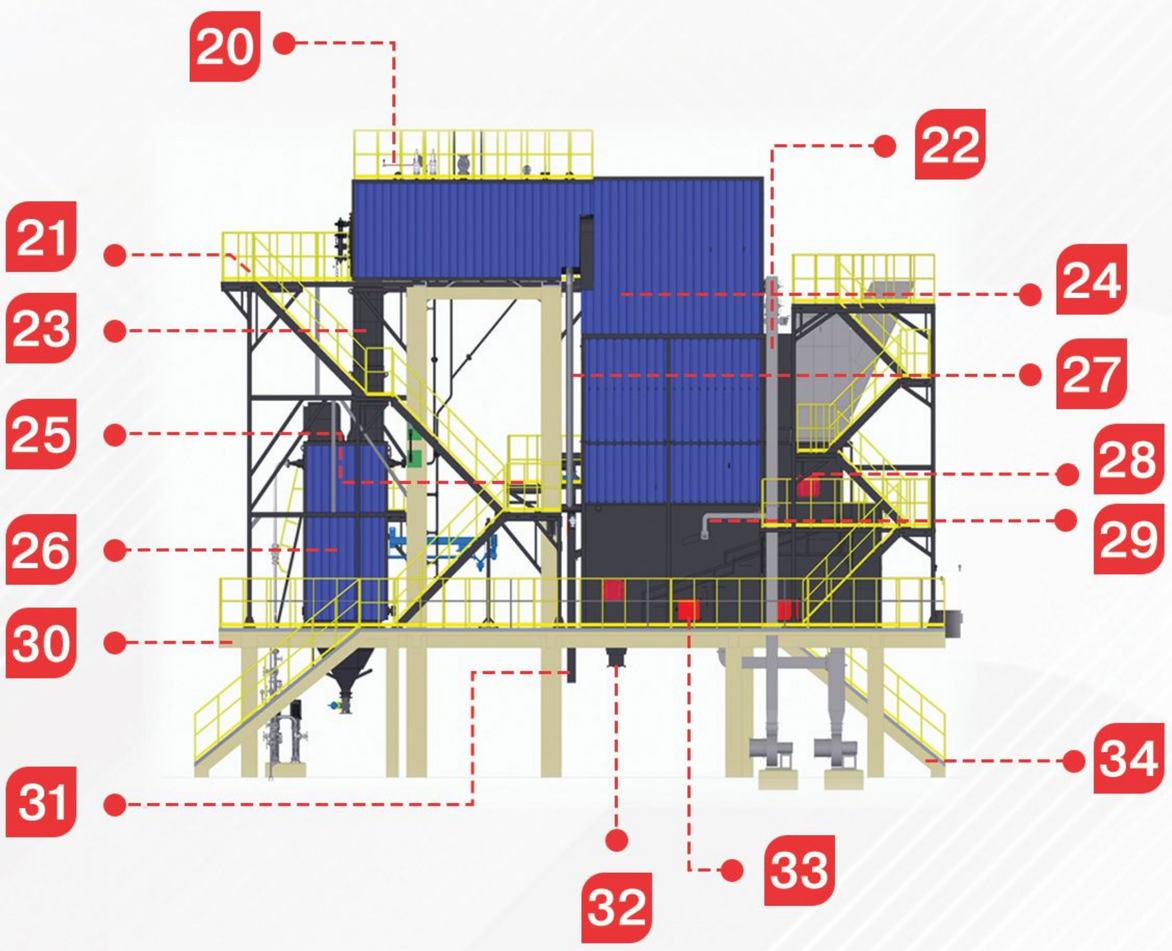
Membrane Panel Assembly

Unique all-side enclosed membrane panel assembly to provide the best environment for combustion, radiative heat transfer & ash separation

- Liberally-sized tall furnace ensures high residence time & low furnace outlet temperature (FOT) to achieve higher efficiency, lower fouling & slagging
- All side MPA ensures significant reduction in refractory to reduce maintenance and site work
- Multi-pass furnace with a baffle wall helps achieve high heat transfer
- Tube strip-design without flow constrictions helps avoiding phase startification, lowers pressure drop & improves circulation ratio
- Ash settling chamber & removal screw ensures effective ash separation & better uptime

Boiler Components



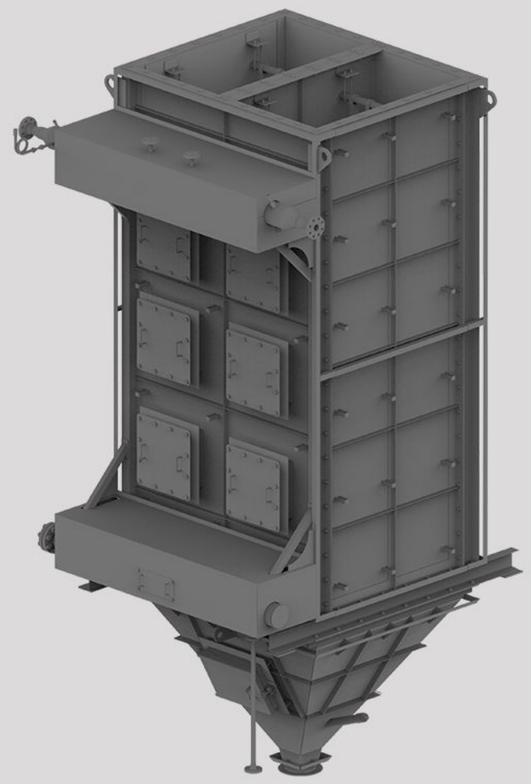


1. BOILER SHELL
2. MPA
3. ELECTRICALLY ACTUATED DAMPERS
4. DROP CHUTE
5. WATER LEVEL CONTROLLER
6. WATER LEVEL GAUGE
7. DANBLAST
8. SECONDARY AIR DUCTING
9. GRATE ACCESS DOOR
10. DRAIN PIPING
11. ASH SCREW FOR ASH SETTLING MPA
12. UNIVERSAL BIOGRATE
13. HYDRAULIC POWER PACK
14. PRIMARY AIR DUCTING
15. PRIMARY AIR FAN
16. SECONDARY AIR FAN
17. SHORT RETRACTABLE SOOT BLOWER
18. RAV FOR ECONOMISER
19. FEED WATER PUMPS
20. SHELL TOP ACCESS PLATFORM
21. SHELL CLEANING PLATFORM
22. TERTIARY AIR DUCTING
23. FG DUCTING
24. ASH SETTLING MPA
25. ASH SETTLING CHAMBER ACCESS POINT
26. ECONOMISER
27. RISER AND DOWNCOMER
28. FUEL RAKING DOOR
29. FURNACE STRUCTURE
30. CIVIL PLATFORM
31. SHELL BLOWDOWN
32. BED ASH REMOVAL POINT
33. ASH REMOVING DOOR
34. CIVIL LADDER FOR ACCESSING PLATFORM

Economiser

Serpentile economiser recovers waste heat from the flue gases and pre-heats the water being fed to the boiler, thus enhacing the efficiency of boiler.

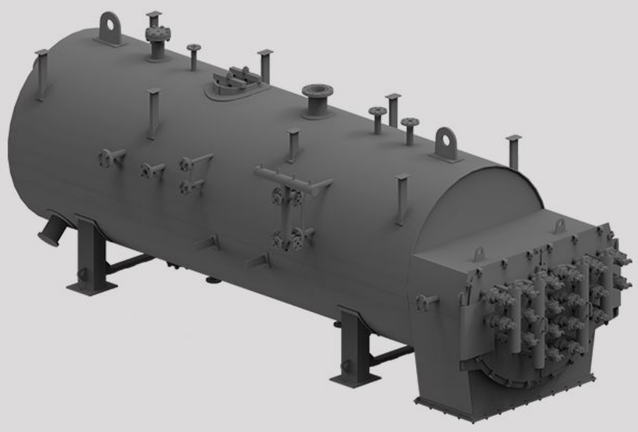
- Two-pass design allows packing of large heat transfer area while ensuring a compact footprint
- Soot blower mechanism ensures automatic cleaning
- Ash hopper & RAV allow convenient online ash removal & avoid air ingress



Danblast

Danblast is an automatic, online, and continuous soot blowing mechanism for smoke tubes using Danish technology.

- Utilisation of compressed air to create shock waves prevents soot buildup & avoids prolonged noise exposure
- Unique adjustable sequential operation reduces the use of compressed air for tube cleaning significantly



Thermowiz™ Nxt

Advanced electrical control system. Experience the power of technology with Thermowiz™ Nxt, a digitally powered device for monitoring, control, and protection of equipment.

- User comfort - Touch screen graphical operator interface
- MIS reporting - Real-time trends, and data logging downloadable on a USB drive
- Networking - Embedded ports on Ethernet. Serial. CAN Open protocols
- Program modification - Download programs through a USB drive

EDGE Live

GreenPac™ comes enabled with EDGE™ Live, an intelligent IIoT solution with ensured data security that enables

Features

- Efficiency monitoring and diagnostics
- Data-driven preventive maintenance scheduling
- Remote monitoring of all critical parameters

Benefits

- Higher steam to fuel ratios & lower fuel bills
- Low life cycle cost & lower downtime
- Seamless communication

Pre-engineered Balance of plant components

Design & execution of balance of plant equipment play a major role in user experience. A well engineered plant compliments product performance with enhanced safety, ergonomics and aesthetics.

- Ancilliary components pre-engineered to the best standards ensure safety & ergonomics
- Pre-engineered components ensure hassle-free installation
- Optimised layouts ensure compact footprints

*Note- Civil works would be in the customer's scope.

Technical Specifications

Description	Unit	GP 50	GP 60	GP 80	GP 100	GP 120	GP 140	GP 160
Boiler Parameters								
Boiler type		Modular, Hybrid (Water cum smoke tube)						
Design Code		IBR 1950 (with latest amendments)						
Mode of firing		Automatic*						
Ash removal		Automatic*						
Steam parameters								
Max steam output (F & A 100˚C)	Kg /Hr	5000	6000	8000	10000	12000	14000	16000
Design Pressure (SVLOP)	kg /cm^2(g)			11.25 or 17.5				
Operating Temperature	˚C			188 or 208				
Dryness	%			98				
Fuel	**Indirect Efficiency***	**Fuel Consumptions (kg/h)***						
Paddy Straw	83%	1145	1374	1831	2289	2747	3205	3663
Bagasse	84.5%	1247	1497	1995	2494	2993	3492	3991
Sugarcane trash	84.5%	960	1153	1537	1921	2305	2689	3074
Jute caddy	83.5%	1107	1328	1771	2213	2656	3099	3542
Maize stalk	86%	946	1135	1513	1892	2270	2648	3027
Palm fibre	84.5%	1201	1441	1922	2402	2883	3363	3844
Mustard stalk	85%	1073	1287	1716	2145	2574	3003	3433
Soya stalk	85.5%	821	986	1314	1643	1971	2300	2628
Total connected Load for Bag Filter & Opticlone/Cyclomax in parallel								
11.25 kg/cm^2(g) SVLOP	kW	59	69	84	108	129	154	182
17.5 kg/cm^2(g) SVLOP		62	72	92	116	133	162	189
Installation - Dimensions & other details (refer image below)								
Width	mm	7650	8750	8900	9350	9550	9750	9800
Length	mm	16850	16850	17850	17850	17850	18800	19700
Height	mm	12850	12850	13000	13000	13000	14000	14500
Dry weight of single largest module	kgs	7735	8168	10141	12222	13002	16704	18533
Chimney Top Dia	mm	750	820	950	1060	1160	1250	1340

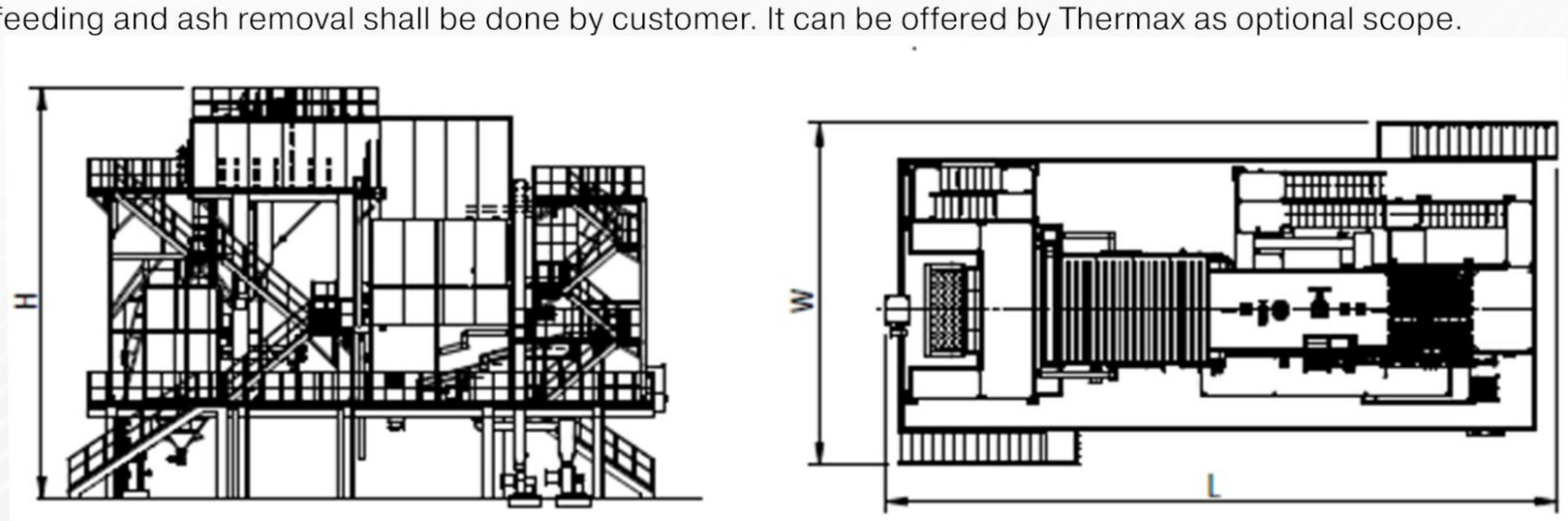
*Note-

The Indirect efficiency mentioned above is on NCV basis and having tolerance of +/- 2%. Indirect Efficiency measurement is as per BS 845 Part 1.

Fuel consumption figures are indicative and given at rated boiler capacity. Kindly refer technical offer for details of fuel composition considered

Heat recovery unit is essential for the performance commitments mentioned above.

Arrangement for fuel feeding and ash removal shall be done by customer. It can be offered by Thermax as optional scope.



Industrial Applications

Edible oil

Textile

Plywood

Spice

Conserving Resources,
Preserving the Future.

THERMAX

- Air Pollution Control
- Boiler and Heater
- Build-Own -Operate
- Chemical
- Cooling
- Projects and Energy Solutions
- Process Heating
- Renewable Energy
- Water and Waste Solutions

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