



# *Combipac*

The multifuel solution



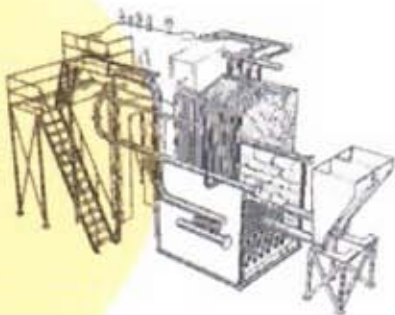
**R**ising fuel bills have forced companies to look for cheaper alternate fuels. India being an agricultural nation, has a variety of agro fuels like Rice Husk, Ground Husk, DOB, Saw Dust, Cotton Stalk, Bagasse, Palm Fibre etc.

Thermax has the necessary expertise and experience to burn these agro fuels efficiently. These agro fuels are available for only 6 to 9 months in a year so there is a requirement for a firing system suitable for conventional fuels like coal, lignite, wood, oil, natural gas as well. In some industries, there is a need to fire byproducts like biogas.

Thermax engineering and R&D addressed this uncertain and varied fuel scenario using a systematic product development process and have come up with the perfect solution - COMBIPAC BOILER.

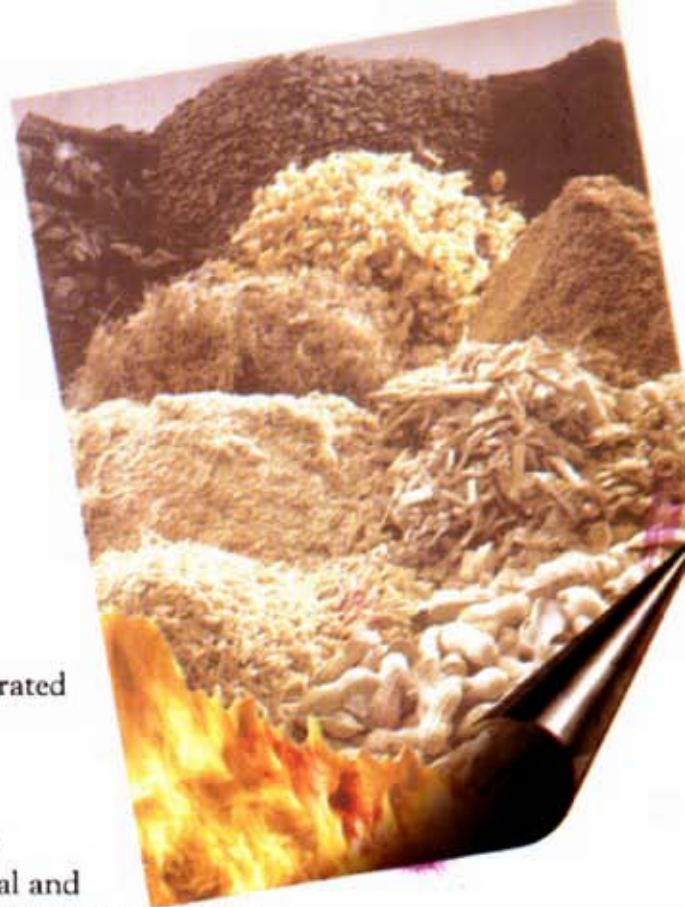
For efficient combustion of these fuels, the furnace temperature plays an important role. The furnace design addresses this requirement most effectively which results in

- ✓ Consistent output
- ✓ No furnace cleaning
- ✓ Multifuel capability
- ✓ Efficient combustion

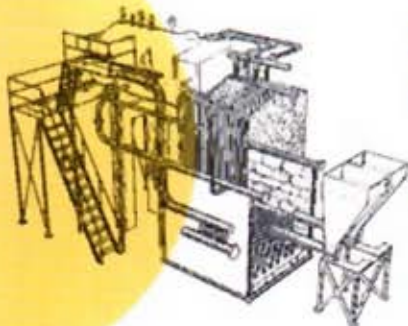


**Combipac**  
You name it...we burn it

# What Combipac Offers



- ❑ Uninterrupted dry steam at rated pressure
- ❑ Fuel flexibility
  - ◆ Agro fuel firing possibility
  - ◆ Conventional fuel like Coal and Lignite firing, options of oil/natural gas firing
  - ◆ Biogas firing option
- ❑ Lower fuel bills due to high thermal efficiency
  - ◆ Thermal efficiency 82% on GCV for conventional fuels - coal, lignite
  - ◆ Thermal efficiency 80% on GCV for agro fuels
  - ◆ Thermal efficiency 88% on NCV for Oil, Natural Gas and Biogas
- ❑ Quality components like Mobrey - KDG, U.K.; Feed pumps - Grundfos, Denmark; Level Gauge - Phonix, Germany; Safety Valves - Moorco, ensure uninterrupted operation and minimum maintenance costs
- ❑ Fast to erect and commission
- ❑ Easy access to boiler parts for cleaning and maintenance
- ❑ Adequately designed ash settling chamber in furnace ensures lower ash carryover which results in lower erosion
- ❑ 3" smoke tubes avoid choking
- ❑ High water holdup and adequate steam space gives sufficient thermal inertia for responding to fluctuating loads
- ❑ Low consumed power

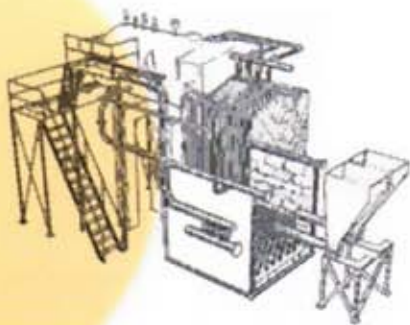
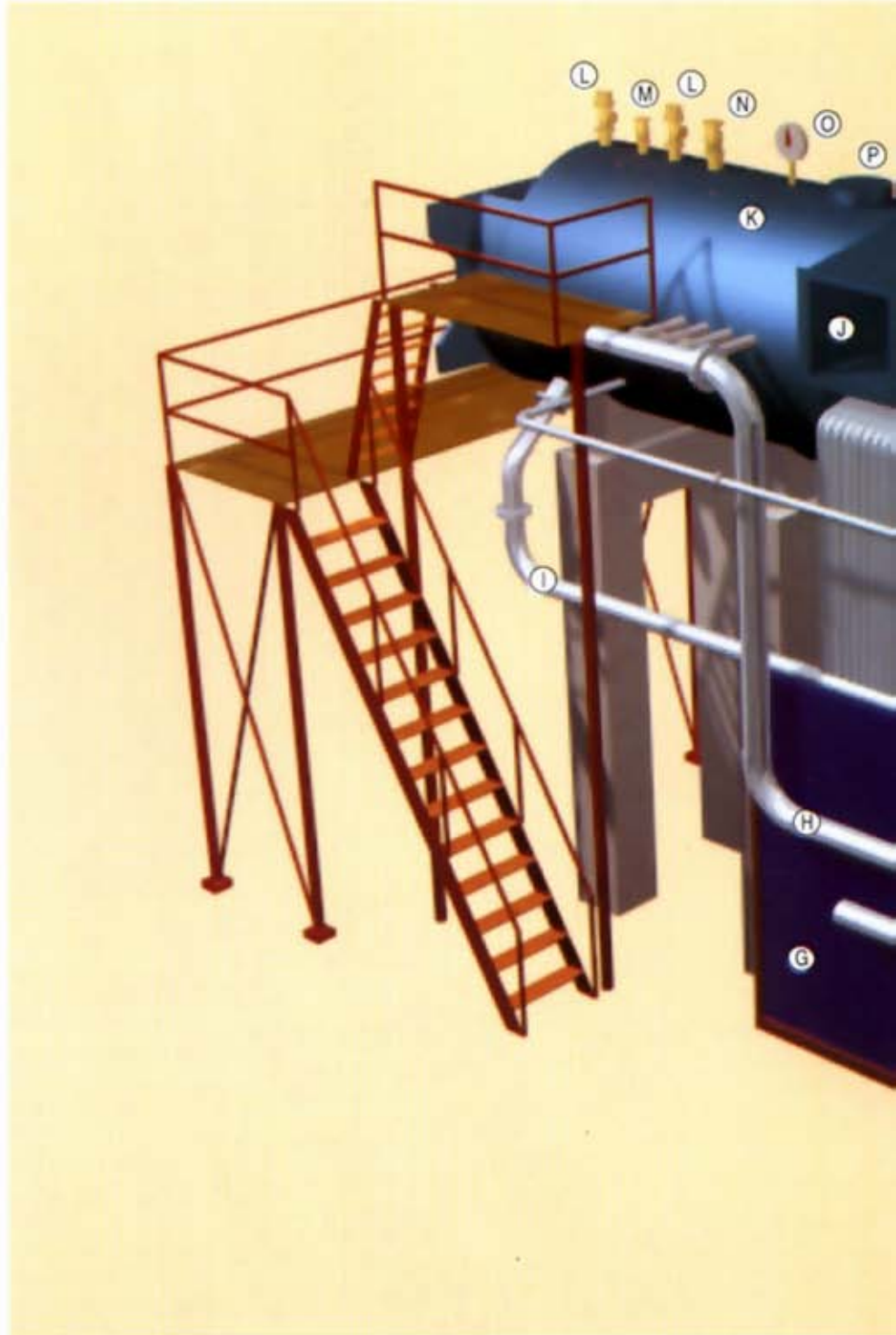


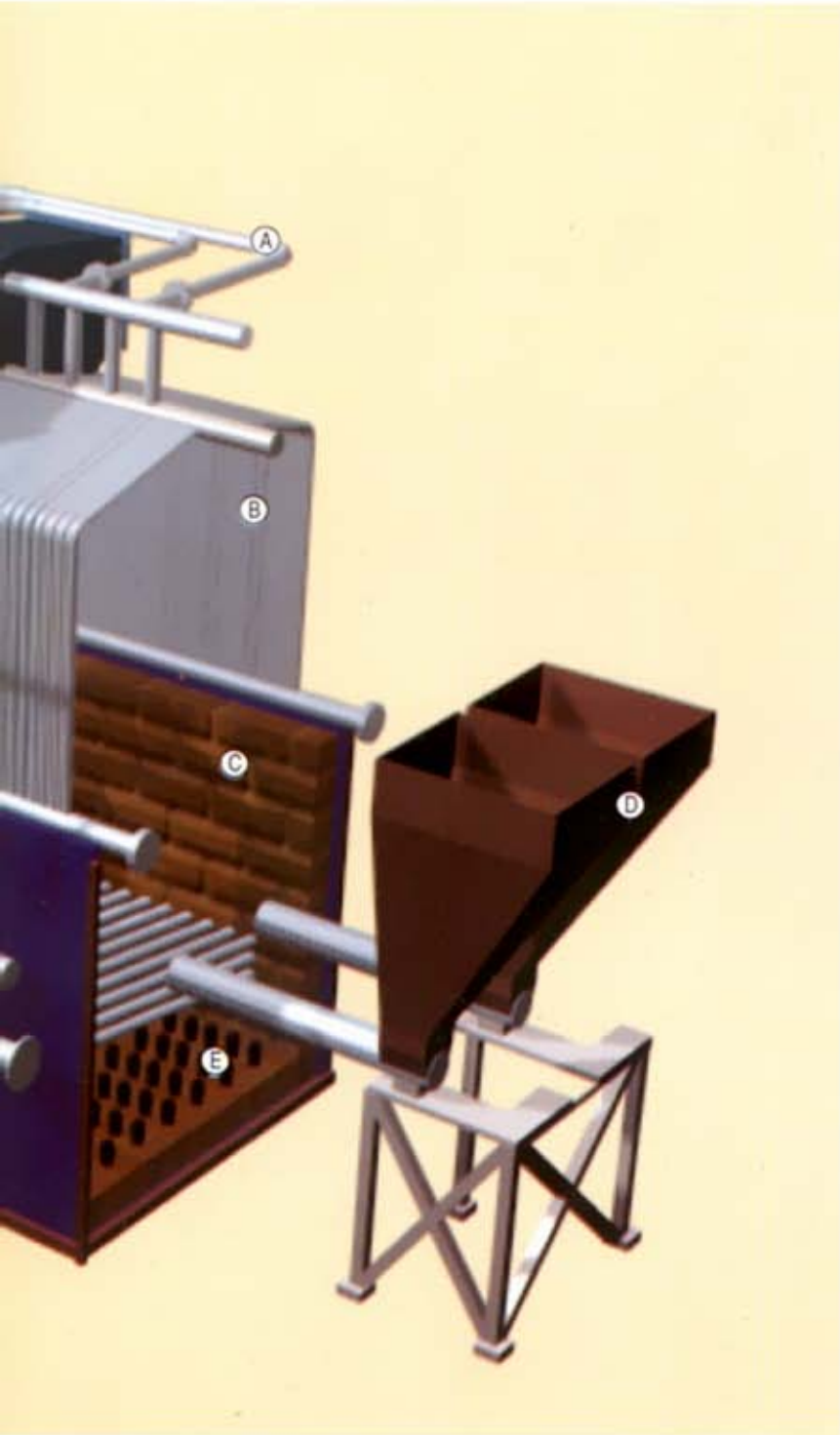
**Combipac**  
You name it...we burn it



# C *onstruction*

COMBIPAC - CPF Series is a multi-fuel composite, two pass, high efficiency, natural circulation, balanced draft, packaged boiler working on FLUIDISED BED TECHNOLOGY.





- A. Riser for Membrane Panel
- B. Membrane Panel
- C. Refractory Bricks
- D. Hopper
- E. Nozzles
- F. Circular Header
- G. Furnace Structure
- H. Riser for Inbed Tubes
- I. Downcomer for Membrane Panel
- J. Exhaust Gas Outlet
- K. Main Shell
- L. Safety Valves
- M. Main Steam Stop Valve
- N. Air Vent
- O. Pressure Indicator
- P. Manhole





## Controls & Safeties

- Float actuated water level controller
- Bed temperature high/low alarm and lockout
- Pressure switch to cut off firing at low load
- Float actuated low water level alarm and lockout
- Single port safety valves
- Flue gas temperature indicating controller
- Fusible plug

- Steam stop valves
- Water level gauges
- Feed check valves
- Blow down valves

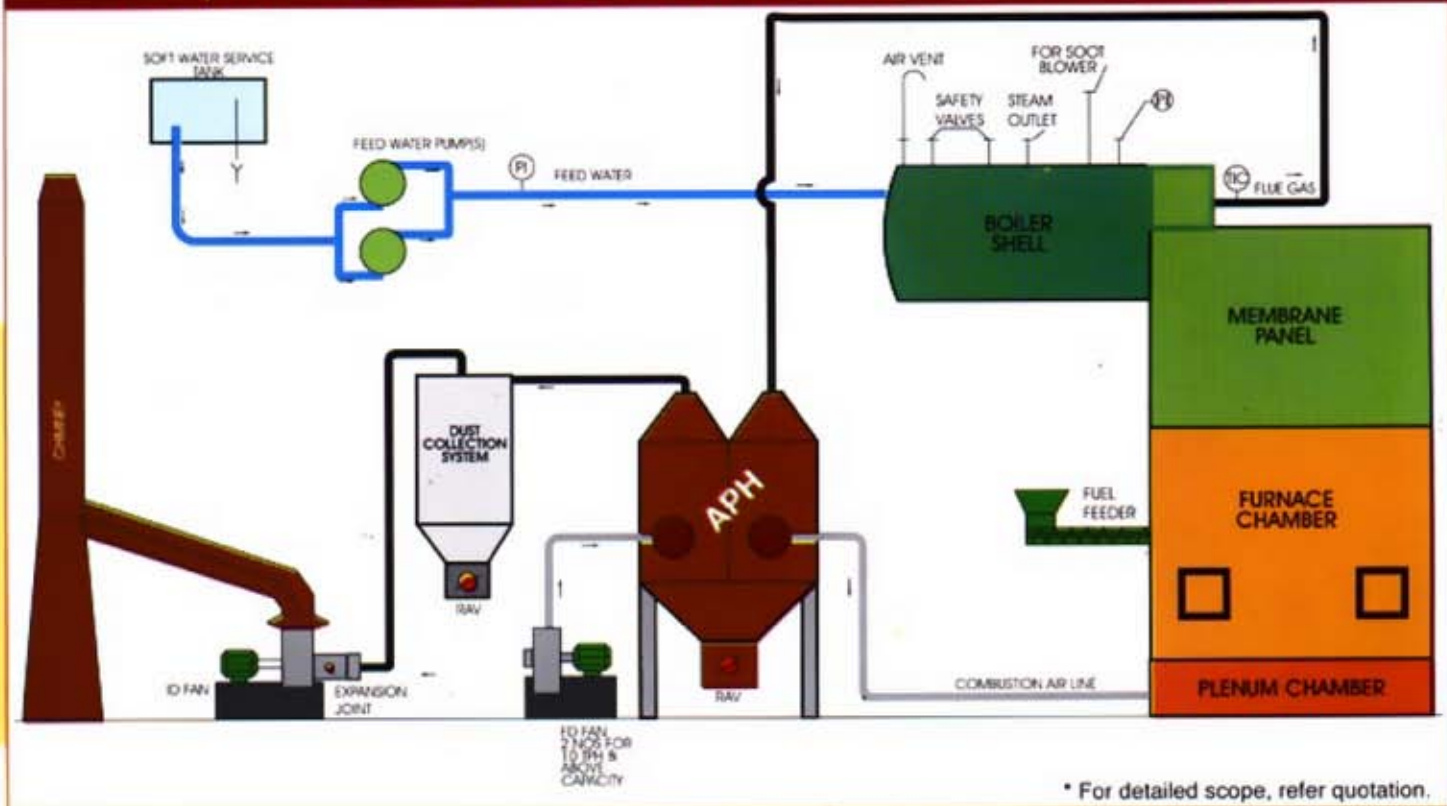
- Pressure gauges for steam and air
- Manometers for draught measurement

## Mountings & Fittings

## Peripherals & Accessories

- Induced and forced draught fans
- Feed water pump
- Stand-by pump
- Pre-wired control panel

## AIR, WATER & FLUE GAS CIRCUIT FOR COMBIPAC



\* For detailed scope, refer quotation.

# Features & Benefits

## Reliable Components

Critical components selection has been done keeping high boiler reliability in mind. Mobrey from KDG, U.K., Feed water pump from Grundfos, Denmark, Level gauge - Phonix, Germany; ID fans with liners ensure uninterrupted and smooth boiler operation.



Feed water pump -  
Grundfos, Denmark



Water level  
controller -  
KDG Mobrey,  
U.K.



Level gauge -  
Phonix, Germany

## Membrane Panelled Furnace

The heat transfer area provided is optimally sized keeping multi-fuels in mind. This helps in bringing the furnace exit temperature below ash fusion temperature. The fin width is 41mm to avoid fin burn out and also effectively fire oil or natural gas. Membrane wall construction provides gas tight construction and reduces the radiation losses. Minimum refractory is used to reduce the refractory maintenance problems.

## Main Shell

Boiler shell consists of two sets of smoke tubes for 2 passes of flue gas and has adequate water and steam volume to take care of fluctuations in load. The interface area and freeboard are sufficient to give 98% dry steam at all times. Procuring steel from manufacturers directly coupled with manufacturing processes, highly qualified welders and stage-wise quality assurance ensures longer life of the shell.

## Right Feeding System

Selection of feeding system is based on the fuels to be used. We offer two options.

### Overbed Feeding System

This is the the right feeding system for sized fuels like Rice Husk, Groundnut Shell, Coal etc. Also for fuels with high moisture content like Neyveli Lignite, Coffee waste etc. , this is the only proven system which will work without problems of choking.

### Combi-Feed System

This system is a combination of overbed feeding system and underbed feeding system. Underbed feeding system is the right option for fine fuels like DOB, Saw Dust, Coal with 40% fines less than 1mm etc. Underbed feeding system does not work when moisture level in fuel is high. Combi-feed system takes care of this problem and is the perfect solution for multi-fuel.



*Thermax-Oertli Oil cum Gas Burner*

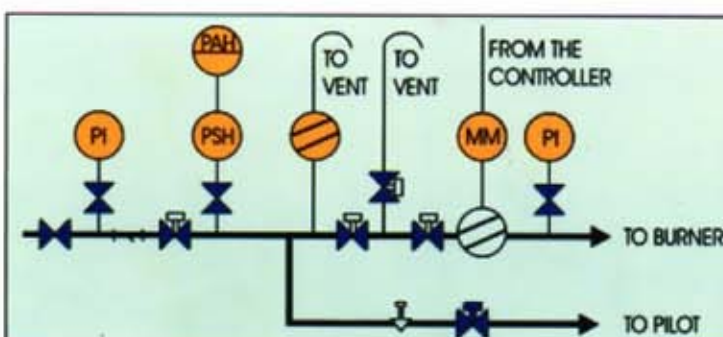


## Other Firing Options

In Combipac, we can fire oil or natural gas efficiently. Rugged burners of Thermax Oertli make ensure 88% efficiency on NCV.

We also offer burners for biogas train consisting of a double block and bleed system.

Adequate safety measures like proper burner management system and flame sensors are provided for safe operation at all times.

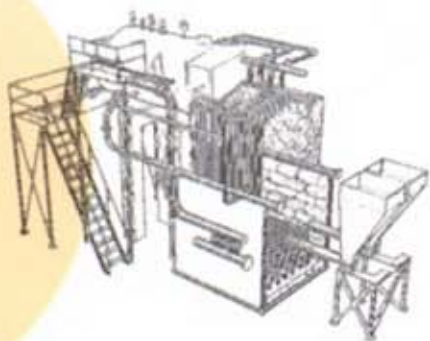


*Gas Train*





*The CPF90 at Continental Coffee, Guntur - Andhra Pradesh*





*A close-up of our highly specialised welders at work*



*R&D is working on Ficirc® technology for Indian Coal & Agro wastes*



*A view of our engineering set-up at Chinchwad, Pune*



**THERMAX**

**THERMAX LIMITED**  
**PROCESS HEAT DIVISION**  
**An ISO 9002 Company**  
**CHINCHWAD,**  
**PUNE 400 019**  
**TEL. : (020) 7475941**  
**FAX : (020) 7472049**

**MUMBAI 400 039**

Dhanraj Mahal, Chhatrapati Shivaji Maharaj Marg,  
 Tel. : (022) 2045391, 2045324. Fax : (022) 2040859

**NEW DELHI 110 057**

9, Community Centre, Basant Lok,  
 Tel. : (011) 6145319, 6145326. Fax : (011) 6145311

**CALCUTTA 700 016**

Park Plaza, Block 6A, 71 Park Street  
 Tel. : (033) 2292423, 2292428. Fax : (033) 2452491

**CHENNAI 600 006**

III Floor, 312, Anna Salai, Teynampet  
 Tel. : (044) 4353831-4. Fax : (044) 4353841

**AHMEDABAD 380 006**

409-411, Mahakant, Opp. V.S. Hospital, Ashram Road,  
 Tel. : (079) 6575408. Fax : (079) 6577270

**BANGALORE 560 020**

54/1, Central Street, 8 Cross, Kumara Park, West  
 Tel. : (080) 3096052-55

**HYDERABAD 500 482**

6-3-649 Nalanda Complex, Somajiguda  
 Tel. : (040) 3310254, 3312013. Fax : (040) 3312335

**BARODA 390 005**

85/B, Armin Chambers, Sampatrao Colony,  
 Productivity Road  
 Tel. : (0265) 320442 Fax : (0265) 310051