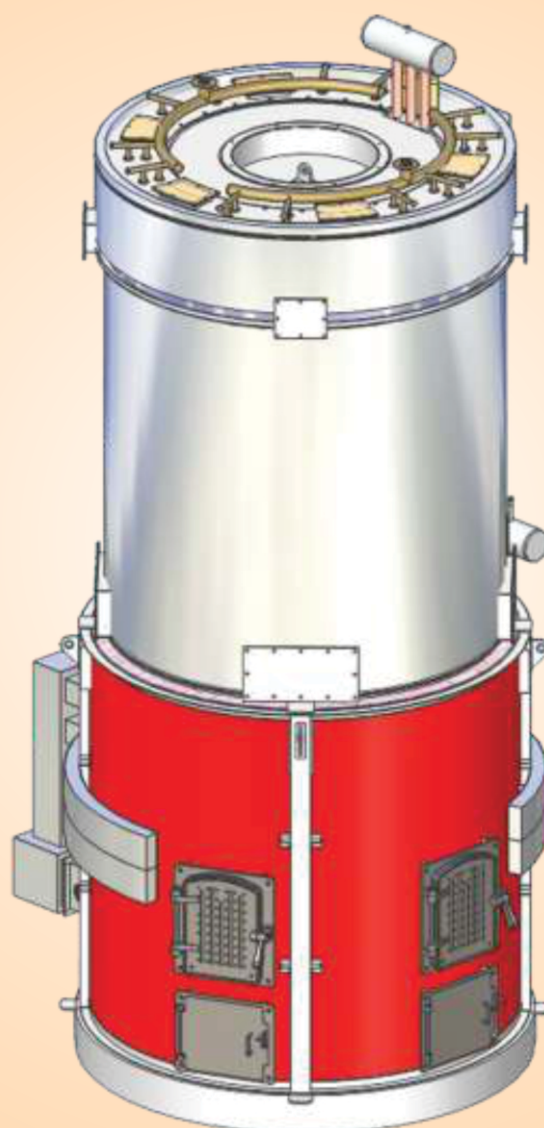


CYCLOTHERM[®]

Solid Fuel Fired Vertical Thermal Oil Heater with
Cyclonic Combustor



Heating Business

Improving your business is our business

Thermax is an engineering major providing sustainable solutions in the areas of energy and environment. Spanning over 86 countries, clients make use of Thermax's business-to-business solutions for heating, cooling, power and cogeneration plants; waste heat recovery units; systems for water & wastewater management and air pollution control; performance improving chemicals.

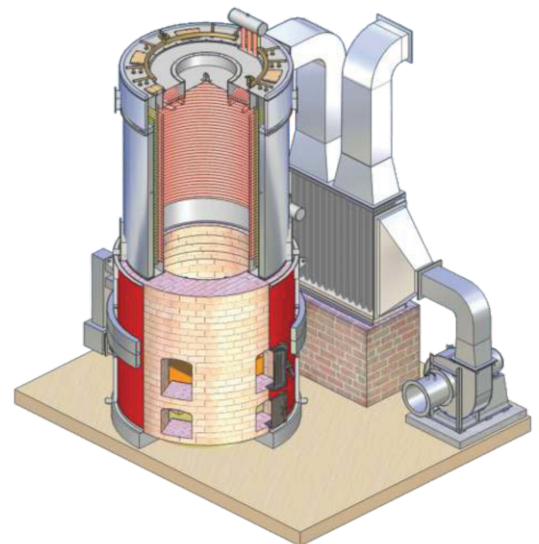
Thermax's operations are supported by ongoing Research & Development, tie-ups with global technology majors, an international sales & service network spread over 27 countries and state-of-the-art manufacturing facilities in 14 locations including India, Indonesia, China, Poland, Denmark and Germany.

As a part of Thermax, Heating business - a strategic business unit offers packaged boilers, thermal oil heaters, waste heat recovery boilers, hot water and air generators. These are available in modular construction as a standard package configuration or a custom design for specific requirements. Innovated by a strong R&D that focuses on customer applications, we offer a range of heating systems designed to combust wide range of solid, oil & gas fuels including biomass and heavy liquid fuels. Heating SBU helps small and medium firms & fortune 500 companies to reduce energy cost with a worldwide presence of oil & gas based systems in Middle East and Europe, biomass and solid fuel fired equipment in South East Asia and Africa.

CYCLOTERM (VTcy) is a solid fuel fired vertical thermal oil heater, with an advanced cyclonic combustor, of modular construction and a compact layout.

Product Offering

- Vertical closed loop thermal oil heater
- Capacity - 1,00,000 to 25,00,000 kcal/hr
- Operating Temperature - up to 300°C
- Fuel - Coal, Wood and Biomass Briquette
(other fuels on request)
- Complete heater house and accessories on turnkey basis



Product Highlight

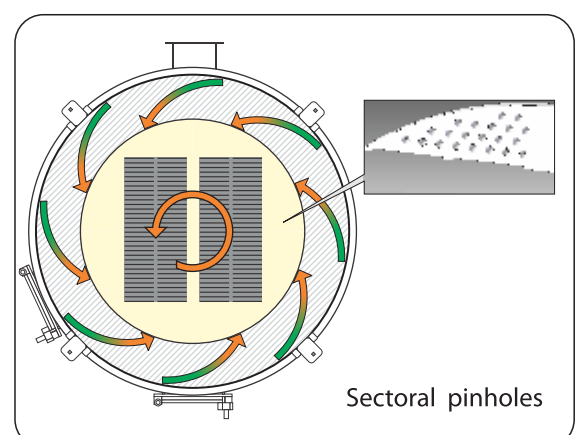
Circular Furnace Construction

- Provision for introduction of cycloidal air for complete combustion
- Heat and thus efficiency leakages, as furnace structure acts as a shell lined with refractory on the inside
- Compact design and layout of furnace with aligned primary and secondary ducting

Cycloidal Air Injection

- CYCLOTERM (VTcy) comes with the unique cycloidal air injection technology, where air is injected into the combustion zone in a cycloidal motion thus leading to higher residence time and lower excess air due to better turbulence levels
- Better combustion of volatiles in fuels is achieved, hence incomplete combustion losses are reduced
- Optimum combustion volume and better utilization of furnace aids in effective and complete combustion

Cyclonic Combustor



Hybrid Combustor Design

In any combustor, spreading and distribution of fuel is not uniform. Fuel is densely loaded at the centre and spread thinner at the periphery, the temperature distribution is exactly reverse - the walls radiating at the periphery have higher temperatures. Special air distribution is required for effective air utilization which then leads to effective combustion. CYCLOTHERM (Vtcy) addresses all these aspects by means of a specially designed hybrid grate layout.

- A fixed grate at the centre of the combustor, which handles the densely spread fuel ensuring proper air ingress and complete combustion, by utilizing primary air from grate bars plus secondary air from the cycloidal air injection
- Sectoral grate bar with tapered pin holes at the peripheral section, which ensures that the precise quantity of required air reaches the periphery of the combustor, without disturbing radiating/peripheral heat zones

Salient Features

CYCLOTHERM (Vtcy) is a thermal oil heater of modular construction and a small footprint, which comes with pre-insulated coil and sleek aesthetics. It has been designed and engineered for a host of benefits that also make it the most cost-effective and efficient thermic fluid heater in its class. It is so quick to install and have up and running, that it could even be compared with many plug and play, oil fired coil type units.

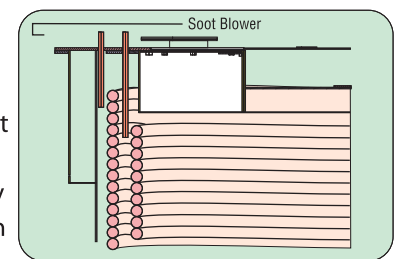
- **More effective heat transfer area than conventional heaters** - Ensures highly effective response to heat load. Also online soot blower operates when the blower stops, ensuring clean coil surfaces, good coefficient of heat transfer and better Efficiency.
- **Specially designed air pre-heater** - Incorporates a cross flow design, which makes the direction of flue

Maximised Heat Transfer

- In CYCLOTHERM (Vtcy), both inner and outer surfaces of the radiant coil contribute to heat transfer unlike conventional thermal oil heaters, where only the inner surface of the radiant coil contributes to heat transfer
- Higher capacities of CYCLOTHERM (VTcy) have roof coils which provide more heat transfer area and thermic fluid Holdup
- Higher radiation surface counters fouling at convective coil and radiation losses are also effectively reduced due to less surface being exposed to air

Pressurised Air Cleaning

CYCLOTHERM (Vtcy) uses a soot blowing system to keep the tube surface clean using compressed air and maintain uniform heat transfer. This reduces variation in efficiency when compared with the effect of manual cleaning in conventional thermal oil heaters.



gas and air flows opposite and perpendicular to each other, thereby guaranteeing maximum heat transfer from flue gas to air.

- **Up to 30% reduction in insulation and cladding than conventional heaters** - Translates into huge savings in material, installation time & maintenance.
- **Up to 60% reduction in refractory weight requirements** - Means saving in refractory material as well as of time required for installation.
- Up to 65% reduction in foot print area - Compact layout frees up expensive land for other uses.
- **Up to 70% reduction in civil construction for coil mounting** - Leads to savings in cement, steel and of time required for installation.
- **Overall reduction in height** - Without the hassle & additional expense of raising roof height, it means that there are no hidden costs.

How CYCLOTHERM (VTcy) scores over the conventional Thermopac

Besides the obvious advantages stemming from its breakthrough design and construction enumerated above, the CYCLOTHERM (Vtcy) outcores the Conventional Thermopac on several other counts :

- Matching (leveling) of convective and radiant coils Eliminated
- Elimination of ash room below convective coil
- Elimination of connecting duct and its refractory

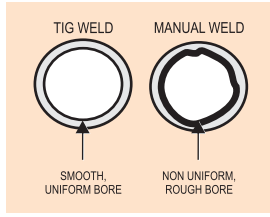
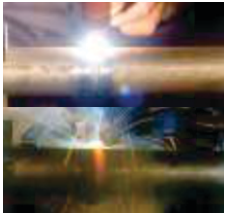


CYCLOTHERM
(Improved design)

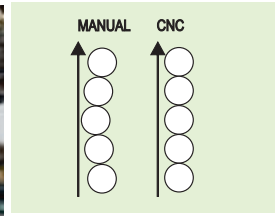


VT (Conventional design)

Manufacturing Excellence



Fully automated tube to tube TIG Welding Machine enables smooth uniform bore



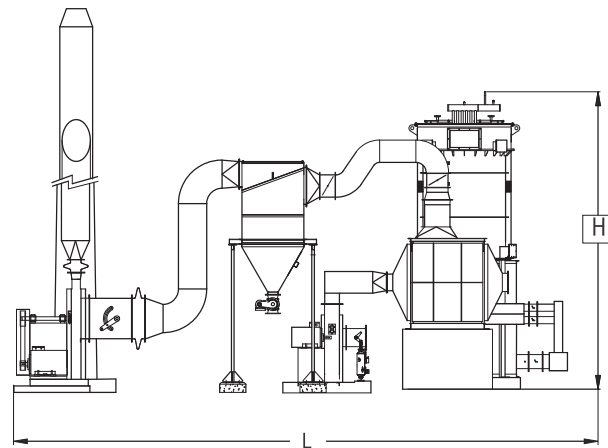
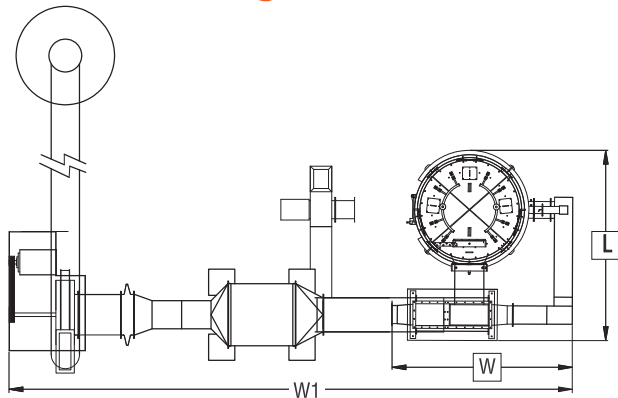
CNC coil winding machine ensures proper alignment, avoiding possibility of hot spots

Technical Specifications

| Description | Units | VTcy 01 | VTcy 02 | VTcy 04 | VTcy 06 | VTcy 10 | VTcy 15 | VTcy 20 | VTcy 25 | VTcy 30 | |
|----------------------------------|---------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Capacity | kcal / hr | 100000 | 200000 | 400000 | 600000 | 1000000 | 1500000 | 2000000 | 2500000 | 3000000 | |
| Maximum Outlet Temperature | °C | 280 | | | | | | | | | |
| Thermic Fluid Flow Rate | m ³ / hr | 7 | 10 | 24 | 36 | 60 | 90 | 120 | 150 | 180 | |
| Thermic Fluid Temperature Rise | °C | 30 | 40 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | |
| Efficiency | | As per BS 845 Part 1 NCV Basis | | | | | | | | | |
| Wood | % | 79.5 | | | | | | | | | |
| Coal | % | 80 | | | | | | | | | |
| Briquette | % | 79 | | | | | | | | | |
| Fuel | | Wood / Coal / Briquette | | | | | | | | | |
| Fuel Firing System | | Manual Firing (Fixed Grate + Sectoral Pin Hole grates) | | | | | | | | | |
| Fuel Consumption | | | | | | | | | | | |
| Wood | kg / hr | 43 | 85 | 171 | 256 | 426 | 640 | 853 | 1066 | 1279 | |
| Coal | kg / hr | 29 | 58 | 116 | 174 | 291 | 436 | 581 | 727 | 872 | |
| Briquette | kg / hr | 38 | 76 | 151 | 227 | 378 | 567 | 756 | 945 | 1134 | |
| Connected Electrical Load | | | | | | | | | | | |
| Wood / Coal / Briquette | kW | 4.25 | 8.85 | 9.95 | 15.65 | 20.95 | 32.25 | 41.25 | 59.5 | 72.1 | |
| Dimensions & Weight | | | | | | | | | | | |
| Length | mm | 2800 | 3100 | 3300 | 3720 | 4340 | 4450 | 5210 | 5939 | 6400 | |
| Width | mm | 1600 | 1700 | 2800 | 3300 | 3700 | 4200 | 4200 | 4793 | 4714 | |
| Height | mm | 4200 | 4900 | 5400 | 5400 | 5700 | 6500 | 7500 | 7670 | 8200 | |
| W1 | m | 5.7 | 6.0 | 7.9 | 8.6 | 9.8 | 10.5 | 11.3 | 12.4 | 13.5 | |
| Chimney Top Diameter | mm | 180 | 250 | 310 | 350 | 500 | 660 | 700 | 790 | 870 | |
| Dry Weight | kg | 1685 | 2135 | 3215 | 4040 | 5970 | 8475 | 11300 | 12200 | 12523 | |

NOTE : VTCY 01 & 02 can not be offered with bubbling bed combustor. Mechanical Dust collector are not supplied for VTCY 01 & VTCY 02. Efficiency is calculated based on NCV of Husk as 2900 kcal/kg, Coal as 4300 kcal/kg, Husk Briquette as 3350 kcal/kg and Wood as 2950 kcal/kg. Units suitable for 300°C bulk oil temperature are also available. Above mentioned weight and dimensions may vary with actuals. Please refer to offer document for more details.

General Arrangement



THERMAX

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Thermax Business Portfolio

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- Chemicals
- Water and Wastewater Solutions
- Solar
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