



Process Heating



POWERMAX

Bi-Drum, Water Tube, High Efficiency Boiler



Conserving Resources, Preserving the Future.

Thermax is a leading conglomerate in the energy and environment space and a trusted partner in energy transition. Thermax's extensive portfolio includes clean air, clean energy, clean water and chemical solutions. Backed by its longstanding industry partnerships across multiple sectors, Thermax has cultivated strong expertise in audit, consulting, execution, and maintenance coupled with digital solutions, ensuring a unified energy-management experience. Leveraging its distinctive engineering capabilities, Thermax converts costs to profits while protecting the environment – a win-win for the industry and society at large.

POWERMAX - The Ideal Boiler for Continuous Operations and Superheated Steam

Presenting the versatile two-drum, water tube design, solid fuel-fired boiler, popularly known as the Bi-Drum, that is custom made for your application.



High pressure steam due to its water tube design



High degree of superheat due to large super heater



Uninterrupted operations



The combustor can be adapted any type of fuel firing. Fluidised Bed Combustion, Travelling Grate, Pulsating Grate or Dumping Grate-making the boiler suitable for burning any kind of solid fuel



Challenges in Biomass Combustion

The age-old challenges faced in biomass combustion have been quite a few. The inconsistent supply of fuel and the seasonal variation in fuel properties make biomass fuels difficult to combust at desired efficiency levels. Biomass fuels are usually low in density, have higher moisture percentages and offer lower calorific values. Hence, the fuel required to burn is in larger quantities as compared to fossil fuels.

The successive oscillation of the grate linkages pushes the fuel into different combustion zones, characterised by drying, volatile generation, volatile combustion, char combustion and ash removal. The continuous mixing of fuel the bed helps to combust low-density, high-moisture, and low-calorific value fuel with slagging and fouling characteristics.

Thermax's Reciprocating Grate Technology

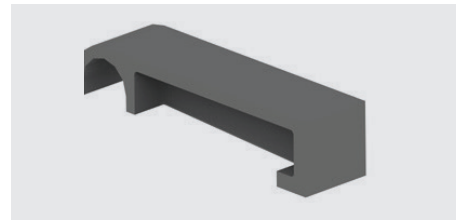
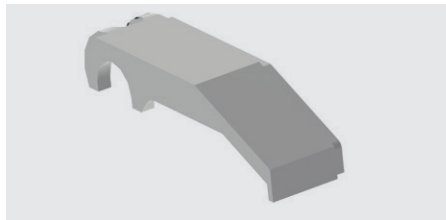
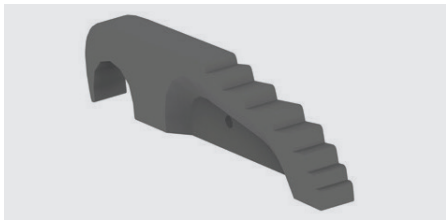
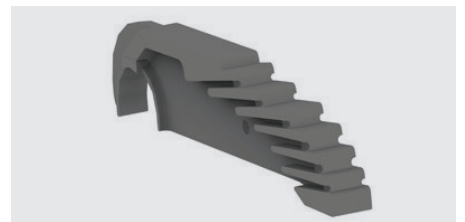
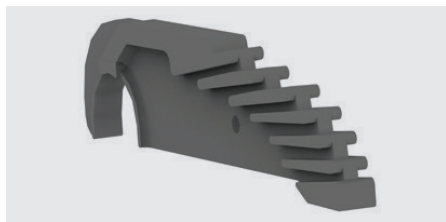
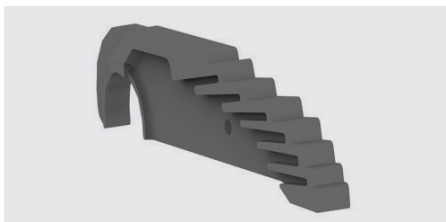
Features

- Constructional features facilitate physical division of the grate into various combustion zones, with independent damper-controlled air connections to ensure optimal air distribution over grate.
- Independent trolley movement in each zone, to suit combustion patterns of specific fuel to provide the required fuel flexibility for biomass combustion.
- Zone-wise speed and air quantity variation provides flexibility to deal with seasonal changes in the fuel.



Unique Grate Bar Design

- Grate bars with multiple geometries and perforations help to achieve width-wise and length-wise air variation in a trolley. This also helps to eliminate the tongue-type structure on the combustion grate by creating a uniform combustion rate on the trolley.
- Grate bar castings with higher proportions of chromium (>26%) and nickel, to achieve desirable abrasion resistance at higher temperatures. This ensures high reliability, minimal wear of the grate bars and a greater life.



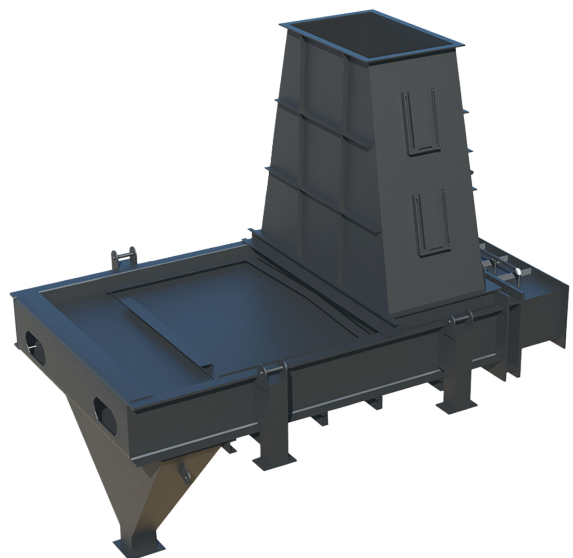
HYDRAULIC RAM PUSHER - An Ideal Fuel Handling System for low bulk density and non-uniform fuels

Working Principle

Fuel stored in the dosing bin, falls on the wear plate of the ram pusher. The pusher element pushes fuel towards furnace chute via a fuel feeding duct. Stroke & speed of the pusher element is controlled by the hydraulic cylinder. Cutting knives on movable & fixed portions cut the large size of fuel pieces.

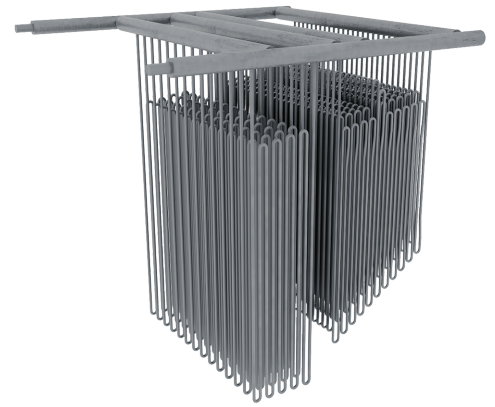
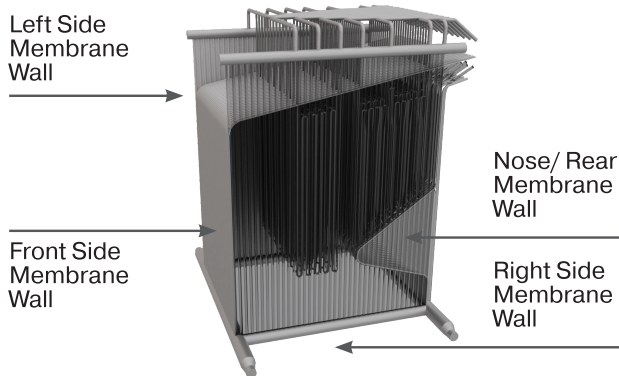
Unique features

- Safety System
- Easy Maintenance
- Steady Combustion
- Easy Integration



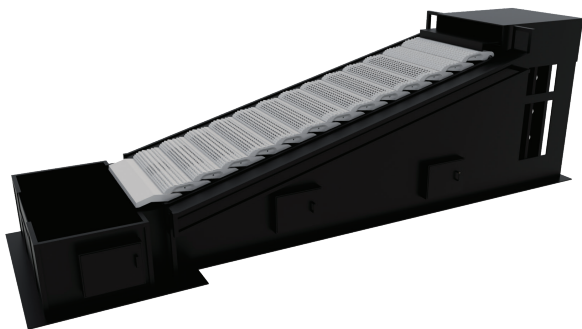
Membrane Water Wall Furnace

The furnace of the Powermax is made of membrane walls. This is an arrangement in tube and fin construction, which provides the advantage of a gas tight chamber, preventing the influx of air which, in turn, results in higher efficiency. The fuel characteristics determine critical parameters like height and footprint of a furnace, which ensure complete combustion. In superheated boilers, the furnace is provided with a nose-wall. This provides radiation shielding to the convective zone of the superheater and prevents any overheating of the convective zone of the superheater tubes. The nose wall guides the flue gases to cover the entire convective superheater area. The membrane wall furnace also ensures that flue gases are cool enough to enter the boiler bank, and that no fouling takes place.



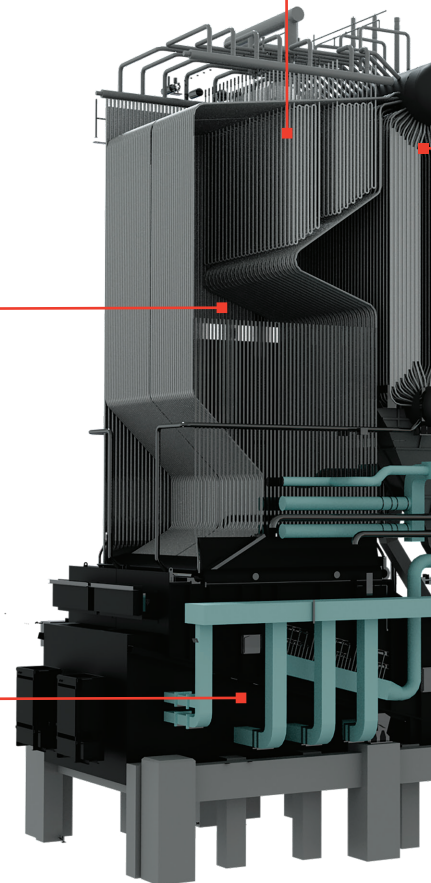
Reciprocating Grate Combustor

Our Reciprocating Grate Combustion Technology, transferred from the renowned Lambion GmbH, offers exceptional versatility by efficiently handling over 100 different biomass fuels. This technology adeptly manages seasonal variations in fuel supply, ensuring consistent performance year-round. It boasts high combustion efficiency with minimal unburnt residues, significantly reducing fuel costs and, consequently, operational costs. Additionally, its robust and reliable design requires minimal maintenance, providing a dependable solution for various biomass combustion needs. Furthermore, it has the capability to combust high fouling fuels and low bulk density fuels, enhancing its applicability across diverse fuel types.



Air Preheater

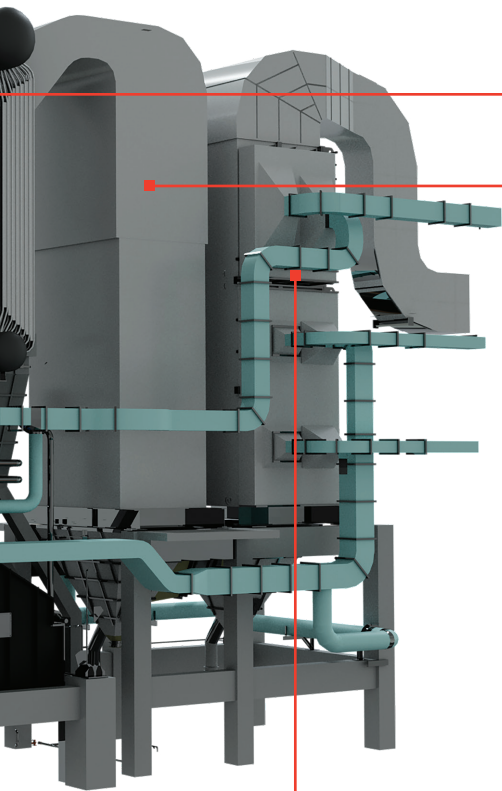
The air preheater is also heat recovery equipment situated last in the flue gas path. It is a cross flow gas-to-gas heat exchanger, which provides hot air for combustion.



Superheater

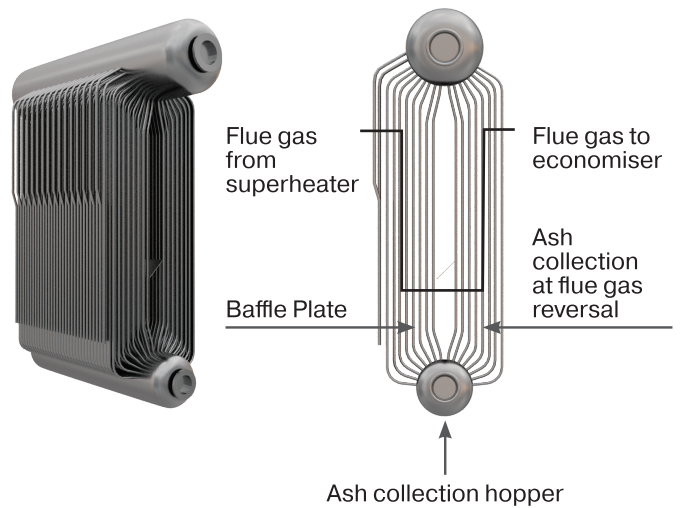
Powermax comes with a superheater located at the top of the furnace. This superheater is a heat exchanger, which converts saturated steam into superheated steam. The superheater is constructed in two halves - primary and secondary superheater - connected to each other by an attemperator.

The primary superheater is shielded from radiation by a nose wall, which also guides the flue gases to cover the entire convective superheater area. The attemperator is a water injecting device that ensures temperature of the outlet steam is controlled within specified limits.



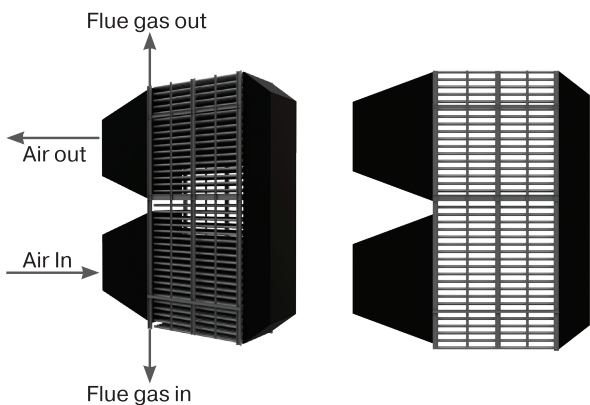
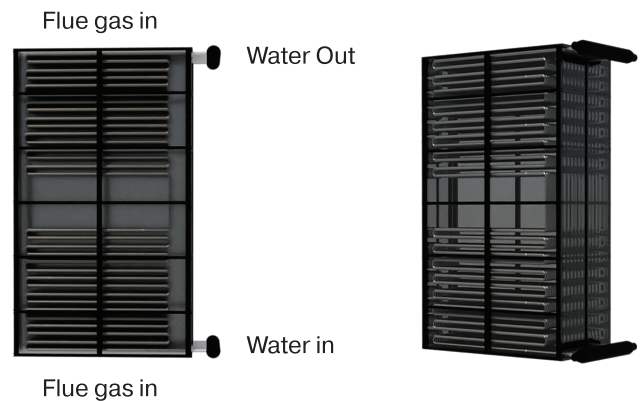
Boiler Bank

The boiler bank is a tube nest connecting the water and steam drums, where water is converted into steam. Downcomer portion of boiler bank, take the water to the water drum, and then a mixture of steam and water rises through, the riser portion of boiler bank tube to the steam drum. Water and steam are separated in the steam drum, and while the steam goes out, water gets re-circulated. The flue gases turn around in the bottom drum against the baffle wall and rise towards the steam drum. Ash separation takes place during reversal, and ash is collected in the hopper below the water drum.



Economiser

The Economiser, made of bare tubes, aids in heat recovery and improving efficiency. Coming after the boiler bank, it uses the heat of the flue gases coming out from the boiler to preheat water going into the steam drum.



Cyclomax

The cyclomax is an arrangement of multi-cyclones. When dust laden gas enter the cyclone tangentially, the centrifugal force that develops due to the cyclonic action makes the dust particles move outward radially, they finally strike the wall and drop out of the gas stream into the hopper. Clean gas then flows out through the exit tube.

For boiler applications, Cyclomax enables achieving emissions as low as 300 to 350 mg/Nm³.

Electrostatic Precipitators

Electrostatic Precipitators (ESP) is an arrangement of electrically charged electrodes. When dust laden gases enter the ESP through the inlet nozzle, dust particles get electrically charged by the emitting electrode. Due to the influence of this electrical field, these charged dust particles migrate to the grounded collecting electrode. The accumulated dust particles on the collecting plate are dislodged into the hopper due to periodic mechanical rapping. Clean gas then flows out through the outlet nozzle of the ESP. For boiler applications, the ESP enables achieving emissions as low as 50mg/Nm³.

Advanced PLC-based Control System

Bi-Drum RG is equipped with an advanced.... PLC-based control system that enables seamless monitoring, control, and protection of the equipment. Designed for reliability in high-capacity industrial environments, this system is further

enhanced with state-of-the-art IIoT capabilities, allowing for remote access, real-time diagnostics, and performance optimisation.



User Comfort

Touch screen graphical operator interface



Networking

Embedded ports on Ethernet.
Serial. CAN Open protocols



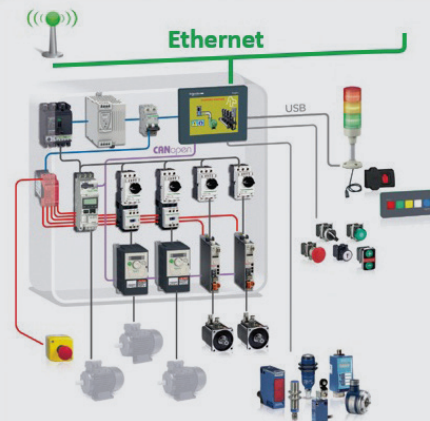
MIS Reporting

Real-time trends, and data logging
downloadable on a USB drive



Program Modification

Download programs through a USB drive



Bag Filter

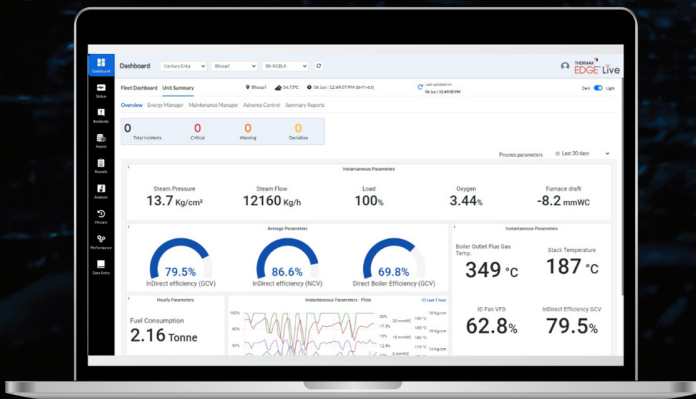
Bag filter is an arrangement of filtration material in the form of bags. When dust laden gases pass through the fabric, the dust is retained while clean air passes through. This dust, deposited on the outer surface of the bags, is removed by high pressure compressed air, operating in a pre-determined cycle.

This air flow is led into the bags through a pulse-solenoid valve combination which is energized by a solid state sequential controller. Thermax bag filters come with features like casing entry, perforated sheets that facilitates better gas distribution

and pre-separation of coarser dust; bags with snap rings that ensure low outlet emissions; leakproof inlet-cum-bypass-damper and outlet damper for automatic system isolation under high/ low temperature situations for safety.

For boiler applications, bag filters enable achieving emissions as low as 100 mg/nm^3

THERMAX EDGE™ Live



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

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



Robust Manufacturing Capability

Thermax has 14 state-of-the-art manufacturing facilities which build reliability and quality into the products and systems we supply to global clients. We have ten in India, one each in Denmark, Germany, Poland and Indonesia. These plants are certified to adhere to rigorous standards: ISO 9001: 2000, ISO 14001: 2004 and OHSAS 18001 : 1999. The facilities are inspected by Lloyds, Bureau Veritas, SGS and TUV.

In view of our constant endeavour to improve the quality of our products, we reserve the right to alter or change specifications without prior notice. All photographs shown in this publication are representative in purpose, and to be used for reference only. For actual details and specifications, please refer to Thermax offer document.

Conserving Resources,
Preserving the Future.



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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This brochure presents only some of our products and we reserve the right to amend any product details without notice.
The photographs used in the brochure are indicative and may not match the actual plant

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