Process Heating

THERMAX

# Horizontal Thermopac RG

## High-Capacity Thermic Fluid Heating for Sustainable, Reliable, and Continuous Operations

# 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.

## Horizontal Thermopac RG: High-Capacity Thermic Fluid Heating for Sustainable, Reliable, and Continuous Operations

As industries pursue their net-zero goals, adopting renewable and low-emission fuels has become critical—especially for large-scale operations. Yet, achieving high thermal capacities using biomass presents challenges such as bulkier system design, increased maintenance, and reduced uptime.

Thermic fluid heating offers a reliable solution—delivering high-temperature heat at low system pressure with superior energy efficiency and safety compared to steam systems. However, conventional high-capacity heaters often fall short in maintainability and operational availability.

Horizontal Thermopac RG addresses these limitations. It combines the proven benefits of thermic fluid heating with the fuel flexibility and robustness of reciprocating grate combustion. Designed for industrial-scale applications, it handles a wide range of biomass and conventional fuels with ease.

Its optimised layout ensures high efficiency, reduced maintenance, and longer uptime—making it ideal for continuous-duty, high-load operations. This solution unites consistent thermal performance with sustainable fuel adaptability, supporting both operational goals and the energy transition journey.

## Designed for Fuel Flexibility

The transition to biomass fuels brings with it a range of combustion challenges. Low bulk density, high moisture content, and fouling tendencies make it difficult to achieve reliable and efficient operation using conventional combustion systems.

Horizontal Thermopac RG is designed to handle this complexity with ease. Based on the same reciprocating grate combustion platform used in Thermax's RG boilers, it enables efficient combustion of a wide variety of fuels—whether naturally sized, processed, or loose biomass.

**A few of the many fuels that Horizontal Thermopac RG efficiently combusts are:**


Husk


Wood Chips


Biomass Briquette


Biomass Pellet


Cashew Nut Shell


Palm Kernel Shell


Ground Nut Shell

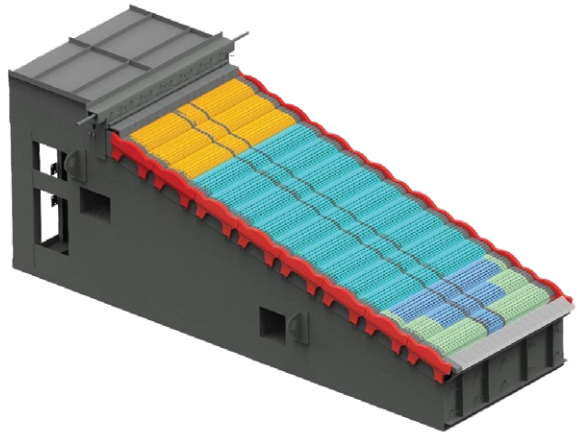

RDF Pellet / Briquette


Indonesian Coal

And more

# Reciprocating Grate – A Technology Transferred from Lambion, Germany

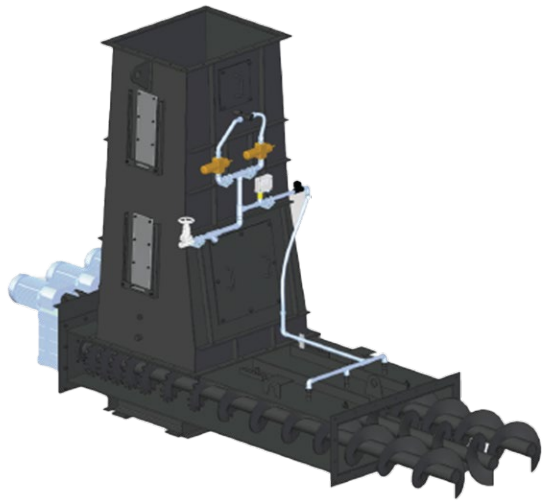
- This technology efficiently combusts multiple biomass fuels, including the difficult-to-combust low-density and fouling fuels.
- Zone wise speed and air control ensures efficient combustion for a wide variety of fuels
- Grate bars with multiple geometries and perforations ensure the required air variation in a trolley to create a uniform combustion rate.
- Grate bar castings with higher proportions of chromium (upto 26%) and nickel, help achieve desirable abrasion resistance at higher temperatures and ensure high reliability, minimal wear of the grate bars, and a greater life.



Block Bars | Side Plate Grate Bar | Nozzle-1 | Nozzle-2 | Nozzle-3 | Nozzle-4 | Nozzle-5

# Fuel Feeding System

- Fuel feeder with toothed screws having variable pitch helps to deal with fibrous & non-uniform fuel, and eliminate possibility of jamming of screw.
- Inverted fuel hopper (dosing bin) enables fuel storage before fuel feeding screw. This hopper is equipped with temperature sensors and water jets for protection from backfire.
- Photo-electric sensors in the dosing bin help maintain fuel level over the fuel screw feeder to reduce the possibility of backfiring.



# Optimised Coil Design for Efficient Heat Transfer

- A vertical coil arrangement ensures an air-tight combustion chamber and provides a larger freeboard area, allowing complete combustion of volatiles.
- The triplex coil construction offers increased heat transfer area, where the inner coil functions as the radiant zone and the two outer coils serve as convective zones.
- The compact serpentine coil layout maximises effective surface area, promoting optimal flue gas heat absorption.
- A top-mounted circulating thermal oil buffer (CTB) placed above the triplex coil provides additional heat transfer surface and improves overall efficiency, while also eliminating complications related to refractory lining on the top plate.

# Horizontal Thermopac RG

**4 to 20 million kcal/hr**

Horizontal Thermopac RG is a high-capacity thermic fluid heater based on reciprocating grate combustion, featuring a membrane panel furnace and a serpentine coil heat exchanger. It is engineered to deliver efficient, reliable heating in a compact, low-footprint design, and is specially designed for higher operational availability in demanding industrial environments.

## Optimised Membrane Panel and Convective Coil Design for Efficient Heat Transfer

- The furnace in Horizontal Thermopac RG is constructed using membrane walls—tube-and-fin assemblies that ensure a gas-tight combustion chamber. This eliminates air ingress, enhancing thermal efficiency.
- The design accounts for fuel characteristics that influence furnace height and footprint. A larger freeboard area supports complete combustion of volatiles, especially for high-moisture biomass fuels.
- The membrane wall furnace ensures that flue gas temperatures are optimised before entering the coil section—preventing fouling and protecting heat transfer surfaces.
- A compact serpentine coil arrangement maximises heat exchange area, ensuring efficient absorption of flue gas energy while maintaining a compact system footprint.

## Serpentine Coil Design – Engineered for Durability, Efficiency, and Ease of Maintenance

### Serpentine Coil Design – Built for Erosive Fuels and High Efficiency

High-capacity thermic fluid heaters face several challenges—coil erosion due to high flue gas velocity, heavy refractory construction, and complex maintenance. Horizontal Thermopac RG addresses these with a re-engineered serpentine coil system that ensures durability, efficiency, and ease of operation.

- Reduced erosion risk: Serpentine coil design lowers flue gas entry velocity, resulting in reduced tube erosion.
- Improved heat absorption: Counter-flow arrangement enhances energy transfer and reduces flue gas outlet temperature
- Lower maintenance: In-situ castable refractory reduces quantity and leakage risk, and online tube cleaning improves the heater uptimeonline
- Energy savings: Reduced pressure drop leads to lower ID fan power consumption
- Simplified layout: Layout is simplified as the need for interconnecting ducting between the radiant and convective sections is removed
- Easy cleaning: Integrated sonic/retractable soot blowers enhance maintainability

## Why Choose Horizontal Thermopac RG

- High thermal efficiency for optimised fuel consumption
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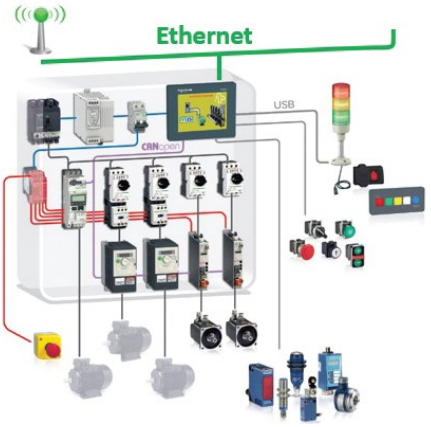
- Automated operation for reduced manpower requirements
- Multi-fuel flexibility, enabling the most cost-effective heat generation
- Quick and easy fuel changeover for uninterrupted operations
- Modular design with pre-insulated main unit delivered from Thermax's factory for faster installation
- Engineered layout for a compact, aesthetic structure with minimal site work
- Lower maintenance costs due to longer grate life and robust construction

# Advanced PLC-Based Control System

The Horizontal Thermopac 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

**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


# Technical Specifications & General Dimension

| Description | Units | HTRG 40 - HTRG 200 |
|---|---|---|
| **Heater Performance** | | |
| Capacity | kcal/hr | 4000000 up to 20000000 |
| Max. T.F. Outlet Temperature | °C | 380 |
| Thermic Fluid Flow Rate | $m^3/hr$ | |
| Head Available at Heater Outlet | mlc | 25 |
| Efficiency – NCV basis | - | As per BS 845 - Part 1 (on NCV Basis) |
| Crushed Biomass briquettes, Woodchips (Total Moisture-25%), Biomass Pellet, Indonesian Coal (Total Moisture-10%) | % | 84 |
| Woodchips (Total Moisture-40%), Rice Husk, Indonesian Coal (Total Moisture-35%) | % | 83 |
| Groundnut Shell, PKS | % | 85 |

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


**Registered Office**

D-13, MIDC Industrial Area, R D Aga Road,
Chinchwad, Pune 411019, India.
**Email:** enquiry@thermaxglobal.com
**Customer Care:** 1800-209-0115

**Bangkok Office**

43, Thai CC Tower, Room 245, 24th Floor,
South Sathorn Road, Yannawa, Sathorn,
Bangkok 10120, Thailand.
**Email:** enquiry@thermaxglobal.com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