Herz Industrial Boiler Specification 1650kW

Warm water boiler with output 1650 KW Nominal power : 1650 kW

- Combustion chamber:

Combustion chamber fit for combustion of solid fuels with high moisture content and maintains the combustion temperature of 900-1.000°C (except during the transitory regimes).

The high temperature smoke, after a long stay in the combustion chamber, still slows down in the post-combustion chamber (gasification) by depositing the majority of the volatile ashes.

The covering of the boiler body is composed by an internal layer in ceramic bricks with different chemical composition , based on temperature, transmigrations speed of the smoke .

In the high temperature and abrasion areas are installed bricks type SIC (silicate carbide bricks) to temperature (till 1600°C), wear, thermal deformation, combustion of wet fuels containing silica as b, , agripellets, bedsteads of chicken, waste wood straws pellets and etc. SIC bricks; over to be cemented on the steel supports of the wall – are jointed with tongue e groove.

Tongue and groove joint permits to be elastic during the thermal modulation of the combustion

chamber maintaining the bricks in the right position. By using the SIC material is mightily reduced possible damages due to the thermal stress, the costs and the frequency of the maintenance.

In the areas with less thermal stress and high temperature we install classic Chamotte bricks with high percentage of alumina (from 40% to 60%). Thickness and composition of the internal wall permits a big thermal inertia, necessary to maintain for long time the temperature of the chamber of combustion. External walls of chamber of combustion are cooled by water.

Combustion chamber walls are fitted with an inter-space and the entire walls are cooled by water. The water passage through the walls permits (in case of over temperature) to absorb immediately part of the warm produced from the combustion an use it as air preheating of the combustion chamber.

There are many advantages in our system:

Maintenance of high temperature for a long period.

Total absence of thermal stress during ignition and modulation of the thermal regime and during the change of fuel from wet to dry.

In addition, since the walls of the combustion chamber are at the same temperature of the fluid product, the entire combustion chamber could be considered as drying chamber, allowing rapid drying of the fuel (first stage of the combustion process) and reducing the residence time of the fuel on the grid.

This allows the installation of grids compact, relatively short but with very high efficiency. External structure in steel plate to fix the interior wall refractory linen and external insulation in high density rook wool.

Combustion air:

Combustion chamber and moving grate are equipped with distribution system of the oxidizing air:

Primary airs blown under the combustion grid. The regulation of primary airs are automatic controlled by the lambda sensor. All motors are equipped with inverters, also the primary airs are pre-heated recovering the heat produced by the walls cooling system.

Secondary airs blown into the combustion chamber into the different flame zone: Secondary airs are managed by the oxygen sensor with automatic adjustment through inverters.

Important note: The combustion technology uses the concept of "STEP COMBUSTION " by the secondary combustion air, in order to reduce drastically emissions of CO and NOx.

Horizontal heat exchanger:

Above the combustion chamber is installed the 2 pass smoke tube heat exchanger . The steel heat exchanger allows an efficient thermal exchanges between smoke at high temperature and water .

The construction geometry helps to ensure maximum heat exchange and performance. Design and constructive system of the heat exchanger, in addition to having a large efficiency, allows a strong reduction of the flue gas outlet temperature, recovering the major part of the latent heat of smoke.

Before and behind the exchanger are installed doors for periodic cleaning and maintenance. Rock wool insulation coating with high density external panels painted steel.

Composition:

Smoke tubes in carbon steel extruded (type Mannesmann) not welded lengthwise. Internal diameter: 2"Pipes wall thickness 4,5 mm Smoke velocity inside the heat exchanger ≥ 20 mt/sec. The heat exchanger is equipped with flanges and counter-flanges for connecting the flow and return water, safety accessories, safety temperature limiter, temperature sensors for smoke and water. Integrated security exchanger for cooling in case of power failure to EN 12828.

HiLoVe© system :

The HiLoVe is a device to be coupled with a HV cleaning system present into the Binder boilers in order to guarantee a successful functioning of the boiler at very low fuel rate without the main effects of a partial load into a solid fuel burner. This device has the purpose to by-pass the second turn of flue gas passing avoiding the possible condensation at very low thermal load regimes.

Automatic cleaning system of heat exchanger (HV System):

- High speed smoke recirculation. This system (designed by Binder) is relative simple: Instead of ID fan with the right power, we install a bigger ID fan controlled by inverter.

when necessary we increase drastically the speed of the fan and a portion of the smoke is fed back into the smoke tube at high speed. in our opinion, this system has some advantages: no thermal stress, no compressor, pipes etc, moreover during the cleaning phases the heat exchange is higher.

Multi cyclone separator:

Multi-cyclone separators consist of a number of small-diameter cyclones, place into a steel container with walls 3 mm thick, covered with insulating material. Under the multi cyclone is positioned a rotary valve to discharging automatically the ash directly into the intermediate ash bin of the centralized ash discharge system, maintaining always the correct depression in the system.

- Flow gas recirculation system (Low DeNOx):

The flow gas recirculation introduces part of the exhaust gases into the combustion chamber by mixing with combustion air. The flue gas recirculation, reducing the quantity of O2 in the combustion air, avoids reaching very high temperatures in the combustion chamber end increasing the melting point of ash .

Furthermore, by keeping constant the temperature of smoke, it reduces the formation of nitrogen oxides (NOx). Recirculation IS NECESSARYin the case of fuels with a high calorific value, low melting point of the ash and high risk of the formation of NOx.

- ID fan

Centrifugal smoke extract fan with high efficiency suitable for the automatic cleaning of the heat exchanger HV, fan and fan casing with inspection door cleaning, 3 mm thick. Inverter control speed.

Flue gas ducts:

Flue gas ducts designed for high temperature in carbon steel, not insulated, for connection between heat exchanger, multi-cyclone. HV system.

-Electric panel board with PLC

Electrical panel board with PLC microprocessor for automatic control of combustion, consisting of a programmable control unit, complete with regulating circuits for :

- Adjusting the fuel supply in relation to the value of O2, combustion chamber temperature and smoke temperature

- Adjusting of combustion airs according to the power demand and the type of fuel.

- Adjusting of quantity and pressure of primary air inlet below the grate as a function of the thermal load through inverter motors.

- Adjusting the secondary air and the depression in the combustion chamber; maintaining the reference value of oxygen in the gaseous effluent through inverter motors.

- System for emergency operations.

- Continuous temperatures monitoring.

- Depression system control

- Combustion control with Lambda sensor for the analysis of the oxygen level in the flue gas

- Control of the fuel ignition and automatic maintenance of the combustion system in stand-by.

- Electrical panel board with all switches and modules as standard OVE 60204-1

- Touch 5,7"

Touch screen control tailored to the project.

The touch screen (man-machine interface) installed directly on the electric panel board with tailored representation of boiler

- Display and settings of operating parameters

- Operating hours counting

- Display errors and failures

- Three levels of Password

Optical-audible alarm

Horn 90 dB(A) and red flash light 230 VAC for indoor and outdoor use

- Remote Monitoring.

Automatic transmission of alarm messages to phones and cellular via analogue telephone network with 2 message lines. Individually configurable For max 10 phone numbers and 10 indent numbers Alarms to be relayed by voice message to mobile phones/landline

. Remote stopping of alarm routine possible

. Constant self-testing inc. power backup through 12 V battery

- Camera

Camera for viewing inside of the combustion chamber.

Vision of combustion It is very useful for remote control and tuning of the combustion itself-.

- Automatic dust extraction from the post combustion chamber:

Water cooled auger to remove the dust deposited at the end of post combustion chamber and discharge in the ash transport system.

Inclined moving grate Mod. SRF Centralized ash extraction system

Inclinated mobile grate composed of elements in Steel-Chrome elements with minimum Chrome e content of 27-30%, (cod. 1.4777). Grate elements designed to work till 1.100°C in oxidizing atmosphere. Structure of grate support cooled by air to reduce the temperature avoiding ash fusion risks and deformation. Moving grate is shared in independent zones with independent hydraulic moving and combustion airs permitting to control the different process passages (fuel drying if necessary, pyrolysis, gasification and ash discharging) and maintaining constant the combustion process and emission levels.

-Important note:

The moving grate surface is dimensioned to have a surface of heat load ≤350 kW/m2 .

- Centralized ash extraction system

The direct centralized ash extraction system allows the automatic extraction and transport of large ash quantity until the ash bin placed outside the boiler

Ash system includes:

Under grate ash extraction: Steel rack positioned on the combustion chamber bottom with electromechanically movement managed by PLC. Rack collects ash on the bottom and carry on the ash to the discharges steel hopper .

Over-grate extraction: mobile grate carry on ash to the end of the grate itself and discharges directly to the steel hopper.

Auger to convey ash from hopper to the intermediate ash bin positioned outside the boiler. Ash augers are equipped with a motor, steel screws compartment with removable lid and reversing system of rotation in case of jam.

Max ash content accepted: 10% Note: Ash bin is not included.

Feed auger:

Feed auger 330 mm diameter with final part enforced fitted to combustible till P100 and high humidity.

Screw with progressive pace permits the loading of different dimension fuel, reducing the risk of jamming. Screw fit with motor-reducer, screw channel in steel and inversion rotation system in case of jamming. Feed screw is fitted security thermostatic probe AVTA for protection in case of flame return and automatic extinction device (SLE) with a shutter flame return and progressive flooding of the screw channel.

Security shutter against return flame risk:

Gate security against of return flame. The (RSE) device prevents return of flame in fuel storage . The system automatically closes the channel of fuel feed during the cycle of operation even in case of black out the supply comprises the container, the locking flap and the motor with automatic closing springs.

Fuel dosing system:

fuel dosing hopper positioned at the head of the screw feeder. Steel hopper compete with all the security organs.

PC end remote control

Industrial PC complete with monitor, to install even far from the thermal power plant, complete with graphic interface in 3D.

- Animated graphic display of thermal plant dedicated specifically to the central in object.

- Overview of plant and partial views conform to the plant layout

- Input and display of all system parameters, selection of operating modes, hour counter.

- Error messages visualization and memory maintained for a long period.

- Recording and storing data such as temperature boiler , oxygen sensor, speed fan rotation, operating performance and trends.

- Implementation of other plant-specific controls

- Remote access and change all settings and parameters of the plant by remote internet access.

- License of use.

- Ethernet Switch for decentralized control systems and data transfer via Ethernet between the master control station

- Distance between the switchboard and control station at 100 mt.

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- Ethernet switch for control systems decentati and data transfer via Ethernet between the master control station included and the PBX in the same building.

- Distance between the switchboard and control station at 100 mt.

-Automatic phone calls to pre selected numbers in case of alarm

Steel frame support for auxiliary burner:

Removable steel support for burner complete of anchor plate, sliding support on cylindrical guides.

Gas burner:

1160kW output gasoil or Natural Gas burner for the automatic ignition of boiler, specifically adapted for Herz Industrial boilers, including combustion management, switchboard components connections and so on.

Auxiliary burner is mandatory according to W.I.D./ IED and automatically turns on when the combustion chamber temperature drops ≤ 850°C.

Predisposition for DeNox:

N.2 flanges for the insertion and fastening the spraying nozzles of liquid urea as request by the SNCR DeNOx.

De-NOx SNCR system (non-catalytic) composed two spears spray and placed in the combustion chamber of the boiler to reduce NOx The nebulization of 'CH4N2O inside the chamber to the range of temperature of from 800 ° C to 1000 ° C is intended to react with the NO in separating water particles and N2, The system is dimensioned according to the following data: Volume hot gases 20.000mc / h Working Temperature SNCR 920 ° C