Bagasse & Biomass
Fired Boilers
**Sustainable Solutions in Energy & Environment**

Thermax is an engineering company that helps business enterprises perform competitively and sustainably in global markets. In over 75 countries, clients make use of Thermax’s products and solutions for energy efficient and eco-friendly operations: heating equipment and power plants that use a wide variety of fuels including solar energy; absorption chillers that use heat in place of electricity; waste heat recovery units; water & waste water management, air pollution control systems; performance improving chemicals.

The company provides its customers value added services – audits of energy and water, system modifications for optimal use of resources, annual maintenance contracts, energy rentals and O&M of power and water installations.

Thermax operations are supported by innovative R&D and partnerships with global technology majors. It has an international sales & service network spread over 24 countries and state-of-the art facilities (in India, Denmark and China) that manufacture to international standards.

**Boiler & Heater Business (B&H)**

Thermax’s Boiler & Heater provides equipment and complete solutions for generating steam for process and power needs through combustion of various solid, liquid and gaseous fuels, as well as through heat recovery from turbine/engine exhaust and (waste) heat recovery from industrial processes. B&H also offers heaters for various applications in the Chemical, Petrochemical and Refinery segments. Its services arm offers renovation and modernization solutions for old boilers and heaters.

The major industry segments served in India and across the world are Steel, Refinery, Petrochemical, Power, Cement, Sugar, Distillery, Fertilizer, Paper, Chemical, Non Ferrous Metal and Textile.
Bagasse & Biomass Fired Boilers

Thermax has always been responsive to the energy needs of industry and to the ever-changing economic and environmental factors governing those needs. Current trends and future outlook highlight the need for utilising the vast untapped energy potential of agrowastes and biomass.

The Thermax biomass boiler is the very equipment required to improve profitability through maximum utilisation of solid agrowastes generated in your plant or available in nearby areas. Over 300 plants in India and abroad meet their process steam and electric power requirements through biomass fired boilers supplied by Thermax.

Flexible design - a variety of options
- Capacity upto 300 TPH, Pressure upto 160 kg/cm²(g) and temperature upto 560°C
- Travelling Grate, Dumping Grate, Pinhole Grate, Pusher Grate or Hopper Bottom (fluid bed)
- Membrane wall / tube and tile construction
- Indoor and outdoor installation
- Auto controls or remote - manual control option
- Multifuel firing capability - Includes bagasse, husk, straw, coffee grounds, cane tops, coconut shells, lignite, coal, pith, wood chips, oil, gas etc.

Higher overall efficiency
- Optimum design & selection of auxiliary equipment to ensure the highest operational efficiency and availability of the plant
- High efficiency steam separators ensure steam purity
- Variable speed fuel feeder allows fine control of feed
- Modulating cyclomotor to ensure even distribution of fuel

Membrane panel furnace design
- Machine welded membrane wall furnace forms a gas tight enclosure preventing ingress of unwanted excess air
- Requires no refractory in furnace walls and eliminates associated maintenance
- Results in quicker boiler commissioning due to reduced site welding, simplified handling / erection

Tall furnace for complete combustion
- Tall furnace increases residence time of flue gases, allowing fuel to burn completely before the gases enter the superheater zone
- High pressure, deep penetration secondary air jets are strategically located at multiple levels on furnace walls, ensuring proper turbulence and good mixing of volatiles with air and complete combustion
Technical Features

- Travelling Grate front and rear air seals automatically keep excess air to a minimum within the furnace. These front and rear seals are ruggedly constructed for long service and are automatically self-adjusting to maintain continuous close sealing contact.

- The curvature design of the grates keeps the grates closed without the aid of auxiliary weights, when making the turn around the sprockets. No gaps appear between the grates, thereby directing all foreign materials into the ash pit and not into the drive shaft mechanism.

- Design is such that any grate section can be replaced without taking the stoker out of service. Simply remove a single bolt, nut & washer and slide the grate off the carrier bar.

- To reduce maintenance costs, grate surface is made in short sections (230 mm to 300 mm long) of best quality, heavy duty, heat-resisting cast iron alloy with uniformly spaced, tapered, self-cleaning air-metering openings, and with close fitting overlapping edges to prevent air leakage at the joints.

- Planetary gear drive with VFD Benefits:
  - Higher transmission efficiency
  - Compact arrangement
  - Design for heavy duty loads
  - Finer speed control through VFD
  - 10:1 turndown
  - Troubleshooting operation

- The hydraulic grate drive can also be provided as an option in place of Planetary gear drive with VFD.
Travelling Grate Boilers

Salient Features

- Travelling Grate ensures uninterrupted combustion
- Continuous ash discharge system avoids dependence on operator’s judgement
- Grate speed can be varied continuously in range 0-12 m/hr (0-45 ft/hr)
- Overlapping grate design prevents air leakages
- Maintenance of grate can be carried out without shutting down the boiler
- An overfire air system provides turbulence and thorough mixing of the volatile gases, thus assuring complete combustion
- All other advantages of suspension burning are ensured
- Dumping Grate can be offered in place of travelling grate on request
Pinhole Grate Boilers

**Salient Features**

- Stationary inclined water cooled grate design with no moving parts for avoiding any mechanical failures and reducing maintenance in the furnace
- Steam nozzles for simplified on-line ash removal from the grate without drop in boiler pressure. Also agitation of fuel occurs which results in reduction in unburnt carbon loss
- An economical and viable option for high capacity boilers
- Combustor can accept air of temperature upto 250°C thus resulting in smooth combustion of fuel
- Inherently capable of burning high-moisture bagasse
- An overfire air system provides turbulence and thorough mixing of the volatile gases, thus assuring complete combustion
- Adequate number of feeders for uniform fuel distribution
- All other advantages of suspension burning are ensured
Pusher Grate Boilers

Salient Features

- Pusher grate is suitable for low quality fuels having high moisture content, low GCV, inconsistent fuel size with very large particle. This design is suitable for municipal solid waste, high moisture agricultural and industrial waste—palm fiber, empty fruit bunches, stalk fuel having high moisture content.
- Hydraulically operated water cooled ram feeder maintains continuous waste feeding.
- Refractory combustor sustains combustion of low calorie waste fuel.
- Furnace and convection zone design suitable for high fouling fuel.
- Water cooling for grate sections can be offered for specific fuels.
- Effective transportation and mixing of fuel as it burns on the grate.
- Air plenum is divided in multiple sections along length, enables independent control of air flow to each section as per combustion requirement.
- Larger grate width with modular construction
- Fully machined grate bars ensure proper clearances for thermal expansion, movement and air flow area.
- Special alloy castings for corrosion resistance and longer wear life.
Hopper Bottom
(Fluidised Bed Combustion) Boiler

Salient Features

- FBC combuster does not have any moving parts thus reducing maintenance in the furnace
- Uniform temperature distribution in the bed and agitating characteristic of fluidised bed ensures optimum combustion
- Low excess air requirement resulting in higher efficiency
- Lower NOx and CO emissions
- Low temperature operation greatly helps in minimising the biomass fuel ash agglomeration and fouling tendency
- Continuous slow draining of bed ash is possible which helps in:
  - Easy settling and disposal of large sized particles which hamper fluidisation
  - Maintaining alkali concentration at minimum level
  - Avoiding accumulation of fuel over slumped bed
  - Under bed / over fuel feeding for proper distribution of fuel

1 unit of 25 TPH, 18 Kg cm²(g), saturated spent coffee grounds, green coffee residue, roasted chaffs & HFO fired hopper bottom (fluidised bed combustion) boiler
# Major Customers

<table>
<thead>
<tr>
<th>CLIENT</th>
<th>COUNTRY</th>
<th>MODEL</th>
<th>NOS.</th>
<th>TPH</th>
<th>KG/CM²G</th>
<th>DEG.C</th>
<th>FUEL</th>
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<tbody>
<tr>
<td>Korach Industry Company Ltd.</td>
<td>Thailand</td>
<td>Single Drum Travelling Grate</td>
<td>2</td>
<td>200</td>
<td>105</td>
<td>520</td>
<td>Bagasse, Wood chips</td>
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<tr>
<td>Victorias Milling Company, INC</td>
<td>Philippines</td>
<td>Single Drum Travelling Grate</td>
<td>1</td>
<td>200</td>
<td>110</td>
<td>540</td>
<td>Bagasse, Cane Residue, Wood Chips, Coconut Shell, Saw Dust, Napier Grass</td>
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<td>Siddheshwar SSK</td>
<td>India</td>
<td>Single Drum Travelling Grate</td>
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<td>200</td>
<td>110</td>
<td>540</td>
<td>Bagasse</td>
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<tr>
<td>Indian Cane Power Ltd.</td>
<td>India</td>
<td>Single Drum Travelling Grate</td>
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<td>195</td>
<td>125</td>
<td>545</td>
<td>Bagasse/Imported coal</td>
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<td>Mitr Phol Bio-Power (Kuchinarai) Co. Ltd.</td>
<td>Thailand</td>
<td>Single Drum Travelling Grate</td>
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<td>170</td>
<td>31</td>
<td>480</td>
<td>Bagasse, Rice Husk, wood Chips, Corn cob &amp; Cane Leaves</td>
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<tr>
<td>URC Sonedco Sugar Corporation</td>
<td>Philippines</td>
<td>Single Drum Travelling Grate</td>
<td>1</td>
<td>170</td>
<td>105</td>
<td>540</td>
<td>Bagasse</td>
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<td>Thailand</td>
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<td>170</td>
<td>105</td>
<td>520</td>
<td>Bagasse, wood chips, rice husk, coal</td>
</tr>
<tr>
<td>Mitr Kalasin Bio Energy Company</td>
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<td>170</td>
<td>105</td>
<td>520</td>
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<td>105</td>
<td>540</td>
<td>Rice husk &amp; coal</td>
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<tr>
<td>Zuker SA DE CV</td>
<td>Mexico</td>
<td>Pin Hole grate</td>
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<td>520</td>
<td>Bagasse</td>
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<td>540</td>
<td>Bagasse/coal</td>
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<tr>
<td>Mitr Phol Bio-Power (Amnat Charoen) Co. Ltd.</td>
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<td>160</td>
<td>87</td>
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<td>540</td>
<td>Bagasse, Rice Husk</td>
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<td>Thip Kamphaengphet Bio Energy Co. Ltd.</td>
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<td>40</td>
<td>450</td>
<td>Bagasse</td>
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<tr>
<td>Mitr Phol Bio Power Co. Ltd.</td>
<td>Thailand</td>
<td>Single Drum Travelling Grate</td>
<td>1</td>
<td>140</td>
<td>70</td>
<td>510</td>
<td>Bagasse, Rice Husk, wood Chips, Corn cob &amp; Cane Leaves</td>
</tr>
<tr>
<td>San Pedro Bio-energy</td>
<td>Dominican Republic</td>
<td>Single Drum Travelling Grate</td>
<td>1</td>
<td>140</td>
<td>81</td>
<td>520</td>
<td>Bagasse, King Grass, Imported Coal</td>
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</tbody>
</table>
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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