JFE Engineering Group
Standardkessel Baumgarte

RANGE OF PRODUCTS AND SERVICES

EXTRACT FROM OUR BROCHURE

IDEAS FULL OF ENERGY!

As our energy recourse grow ever scarcer, it is increasingly essential that we make more efficient use of our existing sources of energy or find entirely new sources for thermal utilisation. That is why our expertise is in greater demand than ever before.

In the following pages, you will find out how we transform ideas into energy.

Since December 2014 Standardkessel Baumgarte Group belongs to JFE Engineering Corporation. JFE Engineering Corporation, a subsidiary of JFE Holdings Inc., is a market leader for "Grate Firing Systems" and "Gasifying and Direct Melting Furnace Systems".
With more than 350 furnaces installed, JFE Engineering has its main experience in the Japanese market. With regard to biomass power plants, JFE Engineering is specialized on the construction of large sized power plants employing circulating fluidized bed boilers.

EXPERIENCE IS OUR BEST INVESTMENT.

INTELLIGENT SOLUTIONS FOR EVERY FACET OF YOUR ENERGY SUPPLY.

There are many ways in which different sources of energy can be transformed into heat, steam and electricity. At Standardkessel Baumgarte we not only know these ways – we also find new ones. Thanks to our more than 170 years of experience, we have in comparable process expertise, regardless of whether it concerns, the supply of high-quality components, the implementation of complete complex systems, the provision of services as an EPCM contractor or the delivery of top-notch plant services. Even new energy concepts such as contracting are becoming increasingly attractive options for many customers.

It is therefore no surprise that energy supply companies, municipal governments, public utilities and industrial firms all rely on our know-how in these matters.
That is because they know that experience is our best investment.

1 PUTTING RESIDUES TO WORK

ENERGY FROM SOLID LIQUID OR GASEOUS WASTE STREAMS

FUEL

Household and household-type industrial waste, liquid and gaseous industrial waste

PERFORMANCE RANGE

Solid residues up to 140 MW_{th}
Steam parameters up to 500 °C - 100 bar

Liquid, gaseous residues up to 550 MW_{th}
Steam parameters up to 570 °C - 170 bar

BOILER TECHNOLOGY

Natural circulation
Vertical or horizontal construction
Reheat system or external super heater
Steam or hot water production

COMBUSTION SYSTEM

Air-cooled or water-cooled pusher-type grate with ram feeder
Fluidised bed combustion system
Industrial burner systems for liquid and gaseous fuels

FLUE GAS TREATMENT

Wet systems, semi-dry or dry systems according to emission requirements
$Ca(OH)_2$, CaO or $NaHCO_3$
SNCR or SCR systems for NO_x-reduction

Sources of Energy

REFUSE AND WASTE MATERIALS / HOUSEHOLD AND INDUSTRIAL WASTES





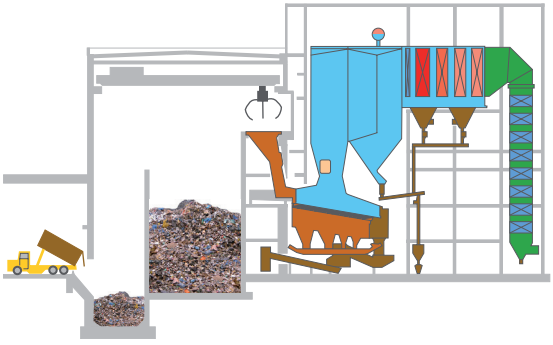
Sample Reference

OOSTENDE, BELGIUM

Scope: Turn Key Power Plant

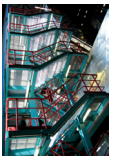
Technical Project Information

Numer of Lines	1
Fuel	Domestic / Industrial Refuse
Heating Value (min. / nom. / max.)	11.0 / 15.0 / 18.0 MJ/kg
Fuel Throuput (min. / nom. / max.)	12.6 / 16.8 / 21.0 t/h
Rated Thermal Input	70 MW
Steam Capacity	80.3 t/h
Design Pressure	54 bar g
Steam Pressure	41 bar g
Steam Temperature	402 °C
Feedwater Temperature	130 °C
Fuel Gas Flow	135,000 m³ i.N./h
Exhaust Gas Temperature	180 °C
Operational Approval	Vlarem II
Year of Commissioning	2009



Example of a plant fired using household and household-type industrial waste





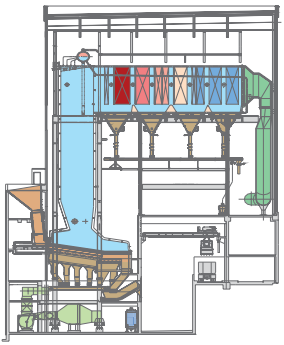
Sample Reference

FRANKFURT, GERMANY

Scope: Boiler Island

Technical Project Information

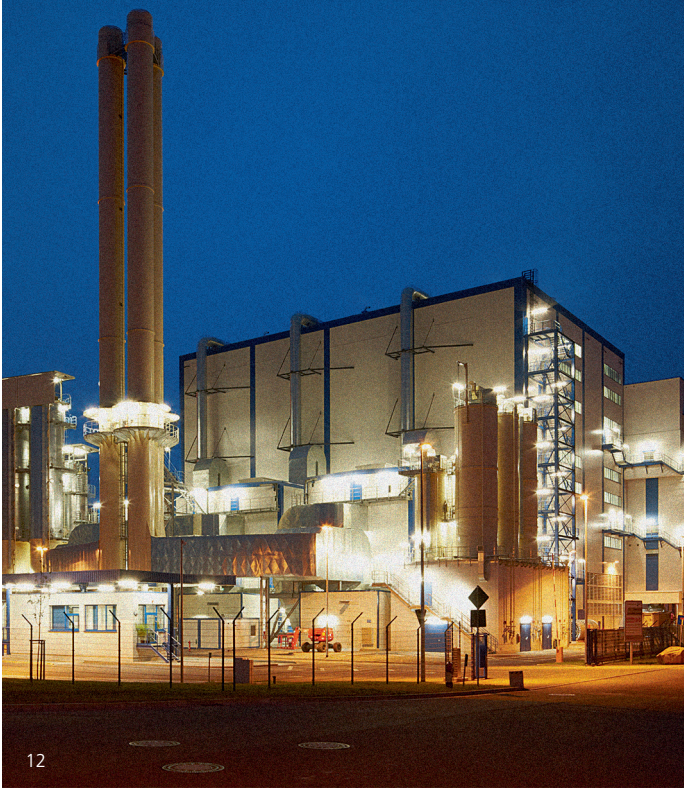
Numer of Lines	4
Fuel	Household Waste, House-hold-type Industrial Waste
Heating Value (min. / nom. / max.)	8.0 / 11.0 / 14.0 MJ/kg
Fuel Throuput (min. / nom. / max.)	12.0 / 20.0 / 22.0 t/h
Rated Thermal Input each	62.8 MW
Steam Capacity each	67.2 t/h
Design Pressure	80 bar g
Steam Pressure	59 bar g
Steam Temperature	500 °C
Feedwater Temperature	130 °C
Fuel Gas Flow	122,500 m³ i.N./h
Exhaust Gas Temperature	220 - 240 °C
Operational Approval	17. BImSchV
Year of Commissioning	2006 / 2008



Example of a plant fired using household and household-type industrial waste

Sources of Energy

REFUSE AND WASTE MATERIALS / REFUSE-DERIVED FUELS





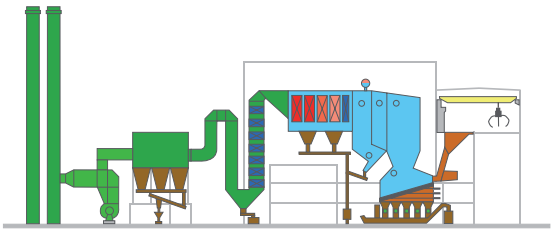

Sample Reference

BERNBURG, GERMANY

Scope: Turn Key Power Plant

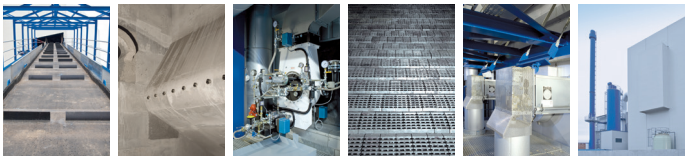
Technical Project Information

Numer of Lines	3
Fuel	Domestic / Industrial Waste
Heating Value (min. / nom. / max.)	10.5 / 15.0 / 18.0 MJ/kg
Fuel Throuput (min. / nom. / max.)	11.3 / 16.8 / 21.0 t/h
Rated Thermal Input	70 MW
Steam Capacity	80.0 t/h
Design Pressure	55 bar g
Steam Pressure	41 bar g
Steam Temperature	410 °C
Feedwater Temperature	130 °C
Fuel Gas Flow	136,000 m³ i.N./h
Exhaust Gas Temperature	180 °C
Operational Approval	17. BImSchV
Year of Commissioning	2010



Example of a plant fired using household and household-type industrial waste

Sources of Energy
SOLID INDUSTRIAL RESIDUES



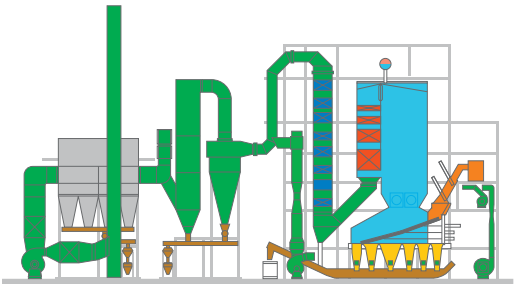
Sample Reference

POLGAR, HUNGARY

Scope: BOILER ISLAND

Technical Project Information

Numer of Lines	1
Fuel	Used tyres
Heating Value (min. / nom. / max.)	28.0 / 31.4 / 36.0 MJ/kg
Fuel Throuput (min. / nom. / max.)	2.5 / 2.9 / 3.5 t/h
Rated Thermal Input	25.3 MW
Electrical Power Output	5.6 MW
Steam Capacity	27.4 t/h
Steam Temperature	503 °C
Steam Pressure	80 bar g
Feedwater Temperature	130 °C
Fuel Gas Flow	55,000 m³ i.N./h
Exhaust Gas Temperature	220 °C
Operational Approval	17. BImSchV
Year of Commissioning	2011



Example of a plant fired using solid industrial materials

Sources of Energy

LIQUID AND GASEOUS INDUSTRIAL RESIDUES



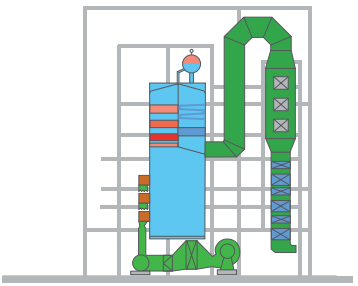

Sample Reference

WESSELING, GERMANY

Scope: BOILER ISLAND

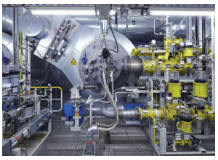
Technical Project Information

Fuel	Heavy Fuel Oil, Production Residues (Gaseous), Production Residues (Liquid)
Heating Value (nom.)	39.53 MJ/kg
Fuel Throuput Rate (max.)	14 t/h
Thermal Capacity of Firing System (max.)	168 MW
Steam Capacity	200 t/h
Design Pressure	138 bar
Steam Temperature	520 °C
Feedwater Temperature	145 °C
Waste Gas Temperature	165 °C
Operational Approval	17. BImSchV / SVTI
Year of Commissioning	2012



Example K7

Sources of Energy
COKE OVEN GAS / BLAST FURNACE GAS

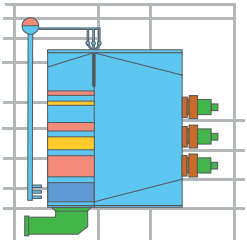
Sample Reference

SALZGITTER, GERMANY

Scope: BOILER ISLAND

Technical Project Information

Fuel	Furnace Gas / Converter Gas
Calorific Value	3.436 MJ/Nm³
Rated Thermal Input	250 MW
Fuel	Coke Oven Gas
Calorific Value	17.24 MJ/Nm³
Rated Thermal Input	180 MW
Fuel	Natural Gas
Rated Thermal Input	180 MW
Fuel	Fuel Oil EL
Rated Thermal Input	150 MW
Rated Thermal Input (total)	298 MW
Steam Capacity HP/RH	340/320 t/h
Steam Temperature HP/RH	568/563 °C
Steam Pressure HP/RH	168/45 bar
Feedwater Temperature	255 °C
Flue Gas Volume Flow	451,000 m³ i.N./h
Exhaust Gas Temperature	130 °C
Operating Approval	13. BImSchV
Year of Commissioning	2010



Example K7

2 A MATURE TECHNOLOGY

ENERGY FROM BIOMASS

FUEL

Matured wood, waste wood, fresh wood, forest waste, tree prunings, peat, bark
Other bio-fuels such as e. g. rice husks, olive pressing residues, etc.

PERFORMANCE RANGE

Pusher type grate up to 100 MW_{th}
Travelling grate system up to 140 MW_{th}
Fluidised bed firing system up to 100 MW_{th}
Dust burner up to 60 MW_{th}
Steam parameters up to 525 °C - 100 bar

BOILER TECHNOLOGY

Natural circulation
Vertical construction

COMBUSTION SYSTEM

Pusher-type grate system
Travelling grate
Fluidised bed firing
Dust burner

FLUE GAS TREATMENT

Cyclone system, bag house filter resp. electrostatic precipitators
Wet systems, semi-dry or dry systems according to emission requirements
SNCR or SCR systems for NO_x-reduction

Sources of Energy
WOOD / WASTE WOOD

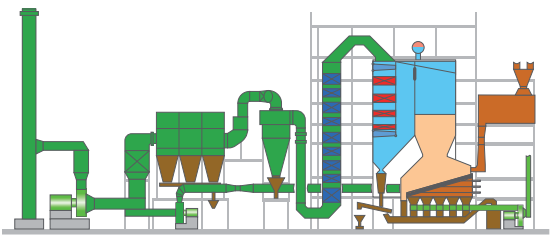
Sample Reference

EBERSWALDE, GERMANY

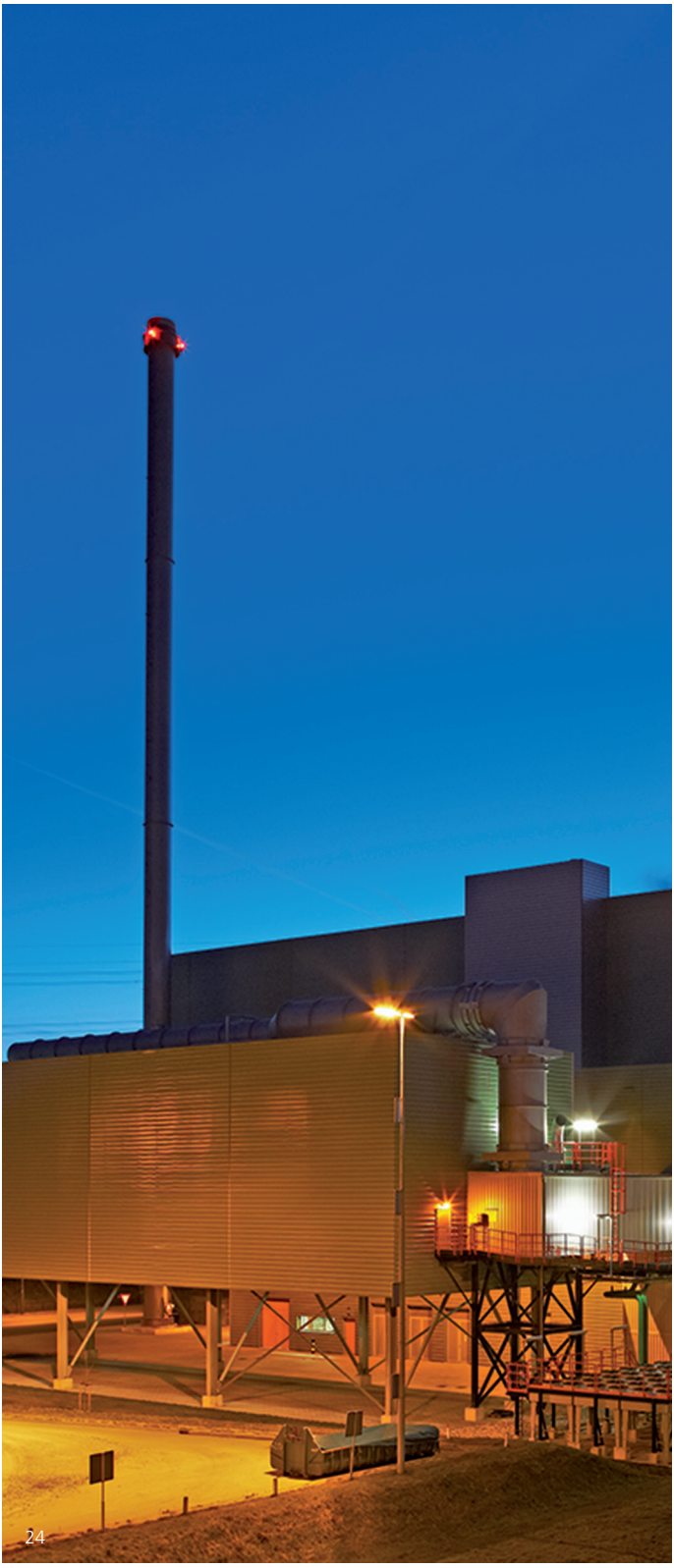
Scope: Turn Key Power Plant

Technical Project Information

Numer of Lines	1
Fuel	Wood
Low Heating Value (min. / nom. / max.)	8.5 / 10.4 / 12.0 MJ/kg
Fuel Throuput (min. / nom. / max.)	11.0 / 22.0 / 24.0 t/h
Rated Thermal Input	65 MW
Electrical Powr Output	20 MW
Steam Capacity HP/RH	68/68 t/h
Steam Temperature HP/RH	482/472 °C
Steam Pressure HP/RH	82/19 bar g
Feedwater Temperature	105 °C
Rated Flue Gas Volume	135,000 m³ i.N./h
Fuel Gas Temperature	170 °C
Operational Approval	13. BImSchV
Year of Commissioning	2006



Example of a wood-fired plant



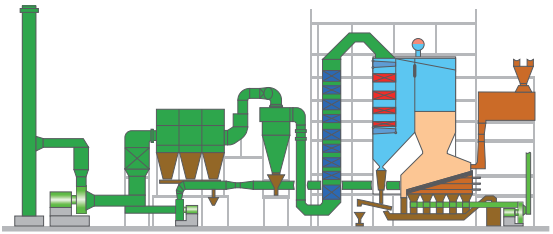
Sample Reference

BEC TWENCE, NETHERLANDS

Scope: Turn Key Power Plant

Technical Project Information

Fuel	Waste Wood (A1 - A4)
Low Heating Value (min. / nom. / max.)	10.0 / 13.4 / 16.0 MJ/kg
Fuel Throuput (min. / nom. / max.)	10.3 / 19.0 / 22.5 t/h
Rated Thermal Input	73 MW
Electrical Power Output	20 MW
Steam Capacity	80 t/h
Steam Temperature	465 °C
Steam Pressure	68 bar g
Design Pressure	79 bar g
Feedwater Temperature	130 °C
Rated Flue Gas Volume	111,500 m³ i.N./h
Fuel Gas Temperature	170 °C
Operational Approval	BVA
Year of Commissioning	2007



Example of a wood-fired plant

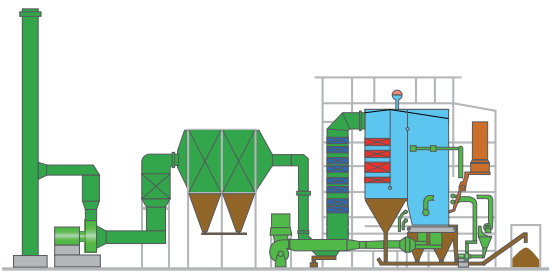
Sample Reference

BAENA, SPAIN

Scope: Turn Key Power Plant

Technical Project Information

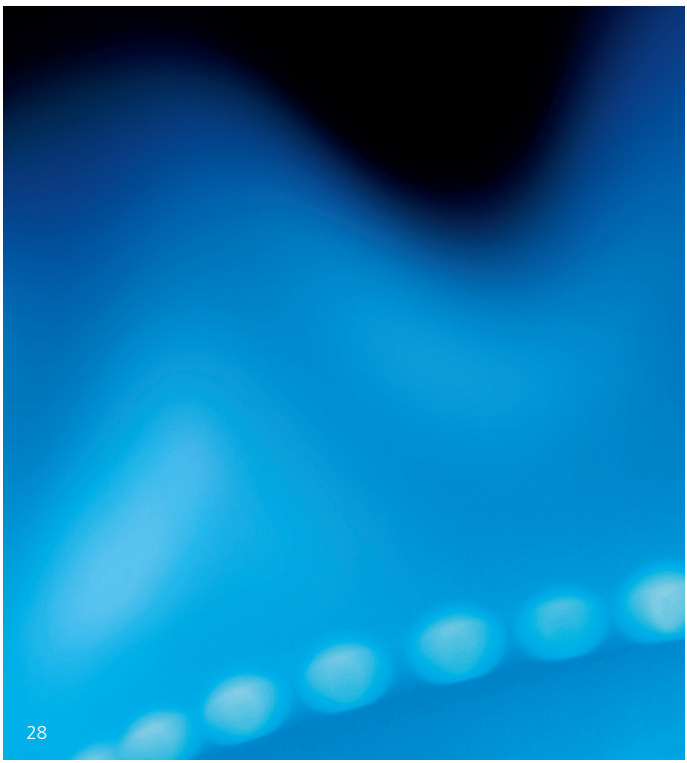
Fuel	Olive Waste
Low Heating Value (min. / nom. / max.)	9.2 / 10.1 / 15.1 MJ/kg
Fuel Throuput (min. / nom. / max.)	25.0 / 37.4 / 41.0 t/h
Rated Thermal Input	105 MW
Electrical Power Output	25 MW
Steam Capacity	110 t/h
Steam Temperature	455 °C
Steam Pressure	78 bar g
Feedwater Temperature	105 °C
Rated Flue Gas Volume	161,890 m³ i.N./h
Fuel Gas Temperature	160 °C
Operational Approval	EU-Requirements
Year of Commissioning	2002



Example of a plant fired using the residue left after pressing olives

3 A HOT TOPIC

HEAT RECOVERY



HEAT SOURCE
Gas turbine exhaust gas

PERFORMANCE RANGE
Heat input up to 550 MW_{th}
Steam capacity up to 600 t/h
Steam parameters up to 570 °C - 170 bar

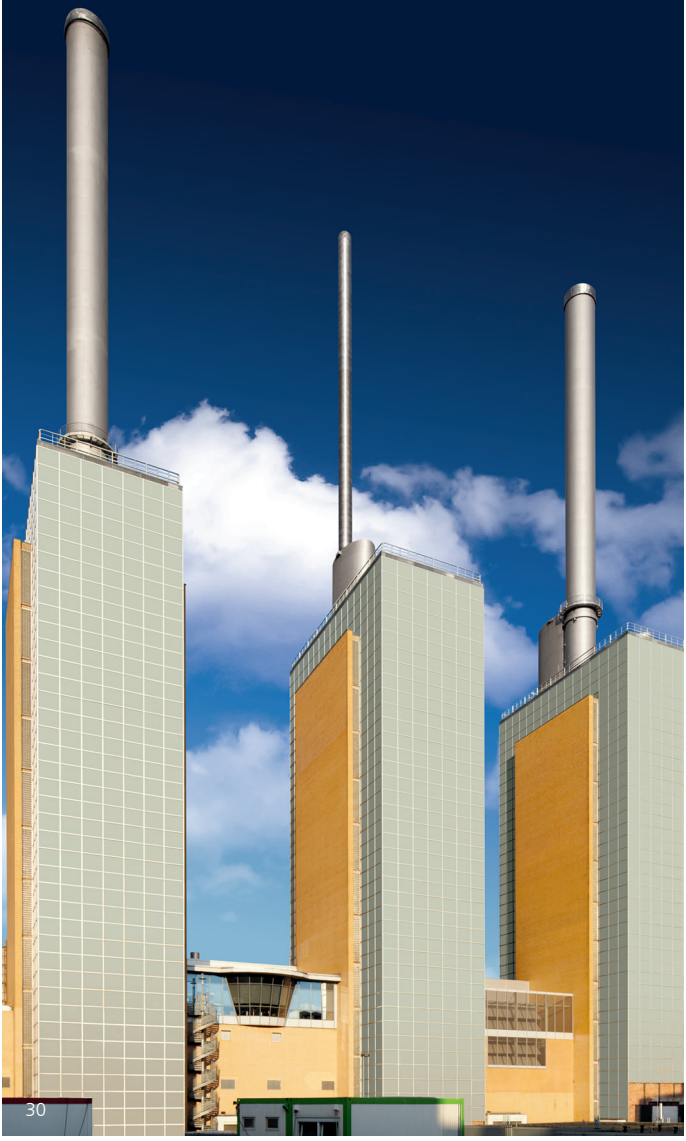
AUXILIARY FUELS
Coke oven gas, blast furnace gas, natural gas, light oil, production exhaust gases

BOILER TECHNOLOGY
Natural circulation
Horizontal, vertical or multi-pass construction
Fresh air operation and "flying takeover"

COMBUSTION SYSTEM
Duct burner in the gas turbine exhaust duct
In-duct-burner in the combustion chamber
Conventional burners with an external exhaust gas feed

FLUE GAS TREATMENT
SCR or SNCR systems for NO_x-reduction

Sources of Energy
GT PROCESS



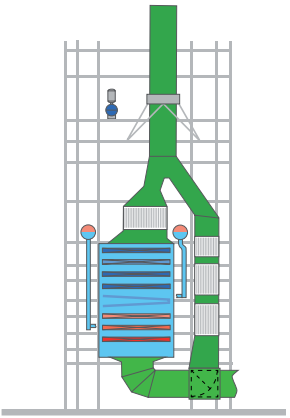
Sample Reference

Linden, Germany

Scope: Boiler Island

Technical Project Information

Energy Source	GT-Exhaust Gas
Type of Gas Turbine	GE 6 FA
Fuel for Auxiliary Firing	-
Electrical Power Output GT	77 MW
GT-Flue Gas Flow	215 kg/s
GT Exhaust Gas Temperature	590 °C
Steam Capacity HRSG HP/RH/MP/LP	93/104.6/12.8/11 t/h
Steam Temperature HP/RH/MP/LP	540/544/351/240 °C
Design Pressure HP/RH/MP/LP	98.1/29/31/5.2 bar g
HRSG-Exit Gas Temperature	80 °C
Year of Commissioning	2011



Example of a HRSG





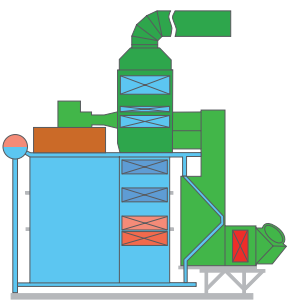
Sample Reference

VAREL, GERMANY

Scope: Steam Generator

Technical Project Information

Fuel	Natural Gas H
Heating Value	31.66 MJ/m³ i.N.
Fuel Throughput	6,078 m³ i.N./h
Rated Thermal Input	53.46 MW
Combustion Air	Gas Turbine Exhaust Gas as Oxygen Carrier
GT Exhaust Gas Temperature	556 °C
GT Exhaust Gas Volume Flow (Wet)	41.76 kg/s
Steam Capacity	90 t/h
Steam Pressure	89 bar g
Design Pressure	105 bar g
Steam Temperature	480 °C
Feed Water Temperature	105 °C
Exhaust Gas Temperature	135 °C
Design Code	TRD-DIN/EN
Year of Commissioning	2007



Example of a boiler plant



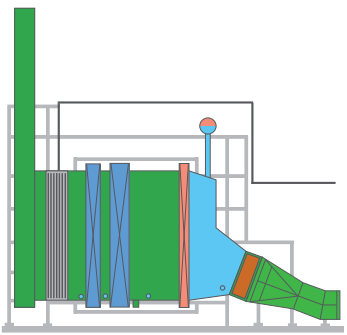
Sample Reference

PLATTLING, GERMANY

Scope: Boiler Island

Technical Project Information

Energy Source	Natural Gas
Gas Turbine Type	GE 6 FA
Additional Fuel	Natural Gas
Electrical Output of GT	77 MW
GT-Exhaust Gas Flow Rate	214.5 kg/s
GT Exhaust Gas Temperature	592 °C
HRB Steaming Capacity	201 t/h
Steam Temperature	532 °C
Approved Working Pressure	108 bar
HRB Waste Gas Temperature	110 °C
Year of Commissioning	2010



Example of a boiler plant

Sources of Energy

WASTE HEAT FROM INDUSTRIAL PROCESSES



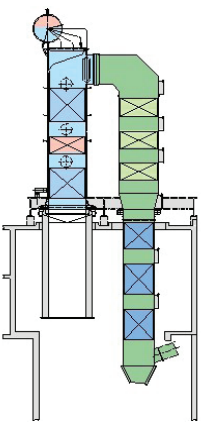
Sample Reference

GROVEHURST, GREAT BRITAIN

Scope: Steam Generator

Technical Project Information

Fuel	Waste Heat from Sludge Combustion
Flue Gas Flow (Moisture)	79,400 m³ i.N./h
Quantity of Flue Gas Heat	33.75 MW
Flue Gas Temperature	860 - 1000 °C
Steam Capacity	38.8 t/h
Steam Temperature	345 °C
Steam Pressure	26.5 bar g
Feed Water Temperature	105 °C
Exhaust Gas Temperature	160 -180 °C
Air Rate	45,000 m³ i.N./h
Air Temperature Inlet/Outlet	25/220 °C
Operating Approval	BS / EN
Year of Commissioning	2002



Example of a plant fired using the heat recovered from industrial processes





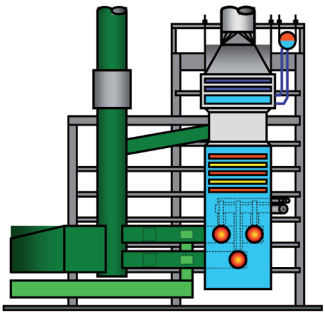
Sample Reference

DUNKRIK, FRANCE

Scope: Boiler Island

Technical Project Information

Lines	2
Energy Source	GT Exhaust Gas
Fuel for Auxiliary Firing	Coke Oven Gas, Blast Furnace Gas, Natural Gas
Electrical Power Output GT	160 MW
Electrical Power Output ST	240 MW
Steam Capacity HP/RH	535/530 t/h
Steam Temperature HP/RH	566/566 °C
Steam Pressure HP/RH	144/31 bar g
Feed Water Temperature	105 °C
Nominal Waste Gas Flow	536 kg/s
GT-Waste Gas Temperature	527 °C
RTO Aux. Firing System	345 MW
FG Temp Boiler Outlet	120 °C
Year of Commissioning	2004



Example of a plant fired using the heat recovered from industrial processes

4

ALL FIRED UP

ENERGY FROM PRIMARY FUELS

FUEL

Coal and lignite briquette, coal dust,
natural gas or fuel oil

PERFORMANCE RANGE

Travelling Grate Firing System up to 140 MW_{th}
Steam parameters up to 540 °C - 140 bar

Dust Firing System up to 300 MW_{th}
Steam parameters up to 540 °C - 140 bar

Gas and Oil Firing System up to 550 MW_{th}
Steam parameters up to 570 °C - 170 bar

BOILER TECHNOLOGY

Natural circulation
Horizontal, vertical or multi-pass construction.
Porta boiler (bi-drum boiler) fabricated as a modular system.

COMBUSTION SYSTEM

Hard coal, lignite
Travelling grate firing with hopper feed and fuel bed controller

Coal dust
Low NOx industrial/poerstation firing systems

Gas, Oil
Low NOx industrial/poerstation firing systems

FUEL GAS TREATMENT

Wet systems, semi-dry or dry systems
according to emission requirements
$Ca(OH)_2$, CaO or $NaHCO_3$
SNCR or SCR systems for NO_x-reduction

Sources of Energy
COAL

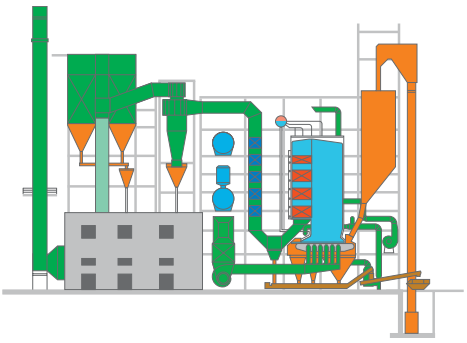
Sample Reference

JÜLICH, GERMANY

Scope: Boiler Island

Technical Project Information

Fuel	Lignite Briquettes
Low Heating Value	19.8 MJ/kg
Fuel Throughput	21.8 t/h
Fuel	Bituminous Coal
Low Heating Value	28.6 MJ/kg
Fuel Throughput	15.1 t/h
Thermal Input	120 MW
Steam Capacity	130 t/h
Steam Temperature	520 °C
Steam Pressure	109 bar g
Feed Water Temperature	110 °C
Rated Flue Gas Volume (nom.)	168,500 m³ i.N./h
Flue Gas Throuput	150 °C
Operating Approval	13. BImSchV
Year of Commissioning	2004



Example of a coal-fired plant

Sources of Energy
GAS AND OIL



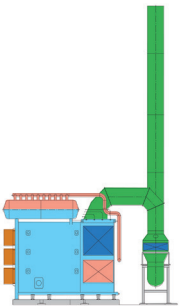

Sample Reference

TRINIDAD, TRINIDAD AND TOBAGO

Scope: Boiler Island

Technical Project Information

Fuel	Natural Gas / Fusel Oil
Heating Value	35.9 MJ/m³ i.N.
Fuel Throughput	11.525 m³ i.N./h
Rated Thermal Input	B1: 115 MW B2: 114 MW
Steam Capacity	147.5 t/h
Steam Temperature	341 °C
Steam Pressure	28.5 bar g
Design Pressure	34 bar g
Feed Water Temperature	109 °C
Exhaust Gas Temperature	200 °C
Design Regulation	TRD-DIN / EN
Year of Commissioning	B1: 2004 B2: 2011



Example of a gas- and oil-fired plant

5 PROCESS TECHNOLOGY

SOLUTIONS ALL AROUND WASTE GAS, EXHAUST AIR AND FLUE GAS CLEANING

CONDENSATION

Spray Cooler

Condensation and solvent recovery by sprayed liquid using nozzles into a vessel to which the vapor is supplied

Bath Cooler

Condensation and solvent recovery by injecting bubbles of vapor in a liquid bath

CATALYSIS

Catalytic Oxidation

with recuperative heat exchange
(CatOx System)
with regenerative heat exchange
(RCO System)

Selective Catalytic Reduction

with heat recuperation
with heat displacement system

COMBINED PROCESSES

Two-stage or multi-stage condensation
Condensation with catalytic oxidation
Catalytic oxidation with selective catalytic reduction

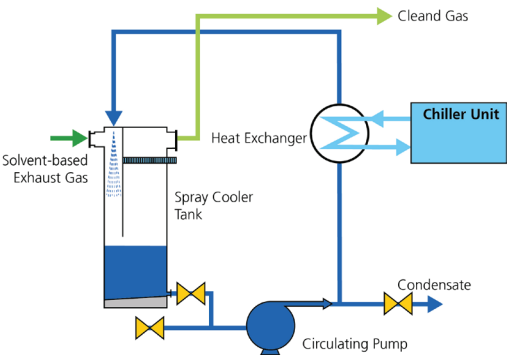


CONDENSATION SPRAY COOLER

Direct Condensation of Solvent in a Liquid Jet

Technical Project Information

Waste Gas Flow Rate	300 kg/h
Waste Gas Temperature at Inlet	120 °C
Condensation Temperature	-15 °C
Condensation Capacity	20 kW
Liquid Circulation Flow Rate	16,000 kg/h
Service Pressure	Atmospheric
Recovery Rate based on the Incoming Load	>90 %
Mode of Operation	Continuous



Direct condensation in refrigerated solvent jet

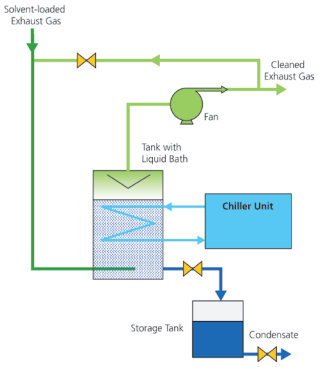



CONDENSATION BATH COOLER

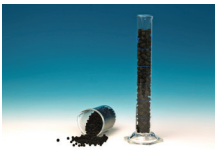
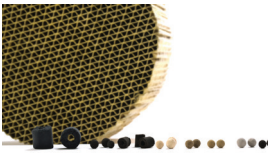
Direct Condensation of Solvent in a Liquid Bath

Technical Project Information

Throughput Rate	20 to 1,700 Nm³/h
Waste Gas Temperature at Inlet	0 °C to 80 °C
Condensation Temperature	10 °C to -45 °C
Service Pressure	0.85 to 10 bars
Condensation Power	Up to 70 kW
Mode of Operation	Continuous/discontinuous
Solvent Concentration	0 to 100 % solvent saturation (fluid)
Control Range, Volume Flow Rate	0 to design volume flow rate (0-100%)



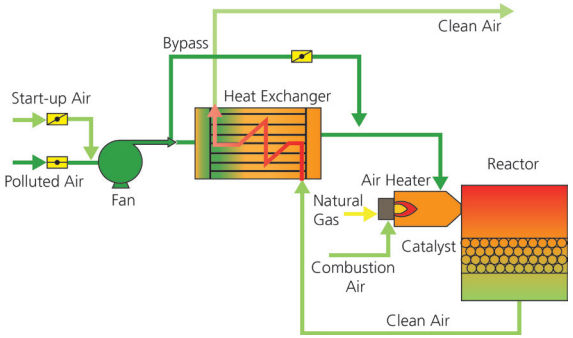
Direct condensation of solvent in a refrigerated liquid bath

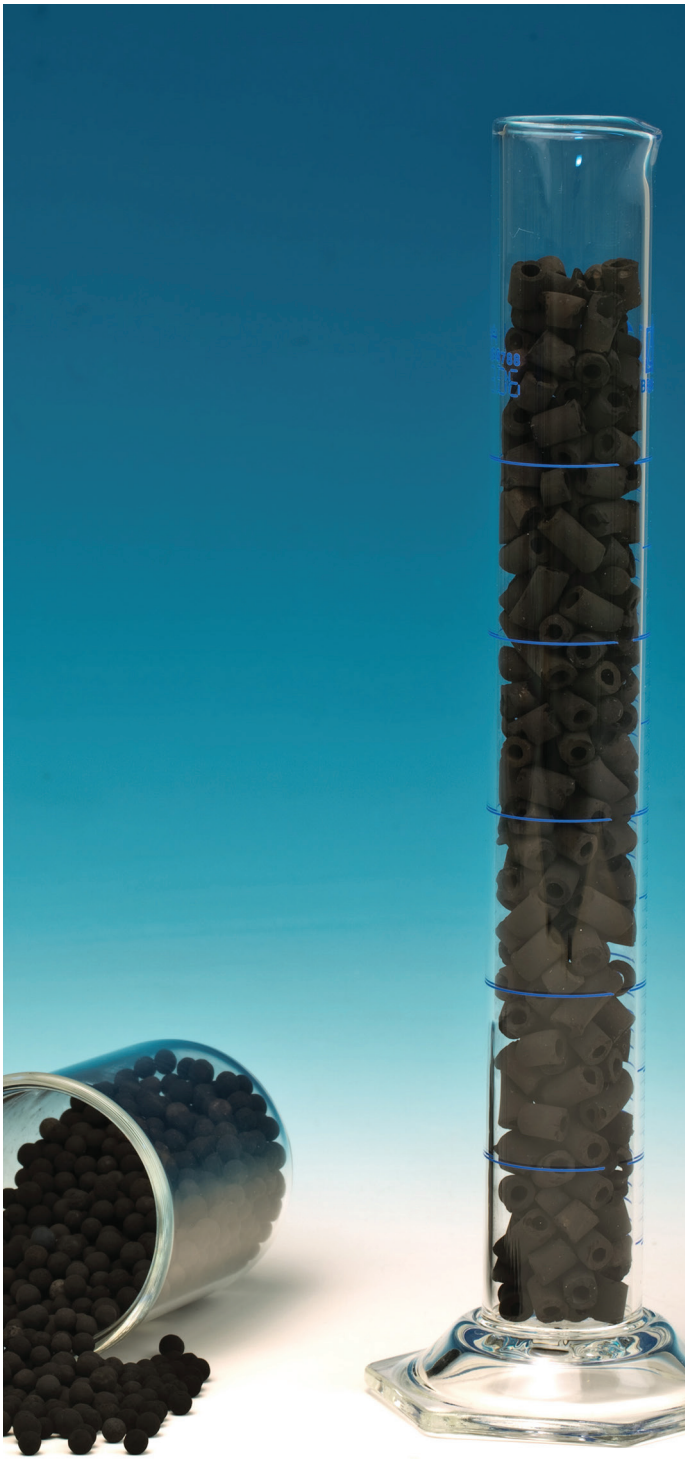

CATALYTIC OXIDATION (CatOx)
with recuperative Heat Recovery

Technical Project Information

Exhaust Air Volume Flow Rate	5,000 Nm³/h
Exhaust Air Temperature	30 °C
Pollutant Concentration (VOC)	2-10 g/Nm³
Clean Gas Value	<20 mg/Nm³ VOC
Auto-thermal Operation from VOC concentration of	3 g/Nm³
Installed Burner Output	200 kW
Service Pressure	Atmospheric
Operating Mode	Continuous



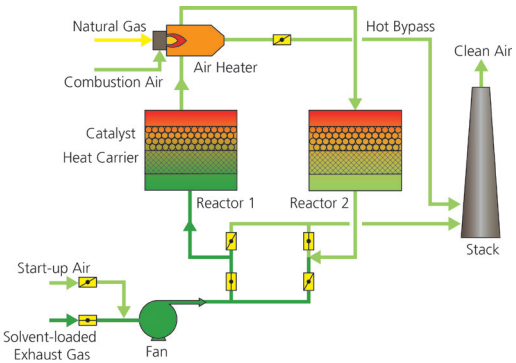
Catalytic Exhaust Air Cleaning Plant with recuperative Heat Recovery



CATALYTIC OXIDATION (RCO)
with regenerative Heat Recovery

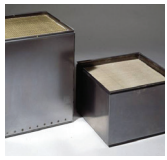
Technical Project Information

Exhaust Air Volume Flow Rate	10,000 Nm³/h
Exhaust Air Temperature	30 °C
Pollutant Concentration (Hydrocarbon)	0-2 g/Nm³
Clean Air Value	<20 mg/Nm³ org C
Auto-thermal Operation from VOC concentration of	0.7 g/Nm³
Heating System	Gas-fired Burner
Installed Burner Output	250 kW
Service Pressure	Atmospheric
Operating Mode	Continuous



Catalytic Exhaust Air Cleaning System with regenerative Heat Recovery

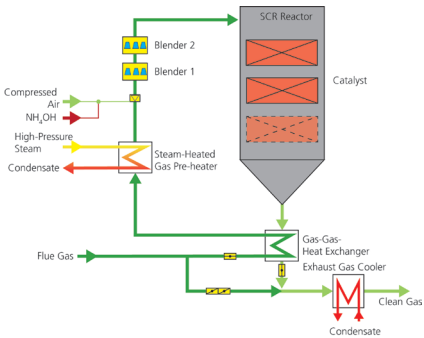


SELECTIVE CATALYTIC REDUCTION (SCR)
with recuperative Heat Recovery

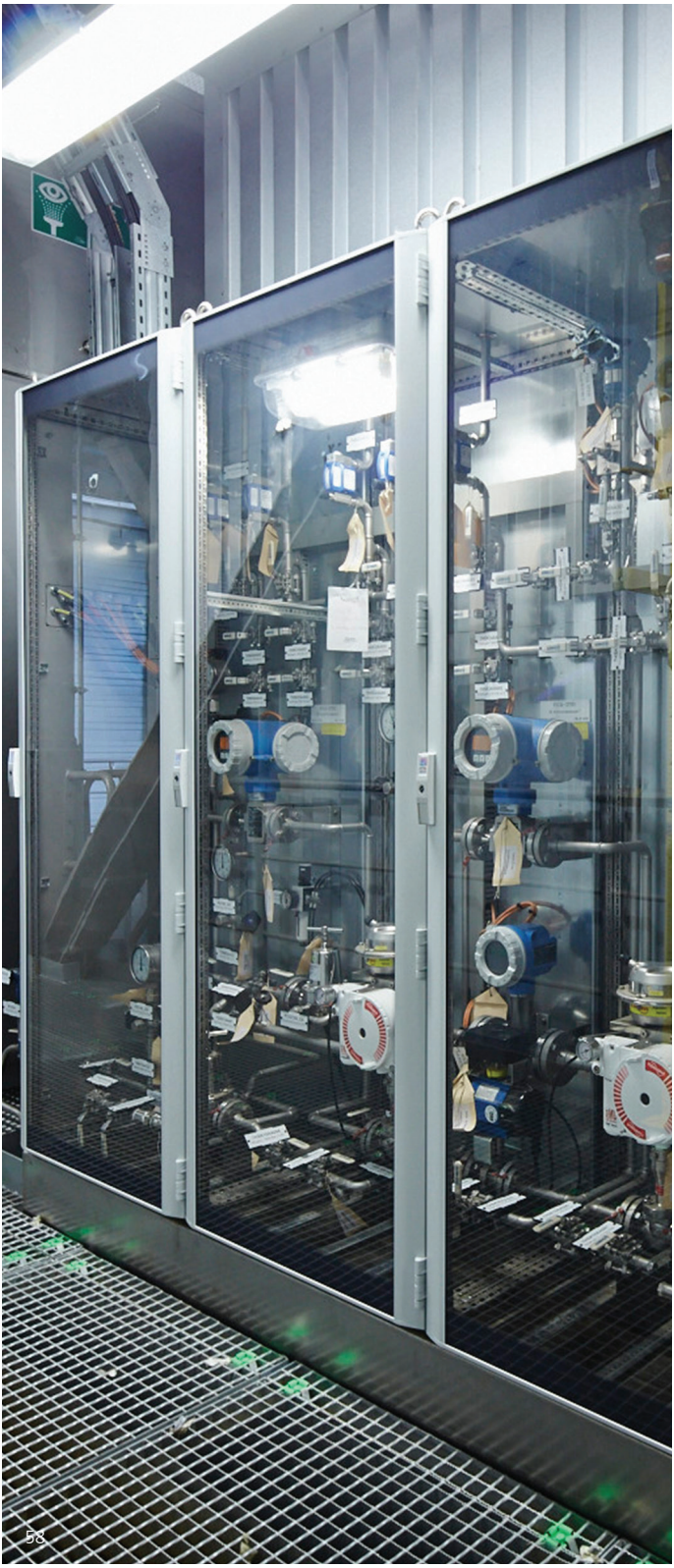
Technical Project Information

Exhaust Air Volume Flow Rate	150,000 Nm³/h
Flue Gas Temperature	155 °C
Pollutant Concentration (NO_x)	1,000 mg/Nm³
Clean Gas Value	<70 mg/Nm³ VOC
SCR Service Temperature	250 °C
Service Pressure	Atmospheric
Operating Mode	Continuous



Selctive Catalytic Reduction

Tail end SCR with Heat Transfer System an Steam/Gas Pre-Heater

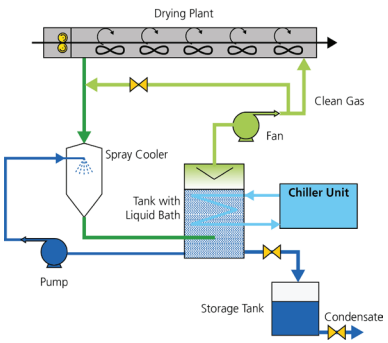




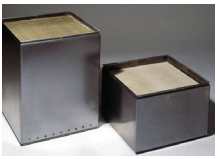
COMBINED PROCESS
Two-stage Condensation

Technical Project Information

Waste Gas Volume Flow Rate	600 Nm³/h
Waste Gas Temperature at Inlet	120 °C
Solvent Concentration	Up to 250 g/Nm³
Condensation Temperature	-10 °C
Condensation Power	65 kW
Condensate Flow Rate	120 kg/h
Concentration at the outlet from the Condenser System	38 g/Nm³
Circulation Dryer	4,500 kg/h
Service Pressure	Atmospheric
Operating Mode	Continuous



Two-stage Condensation
Direct Condensation in a Liquid Bath - with a Spray Cooler arranged upstream - in a Closed System



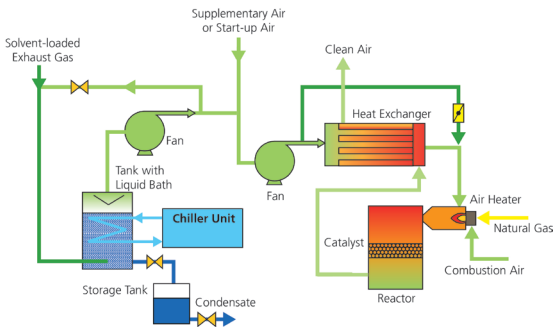
COMBINED PROCESS
Condensation with Catalytic Oxidation

Technical Project Information
Condensation

Waste Gas Volume Flow Rate	800 Nm³/h
Solvent Concentration	Up to 150 g/Nm³
Condensation Temperature	-25 °C
Condensate Flow Rate	0 bis 70 kg/h
Concentration at the outlet from the Condenser System	8 g/Nm³

Oxidation (CatOx)

Volume Flow Rate	1,600 Nm³/h
Concentration at Inlet	8 g/Nm³
Clean Gas Value	<20 mg/Nm³ VOC
Auto-thermal operation, from a VOC Concentration of	8 g/Nm³
Installed Heating Capacity	90 kW
Service Pressure	Atmospheric
Mode of Operation	Continuous



6 SERVICE O.K EVERTHING O.K.

PLANTS SERVICES FROM A TO Z

When investing in a system, it is not just the right concept and subsequent implementation that are important. Service is also an important consideration. That is because an efficient system depends on smooth operation, and that is where the wide range of services provided by Standardkessel Baumgarte Service is able to help.

ENGINEERING

Task definition, check and evaluation of measurements and protocols, recommendations and proposals of measures, planning and engineering, execution of engineering works, quality control

MODERNISATION

Definition of actual plant situation, definition of modernisation works, execution of modernisation works

OPTIMISATION

Conceptual design and realisation of: increase of availability, efficiency, reduction of emission values, operation costs, ect.

MAINTENANCE

Yearly power plant maintenance works, repairs, optimisation of components, spare part management

ERECTION

Planning of erection, erection works and erection supervision, assembling of components and turn key plants, quality controls, erection management

COMMISSIONING

Functional check and settings of components, over all functional tests, performance checks and tests of components, preparations of test run, execution of test run including performance tests

OPERATION

Power plant operation

7 PIONEERS

INNOVATIVE TECHNOLOGIES

THICK NICKEL PLATING

An essential element of an econocically operating boiler plant is a smooth and reliable operation, without failures and expensive time-consuming maintenance measures.

TETRATUBE

With Tetratube, Standardkessel Baumgarte offers a solution that can increase the service life of your plant.

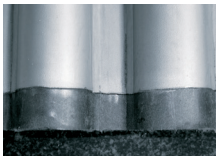
TANGENTIAL AIR INJECTION

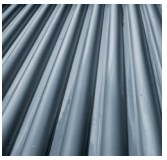
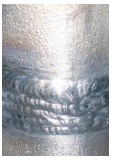
The key prerequisite for good post-combustion is an optimun mixture of the flue gas with the combustion air. With the patented tangential air injection process, we are able to deliver th oxygen directly to the carbon monoxide.

FLUIDISED BED FIRING SYSTEM

In order to be able to offer solutions for fuels that could not be used with existing grate technologies, we have expanded our product range and readopt a fluidised bed firing system. The fluidised bed firing system is primarily utilised with waste materials and biomass.

As a leading supplier of plants for the combustion of disposals we are also the frontrunner in the development of new corrosive protection procedures, one of which is the thick nickel plating process which is exclusively licensed to Baumgarte Boiler Systems.



New, innovative and highly efficient:

THICK NICKEL PLATING

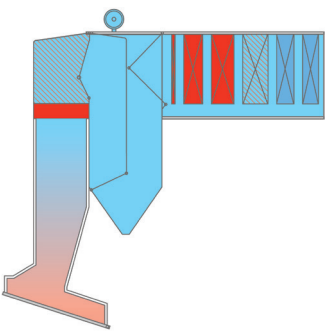
The advantages are obvious

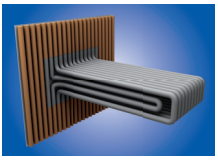
- The non-porous surfaces produced in the electroplating process protect the components from attacks by aggressive flue gases.
- The surface properties reduce the tendency for combustion residue to accumulate.
- Even large components and relatively complex forms can be effectively protected at little cost.
- The 100 % nickel is applied using a low tension technique, ensuring good adhesion.
- Unlike conventional processes, thick nickel plating does not mix with the base of the components.

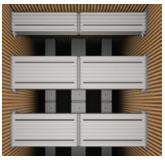
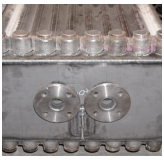
Application of thick nickel plating

The new innovative process of corrosion protection offered by Baumgarte Boiler Systems is suitable for heating surfaces with tube wall temperatures of max. 400 °C, such as:

- Membrane Walls
- Convection Evaporator
- Superheater
- Components in Energy-Generating Plants prone to Corrosion and Fouling

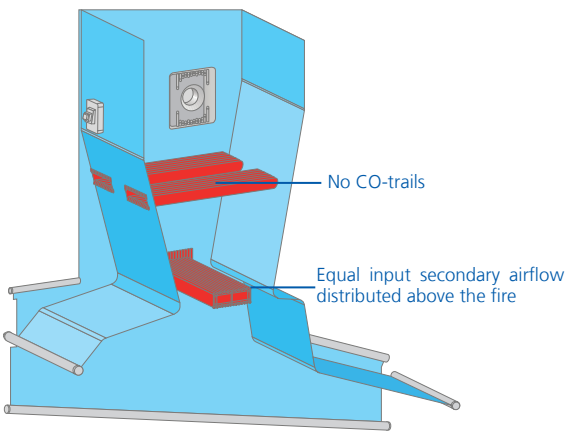




System for optimal afterburning
TETRATUBE

With the patented TetraTube Standardkessel Baumgarte offers an innovative solution for optimum afterburning. It doesn't inject the secondary airflow from the side but delivers it to where it will be most effective: in to the top of the furnace. Constricting the boiler's cross section produces a kind of nozzle effect that causes the flue gases to mix perfectly with the injected secondary air. A second TetraTube, turned 90° and located approx. 2 m above the first, enhances the effect. At the most constricted point of the cross-section, the mixed gases reach peak speeds of 30 m/s. These conditions are perfect for preventing peaks in CO and ensuring continuous afterburning. The system is also perfectly suited to injecting NOx reducing agents. The modified version is fitted in the furnace's corresponding temperature zone.

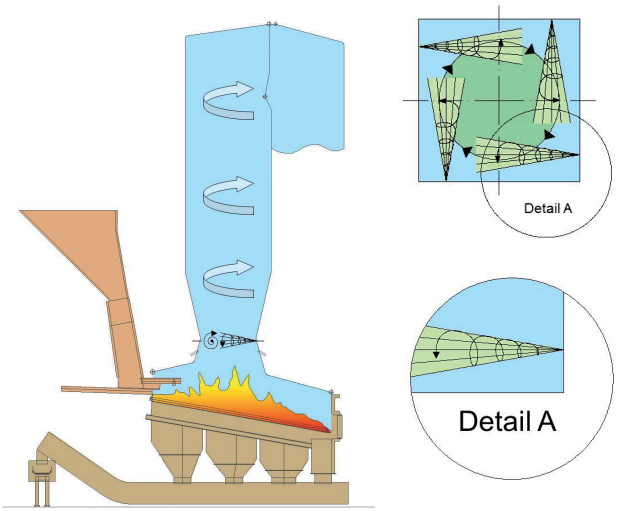


New plant equipment with Tetra Tube

A patented system for secondary airflow
in the afterburner chamber

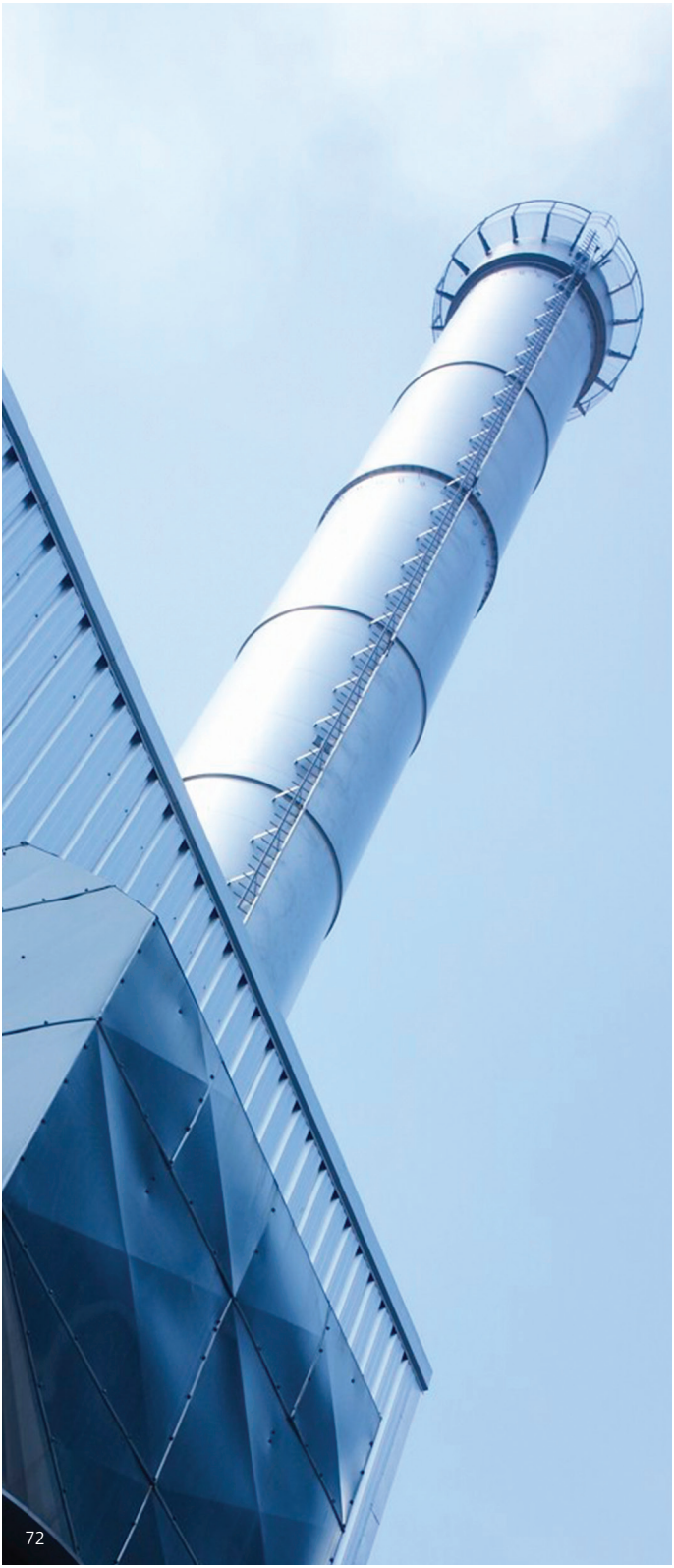
TANGENTIAL AIR INJECTION

The key prerequisite for good post-combustion is an optimum mixture of the flue gas with the combustion air. Ensuring that the unburned constituents of the flue gas are completely combusted requires oxygen, extensive expertise and the correct process technology. With the patented tangential air injection process, we are able to deliver the oxygen directly to the carbon monoxide.



The advantages of this air injection are

- Improved Emissions Value
- Optimised Flue Gas Mixture
- Harmonisation of the Flue Gas Temperature throughout the entire Firing Chamber Cross-Section
- Controlling the Afterburning and Temperature Distribution
- Reduction in Excess Air and Lower Flue Gas Volume
- Reduced NH_3 Consumption
- Reduction in the Susceptibility to Corrosion






The perfect addition to our grate technologies

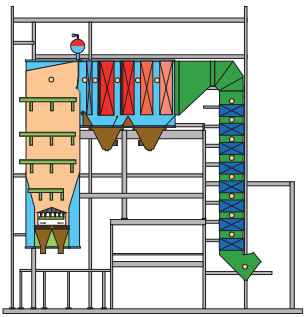
FLUIDISED BED FIRING SYSTEM

Functional principle of Fluidised Bed Technology

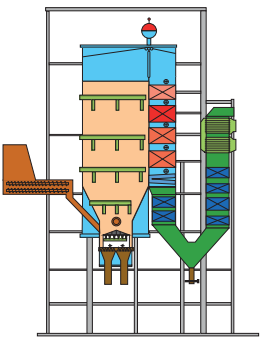
Our fluidised bed technology is based on the principle of a stationary fluidised bed in which the fluidised bed is integrated into the steam generator. The side walls of the first boiler pass, integrated into the natural circulation, at the same time form the containing walls of the fluidised bed combustion chamber. The fuel is introduced into the fluidised bed by feed chutes via these side walls. The constant fluidisation of the fluidised bed, over the entire load range with low gasification temperature, is achieved by the injection of air and recirculated flue gas via an open nozzle plate. Above the fluidised bed follows the staged post combustion of the gasification products in the freeboard. Through the several rows of nozzles the secondary air and recirculated flue gas are introduced temperature-regulated. If required several nozzle levels can be started and stopped for regulation of the combustion conditions. The steam generator is a classic vertical multi-pass natural circulation boiler and consists of an optional radiation pass, a super-heater pass as well as an economiser pass and an air-heater pass. Ash discharge from the fluidised bed is carried out below the nozzle plate, hence facilitating the removal of impurities and assures a continuous plant operation.

Parameters of the fluidised bed technology

Fuels	Biomasses, sludges, RDFs, pasty waste, etc.
Heating Values	4-30 MJ/kg
Grain Sizes	Total edge lengths <ca. 200 mm - 300 mm
Output Parameters	25-100 MWth 5-30 MWel
Steam Parameters	up to 525 °C up to 100 bar up to 115 t/h
Emissions	CO <5 mg/Nm³
NOx without SNCR	<150 mg/Nm³
with SNCR	<50 mg/Nm³



Fluidised bed technology for the combustion of industrial waste



Fluidised bed technology for the combustion of biomass

Main characteristics of Fluidised Bed Technology

- High Efficiency
- Fouling Tolerant
- Low Corrosion Tendency
- Co-combustion of liquid, pasty and solid fuels, possible in a broad mix ratio and a large range of heating values
- Low Emissions
- Equal temperature profile along the length of the furnace due to temperature controlled injection of secondary air and recirculated flue gas into the fluidised bed combustion and the freeboard
- High Availability
- Good mixing of oxygen and flue gas due to optimized nozzle geometry and air control
- Large thermal load range due to load-dependet activation and deactivation of nozzle levels
- Intensive mixing relation of fuel, fluidisation material plus combustion air in fluidised bed and thereby excellent mass and heat transfer with good ignition and high fuel burnout
- Operation with low excess air volumes and low exhaust gas losses

Design features of Standardkessel Baumgarte Fluidised Bed Technology

- Open nozzle plate with a wide and open cross section and bottom nozzles, insensitive versus impurities
- Fluidised bed firing system integrated into water-tube, natural circulation steam generators of horizontal or vertical type of construction
- Membrane walls lined with refractory material
- No moving components in the furnace

8 WHAT OUR CUSTOMERS SAY

CUSTOMER REFERENCES

Every project is different, yet they all share one thing in common: our passion for intelligent engineering. It is something that is also demonstrated by our many satisfied customers. That is why we have asked some of them about their experiences with Standardkessel Baumgarte. Here is what they told us.

Customer References

PLANNED, BUILT AND APPROVED

RWE Technology GmbH, Essen, Germany

»With regard to building the new upstream gas turbines, we decided to award contracts on a lot-by-lot basis. Since we did not have the available capacities required to implement the project ourselves, we were looking for an expert partner who could realise the modernisation of the power plant without acting as a supplier at the same time. Standardkessel Baumgarte was just the right choice for us.

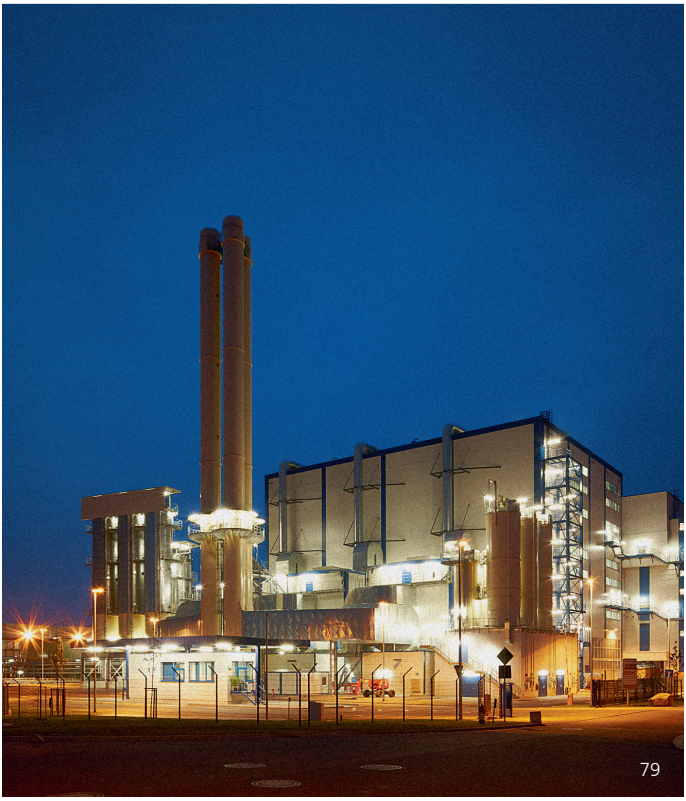
Under the general management of RWE Technology, the job involved the basic engineering, process technology design, preparation of the tender documents, support in selecting and acquiring the individual sub-contractors as well as technical project support all the way through to the initial commissioning.«

Dr. Michael Fübi
Member of the Management Board, RWE Technology GmbH

Tönsmeier Dienstleistung GmbH & Co. KG, Bernburg, Germany

»Innovative technologies are needed – especially these days – in order to guarantee us a supply of energy which is dependable, cost-efficient and also sustainable. In Standardkessel Baumgarte we have found the perfect ally which is able to apply the full force of its expertise precisely in our field. In 2007 we commissioned the company to erect a substitute fuel combined heat and power station for us. The idea was to set up three combustion lines of equal output. The experts at Standardkessel Baumgarte quickly drew up a solution tailored to our needs and handed it over to us completed, within budget and on schedule, in October 2010. Now we are supplying Solvay Chemical Plant not only with its electricity and heat requirements, but also with the steam it needs.«

Dr. Jürgen Balg
Spokesman for Group Management,
Tönsmeier Dienstleistung GmbH & Co. KG




HBK 3
DLR

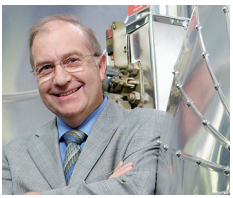
Customer References

TOP MARKS

Deutsches Zentrum für Luft- und Raumfahrt e.V., Cologne, Germany

»Conventional gas and steam power plants will continue to maintain a large share in the comprehensive energy supply in the future as well. Under these circumstances, it will become increasingly important to compensate for the output fluctuations of renewable energy sources. Managing and handling these quick load changes puts great demands on the combustion systems. To test and further develop these systems under realistic conditions, the existing test facility at the DLR in Cologne, Germany, has been expanded. Standardkessel Baumgarte Service developed, manufactured and installed the air preheater for the facility. When selecting a supplier for the air preheater for the DLR, it was important to find a partner capable of meeting the complex requirements in an efficient and independent manner. Standardkessel Baumgarte Service has just the know-how it takes.«

Christian Fleing, Dipl.-Ing. (Graduate Engineer)
Head of Combustion Test Department, Deutsches Zentrum für Luft- und Raumfahrt e. V.



Papier- und Kartonfabrik Varel GmbH & Co. KG, Varel, Germany

»In 2006, we awarded Baumgarte the contract to supply our factory with Boiler 8 (output level 95 t/h, steam/95 bar). After just 11 months, the steam generator went into operation as a combined heat and power installation with two upstream gas turbines (6.3 MWel each). Since its commissioning, the plant has run flawlessly and we are completely satisfied. In addition to the price-performance ratio, Baumgarte's expertise, reliability, flexibility and personal commitment were crucial factors that won us over.

The success of the new boiler once again affirms the trusting and excellent cooperation between Papier- und Kartonfabrik Varel and Baumgarte Boiler Systems.«

Horst Büsing
Managing Director, Papier- und Kartonfabrik Varel GmbH & Co. KG

COUNT ON US TO FIND THE ENERGY MANAGEMENT IDEAS YOU NEED. PROVIDED, OF COURSE, THAT YOU FIND US FIRST.

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