wasco

WASCO THERMAL SDN BHD

Steam and Energy Solution Provider

About The Company

We specialize in customized steam boilers firing various fuels

MACKENZIE SERIES

Overview

Wasco Thermal Sdn. Bhd. is one of the leading suppliers of steam boilers for the renewable energy industry. We specialize in customized steam boiler systems firing various fuels ranging from biomass waste, oil, gas, coal as well as waste heat recovery.

We are capable of undertaking complete EPCC projects covering power and steam energy generation for palm oil mills and/or other process plants. The EPCC scope of works include feasibility study, engineering design, procurement, project management, site construction and system commissioning. Our dedicated engineering design team are able to customize various designs to suit individual customers' specification and requirements in term of capacity pressure, temperature, fuel specification and steam energy usage.

We are part of Wasco Berhad, a company listed on Bursa Malaysia. We serve most of the major oil palm plantation and refinery players local and abroad, i.e. South East Asia, Africa and Latin America. Our water tube and fire tube package boilers are also well known in the following industries i.e. O&G refinery, petrochemical, sugar refinery, pharmaceutical, food & beverage, and paper. Mackenzie waste heat boilers dominate the local market and are also well established in various South East Asia countries.

Product and Services

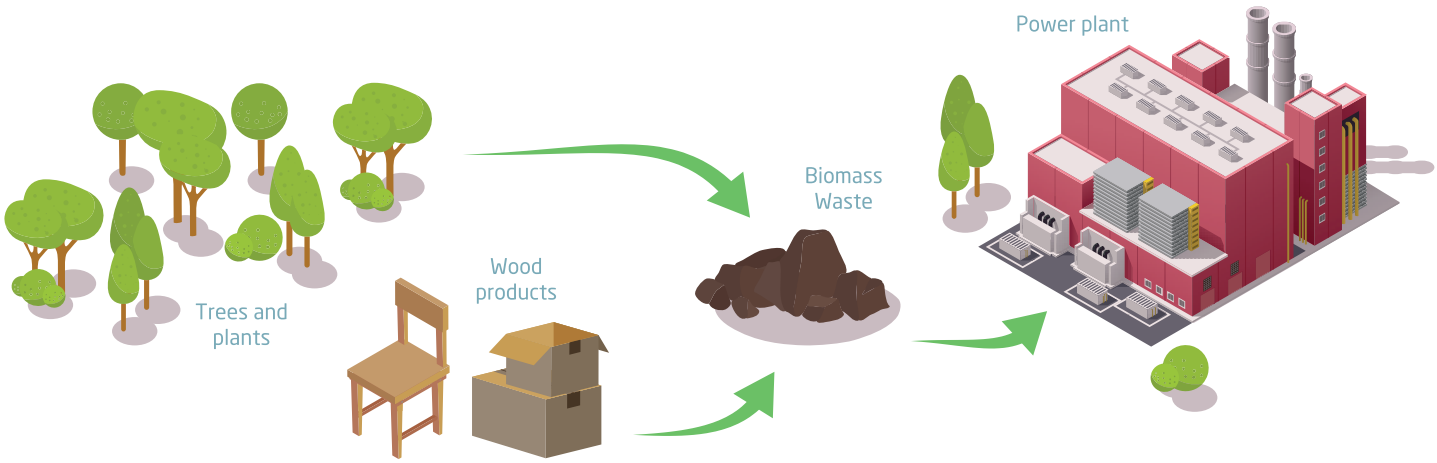
- Biomass Boiler - Mackenzie WD Series
- Biomass Boiler - Mackenzie BD Series
- Biomass Boiler - Mackenzie CB Series
- Package Boiler - Mackenzie PWT Series
- Package Boiler - Mackenzie PWB Series
- Waste Heat Recovery Boiler - Mackenzie WH Series
- Auxiliary Equipment
- After Sales Services and Repairs

Our Expertise

We provide comprehensive solutions to our customers in product availability, reliability, and especially in the combustion of unconventional fuel

Our Expertise

In our ongoing quest to improve overall boiler efficiency, our boilers are designed to be coupled with auxiliary equipment such as combustion air preheaters and feedwater economizers by capturing the heat energy of the flue gas. In addition, various fuel feeding systems can be used in conjunction with different combustion stoker grates to cater for different biomass fuel compositions. Smart automation & control system i.e. PLC and SCADA can be added to our boiler to form a comprehensive solutions package. Our strength lies in our capability to offer a total solution to the customer in product availability, reliability, and especially in the combustion of unconventional fuel. Successful combustion of various unconventional fuels is accomplished through accumulated past experience and the know-how in the field of pyrolysis. Wasco Thermal has a licensing agreement with ERK Eckrohrkessel GmbH of Germany to produce the full range of ERK-designed boiler products. ERK is a reputable 100-year old boiler design and engineering company based in Germany. It has over 6000 units of boiler design to its credit.



The Products

Mackenzie Biomass Boiler - WD Series / BD Series / BDV Series / CB Series

Wasco provides high efficient and reliable biomass boilers of proven design and excellent manufacturing quality, suitable for handling various solid biomass fuels i.e. palm fiber, palm kernel shell, empty fruit bunch (EFB), wood chips, rice husks, etc.

Our bi-drum water tube boiler provides a complete renewable energy solution for a wide range of applications in the palm oil, food and beverage, paper and other general industries.

Mackenzie Packaged Boiler - PWT Series / PWB Series

Wasco's package boiler is designed with bigger volume and larger heating surface, thus promoting additional heat transfer to the waterside. The complete boiler pressure part is designed, fabricated and assembled in our factory/ plant as a package prior to site delivery.

The boiler is equipped with multi-stage or modulating-type industrial burners. These burners are highly efficient, fully automated, capable of high turndown ratio operations and are designed for firing multiple fuels i.e. fossil fuel oil, natural gas or dual fuels.

Mackenzie Waste Heat Recovery Boiler - WH Series

At Wasco, we have a proven track record of providing the best designed and most innovative solutions for waste heat recovery boilers. Our Mackenzie WH Series, also known as Industrial HRSG, are designed for combined heat and power (CHP) generating plants by utilizing exhaust gases from power generating turbines engines and / or high temperature process / flue gas.

From a single fuel source, multiple types of energy can be generated for industrial usage. Additional supplementary firing systems can be included in the overall design to further improve total efficiency of the CHP system.

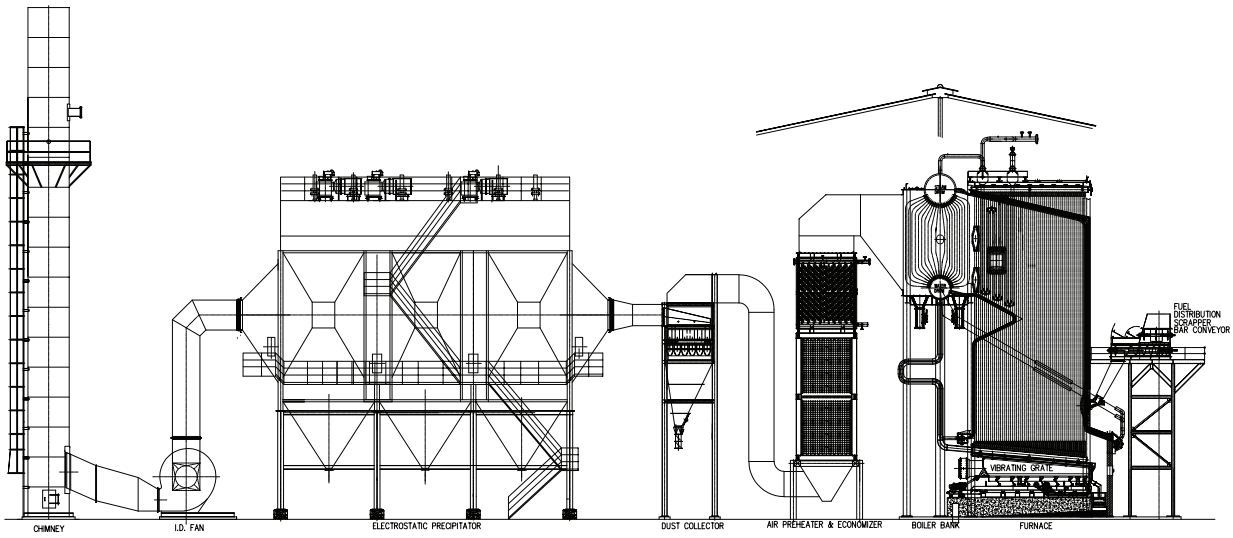
WD Series

- Natural circulation membrane wall Bi-drum water tube boiler
- Design for biomass fired industrial power plant which requires high efficiency performance as well as uninterrupted operation
- Grate : reciprocating grate, air cooled and water cooled vibrating grate, etc

Mackenzie Biomass Boiler

Natural circulation, bi-drum water tube boilers with furnace membrane walls are designed for biomass firing power plants. These boilers are designed for high efficiency, and continuous operation with reduced downtime for scheduled maintenance.

Steam generated from the boiler will be used to drive a back pressure and / or condensing turbine thereby generating electricity for the mill's own consumption and process purposes. This replaces the need for fossil fuel oil for electricity generation in remotely located mills without access to the electrical grid.



Steam Conditions

Evaporation Rate	: 15 T/H - 70 T/H
Pressure	: 20 Barg - 80 Barg
Superheater	: Up to 420 °C

Fuel

- Palm Fiber and Shell
- Processed Palm Empty Fruit Bunches
- Wood Waste
- Rice Husk
- Coal (mixture with biomass fuel)

Special Features

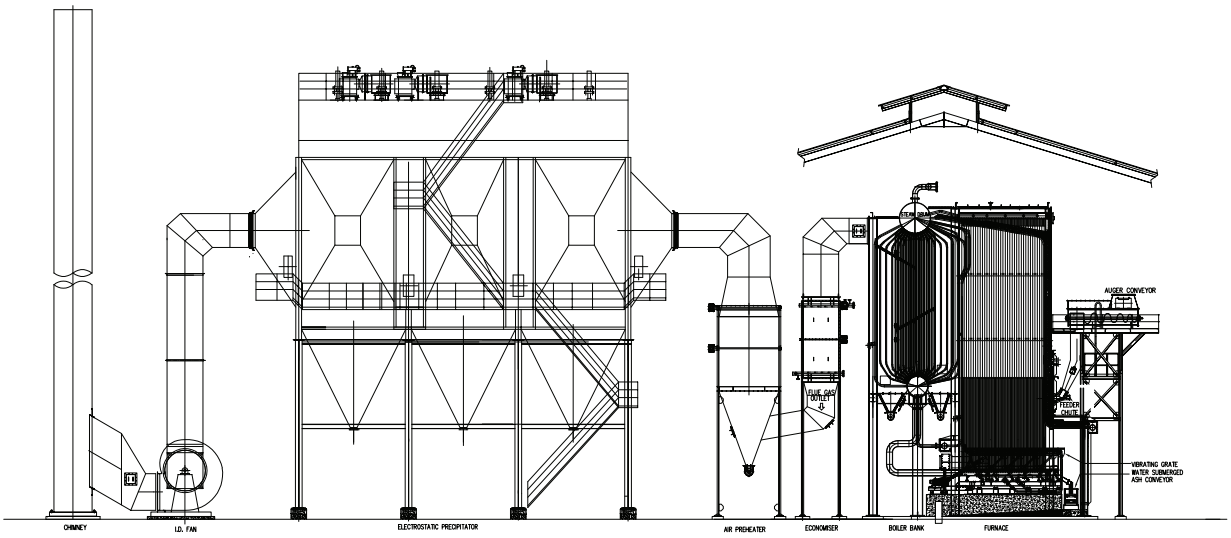
- Membrane Wall Furnace Tubes
- Single Pass Convection Bank
- Vibrating Grate (Water Cooled)
- Reciprocating Grate
- Travelling Grate
- Air Pre-heater
- Economizer
- Superheater

BD/BDV Series

Mackenzie Biomass Boiler

Mackenzie BD / BDV Series boilers are highly suited to the supply of steam to industry-wide plants and their various applications. We offer customers a comprehensive solution of steam boilers for power generation and in-house steam processing purposes. The boiler's uniquely designed furnace, water tube and tile construction contribute to overall combustion efficiency.

- Furnace tube & tile construction
- Suitable for supplying steam for most industrial plant application
- Fuel : palm waste, wood waste, rice husk
- Grate : stationery horizontal fix grate or reciprocating grate or vibrating grate



Steam Conditions

Evaporation Rate : 15 T/H - 70 T/H
Pressure : 20 Barg - 70 Barg
Superheater : Up to 360 °C

Fuel

- Palm Fiber and Shell
- Wood Waste
- Rice Husk
- Processed Empty Fruit Bunches

Special Features

- Brickwall Furnace Tubes
- 3 Passes Convection Bank
- Fix Grate (Water Cooled or Air Cooled)
- Reciprocating Grate (Air Cooled)
- Vibrating Grate
- Travelling Grate

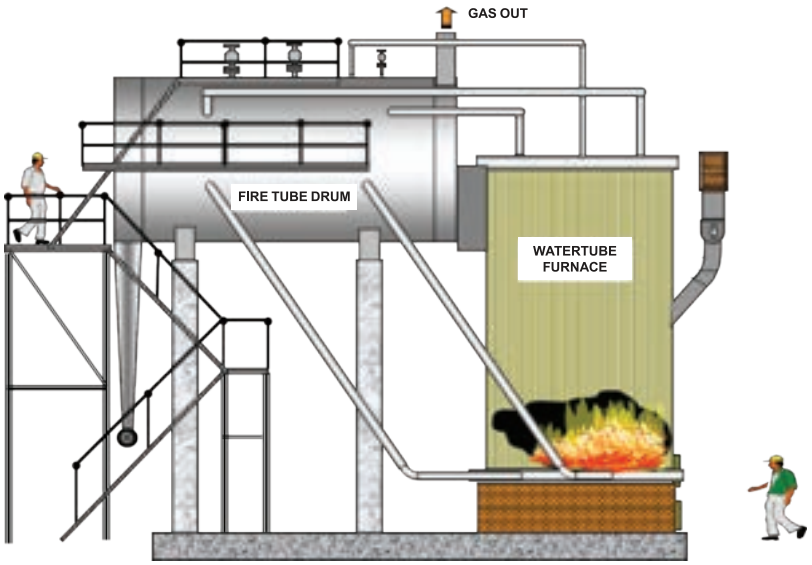
CB Series

- Compact solution to generate steam for processing purposes
- Excellent for radiant heat absorption

Mackenzie Combination Boiler

Mackenzie CB Series boilers are of a water tube - fire tube design, suitable for applications in the palm oil and wood industries. The water tube membrane wall furnace is excellent for radiant heat absorption. As the flue gas exits the furnace, it will then pass through a 2-pass fire tube drum. Steam raising from the water tube section is immediate and responsive especially during cold start-up conditions when the fire tube drum is still cold.

The boiler has short delivery and field erection time.



Steam Conditions

Evaporation Rate	: 5 T/H - 20 T/H
Pressure	: 10 Barg - 20 Barg
Temperature	: Saturated

Fuel

- Palm Fiber and Shell
- Processed Palm Empty Fruit Bunches
- Wood Waste
- Rice Husk

Special Features

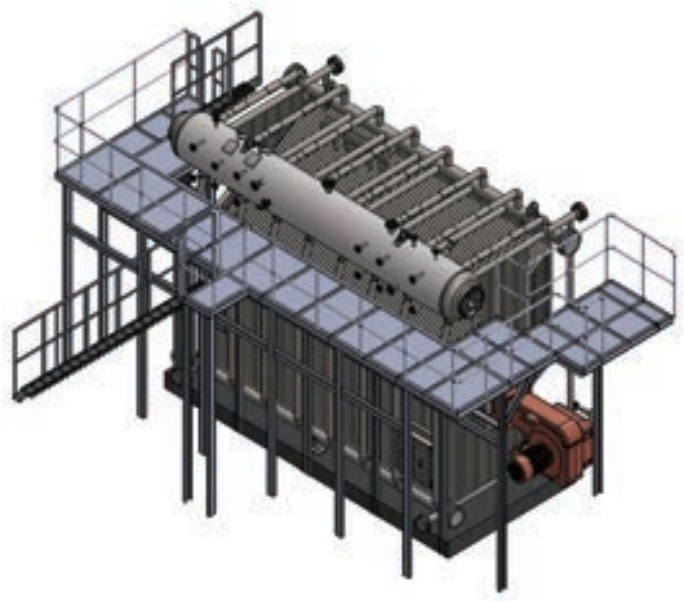
- Membrane Wall Furnace Tubes
- Single Pass Convection Bank
- Vibrating Grate (Water Cooled)

PWT Series

Mackenzie Packaged Boiler

Mackenzie-ERK Boiler (German Design)
The Mackenzie-ERK boiler is a natural circulation boiler, distinguished by a robust and innovate design that best fits the demands of power plants and industrial applications. Unlike the conventional water tube boiler series, Mackenzie Industries-ERK boilers are designed and built for low maintenance and high reliability. Its proven track record extends to many customers worldwide who require safety, efficiency and reliability.

- Natural circulation membrane wall Bi-drum water tube boiler
- Design for fossil fuel fired industrial power plant which requires high efficiency performance as well as uninterrupted operation



Steam Conditions

Steam Capacity	: 3,000 - 80,000 kg/ hour
Working	: 8 Barg - 75 Barg
Type	: Watertube (Mono Drum Corner Tube or Bi-Drum Corner Tube)

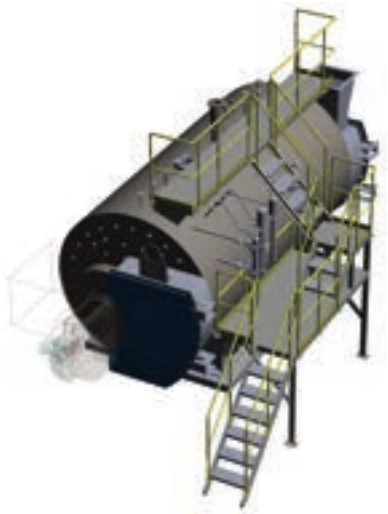
Suitable For

Chemical Refinery, Food Processing, Petrochemical Plants, Cogen Plants, Sugar Refinery, Edible Oil Plants, Textile Factory, Pulp & Paper

PWB Series

Mackenzie Packaged Boiler

The Mackenzie PWB Series of packaged boilers are designed with bigger volume and larger heating surface. The larger heating surface allows for faster boiler response to steam load changes, making it ideal for industries with high steam surge rates. The complete boiler pressure part is designed, fabricated and assembled in our workshop as a package prior to site delivery. The boiler is equipped with multi-stage or modulating-type industrial burners. These burners are highly efficient, fully automated, capable of high turndown ratio operations and are designed for firing multiple fuels i.e. fossil fuel oil, natural gas or dual fuels.



Steam Conditions

Steam Capacity	: 5,000 - 32,000 kg/ hour
Pressure	: 10 Barg - 17 Barg
Type	: Firetube, Fully Wet Back / 3-passes

Suitable For

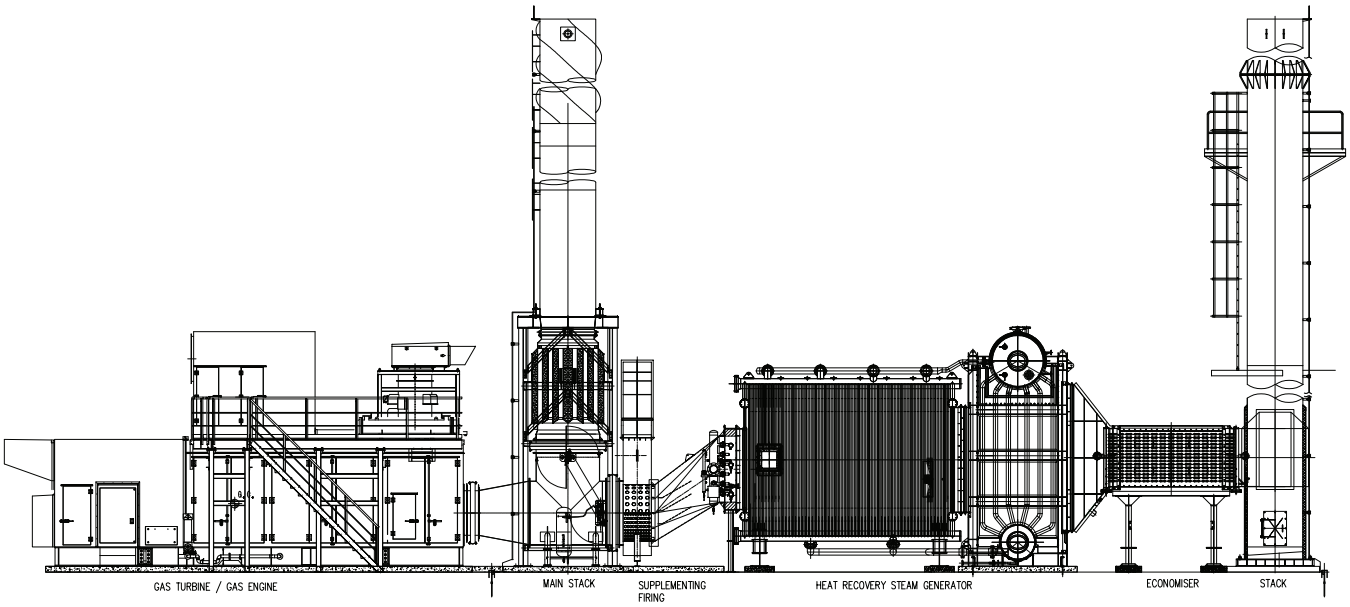
Food Processing, Petrol Chemical Plants, Pulp & Paper, Edible Oil, Plastic, Oil & Gas, Cogen Plant, Gas District Cooling Plants, Hand Glove Factory

WH Series

Mackenzie Waste Heat Recovery Boiler

Mackenzie WH Series, also known as Industrial HRSG, are designed for waste heat recovery from exhaust gases of power generating turbines engines and / or high temperature process / flue gas. This series utilizes a bi-drum construction with fin tube and is specifically designed to be shop assembled. It is highly suitable for gas fired cogen plant applications. In addition, we offer the option of incorporating duct fired burner to increase the evaporation capacity. Our Industrial HRSG cogen plants are designed for maximum automation with minimal human interaction.

- Designed for full automation with least human interaction
- Bi-drum with fin tube and shop assembled unit
- Able to design to suit most of the prime mover



Steam Conditions

Evaporation Rate : 5 T/H - 60 T/H
Pressure : 6 Barg - 80 Barg
Temperature : Saturated / Superheated

Heating Medium

- Flue Gas
- Gas Turbine Exhaust Gas
- Gas Engine Exhaust Gas
- Supplementary Gas Firing

Special Features

- Flue Gas Duct Burner
- Diverter Damper
- Economiser
- Modular Design
- Fully Automated Operation
- Compact Design

Auxiliary Equipment

Emmision Control System

Environmental Friendly Emission Control System - Electrostatic Precipitator (ESP)

Protecting the environment is part of our overall mission statement and the implementation of the ESP with our biomass boiler system supports this initiative. An electrostatic precipitator (ESP) is a filtration device that removes fine particles, like dust and smoke, from the flue gas using the force of an induced electrostatic charge while minimally impeding the flow of gases through the unit. An ESP applies energy only to the particulate matter being collected and is therefore very efficient in its energy consumption.

Dust Collector System

Dust collector system is used to enhance the quality of air released from industrial and commercial processes by collecting dust and other impurities from air or gas. Designed to handle high-volume dust loads, a dust collector system consists of a blower, a dust filter, a filter-cleaning system, and a dust receptacle.

Electrostatic Precipitator

Dust Collector System

PLC Control & SCADA

Vibrating Grate

Boiler Features Automation

Sophisticated and High End PLC Control & SCADA System

The boiler control philosophies can be more accurately executed through the use of sophisticated PLC systems. The SCADA is a control system architecture to maintain efficiency, process data for smarter decisions, and communicate system issues to the high-level process supervisory management to mitigate downtime.

Automatic High Efficient Combustion Grates - Vibrating Grate

The water-cooled vibrating grate is designed to burn solid waste fuel with total reliability and has an outstanding record of availability at lower maintenance costs. The grate's water-cooling protection is ideal for burning biomass waste which are high in moisture and low in ash.

Higher temperature combustion air needed to burn the high moisture fuel can be maintained without concern for damaging the grate. Intermittent grate vibration moves the fuel bed forward through the furnace. Ash is automatically discharged from the forward end of the grate surface.

The grate is driven by electric motors and eccentrically linked drive shafts. The drives are controlled to vibrate the grid sections sequentially but not simultaneously. Frequency is controlled by manually adjusting the pulley in the field. Environmentally harmful emissions from the chimney are further reduced as the slag is burned out.

Reciprocating Grate

The air-cooled reciprocating grate is an inclined combustion stoker consisting of alternating stationery and moving rows of high chrome alloy iron bars. The reciprocating action on the grate bars are accomplished using a hydraulic power pack. This action agitates and migrates the fuel bed down from the rear of the furnace to the front. The resultant ash is continuously discharged via a water-submerged stainless steel ash conveyor. There is no manual raking required of the fuel bed or for ash removal. The reciprocating action and sectional control of the burning process guarantees good fuel burn out even for biomass fuels with relatively high moisture content.

Efficiency Enhancement Products

Boiler efficiency can be significantly improved through the installation of feedwater economizers and combustion air preheaters. This will save on energy costs and reduce the emission of greenhouse gases into the environment.

Innovative High Efficient Economiser

An economiser is a heat exchanger device that recovers heat from the boiler flue gases to heat the boiler feed water. The feed water or the return water is pumped through the water tubes in the economiser and absorbs the waste heat from the hot flue gas. This results in an increase in the temperature of the feed water which is then pumped into the boiler, increasing its efficiency.

The efficiency of the boiler can generally be increased by up to 5% when installing the economiser into the overall system.

Thermal Efficient Air Pre-Heater

An air preheater is an air-to-air heat exchanger device designed to heat the boiler combustion air using the recovered heat from the boiler flue gas. The primary objective is to increase temperature of the inlet air and improve the combustion efficiency by reducing the energy required to heat the inlet air. The efficiency of the boiler can typically be increased by approximately 1% for every 20°C increased in combustion air.

Economiser

Air Preheater

Reverse Osmosis System

Advance Water Treatment Systems

A boiler feed water treatment system is made up of several individual technologies to ensure an efficient process and quality steam generation. Treating boiler feed water is essential for both high-and low-pressure boilers.

An efficient and well-designed boiler feed water treatment system should be able to:

- Efficiently treat boiler feed water and remove harmful impurities prior to entering the boiler
- Promote internal boiler chemistry control
- Maximize use of steam condensate
- Control return-line corrosion
- Avoid plant downtime and boiler failure
- Prolong equipment service life

The most appropriate boiler feed water treatment system will help the facility avoid costly plant downtime, expensive maintenance fees, and boiler failure as a result of scaling, corrosion, and fouling of the boiler and downstream equipment.

Thermal Deaerator

The removal of dissolved gases from the boiler feed water is an essential process in a steam system. The presence of dissolved oxygen in feed water causes rapid localized corrosion in boiler tubes. Dissolved gases and low pH levels in the feed water can be controlled or removed by the addition of chemicals, it is economical and thermally efficient to remove these gases mechanically.

Reverse Osmosis (RO) System

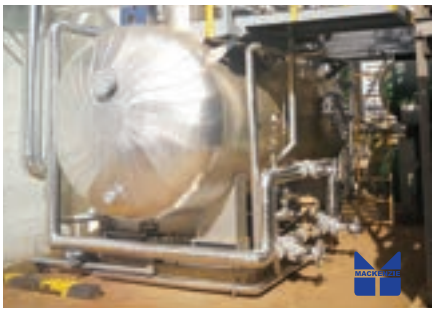
The RO System is a water purification technology that uses a semipermeable membrane. It is used to filter highly concentrated dissolved solids from water by forcing the water through a membrane by applying pressure in the solution while rejecting contaminates such as bacteria, salts, sugars, proteins, particles, dyes, and organics.

Water Softening System

Hard water is softened by removing the calcium and magnesium it contains. When hard water passes through the water softening system's resin bed, the calcium and magnesium (hardness) ions are removed through an ion exchange process, so only softened water passes through to the boiler system.

After Sales Services & Repairs

Our committed and highly trained after sales service personnel are ever ready to attend to any technical or engineering challenges that may occur. We offer boiler monitoring, inspecting and servicing plans to ensure each and every one of our boilers operate optimally, smoothly and safely while reducing costly plant down time.



Thermal Deaerator

In House Certification

JKKP License

MITI Manufacturing License

SEDA Approval Local Manufacturer

CIDB License

ISO 9001 : 2015

ASME S
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ASME U
(In the name of sister company)

ASME U2
(In the name of sister company)

NB R
(In the name of sister company)

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