KABLITZ
FOUNDED 1901

- Power Stations
- Boiler Plants
- Hot Gas Generators
- Firing Systems
- Heat Recovery
- Service
- Customised Casting

BIOMASS and WASTE to ENERY

RICHARD KABLITZ GMBH

Renewable Energy Solutions for the next generations

Corporate Introduction - History

1901 R. Kablitz invents the fined cast iron gilled plates. Foundation of the company by R. Kablitz in Riga, Latvia

1948 Moving of the company to Lauda-Königshofen, Germany

1990 Begin of EPC activities for complete biomass and waste to energy plants

2013 Andreas Hehn-Mark buys 20% of the shares

2015 Engitec Technologies SpA buys 80% of the shares

MULTI-FUEL

1. Biomass

Virgin Wood Chip | EN Plus A1 Pellets | EN Plus A2 Pellets | EN B Pellets

2. Agriwaste

Palm Kernel Shells (PKS) | Olive Cake | Rice Husk Pellets | Rice Husk Briquettes, Chicken litter

3. Waste to Energy

RDF (Refuse Derived Fuel) | SRF (Solid Recoverable Fuel) | A Grade Recycled Wood | C Grade Recycled Wood | Tyre Chip, Sluge

Fuels – Fresh and Waste Wood

Natural, untreated Wood, Bark, Landscaping Wood, Wood Chips

Industrial Wood, Waste Wood (AI - AIV)

Wood Granulate, Saw Dust and Fibres

Fuels - Agricultural Waste

Rice Husks, Olive Stones or Pomace, Peach Kernels, Sunflower Seed Husks, Nut Shells, Coffee Grounds, Sansa

Farm wastes

(Cow manure, chicken litter, ...)

Empty Fruit Bunches (EFB), Palm Shells and Kernels (PKS), Bagasse, Straw

Fuels - Waste and Coal

Solid Sorted Waste,

RDF/SRF/Fluff

Paper Mill Wastes

(Pulp, Rejects, ...)

Coal

Fuels – Chicken litter

Sludge in different kinds

Fuels – New Possibilities

- **Corn**
- **Sunflowers**
- **Palm**
- **Grain**
- **Short-circulating palms**

Waste and Biomass to Energy

Steam

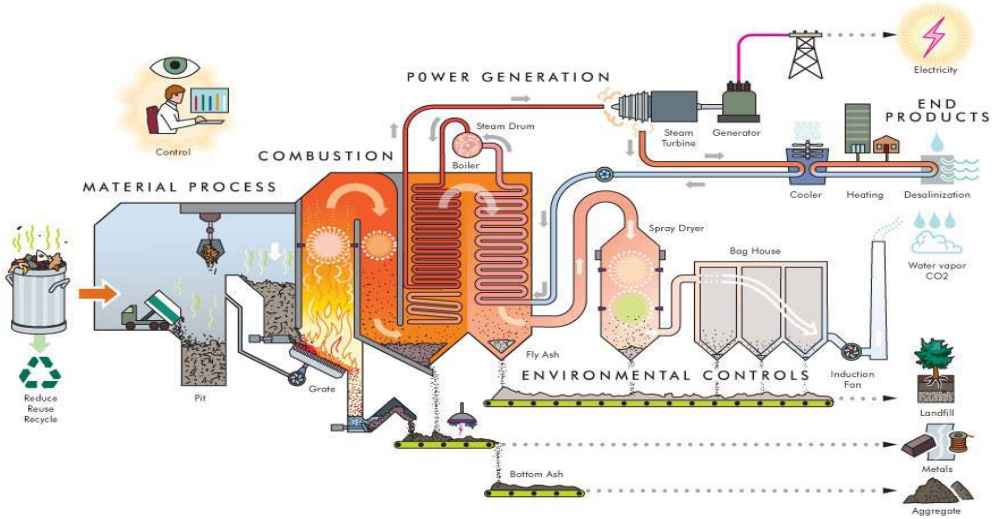
Hot gas

Thermal oil

Electric power

Multi Fuel Plants

Biomass, Agriwaste, Waste fuels, Sludge…..



Corporate Introduction - Our Know-How

Biomass and Waste Power Stations

Biomass and Waste Energy Centers

Biomas and Waste Grate Systems

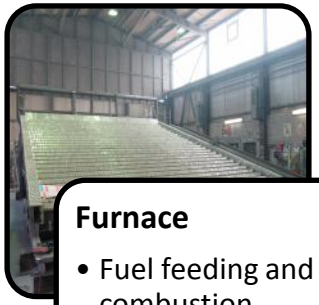
Heat Exchangers

Customized Casting

Our Products – An Overview

Fuel supply

- Storage
- Inpurity deposition
- Conveyor technology



Furnace

- Fuel feeding and combustion
- NO_x removal
- Ash removal

Boiler technique

- Steam boiler
- Thermal oil heater
- Hot water boiler

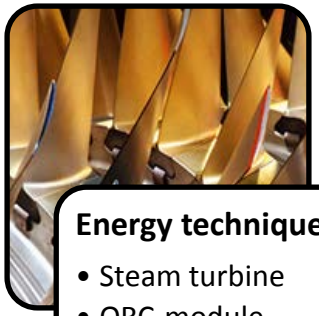
Flue gas cleaning

- Dust removal
- Sulphur removal
- Residues conveyance

Our Products – An Overview

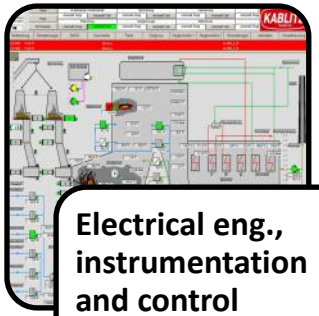
Steel construction

- Structural steelwork
- Boiler housing



Energy technique

- Steam turbine
- ORC-module
- Air / water cooled condenser
- District heating



Electrical eng., instrumentation and control

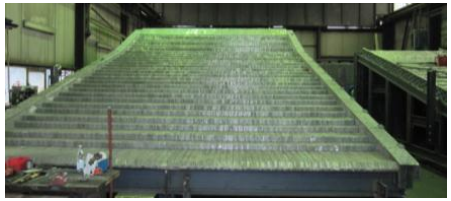
- Motor control center
- Distributed control system

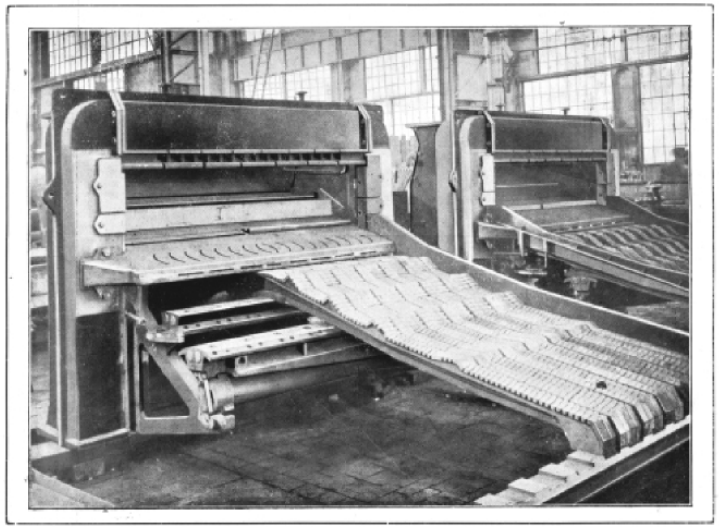
Assembly & Commissioning

Firing Systems (Excerpt)

Type 116 SW/SL

Type 422/415





Universal – High-Performance – Grate

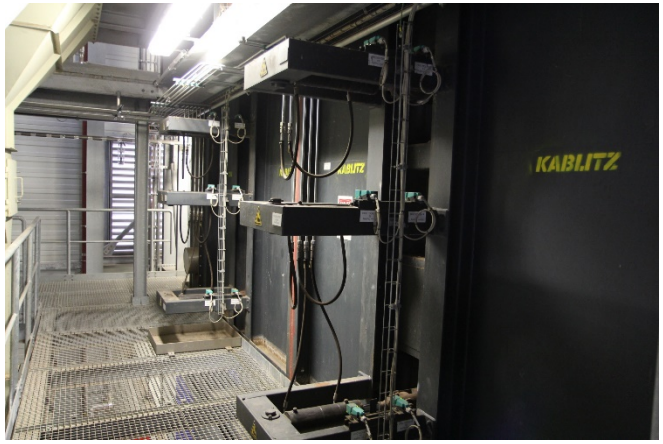
Type 415

Type 400

Firing Systems

Functional Principle of the Reciprocating Grate

Every moving carriage can be controlled individually

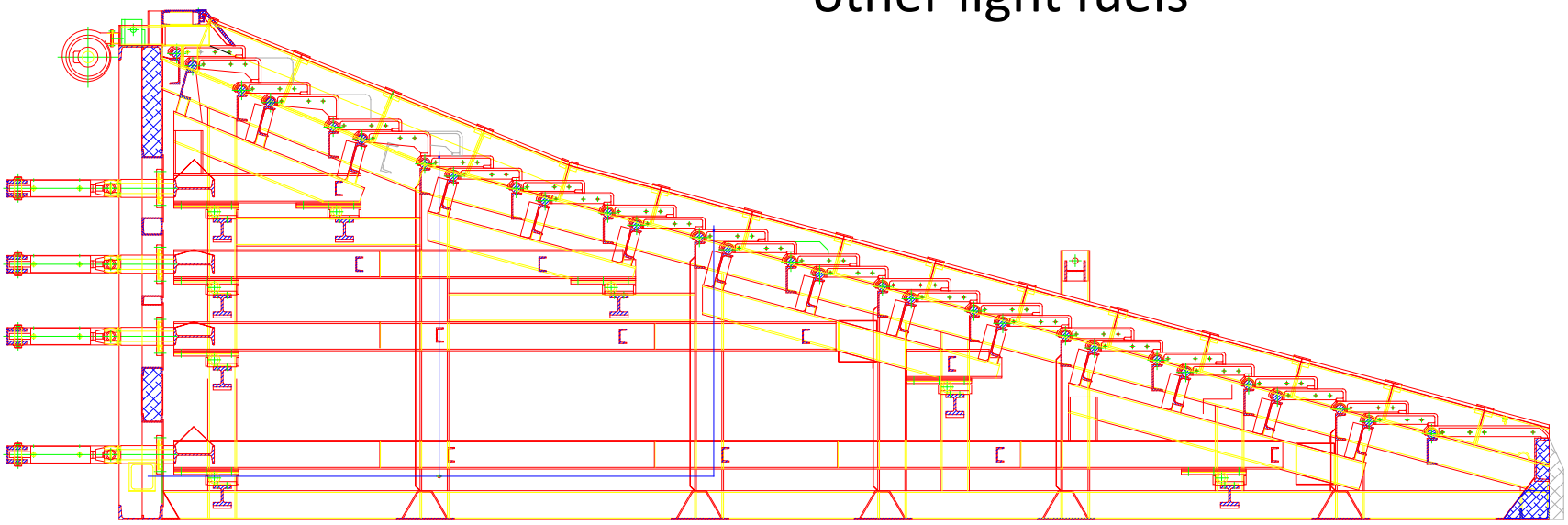


Each Primary Air injection zone can be individually controlled

Firing Systems

Type 422/415 Combined Grate

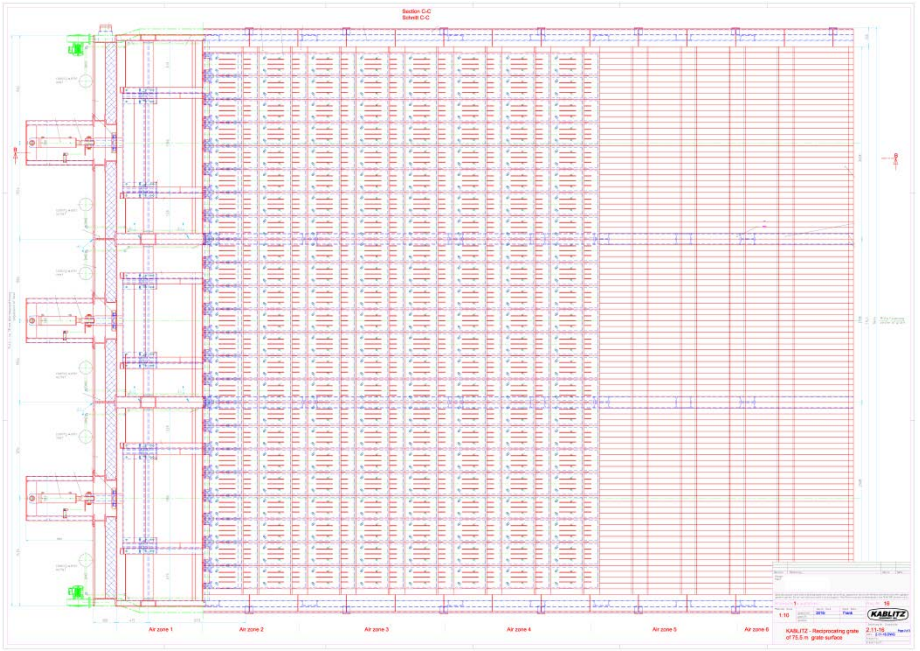
- specially engineered for the combustion of rice husks and other light fuels

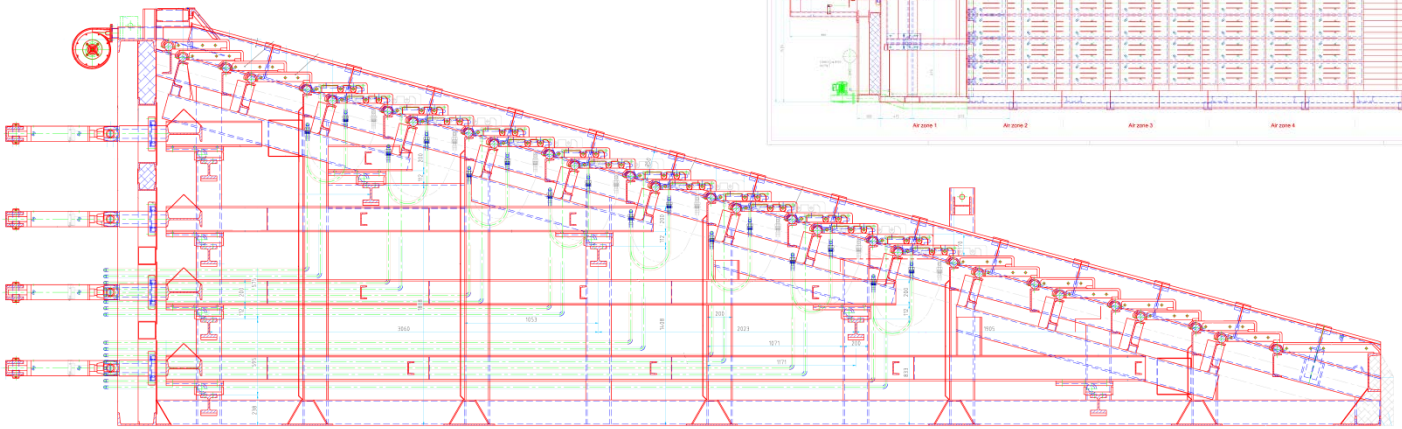


Firing Systems

Type 715 water-cooled Grate

For RDF and other very high calorific fuels





Conclusion

- Flexible multi-fuel systems
- Air-cooling and water-cooling possible
- Suitable for fuels with low as well as high calorific values
- Ready for future challenges

Firing Systems

Granulate nozzle

For the combustion of:

- Saw dust
- Shavings
- Granulate
- Fibres

Our System

- Granulate nozzle with 1 – 5 MW thermal power
- own combustion air control
- Granulate nozzle can be started when the temperature of the combustion is >600°C
- Fuel supply handling
- Granulate Nozzle can be installed in the combustion chamber at the end of the grate

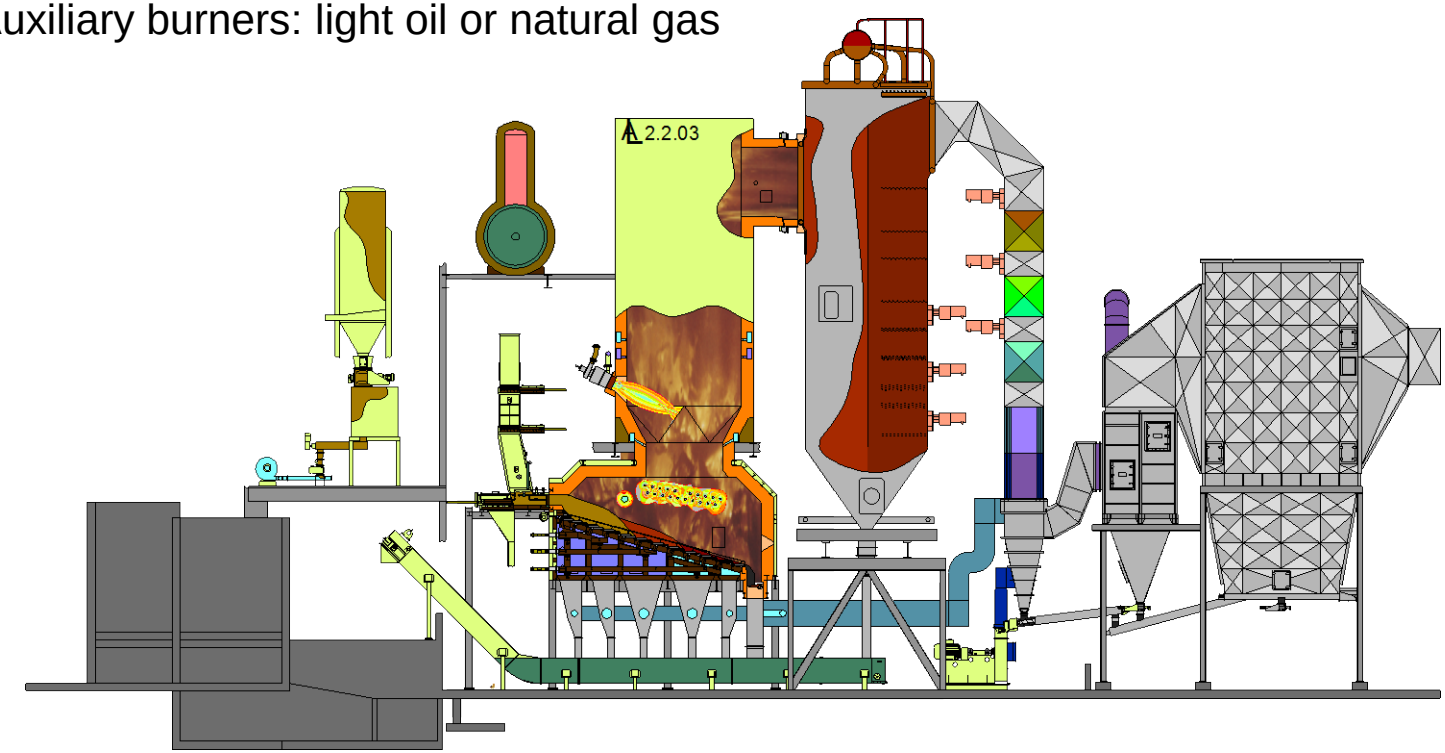
Multifuel Combustion:

It is possible to combine different combstion systems in a plant:

Grate: wood chips and other large fuel parts

Dust / granulate burner: fine particles < 3 mm

Auxiliary burners: light oil or natural gas



Biomass Steam Boiler Plants

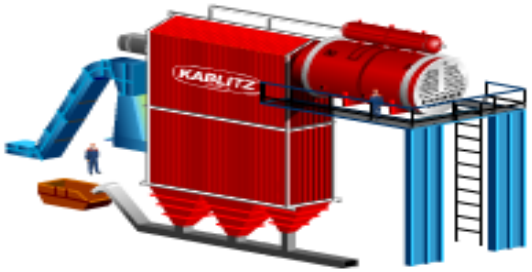
Different boiler types:

Water tube boilers

Vertical boiler

Horizontal boiler
(tail end boiler)

Smoke tube boilers



Biomass Thermal Oil Heater Plants

Thermal Oil Heaters

Different boiler types:

Heaters in membrane wall design

Thermal oil heaters with meander convection part

2-pass/ 3-pass thermal oil heaters

Hot Gas Generators

The hot gas is directly used for drying processes for the wood working industry.

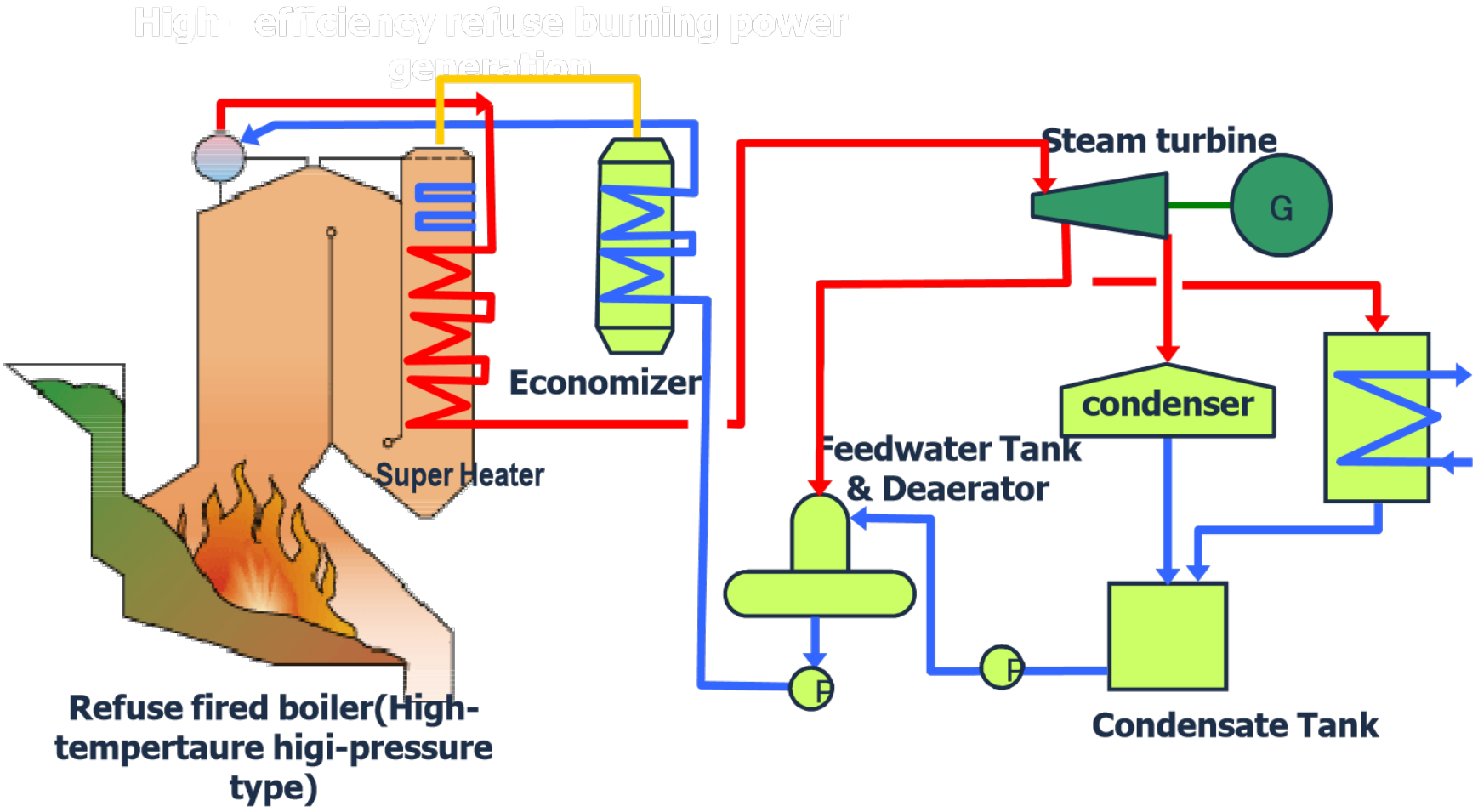
Combustion Chamber :

- Design depends mainly on the fuel moisture
  - Moisture < 50 -55 Ma. %: Integrated grate combustion chamber

  - Moisture 55 – 60 Ma. %: brick lined grate combustion chamber

  - Moisture > 60 Ma. %:
    brick lined post combustion chamber
    (Kablitz Patent)

Boiler Principle



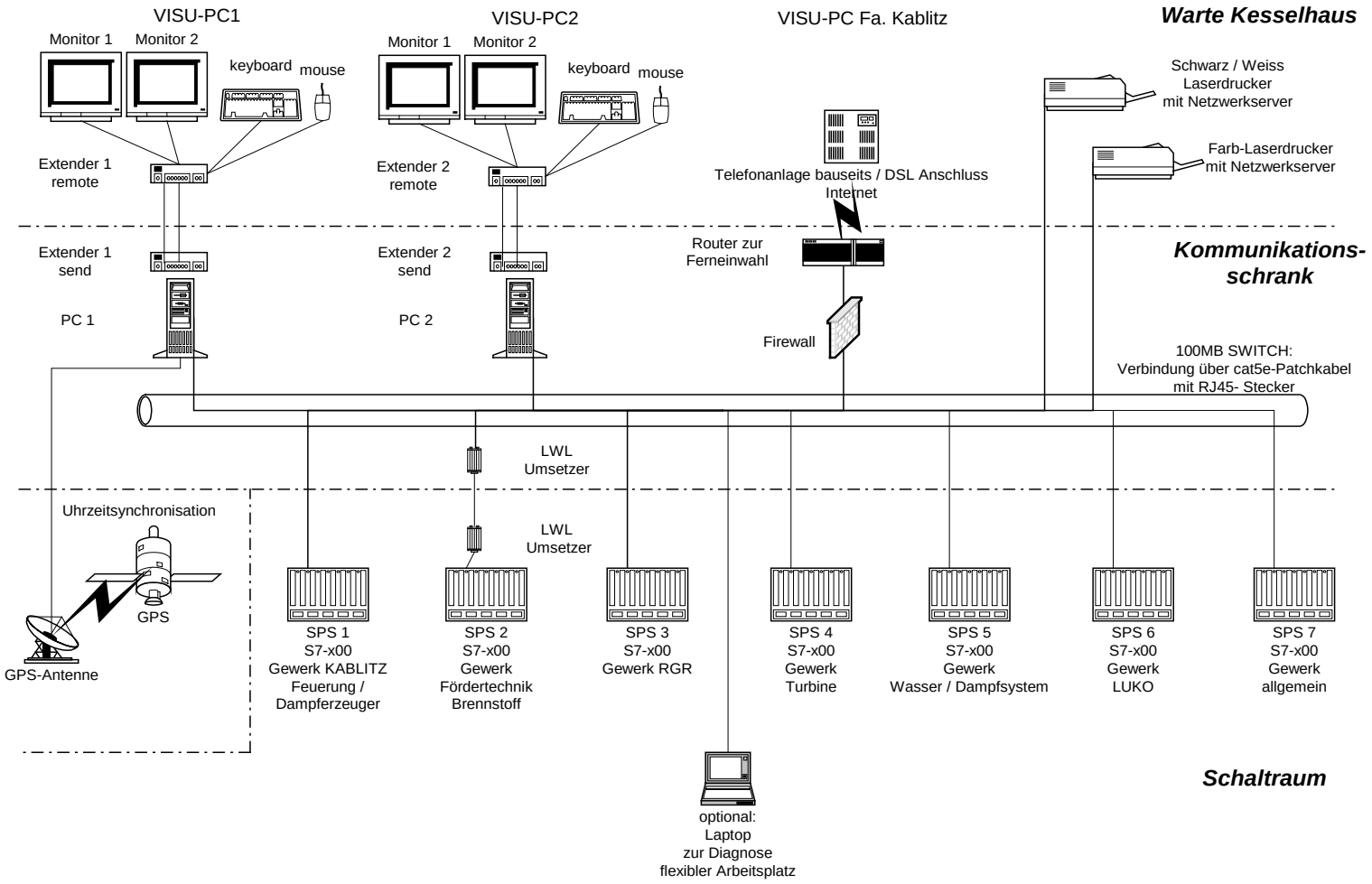
Process Control System

Control room with KABLITZ Visualization System

Process Control System

Control room with KABLITZ Visualization System

Process Control System



Waste-to-Energy steam boilers

Horizontal water tube steam boiler

Project:	**Germany**
Location:	Germany
Electrical output:	10,0 MW
Heat output:	24,0 MW
Steam mass flow:	49 t/h
Steam pressure:	42 bar(a)
Steam temperature:	425 °C
Installed combustion capacity:	Reciprocating grate: 38,4 MW
Fuel:	Wood waste grade 1 to 4
Year of commissioning:	2013

Biomass steam boilers

Vertical water tube steam boiler

Project:	**Pemuco**
Location:	Chile
Electrical output:	12,1 MW
Heat output:	60 t/h at 1,2 bar(g)
Steam mass flow:	60 t/h
Steam pressure:	76 bar(a)
Steam temperature:	485 °C
Installed combustion capacity:	Reciprocating grate: 55,0 MW
Fuel:	Forest residues, eucalyptus bark, coal
Year of commissioning:	2014

Biomass Thermal Oil Heater Plants

Thermal Oil Heaters

Reference Project:

Location:	Switzerland
Fuel:	Wood Chips, Production Wood,
Fuel Bandwidth:	2,7 – 4,0 kWh/kg
Installed Combustion Capacity:	Reciprocating Grate: 40 MW Granulate: 12 MW Dust: 25 MW Design: 57 MW
Thermal Oil Output:	25 MW
Thermal Oil Temperature:	285°C / 255°C
Hot Gas:	30 MW / 350°C
Year of Commissioning:	2009

Biomass CHP and Energy Centers

Steam Turbine Power Plants

Reference Project:

Location:	Germany
Fuel:	Waste wood, Industrial wood
Installed Combustion Capacity:	Reciprocating grate: 20 MW Dust/Granulate burner: 3 x 5 = 15 MW
Electric Power:	6,0 MW
Live Steam Mass Stream:	30 t/h
Live Steam Pressure:	66 bar(a)
Feed Water Temperature:	107 °C
Year of Commissioning:	2001

Examples:

Reference Project:
Rosières en Santerre

Location:	France
Fuel:	Wood Chips
Fuel Bandwidth:	1,9 - 3,1 kWh/kg
Installed Combustion Capacity:	Reciprocating Grate: 19,9 MW
Heat Output:	18 MW
Saturated Steam mass flow:	28 t/h
Saturated Steam Pressure:	18 bar(a)
Saturated Steam Temperature:	207°C
Feed Water Temperature:	105 °C
Year of Commissioning:	2012

Biomass CHP and Energy Centers

Biomass CHP and Energy Centers

Thermal oil heater and

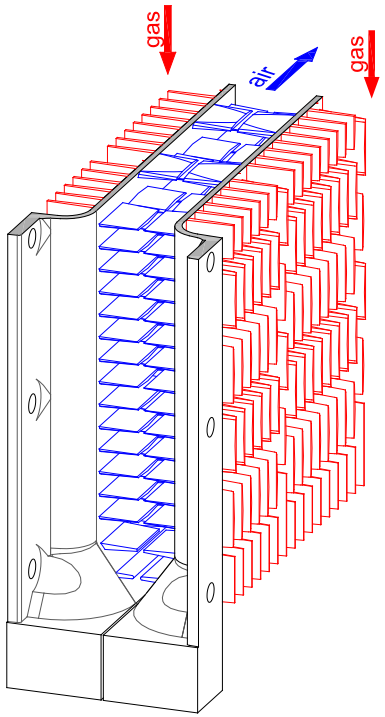
hot gas generator:

Belgium

Grate, Fuel Feeder, Kablitz Turbo System and steel works

Heat Exchangers

Gilled Cast Iron Heat Exchanger



Gilled cast iron heat exchangers for H_2, N_2, natural gas, gases from combustion processes (heating oil EL&S, diesel, biomass)

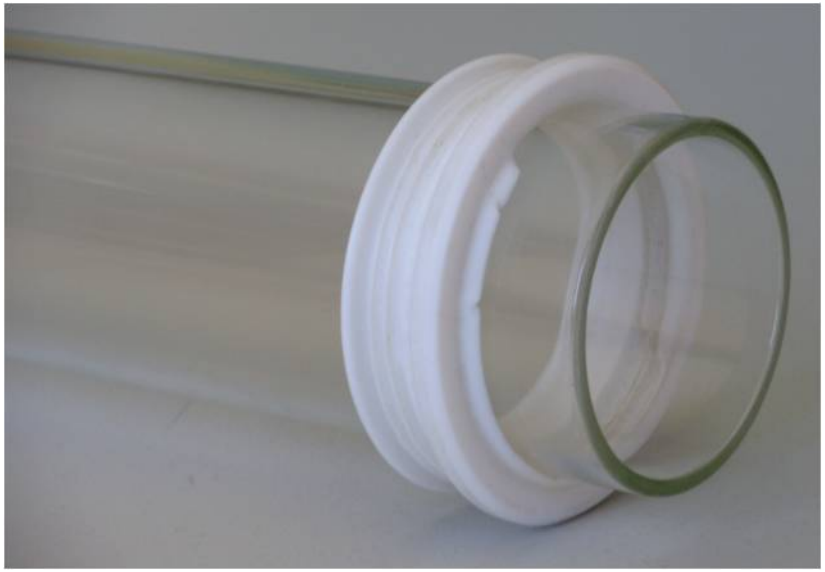
Heat Exchangers

The fins are formed convex and concave

Heat exchangers in our factory

Heat Exchangers

Glass Tube Heat Exchanger



Detail of a glass tube with PTFE-sealing

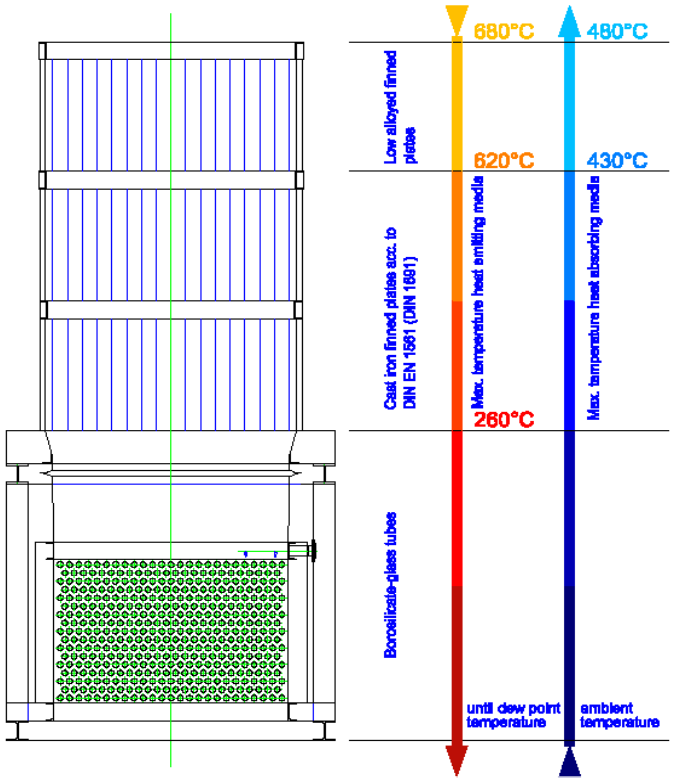
- Glass tube heat exchangers for exhaust gases below the dewpoint

Module of a glass tube heat exchanger

Assembly of glass tubes

1. Design and Construction

Kablitz Heat Exchanger for Gaseous Media



Max. allowable pressure difference : 300 mbar

Temperature Profile

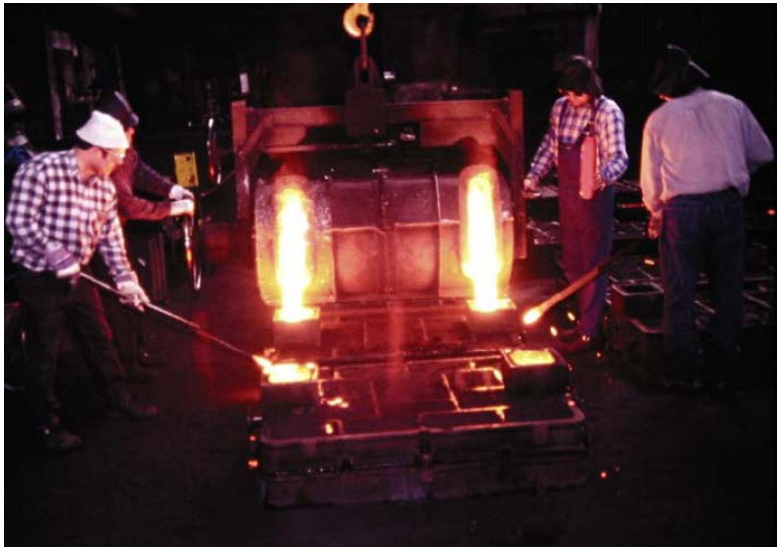
Gilled cast iron & Glass tube heat exchangers for H_2, N_2, natural gas, gases from combustion processes (heating oil EL&S, diesel, biomass)

Spare Parts

Own Foundry for casting:

- Cast iron for own products such as:
  - Gilled plates for APH
  - Grate bars, grate beams etc.
- Cast iron for existing plants of our competitors
- Spare parts

Customised & Own Casting



- We manufacture all cast iron parts in our own foundry
- High Quality guaranteed
- Highly customized casting orders possible

Customised & Own Casting

lifelong support of cast iron spare parts for our grates and heat exchangers and also for foreign products

High flexibility

Fast response time

Customised & Own Casting

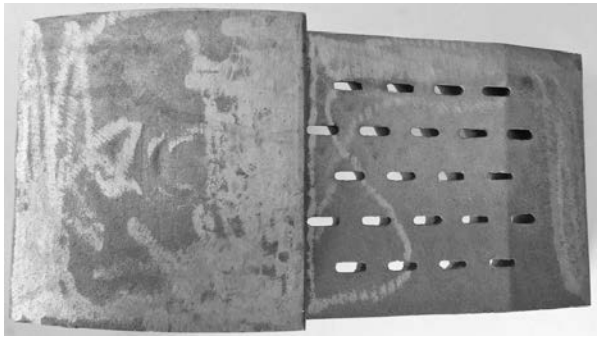
German Quality from our foundry in Lauda.

We cast in different quality:

- Cast iron from chrome RKG-X, equal to material no. 1.4777, GX 130 Cr Si29, DIN 17465
- Grey cast iron, acc. RK EN-GJL resp. EN-GJL-100 bis EN-GJL-200, DIN EN 1561
- Heat resistant special cast iron

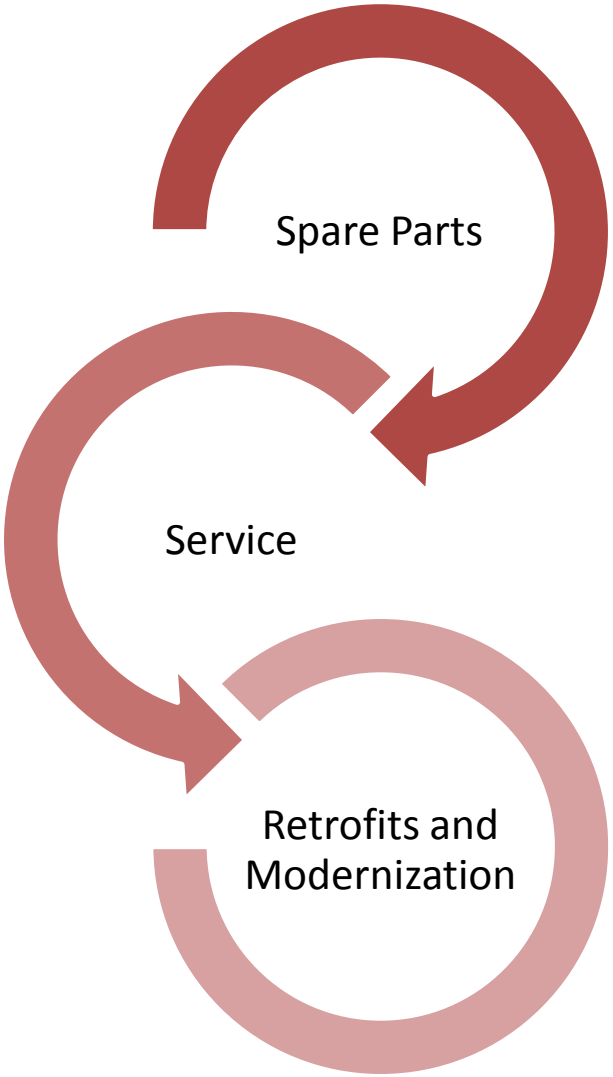
Spare Parts

Examples of Customized Cast Iron:



Spare parts and service

- Inspection, maintenance and repair
- Installation works and installation supervision
- Commissioning and commissioning support
- Plant optimization
- Emission measurements
- Process engineering and consulting



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BIOMASS and WASTE to ENERY

Thank You

RICHARD KABLITZ GMBH

Intelligent technologies for energy recovery

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