TBWES - A THERMAX GROUP COMPANY

THERMAX

Waste Heat Recovery System for Cement Plant

Energy Solutions

Improving your business is our business

Thermax offers products, systems and solutions in energy and environmental engineering to industrial and commercial establishments around the world. Its business expertise covers heating, cooling, waste heat recovery, captive power, water treatment and recycling, air pollution control and waste management and performance chemicals.

Thermax brings to customers extensive experience in industrial applications and expertise through technology partnerships and strategic alliances.

Operating from its headquarters in Pune (Western India), Thermax has built an international sales and service network spread over South East Asia, Middle East, Africa, Russia, UK and the USA.

Thermax Babcock & Wilcox Energy Solutions (TBWES)

TBWES, a wholly owned subsidiary of Thermax Limited 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. TBWES also offers heaters for various applications in the Chemical, Petrochemical & Refinery segments. Its services arm offers renovation and modernization solutions for old boilers and heaters.

The major industry segments served by the Group in India and across the world are Steel, Refinery, Petrochemical, Power, Cement, Sugar, Fertilizer, Paper, Chemical, Non-Ferrous Metal and Textile.

Cement manufacturing is a highly energy-intensive process. Given the fragile and dynamic nature of the fuel and power situation faced by cement plants today, it makes sense for them to adopt waste heat recovery based solution for the following reasons:

- Greater **energy security** (helps meet upto 35% of power requirement)
- Improved **competitive positioning**
- **Regulatory push** (Policies mandating use of minimum 5-10% renewable/WHR energy are already in place in several states in India)

WHR solution based on **steam rankine cycle*** and envisaging recovery at two points viz. **preheater/calciner** and **clinker cooler** (tapping at exhaust or mid-cooler) is field tested and proven at many cement plants all over the world for the past two decades.

With technical assistance from Taiheiyo Engineering Corp. (Japan), Thermax offers this world-class WHR system through following routes:

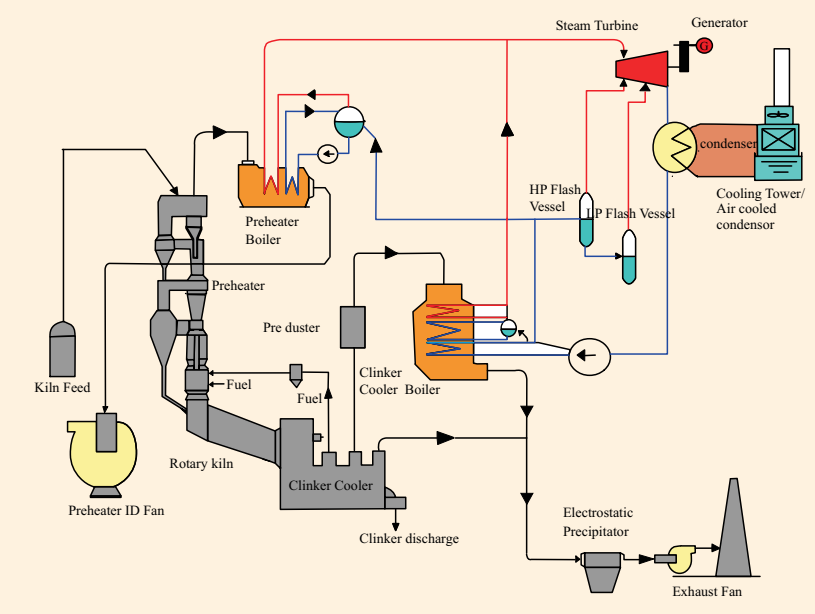
- Boiler island.
- Boiler-Turbine-Generator package.
- Complete turnkey solution on EPC basis.
- Build-Own-Operate-Transfer (BOOT) basis.

Designed and Engineered for Excellence

- Recovery from preheater / calciner / clinker cooler / diesel genset exhaust to generate steam for power generation or regenerative feedwater heating (HP/LP Heater) in captive power plant
- Preheater Boiler:
  - ➤ Installed between preheater exhaust gas duct and preheater ID fan
- Clinker Cooler Boiler:
  - ➤ Installed between clinker cooler and ESP inlet
  - ➤ Preduster installed before boiler to screen out large sized clinker particles which are very abrasive

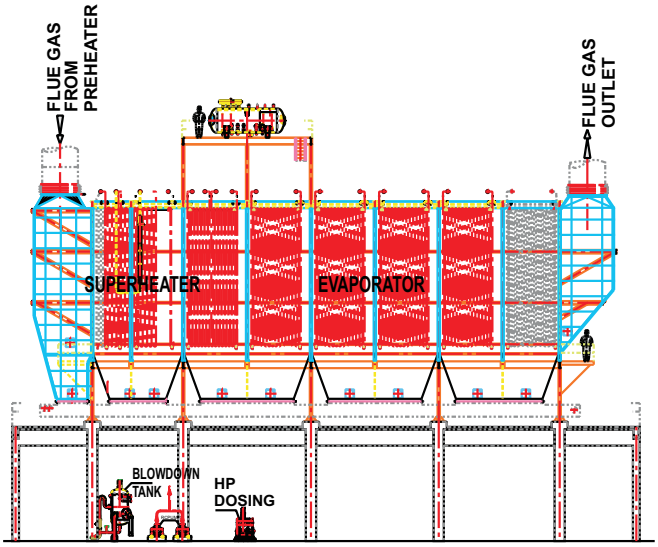
*Can also offer WHR system based on Organic Rankine Cycle on case-to-case basis.

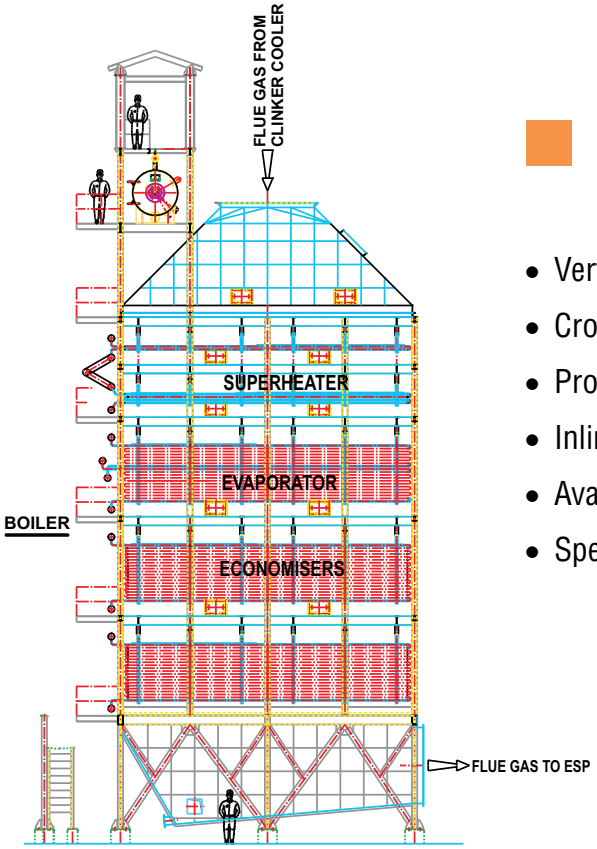
TBWES waste heat recovery system for cement plants



Waste heat recovery boiler for preheater and calciner

- Horizontal boiler with tubes located vertically for uniform dust disposal and gas distribution.
- Proven technology to handle high dust laden gases of preheater and calciner.
- Cross flow gas direction offering efficient heat transfer.
- Fully field proven de-dusting hammering mechanism.
- Higher water hold up capacity to cater to any steam fluctuations.
- Better accessibility





Waste heat recovery boiler for clinker cooler

- Vertical boiler with horizontal tubes.
- Cross flow gas direction offering efficient heat transfer
- Proven design for highly abrasive clinker cooler gases
- Inline/staggered heat transfer area
- Available in both forced/natural circulations design unlike other designs
- Special finned design tubes for better heat transfer

Manufactured as per Technology developed by Thermax

THERMAX

Typical parameters for WHR system comprising preheater, calciner and clinker cooler boilers

Description	Preheater Boiler	Calciner Boiler	Clinker Cooler Boiler
Kiln capacity in TPD		4800	
Flue gas qty. in Nm3/hr (approx.)	1,11,000	2,50,000	2,10,000
Flue gas inlet temperature in deg C	365	365	375 *
Steam generation in TPH (approx.)	9	21	20
Steam pressure in kg/cm^2(g)	17	17	17
Steam temperature in deg C	325	325	325
Dust content in gms/Nm3	100	90	**
Feed water temperature in deg C	130	130	130
Draft losses in mmWC	<100	<100	<100

Note: *Higher temperatures possible with centre tap-off on clinker cooler

** Depending upon tapping point

Major details of WHR system at JK Cement works at Nimbahera, Rajasthan state

- Total steam generation: 72.0 TPH
- Number of boilers: 5
- Gross power generation: 13.2 MW
- Approx. auxiliary power consumption: 8%
- Payback period (approx.): 3 Years

TBWES - A THERMAX GROUP COMPANY

THERMAX

Thermax Babcock & Wilcox Energy Solutions
Energy House, DII Block, Plot No
38 & 39, MIDC, Chinchwad,
Pune: 411 019

enquirytbwes@thermaxglobal.com

Customer Care: 1800-209-0115

www.thermaxglobal.com

www.linkedin.com/company-beta/166428

www.facebook.com/Thermaxglobal

Thermax Business Portfolio

- Heating
- Cooling
- Power
- Air Pollution Control
- Chemicals
- Water and Wastewater Solutions
- Solar
- Specialised Services

design@synergydesign.in