SCOT HEAT & POWER

BEST IN BIOMASS

KOHLBACH

Jernforsen
bioenergy solutions


SCOT HEAT & POWER Co.
Best in
BIO-ENERGY
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www.scottishheatingcompany.co.uk
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V55 SHC

SCOT HEAT & POWER

BEST IN BIOMASS

Scot Heat and Power is a fully integrated biomass renewable energy service, with over 40 combined years of the waste to energy industries, operating throughout the UK

Contract Service Provision with a Commitment to the highest standards of Health, Safety Quality and Environmental Impact

Distributers for:

Jernforsen bioenergy solutions

KOHLBACH

Professional Contract Delivery at Competitive Cost

A Highly Trained and Competent Management Team and Workforce

A Wide Range of Services

Operating Sectors


Food and Drink Industry


Power Generation


Petro-Chemical


Industrial


Pharmaceutical


Facilities Management


Waste Water Treatment


Public Sector – Schools NHS etc

Scot Heat and Power operate within many different sectors,

Below are a few examples:

Food and Drink Processing and Manufacture

- Isle of Mull Cheese

Facilities Management

- Gleneagles Hotel
- Queen Margaret University

Public Sector

- NHS State Hospital Carstairs
- University Hospital of South Manchester
- St Andrews University

Insurances

Scot Heat and Power Ltd are fully insured to carry out all of the services in our service portfolio, reassuring our client that all work undertaken is not only carried out to the highest standard but is also indemnified by our insurers.

- Employers Liability, Public Liability & Products Liability - £20 million
- Professional Indemnity - £2.5 million

SCOT HEAT & POWER
BEST IN BIOMASS

Biomass Boiler Installation and Services

Scot Heat & Power Ltd offer a complete range of Biomass Boiler Services including:

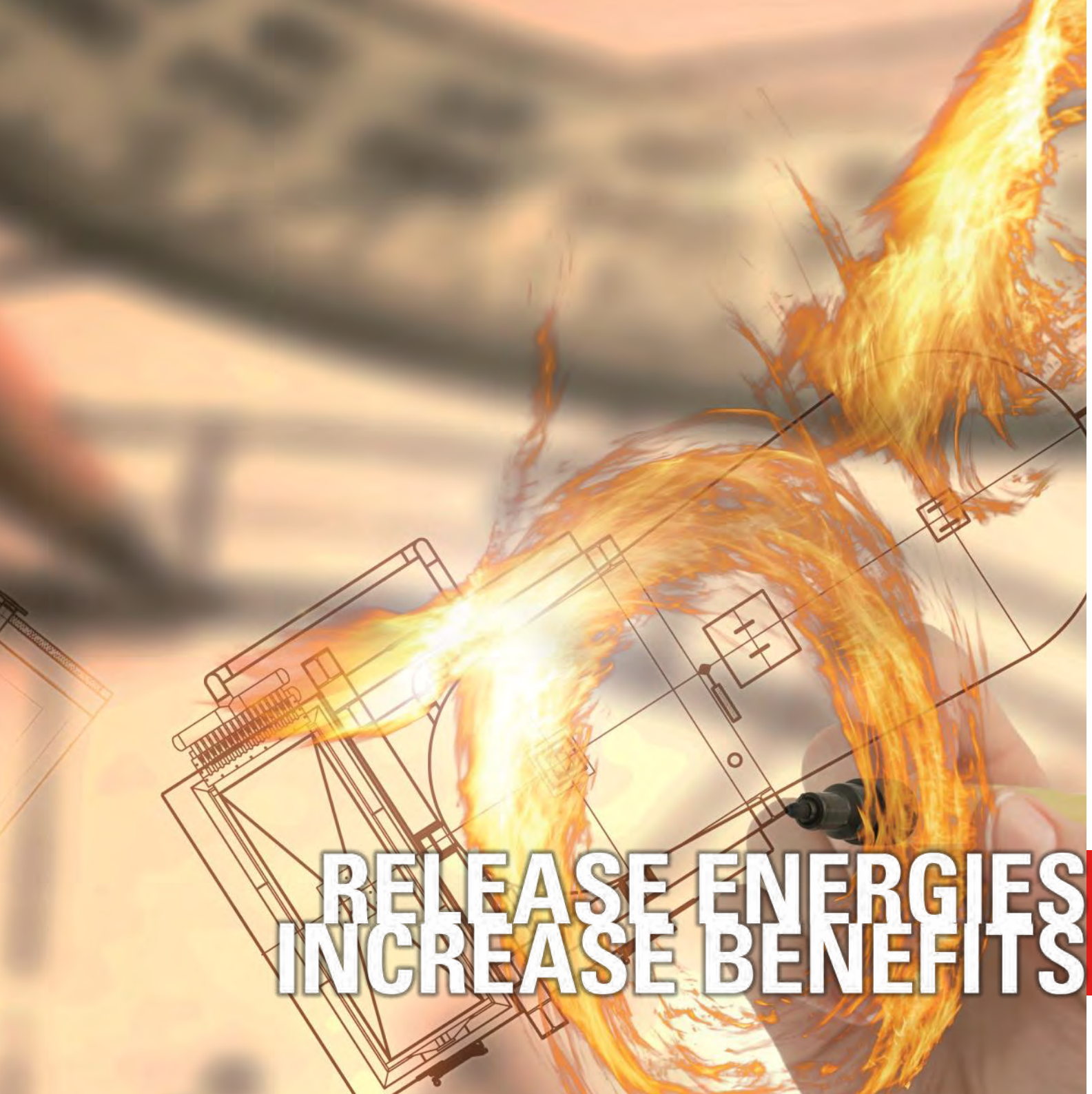
- Biomass Boilers – Including WID Compliant
- LTHW Boilers
- Steam Boilers
- Biomass Fuel Stores
- Service and Maintenance

- Ash Handling

- Energy Centre Operation & Maintenance: Ad hoc/contract
- Unscheduled Repairs & Maintenance
- Energy Boilers Supplied
- Site Surveys / Feasibility Studies
- Project Managements & Detailed Technical Design of Bespoke / Standard Biomass Boiler installations and heating circuits
- Heat Meters
- Electrical Testing

- Competent Advice and Consultation to Ensure Compliance with OFGEM
- Risk Assessments, Management Strategies and Action Plans
- HSE Interaction
- Innovative Solutions
- Biomass Knowledge, Providing Training, Fuel and Boiler Testing
- Performance Monitoring / Evaluation / Improvements / Energy Loss Calculations

info@scotheating.co.uk – 01506 444255 – www.scottishheatingcompany.co.uk



RELEASE ENERGIES INCREASE BENEFITS

KOHLBACH

PRODUCTS

WE MANAGE THE ENTIRE PROCESS FOR YOU

YOUR BENEFITS BY KOHLBACH

FUELS

The energetic use of regenerative fuels requires decades-long experience in regard to the chemical composition, size, moisture content of the biomass fuels and associated legal provisions.

- **wood or agricultural biomass**
- **also difficult, inhomogeneous fuels with water contents of 10 to 60% and an ash content of up to 10**
- **several testing plants for individual fuel tests are at your disposal at Kohlbach‘s**

FUELS FOR THE FUTURE










Research Kohlbach boiler systems' versatile fuel spectrum

Boiler systems with versatile fuel spectrums are the familiar trademark of the Kohlbach product range. With robustness and durability our systems utilise the most heterogeneous wood fuels (in terms of size and water content), which would result in significant operational limitations with more conventional systems. Our boiler systems are available for applications using wood-type biomass, such as bark, forest wood chips, energy wood chips, sawdust, reduction wood chips, pellets, industrial pellets or even suitable wood from landscaping operations, wood waste from the sawmill industry and from wood-working operations. All natural wood waste and wood residues per ONORM M 7133 and EN 14961 are ideal for use in Kohlbach boilers that have been designed specifically for this purpose. Please contact us as our boiler systems will be individually customized to your fuel specification. In addition we are also happy to investigate alternative special fuels for mixing in with your conventional biomass fuel.

Alternative special fuels for Kohlbach individual solutions

The versatility and robustness of Kohlbach boiler systems also enables their individual adaptation to use particular alternative fuels or to admix them in with conventional wood fuels. Upon request we would be happy to carry out an advance investigation for you by means of fuel analysis and/or test operation on one of our testing systems, the possibilities for the adaptation of the system technology for use with alternative special fuels - other than standard wood fuel.

Kohlbach has a multitude of reference systems that have been specially equipped and adapted to use such special fuels, for example - corn cobs, straw, cacao husks, straw pellets, miscanthus, misc. agrarian waste, sanding dust, etc.

Such special fuels are characterised by very high ash content, increased nitrogen, chlorine or sulphur content, slagging components, etc. and require Kohlbach's particular experience in system development, in particular with respect to combustion behaviour, emissions and fouling behaviour. With our comprehensive know-how you can tap in to the additional economic advantages aside from expensive standard fuels and this often also solves a cost-intensive disposal problem or obstructive space problem at your facility.

YOUR BENEFITS BY KOHLBACH

KOHLBACH - GET TO KNOW OUR COMPANY

The Kohlbach Group is *THE* innovative and efficient enterprise in the biomass boiler plant manufacturing industry with its own facilities in Austria, Germany, France and Croatia. A family owned business with 250 employees, more than 60 years of experience and already more than 1,500 installed systems.

- **reliable plant technology and outstanding quality**
- **continuous development and innovative products through R & D**
- **one of the largest employers and provider of vocational training in the region**
- **multiple awards for economic, environmental and social responsibility**

WE MANAGE THE ENTIRE PROCESS FOR YOU: DESIGN—PRODUCTION—INSTALLATION—SERVICE

Where it says Kohlbach on the outside, it is Kohlbach inside!

With its specialised companies the Kohlbach group is in the position to provide all of the necessary services - research and development, project management, production and installation, after-sales service and on-site presence - with our in-house resources. With Kohlbach you get all services and skills from a single source:

Biomass plants with IQ: Listen, observe, understand

The many years of practical experience of plant operators in the daily production of energy from biomass as well as market changes are a constant contribution to Kohlbach's continued development. We also carry out regular test runs for our customers and then immediately incorporate the results into the system concept. A Kohlbach plant is always "state of the art", which is why we put our name on it.

Project management

Every single system is adapted to the individual requirements of the customer - thus the customer receives their own custom solution. To do so our customers receive complementary support by an experienced project manager right from the very start.

Manufacturing

All significant components from the fuel logistics to the de-ashing, as well as all combustion and boiler systems are produced and assembled by our employees in our own Kohlbach production facilities with the highest level of technical precision. Our highly qualified specialists and professionals manufacture your system components with dedication, pride and a sense of responsibility, for your head start with proven Kohlbach quality.

After-sales service

Our highly motivated and experienced service personnel attend to our customers' daily needs. We are your contact partner for a smooth and rapid spare parts supply, the daily support for your system through to preventative annual servicing of all boiler makes. Our enormous experience with energy from biomass, our extensive service fleet and our own company production facilities make us your reliable and flexible partner.

YOUR BENEFITS BY KOHLBACH

APPLICATIONS

Around the energy from wood and biomass, we offer our customers an extensive range of services and products. Enjoy the advantages of a complete provider, from the fuel logistics, through furnace and boiler systems, flue gas cleaning, flue gas condensers up to chimneys: immerse yourself in the world of Kohlbach solutions.

- **efficient supply of heat from 400 to 18,000 kW per module or of electricity and heat from about 1,500 kW**
- **individually designed boilers for our customer needs: different rated outputs, temperature and pressure levels**
- **highest quality and economical solutions for every application**
- **exemplary high levels of efficiency**
- **robust and reliable**

RELIABLE HEAT SUPPLY

Kohlbach biomass boiler plants assure a reliable and efficient supply of heat from 400 to 18,000 kW per module:

- **Warm/hot water boilers**: Warm water up to 110 °C and hot water up to 200 °C, 2 or 3 pass
- **Steam boilers**: from 0.5 to 40 bar, hot steam temperatures up to 450 °C
- **Thermal oil boilers**: Process heat at high temperature levels (supply temperatures > 150 °C to 315 °C)

Our boiler systems are ideal for the heat supply of district heating of communities, environmentally-sensitive tourist locations, factories, productions halls, as well as the supply of drying kilns or steam chambers, dairy production, breweries, hospitals, nurseries, and much more.

RELIABLE SUPPLY OF HEAT AND ELECTRICITY

The simultaneous generation of power and heat from biomass is the supreme discipline of biomass utilisation. Therefore, Kohlbach boilers are designed in special capacity ranges attuned to common turbine module sizes:

- **High-pressure steam boilers for steam turbines and engines**: Fire tube boilers up to 40 bar or water tube boilers for higher pressure levels
- **Thermal oil boiler plants for ORC technology** (Organic Rankine Cycle): For small combined heat and power plants ranging from 200-3,000 kW electric, low pressure boiler circuit operation, very high overall system efficiency, outstanding partial-load characteristics, tried and tested durable technology

YOUR BENEFITS BY KOHLBACH

BOILER SYSTEMS

The boiler systems form the heart of biomass energy plants. Here Kohlbach offers a complete range of boilers for flexible industrial process heat applications: Warm/hot water, steam and thermal oil boiler plants assure a reliable and efficient supply of heat from 400 to 18,000 kW per module or with heat and electrical power, from approx. 200 kW electrical (approx. 1,500 kW thermal) per module.

- **long operating life**
- **exemplary high efficiency**
- **low maintenance**
- **extended full-load runtimes between maintenance shut-downs due to large heating surface reserves**
- **reliable operator and maintenance support by your Kohlbach Customer Service**

WARM/HOT WATER BOILER

Boiler's nominal output: 400 to 18,000 kW

Output: Warm water up to 110 °C ***OR*** hot water up to 200 °C

Variants:

- 3-pass-boilers optimized or full load operation OR 2-pass-boilers optimized for smooth modulating partial load operation
- Horizontal-on-top-of-furnace-design for minimal thermal radiation losses and efficiency optimization OR upon request also in vertical standing design to accommodate special space constraints
- 6 to 16 bar Operating pressure: Every boiler is customized to the particular customer requirement

STEAM BOILER

Boiler's nominal output: 400 to 18,000 kW

Output:

- Steam up to 450 °C, from 0.5 to 40 bar
- Process steam ***OR***
- For combined Power and Process steam generation with steam turbines or steam engines

Variants:

- Every boiler is custom designed to the particular customer requirement, incl. design approval- and shop testing by notified bodies
- Saturated steam boilers for Process steam ***OR*** High pressure steam boilers for Cogeneration

THERMAL OIL BOILER

Boiler's nominal output: ~1,500 to 18,000 kW

Output:

- Heat and Power with ORC-Turbine ***OR***
- Process heat on high temperature levels (Flow temperature >150 °C to 315 °C)

Variants:

- Optimized for use with ORC-heat and power cogeneration ***OR*** for high temperature process heat
- Module sizes adjusted to the standard sized ORC-Modules available on market
- Available as split-up multi-pass-system for easy accessibility and long continuous operating runs also with heterogeneous fuels (bark and green cuttings) OR upon request as price and space saving 3-pass-boiler with tube-coil design use with selected high quality fuels

YOUR BENEFITS BY KOHLBACH

COMBUSTION SYSTEMS

The combustion systems are individually adapted to the fuel and provide an optimal combustion of the biomass material. We have the suitable furnace solution for your biomass fuel: Sawdust, bark, wood chips, landscaping residues, Nawaro wood, very wet or dry fuels with very high ash content, rough and inhomogeneous fuels or fine fuels, admixture of selected agrarian fuels - your solution is our combustion systems.

- **exemplary high efficiency and lowest emissions**
- **reliable nominal output with all usable fuels and degrees of water content**
- **reliable long operating life of combustion chamber**
- **rapid and simple installation due to pre-assembled modules**
- **special purpose designs and special sizing of furnace system customized for your application possible upon request**

SYSTEM K8 „THE ALLROUNDER“

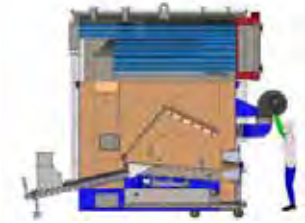
Furnace technology: Counter flow furnace with moving grate and water cooled compression zone
Thermal Firing Capacity: 525 to 7,675 kW
Fuel:
Water content [wet mass.-%]: 20 to 60 depending on configuration
Granulation [length mm]: 30 to 100
Maximum ash content [dry mass.-%]: 5

SYSTEM K12 „THE LARGE ONE“

Furnace technology: Center flow furnace with moving grate and water cooled compression zone
Thermal firing capacity: 2,000 to 18,000 kW
Fuel:
Water content [wet mass.-%]: 20 to 60 depending on configuration
Granulation [length mm]: 30 to 100
Maximum ash content [dry mass.-%]: 10

SYSTEM K11 „THE DUSTY FUEL BURNER“

Furnace technology: Counter flow furnace with moving grate and tray fed by screw stoker
Thermal firing capacity: 525 to 7,675 kW
Fuel:
Water content [wet mass.-%]: 10 to 50 depending on configuration
Granulation [length mm]: ≤ 50
Maximum ash content [dry mass.-%]: 2

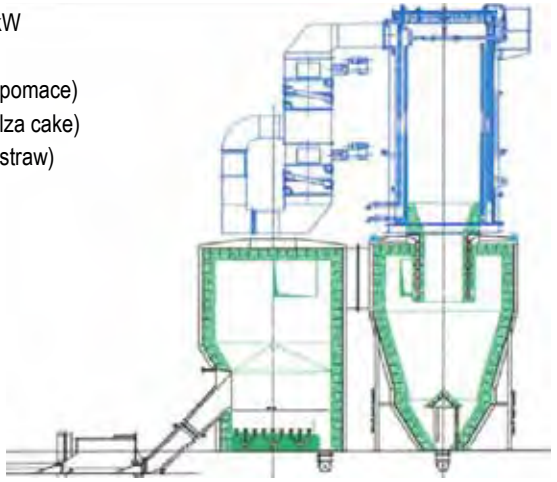


SYSTEM K13 „THE DRY FUEL BURNER“

Furnace technology: Coflow furnace with moving grate and tray fed by screw stoker
Thermal firing capacity: 900 to 6,800 kW
Fuel
Ideal for Pellets in accordance to EN14961-2 in A1, A2 and B (industrial pellets) quality
Water content [wet mass.-%]:≤ 10
Granulation: length 3,15 to 40 mm, diameter 6 and 8 mm
Maximum ash content [dry mass.-%]: 3

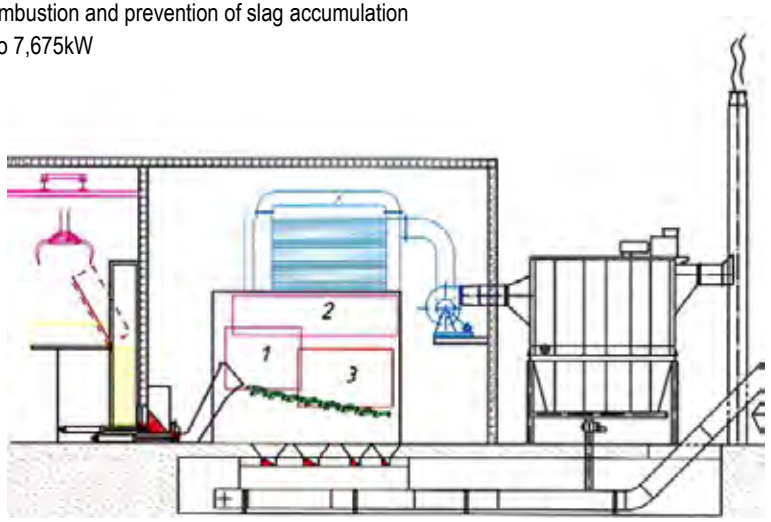
SYSTEM K14 „THE AGRARIAN FUEL BURNER“

Furnace technology: : Stationary Fluidized bed combustion
Thermal firing capacity: 4,000 to 15,000 kW
Fuel:
Biogenetic residues (f.i. ergot, shred, draff, pomace)
Waste from rape-seed oil production (f.i. colza cake)
Waste from spice production (f.i. marjoram straw)
Recycled wood



SYSTEM K10 „THE STRAW BURNER“

Furnace technology: Straw combustion with compact metering stoker and backfire safety provision, low-emission combustion and prevention of slag accumulation
Thermal firing capacity: 2,500 to 7,675kW
Fuel:
Straw whole-bales



YOUR BENEFITS BY KOHLBACH

SPECIAL PURPOSE FURNACE SYSTEMS

Our Special Purpose Furnaces are designed for exploitation of agrarian biomass fuels or straw wastes. These systems have been developed by our in-house research and development.

- **exemplary high efficiency and lowest emissions**
- **reliable nominal output with all usable fuels and degrees of water content**
- **reliable long operating life of combustion chamber**
- **rapid and simple installation due to pre-assembled modules**
- **special purpose designs and special sizing of furnace system customized for your application possible upon request**

YOUR BENEFITS BY KOHLBACH

HEAT RECOVERY AND EMISSIONS

Our developments, particularly in the field of efficient energy utilisation and heat recovery set up standards in the industry. The reduction of emissions also drives this market through ever stricter environmental regulations. In this section we will give you a short overview of the subject of heat recovery (flue gas condensation) and reduction of emissions.

- **very efficient energy utilization**
- **conforming to legal and subsidy schemes**
- **high availability and reliability**
- **customized for the particular Customers requirements**

FLUE GAS CONDENSATION (HEAT RECOVERY)

Kohlbach biomass boiler systems generally exhibit an exemplary, high degree of efficiency in combustion. Additional higher thermal efficiency and thus a more effective energy utilisation can be achieved primarily when using very wet biomass (> 50 % fuel water content) in the Kohlbach flue gas condensation systems. No energy is left untapped with our flue gas condensation systems. Every heat recovery system is tailored and adapted to your requirements, the network conditions and the fuel used.

Features of the Kohlbach flue gas condensation

- Previously unused residual heat in the combustion gases is also utilised insofar as is possible
- Compact self-sufficient system with individual design tailored to the specific system
- Switching on and off of the condensation system independent of the operation of the boiler system
- Operation and cleaning implemented largely automatically

Variants

With de-pluming for preventing steam plumes at the chimney outlet up to outside temperature of -10 °C for tourist resorts or sensitive zones OR without de-pluming

EMISSIONS

The combustion systems from Kohlbach are already equipped with a pre-dedusting device for the flue gas located in a re-burning zone specially designed for the purpose. Further dedusting is implemented with multi-cyclones (centrifugal separators), electrostatic filters, fabric filter, etc. depending on the size of the plant and legal stipulations. Our systems comply with all legal regulations and subsidisation conditions for the reduction of emissions (the air pollution control act, BImSchV [solvent regulation], FAV, QM heating stations, etc.) - for the most part the emissions from our systems lie significantly below these threshold values.

Variants

- **Multi-cyclone**: The dust is pre-separated here at < 150 mg/Nm³ (half-hour average value) by the principles of centrifugal separation.
- **Flue gas scrubber**: Just as with the multi-cyclone, the scrubber serves to remove dust, however the particles that form the dust can be reduced further by using a washing fluid than with the centrifugal separation.
- **Electrostatic filter**: This is used to remove dust up to a dust content of <10 mg/Nm³ (half-hour average value).
- **Bag and fabric filter**: Bag and fabric filters can be employed downstream to reduce the fine dust content further to < 5 mg/Nm³.
- **SNCR injection or SCR catalysers**: These are employed to reduce the NOx values in particularly sensitive and emission protected regions.
- **Special solutions** possible at any time upon request

YOUR BENEFITS BY KOHLBACH

CONTAINER/HOUSING

With the KohlbachCompact system complete boiler plants are set up and installed ready to run in the shortest possible time. Available in sizes of 400 kW up to 2,000 kW.

- **extremely robust construction**
- **possibility to change location simply**
- **replaces boiler room through cost-effective solution**
- **individually tailored to customer requirements**
- **a single contact partner for all your concerns**

CONTAINER/HOUSING

KohlbachCompact complete boiler systems in containerized form can be installed ready for operation in the shortest time possible. The available heating capacity ranges from 400 kW to 2,000 kW. Delivery is in pre-assembled modules and so only a few days are required until the system is completely assembled and commissioned. The compact biomass heating plant can be flexibly integrated into existing structures without high costs for necessary buildings. In comparison to conventional heating solutions with KohlbachCompact the builder has a minimal workload with manageable investment costs and a single contact partner for all concerns. The customer has only to provide a foundation plate and the connection to electricity and water supply as well as the heat consumers for the KohlbachCompact heating plant.

Variants

- Container design: Robust design, so that the container including boiler and equipment can be lifted in by a crane and so that any subsequent change on location can be implemented quickly and simply
- Housing variant: Cost-effective variant to replace the boiler room, but not to be moved a load carrying container

KohlbachCompact equipment

- Container boiler house / housing, silo container
- Fuel loading
- All pumps, piping and distributers
- Water treatment system
- Expansion system
- Comprehensive thermal insulation
- Boiler plant for warm or hot water
- Control system
- Fully automatic boiler cleaning
- Ash discharge
- Flue gas scrubbing, chimney system
- Online remote maintenance system

YOUR BENEFITS BY KOHLBACH

FUEL FEEDING

Robust loading systems are very important to the combustion of biomass. Our loading systems are manufactured in-house and are available as hydraulic versions for heterogeneous fuels or as screw augers for optimised metering of fine fuels.

- **particular robust design**
- **reliable fuel feeding also of inhomogeneous fuels**
- **high availability and reliability**
- **customized for the particular Customers requirements**

HYDRAULIC LOADING

With the Kohlbach hydraulic loading system very inhomogeneous fuels, such as bark and similar, can also be faultlessly metered into the furnace. Large individual pieces in the fuel can also be fed flawlessly into the combustion chamber thanks to the shearing system. The workload for personnel for the operation of the plant is minimised by the high operational reliability.

Variants:

- Push floors with single or multiple push rods
- Depending on location within the plant, further transportation is implemented by means of hydraulic transverse feeders and/or hydraulic stokers in the hydraulic compression zone
- Ideally suited for the Kohlbach K8 and K12 combustion systems

AUGER LOADING

With very fine grain fuels auger systems or Kohlbach's patented dual fine metering system is used to load the system. With this the fine grain material, such as pellets, sawdust or chips, is fed from space-saving tall silos to the dual fine metering system via loading augers. A feature of this system is the cost-effective, yet robust and compact design. This loading system is ideally suited to the Kohlbach K11 and K13 combustion systems.

SPECIAL LOADING SYSTEMS

Customized engineering and our technicians' search for the best solution for the customer for every possible fuel application enables you to employ a multitude of special solutions with Kohlbach. For example, a drag link conveyor can be applied for overcoming a specified loading height - a combination of hydraulic and auger loading systems and many more possibilities could be entertained. Our highly qualified and committed employees will be happy to advise you with the development of your fuel feeding system.

YOUR BENEFITS BY KOHLBACH

CONTROL SYSTEM

A major advantage of Kohlbach biomass boilers is our specially developed control system. It ensures the combustion quality combined with an easy handling and still provides the keen operator with a multitude of options to adjust parameters and optimize your plant operation.

- **reliable, safe and powerful**
- **simple to operate**
- **short cable distances**
- **customizable and efficient boiler plant operation**
- **multiple possibilities and options to arrange for individual trend records and operating data reports also to correspond to „QM-Heizwerke“ requirements**

FULLY AUTOMATIC OPERATION CONTROL

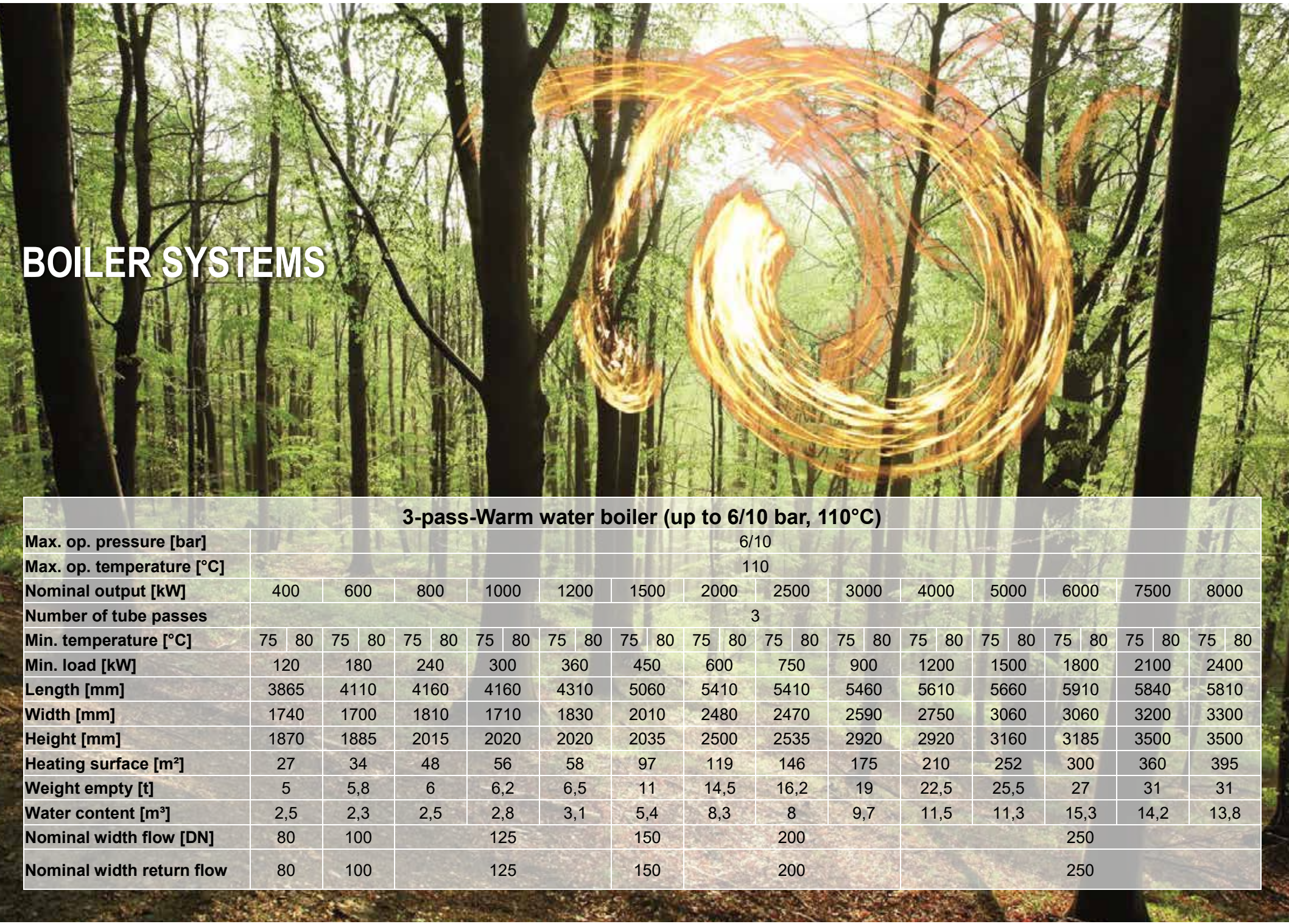
Kohlbach use exclusively high quality electrical and electronic components from selected suppliers for the control and regulation part of the plant offered.

User-friendly and high quality PLC control systems offer a multitude of settings for individual and efficient plant operation.

Kohlbach quality control through

- Reliable and powerful Siemens S7 control systems
- Secure and simple remote access through new remote maintenance concept
- Latest BUS technology for short cable paths
- Full transparency through trend, action and alarm recording
- Rapid and simple analysis of the system
- Simple operation through high degree of automation and interactive help for adjustment and optimisation tasks
- Economical expansion and upgrading

The electrical design of the control system complies with EU directive 2006/95/EC.



BOILER SYSTEMS

3-pass-Warm water boiler (up to 6/10 bar, 110°C)																														
Max. op. pressure [bar]	6/10																													
Max. op. temperature [°C]	110																													
Nominal output [kW]	400		600		800		1000		1200		1500		2000		2500		3000		4000		5000		6000		7500		8000			
Number of tube passes	3																													
Min. temperature [°C]	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80	75	80		
Min. load [kW]	120		180		240		300		360		450		600		750		900		1200		1500		1800		2100		2400			
Length [mm]	3865		4110		4160		4160		4310		5060		5410		5410		5460		5610		5660		5910		5840		5810			
Width [mm]	1740		1700		1810		1710		1830		2010		2480		2470		2590		2750		3060		3060		3200		3300			
Height [mm]	1870		1885		2015		2020		2020		2035		2500		2535		2920		2920		3160		3185		3500		3500			
Heating surface [m²]	27		34		48		56		58		97		119		146		175		210		252		300		360		395			
Weight empty [t]	5		5,8		6		6,2		6,5		11		14,5		16,2		19		22,5		25,5		27		31		31			
Water content [m³]	2,5		2,3		2,5		2,8		3,1		5,4		8,3		8		9,7		11,5		11,3		15,3		14,2		13,8			
Nominal width flow [DN]	80		100		125						150		200						250											
Nominal width return flow	80		100		125						150		200						250											

COMBUSTION SYSTEMS

FURNACE K8														
Nominal boiler output [kW]	400	600	800	1000	1200	1500	2000	2500	3000	4000	5000	6000	7000	8000
Refractory stone quality	Stones A40, M60													
Weight total [t]	7	10,5	11	12,5	18,5	21	28,6	32	34	52,5	82	84	102,2	106,5
Weight refractory [t]	2,9	4,5	5	5,8	7,6	9,9	15,1	17,4	18	32,2	47,8	49,9	61,5	62,3
Length [mm]	2760	3400	3405	3505	4250	4250	4850	5300	5370	6100	7250	7650	8200	8200
Width [mm]	1680	1700	1810	1710	1830	2010	2480	2470	2590	2890	3060	3060	3200	3300
Height [mm]	2000	2450	2450	2900	3400	3400	3800	3800	3800	4900	6000	6000	6550	6550
Insulation [mm]	50													
Furnace rating. [kW/m³]	312	271	330	278	261	266	224	220	246	209	136	149	134	144
Max. allow. TFC [kW]	525	775	1025	1275	1550	1925	2550	3200	3850	5100	6400	7675	8950	10225
Max. allow. Pressure [bar]	6													
Grate surface [m²]	1,09	1,38	1,52	1,85	2,36	2,89	3,87	5,01	5,39	7,14	10,12	11,23	13,02	13,67
Grate rating [kW/m²]	430	510	617	633	595	607	604	583	650	654	576	623	627	682
Air sections on grate	2	2	2	2	2	2	3	3	3	3	3	3	3	3

CONTAINER/HOUSING


RELIABLE SUPPLY OF
HEAT AND ELECTRICITY
Biowärme Haus i. E.


JCB

CHP | DISTRICT HEATING | INDUSTRIAL PROCESSES

BIOFUEL PLANTS WITH A CAPACITY UP TO 20 MW

Jernforsen
bioenergy solutions

THE EMISSION REQUIREMENT FROM THE AUTHORITIES HAS BEEN TIGHTENED DRAMATICALLY IN THE LAST 10 YEARS

This means that we at Jernforsen also provide equipment for flue gas cleaning for our plants.
This is done through three different technologies in order to meet our customers' financial needs and the regulatory requirements.

MULTICYCLONE

This technology consists of a mechanical separation in which the coarsest particles are separated. By using the centrifugal force that is generated in each small cyclone, the particles are hurled against the wall and thus separated from the flue gas.

The efficiency is high, but separating the finest particles is extremely difficult since the weight of each particle is too small to be separated from the flue gas.

The operating cost is extremely low since the cyclone is completely mechanical apart from the dust lock under the cyclone.

Depending on the type of fuel we can treat dust levels down to 150 mg /Nm3.

ELECTROSTATIC PRECIPITATORS

Plants placed near urban areas demand an additional purification step in addition to the multicyclone in most cases.

The gases are led into a large chamber and by reducing the velocity as well as charging the fine particles electrically with negative voltage from the electrodes; a movement is created towards the positive pole, which consists of the discharge electrodes. The dust particles are thus stuck on the electrodes, which are cleaned through the process of a hammer hitting the electrodes causing the particles to fall to the bottom of the electrostatic filter for further transportation to the ash container.

Our electrostatic filters have high separation efficiency, high operational availability and good service spaces. They are best used where the dust requirements are between 10-150 mg /Nm3.

FLUEGAS CONDENSATION

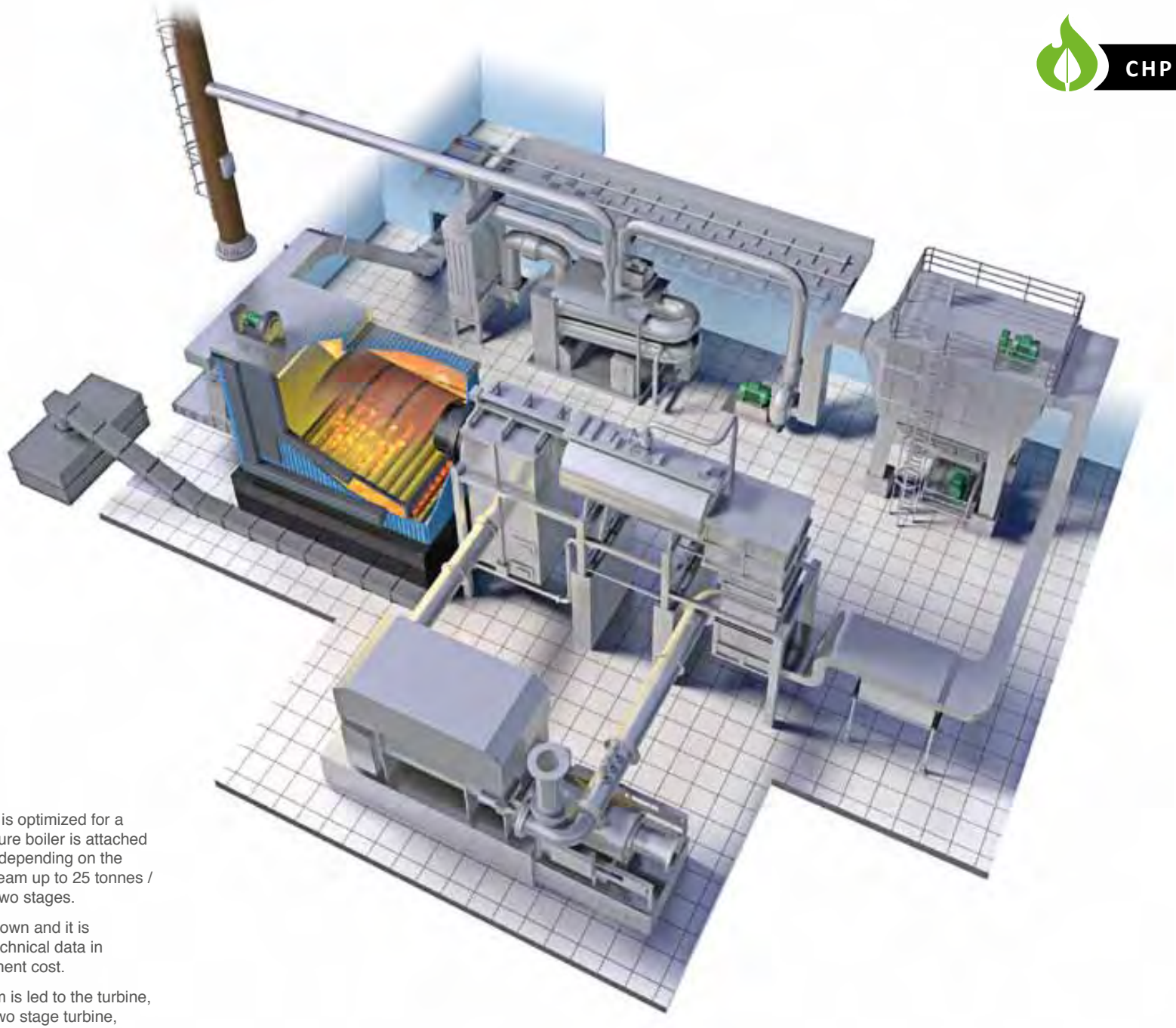
In collaboration with several leading suppliers of fluegas condensation, we can offer an integrated solution for those situations when this technology is appropriate.

In this process the remaining energy in the fluegas is used. It is passed through a scrubber, which is used to both recover the energy in the fluegas and as a washer to reduce the level of particles.

The energy is transferred via a heat exchanger to other systems while the dust is separated from the water through water treatment.

Depending on the conditions, the heat recovery can be about 25% of the boiler capacity and the dust emission

down to about 30 mg /Nm3.

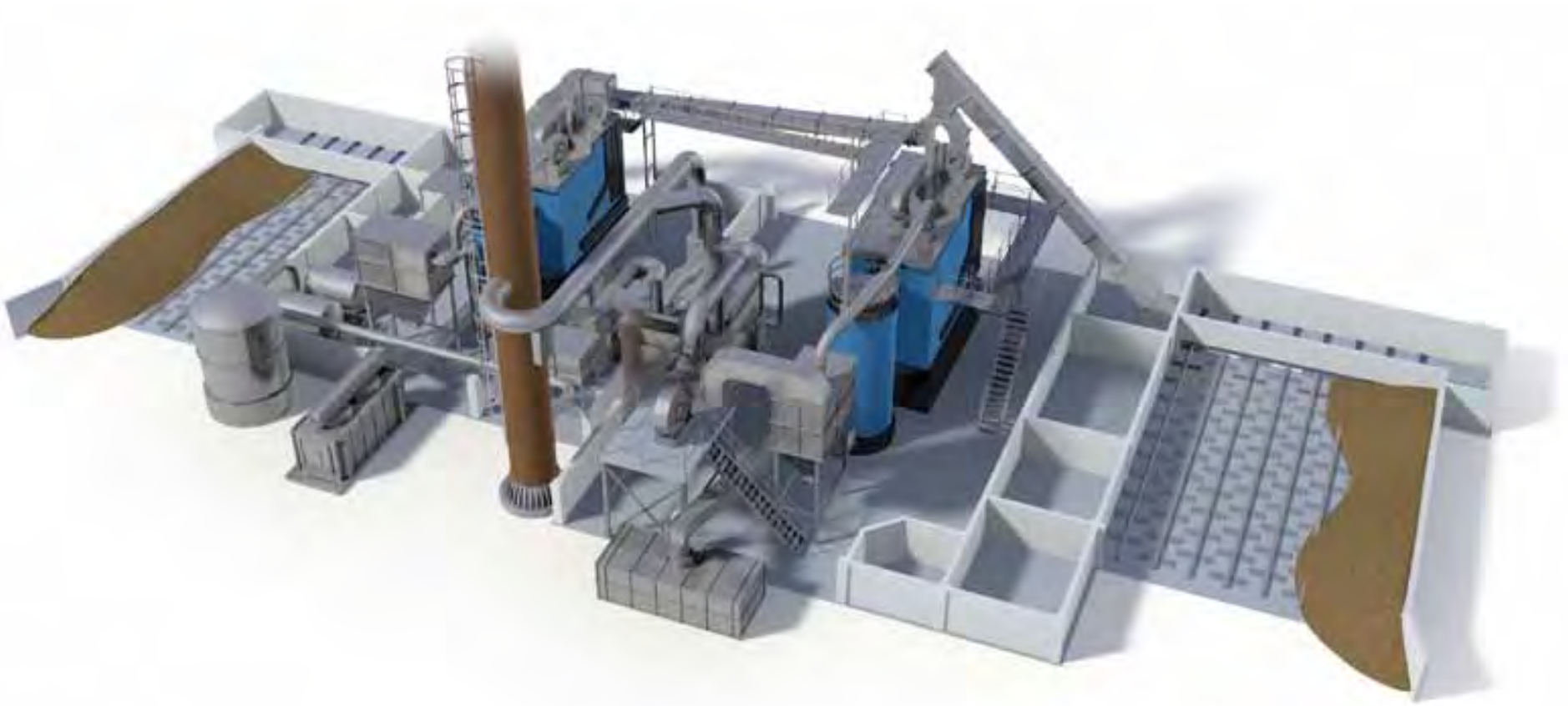


CHP

Our combustion system is optimized for a CHP plant. A high pressure boiler is attached to our furnace and can, depending on the steam need, produce steam up to 25 tonnes / h and 480 °C in one or two stages.

The boiler design is our own and it is optimized to meet the technical data in balance with the investment cost.

The high pressure steam is led to the turbine, which can be a one or two stage turbine, depending on your needs. The system is optimized depending on the choice of back pressure or condensation design.

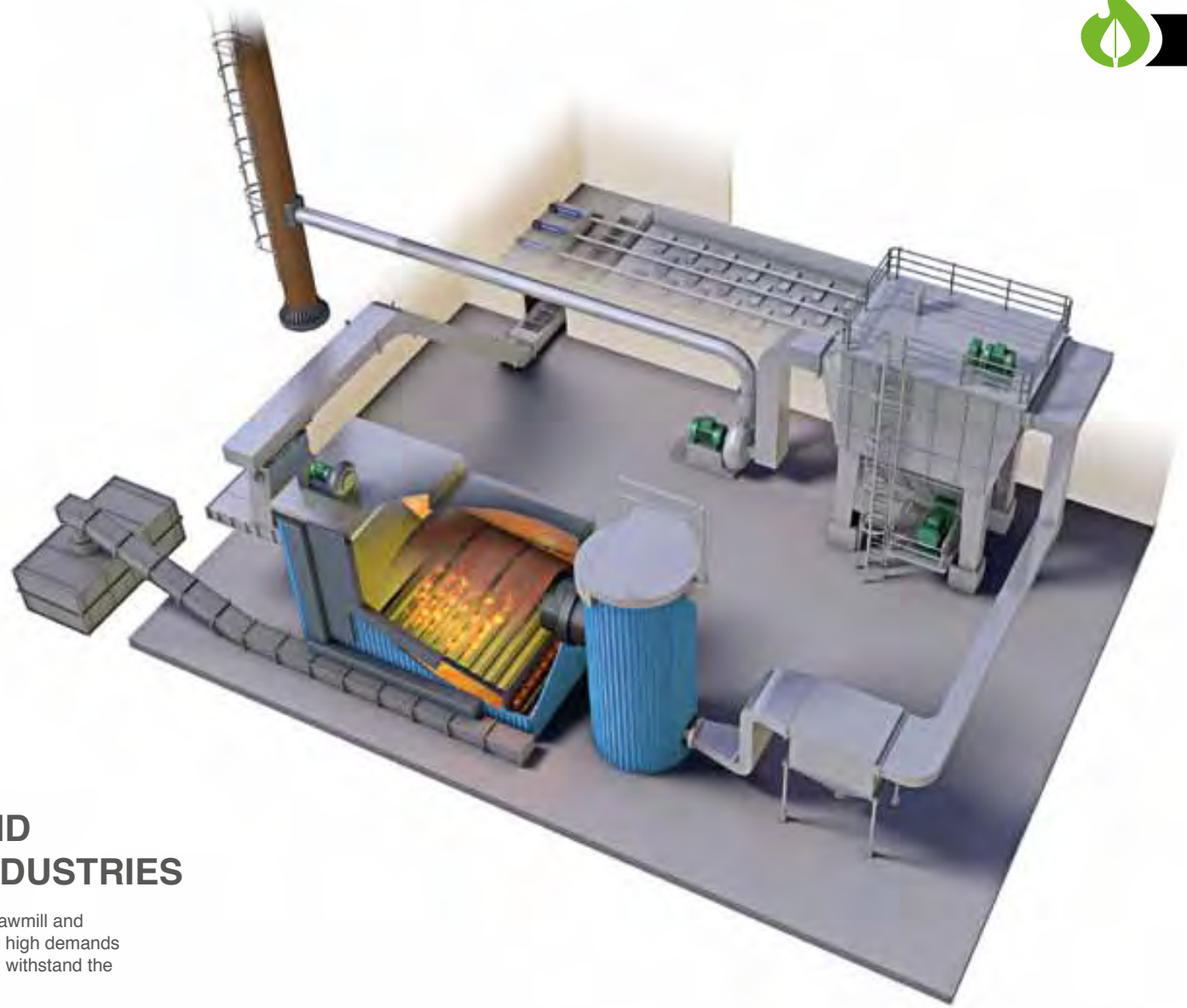


DISTRICT HEATING

Many of our customers are district heating operators where efficiency and environmental constraints are the key factors for low operating costs. In these systems we try to, in most cases, build in a flue gas condenser to increase the efficiency of the plant.

The advantage of this is low emissions and if the regulatory requirements are extremely high then we can also supplement these facilities with further flue gas cleaning equipment to meet the needs.

Like in the other systems, the combustion equipment is fundamental and it is developed in the same robust and reliable manner as in the other systems.



SAWMILLING AND PROCESSING INDUSTRIES

The stringent requirements of the sawmill and processing industries put extremely high demands on the equipment to be designed to withstand the harshest environments.

Our systems are robustly built in order to always have high availability with only scheduled stops for service and maintenance.

We have especially focused on developing fuel-handling systems that can handle the extreme fuel qualities that may occur in this industry, in order to eliminate unplanned downtime of the plant.

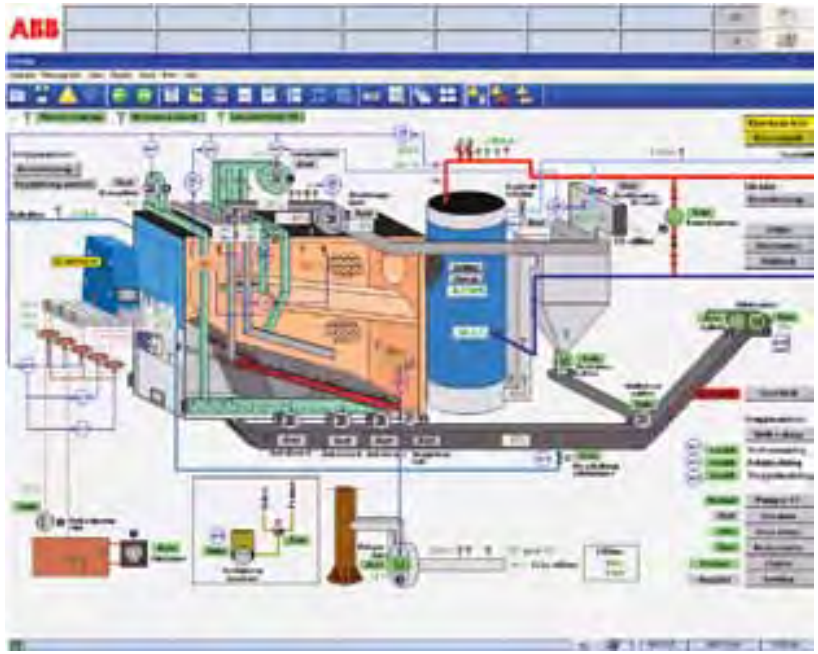
CNB Sia, Rezekne, Latvia. 18 MW

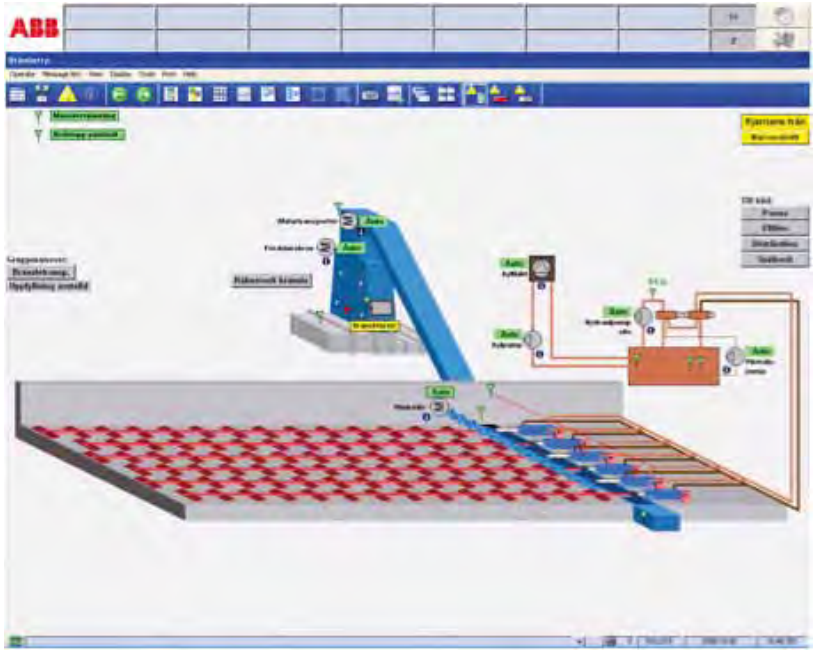
DRYING PLANT

For more than 25 years we have delivered combustion systems for dryers where our customers dry everything from sawdust for pellet production to grass which is pelleted and used during winter as livestock feed.

Our drying plants are designed to either provide the drying systems with hot raw gas between 300-500°C or to steam systems that supply belt dryers or converted drum dryers with energy. In this case the demands are high on the final dried product that it is of an evenly dried quality e.g. before being pelleted.

Our combustion system is part of the same series as the other energy systems, but in these applications the requirements are a little different on the temperature control of the hot gases. This means that our control systems play an important role in the design of a drying plant.





Screen shots showing the control system ABB freeelance.

We continually pursue high safety, good accessibility and user-friendly interfaces for the operational staff. Jernforsen holds a certificate of internal control of safety circuits for our boilers, in compliance with European PED Module B + D.

CONTROL SYSTEMS

From having only done the control systems for our own boilers, we can today commit ourselves to making complete control systems for entire plants and boiler rooms. We can also provide consultative assistance in the design and planning of the layout of the systems for both hot water and steam.

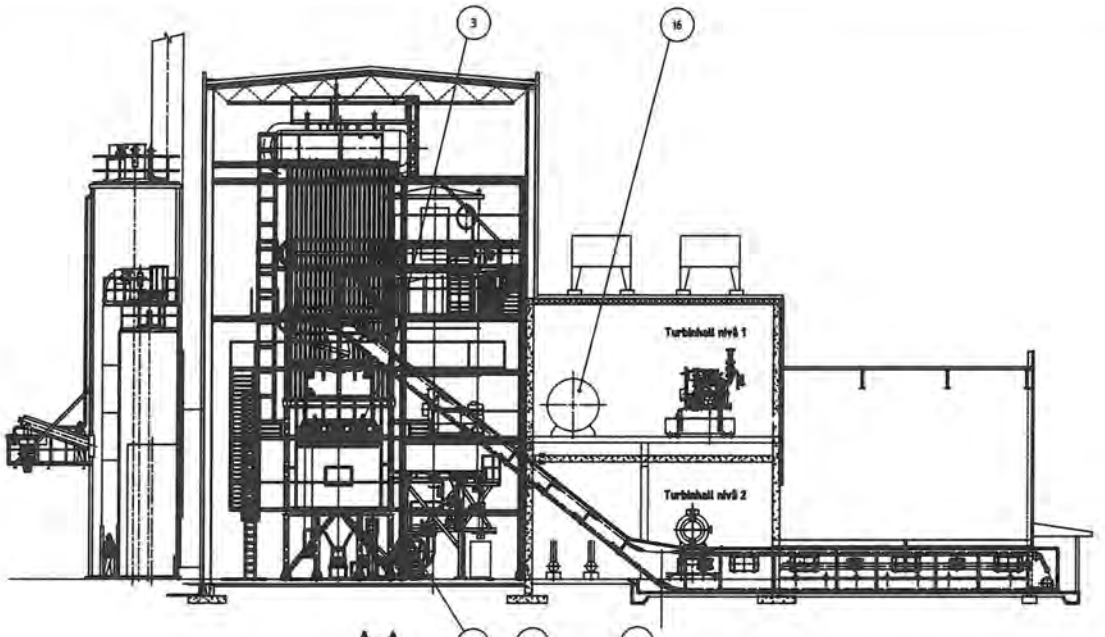
The control systems we use are mainly:

- Mitsubishi, Melsec serie Q
- Siemens, Simatic S7 300
- ABB, AC 800M
- ABB, Freelance AC 800 F

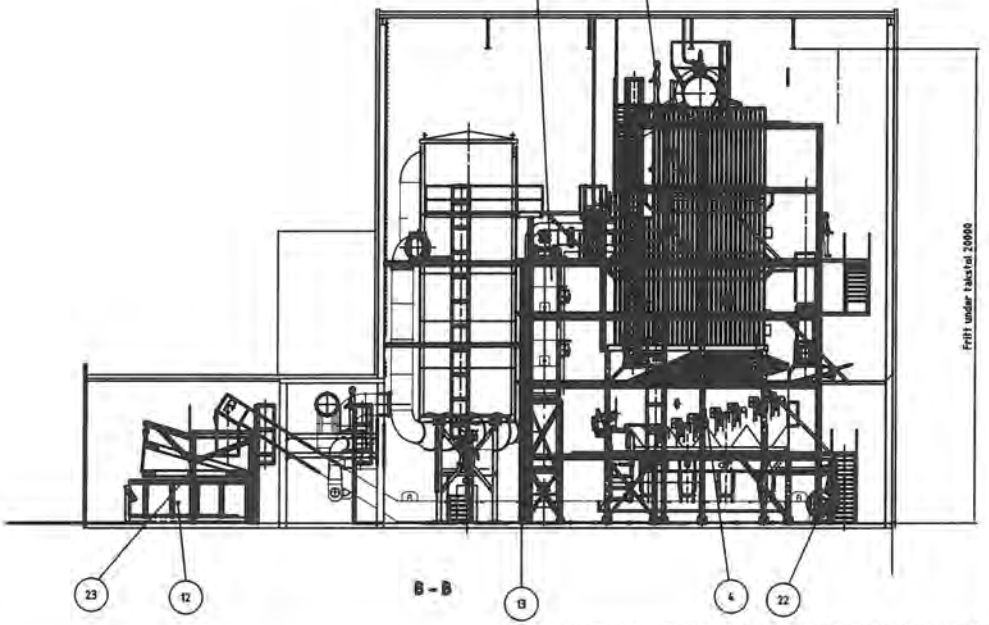
OPERATING SYSTEMS

The operating interface mostly consists of an operating computer today. The operating systems in these computers are, in most cases, Citect Scada, but we can also offer other systems such as iFIX and WinCC (Siemens). In those cases where the ABB Freelance is used as a control system, the operating system of the computer is also ABB Freelance, because it is a so called DCS system.

For the smaller plant, an operator panel could be an alternative to an operating computer. Here we mainly offer Beijer Electronics or Siemens panels.



A – A



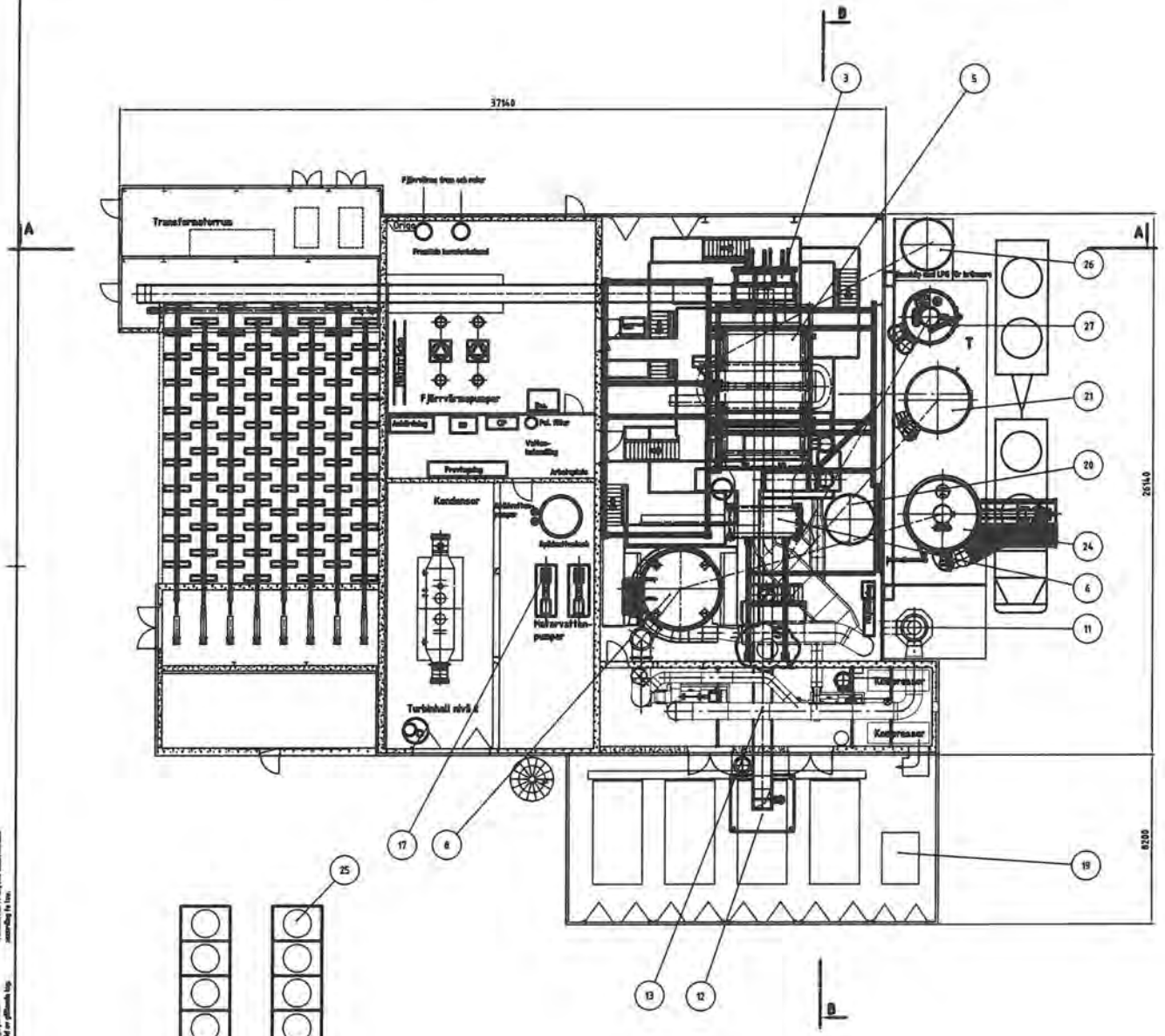
B – B

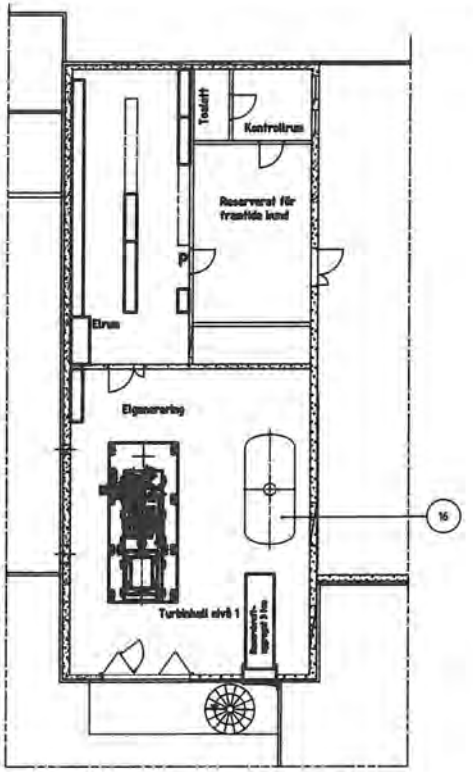
Nr	Ändring	Datum	Sign
	Ändring utförd under		

Jernforsen
Bioenergy solutions

BIOMASSBOILER
12 MW thermal + 2 MW electric

Ritad/s	KLH
Skal	1:100
Kontr	KLH
Datum	2016-12-06
Ritnr	19162-101





Övre plan

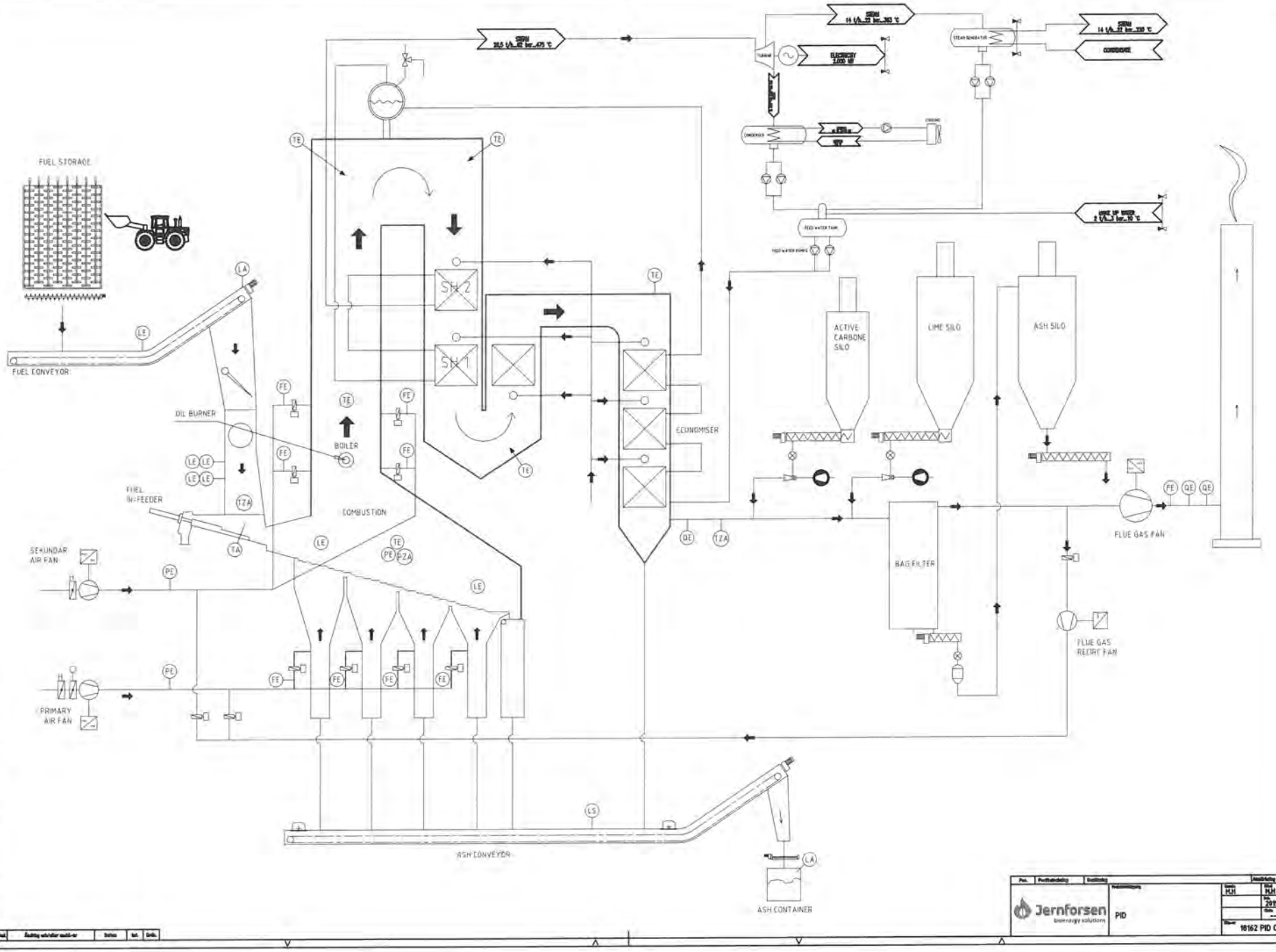
Placed on roof

Item	Qty	Description	Standard	Material
27	1	Coke silo		
26	1	Oil tank		
25	2	Cooling tower		
24	1	Ash silo		
21	1	Lime silo		
20	1	Waste water tank		
19	1	Central vacuum cleaner		
17	1	Feed water pumps		
16	1	Feed water tank		
15	1	Turbine		
14	1	Sekundäry air fan		
13	1	Wet ash conveyor		
12	4	Wet ash container		
11	1	Chimney		
8	1	Bagfilter		
6	1	Economiser		
5	1	Boiler		
4	1	Combustion		
3	1	Infeeder		
2	1	Fuel conveyor		
1	8	Walking floor		

Jernforsen

BIOMASSBOILER
12 MW thermal + 2 MW electric

Ritad: MJH
Granskad: MJH
Datum: 2019-12-06
Skala: 1:100
Ritnr: 19162-101


FUEL STORAGE
FUEL CONVEYOR
OIL BURNER
FUEL IN-FEEDER
BOILER
COMBUSTION
SH 2
SH 1
ECONOMISER
SEKUNDAR AIR FAN
PRIMARY AIR FAN
ASH CONVEYOR
ASH CONTAINER
ACTIVE CARBONE SILO
LIME SILO
ASH SILO
BAG FILTER
FLUE GAS FAN
FLUE GAS RECIRC FAN
FEED WATER TANK
ELECTRICITY 2,000 kW
CONDENSATE
Jernforsen
PID
18162 PID CHP
2019-01-07

Latgran 3, Kraslava, Latvia

Start up: Autumn 2011

Capacity: 18 MW

Type of plant: Pellet production industry

Customer: Latgran, SIA, Latvia

Jernforsen produced and delivered fuel handling system, furnace (18 MW) and and steam boiler for the pellet production. This plant in Kraslava produces 150 000 tonnes pellets a year.

Ilmars Kass ,
Project Manager, SIA Latgran

"I have been working together with Jernforsen for setting up the pellet production factory of Latgran in Kraslava (Latvia).

Jernforsen was responsible for supply of wood biomass combustion furnace, steam generation system, as well as fuel and material handling equipment.

Support and cooperativeness have been experienced during all phases of the project, starting with general layout configuration, erection of the plant during toughest winter conditions in 2011, putting plant in operation, training of personal and final commissioning. All the faults of any kind (minor in our case) have been acknowledged and fixed in shortest possible time.

Engineers of Jernforsen still keep an eye on the major combustion processes in the furnace remotely and advice the operators if needed. They know how to get energy out of woody biomass in most efficient way!"

CUSTOMER REVIEWS

”The customer support at Jernforsen is exceptional!

We have had several different solutions over the years but never before experienced the high standards that Jernforsen delivers. As a result of the close contact we have had with the project leader in the mechanical and electrical department, we have never lacked assistance or support.

On a special occasion, we had to call on a Saturday night at 3:15am to ask a question regarding our control system which had received a blow in an autumn storm. I received a very rapid response, and the system was restored already at 3:45am. Unbelievable .... what dedication!

Working with a company that you know possesses the skills and that always responds when asked, is a huge security for us who operate the plant. I am pleased we decided to use Jernforsen when we invested in a new plant. ”

Per Johan Johansson,
Lessebo district heating, Sweden

”Eidskog heating plant was started up in Skotterud, Norway, on 1 August 2003. I got the job as operations manager of the plant.

I had no prior experience of this kind of plant and it was a tough start, lightening struck during the start-up phase. At that point the electrical work was not yet finished as the electrician had not yet grounded the plant. The lightening strike therefore resulted in some of the automation being wiped-out and the plant stopped.

I called Jernforsen´s Electrical Engineer Håkan at 8 in the evening. He was at his son’s football practise, but he answered the phone anyway and helped us troubleshoot. The plant was operative again after a few hours.

Jernforsen has given us very good service and taught us how to operate the plant in the best way.

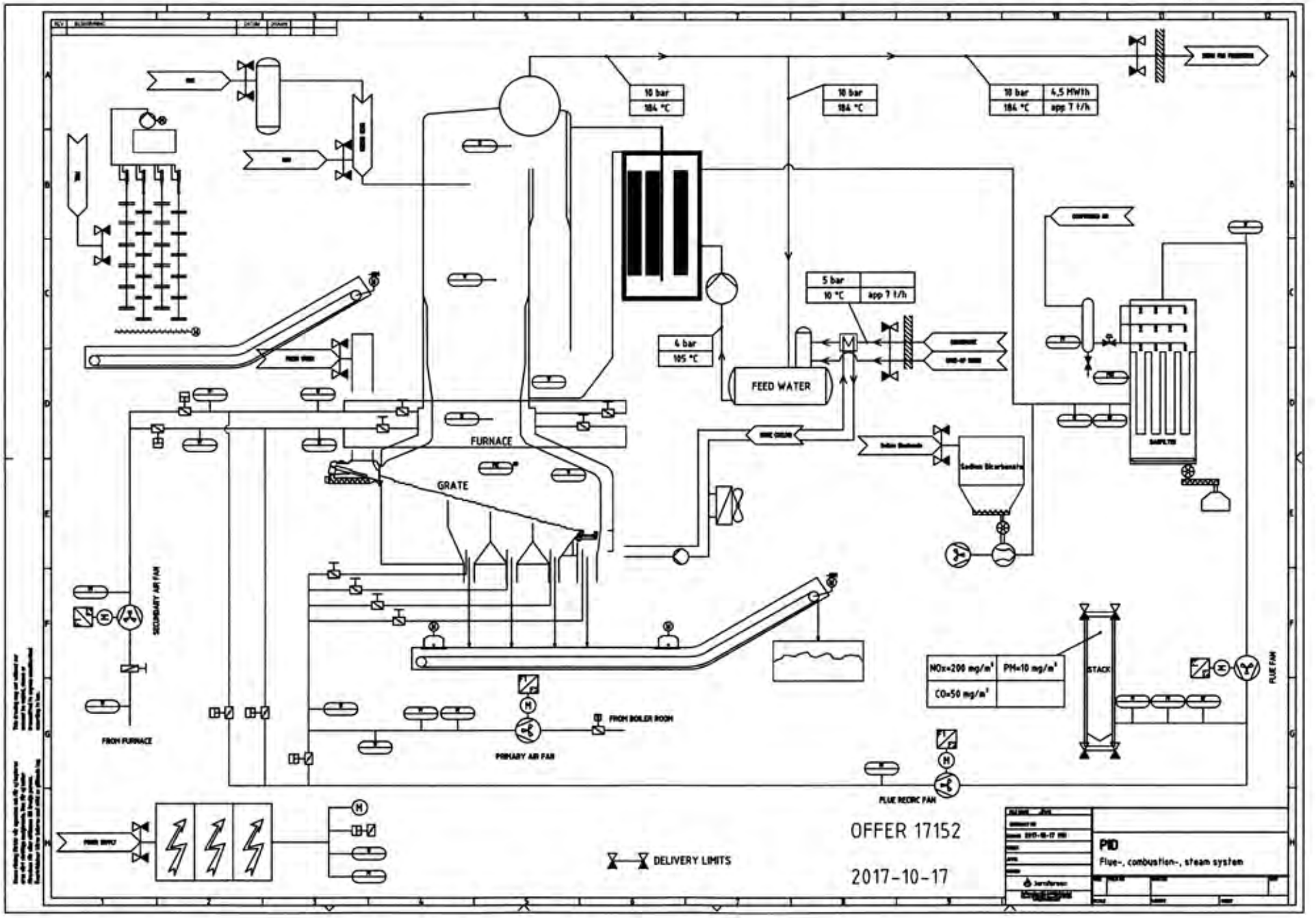
Whenever we have a problem and call Jernforsen, there is always a pleasant and experienced person who gives us tips and advice. This service is extremely valuable to us running the plant and we have learned an incredible amount from the people at Jernforsen.

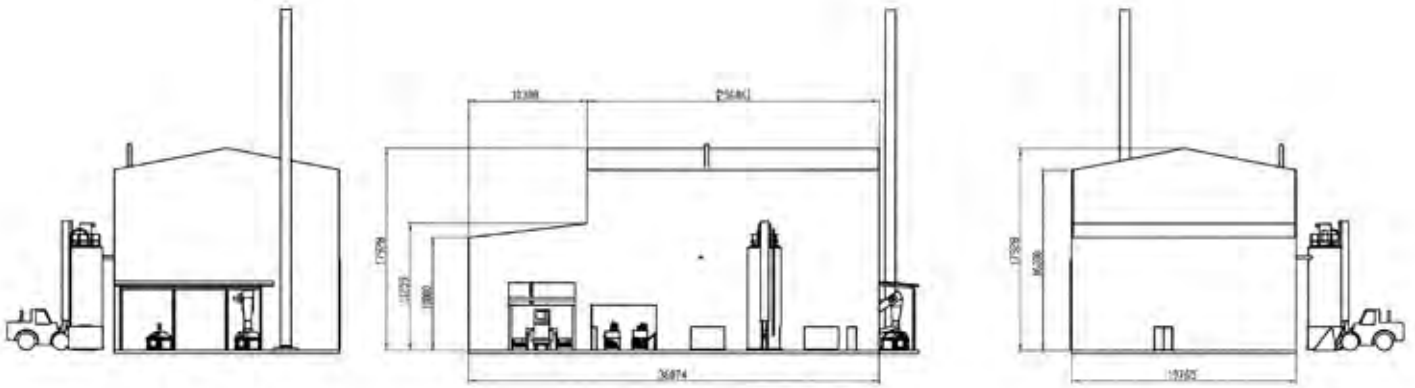
We have been running the plant for seven years now, and we have not had any unexpected shutdowns. We only need to shut down the boiler for three weeks in July for inspection and maintenance. Jernforsen also supply spare parts very quickly. If we make the order one day, the package will be delivered in the mail in Charlottenberg the next.

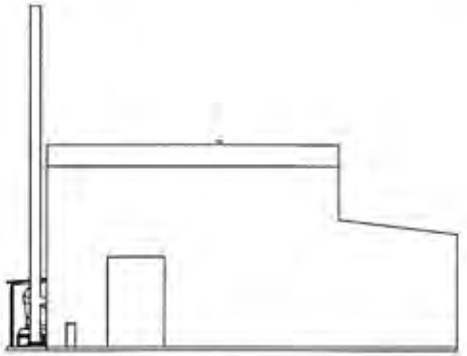
We hardly ever need to do any maintenance, which proves that we have a solid and reliable facility.

Eidskog Nutrition Service KF is very pleased with Jernforsen as a supplier of our 5 MW bioplant. I have really learned a lot from Jernforsen’s professional team during these ten years the plant has been in operation.”

Roald Bodding,
Eidskog district heating, Norway


10 bar
184 °C
10 bar
184 °C
10 bar
184 °C
4,5 MWth
app 7 t/h
5 bar
10 °C
app 7 t/h
4 bar
105 °C
FEED WATER
FURNACE
GRATE
SECONDARY AIR FAN
FROM FURNACE
PRIMARY AIR FAN
FROM BOILER ROOM
FLUE RECIRC FAN
FLUE FAN
STACK
NOx<200 mg/m³
PM<10 mg/m³
CO<50 mg/m³
DELIVERY LIMITS
OFFER 17152
2017-10-17
PID
Flue-, combustion-, steam system





Jernforsen

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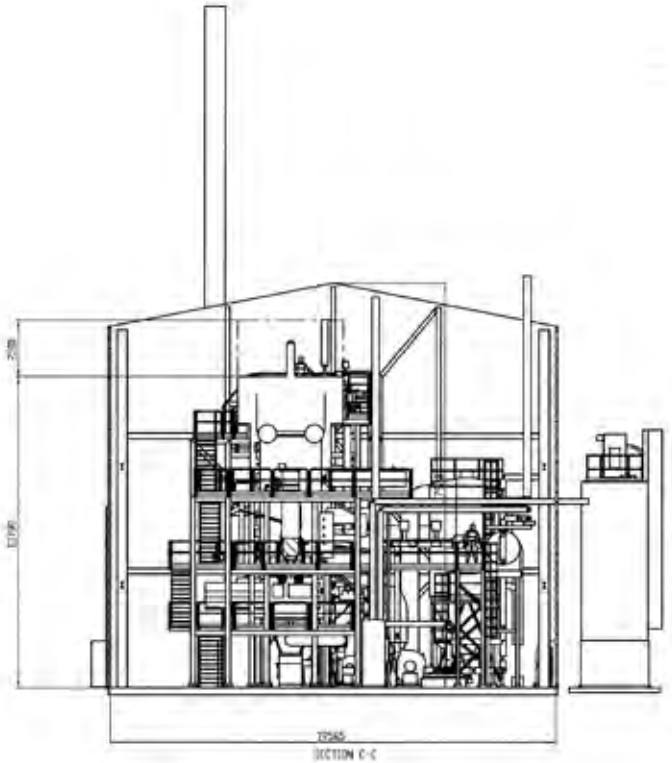
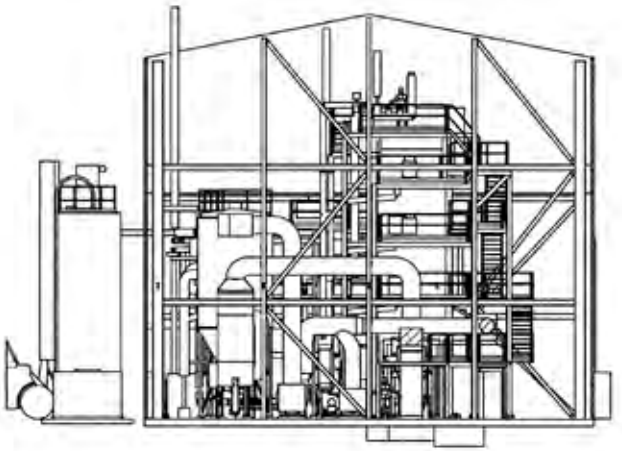
2016-09-29



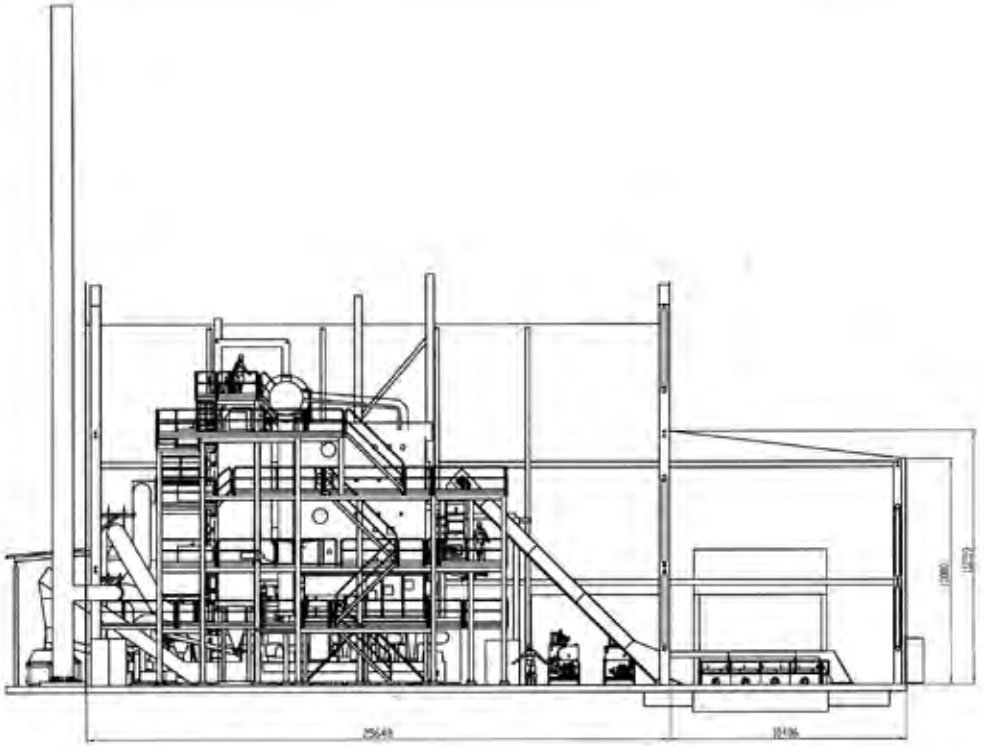
SECTION C-C

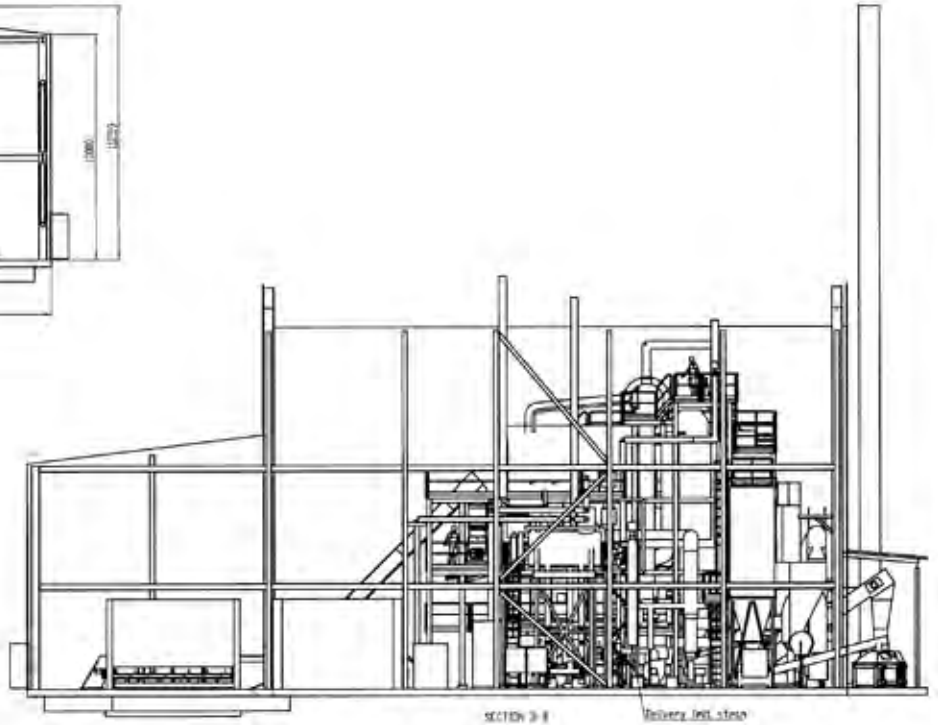


SECTION D-D

Jernforsen

Layout





Jernforsen

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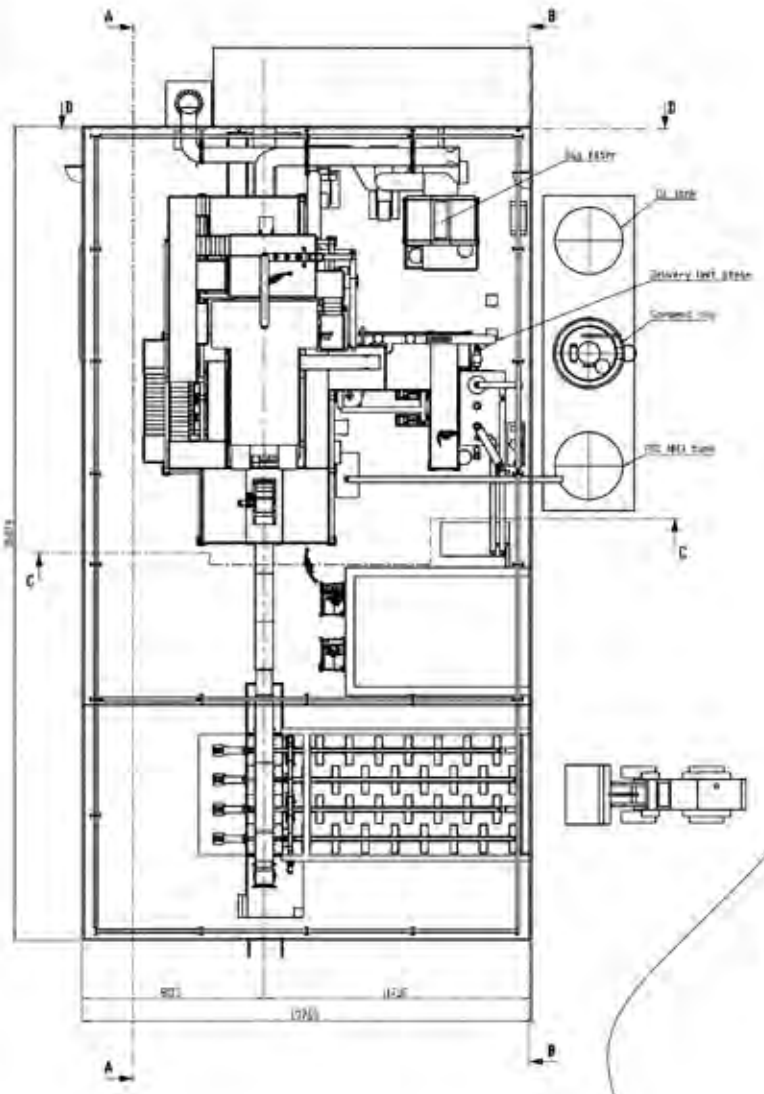

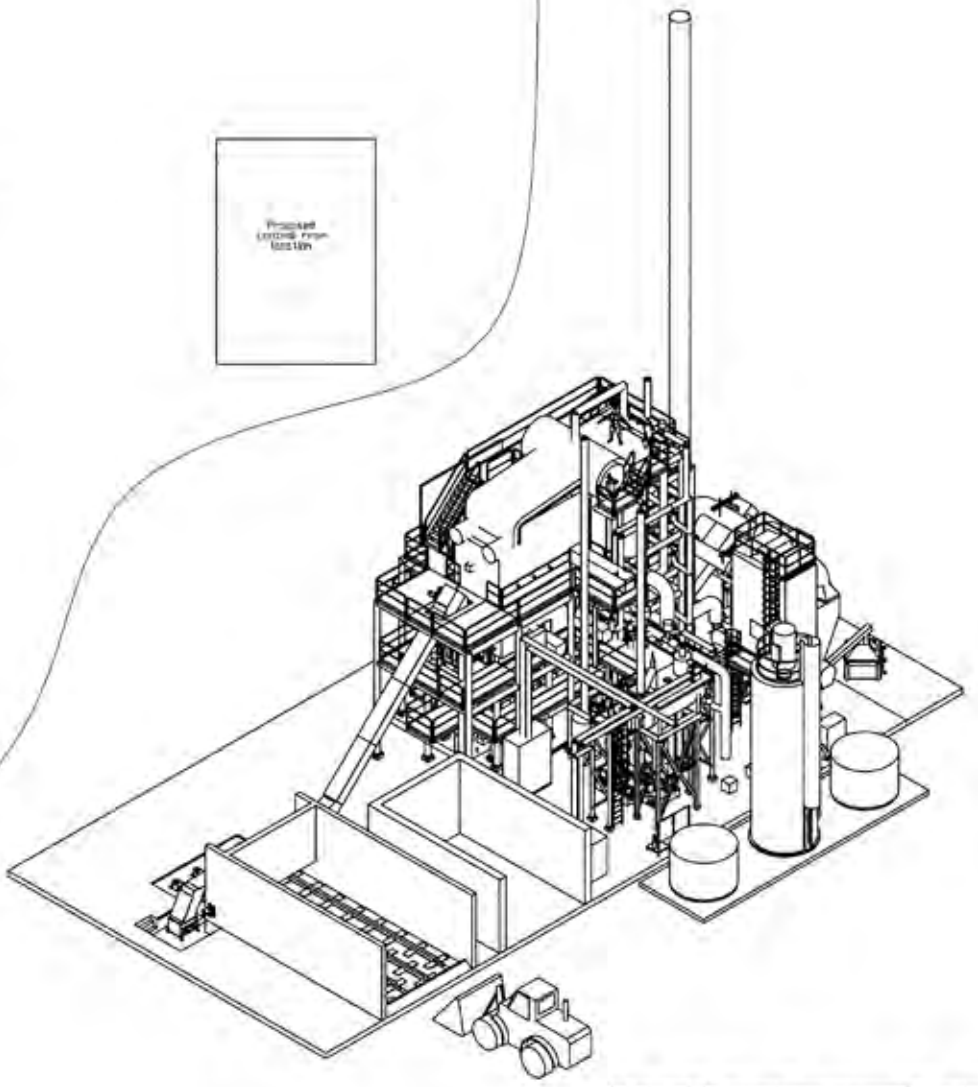

Jernforsen

SCOT HEAT & POWER
BEST IN BIOMASS

Renewable Fuels Services





- Wood Chips G30 M30 /G30 M40 / G50 M30 / G50 M40 / G50 M50 / G100 up to M50
- Shredded Forest Arisings and Brash: Various Grades
- G50 BSL Compliant Blended Fuels
- Wood Pellets: Bulk deliveries
- Wood Pellets: 15 kg & 1 Tonne Bags
- Fuels Bulk Sampling and Analysis
- Timber Collection – Roadside/Forest
- Timber Processing
- Brash/Arboriculture Arising Collected
- Whole Logs
- Timber Harvesting
- Storage od Bulk and Bailed Waste Products (SRF etc)

Industrial Services: Plant Hire and Equipment






Specialised Hire

Scot Heat & Power have a range of equipment and vehicles available for hire. Developed for the environmental market our machines include, waste handling, specialist attachments, mobile crushers, mobile screeners, material handlers. Our hire fleet is available Nationwide. We can transport and store shipments of woodfuel.

Our WML premises have segregated storage facilities for wood fuels or waste materials. Scot Heat & Power has shredders that are fully mobile, easy to set up and operate. They can be delivered to site by one of the company's trained operatives who will determine the optimal settings for the machinery based on the material processed. They are one-man operation, easy maintenance and low fuel consumption.

Shredders / Screeners / Stackers

- Wood Recycling & Waste Management
- Plant Maintenance
- Slow Speed Shredder Hire
- JCB 3cx Hire
- Spillage Cleaning and Remediation
- Liquid Tanker Provision
- Logistics (Assets and Material Movement etc)
- Highly Skilled, Trained and Competent Teams
- Excellent Safety Record and Procedures
- Task Specific Method Statements and Risk Assessment
- Decontamination
- Decommissioning
- Impact Surveys

Our Business Accreditation and Trade Association Summary

Quality / Management Accreditations / Trade Industry Memberships

ISO 9001: 2015 Quality Management System

ISO 14001: 2015 Environmental Management System

OHSAS 18001: 2007 Health & Safety Management System

BS EN ISO/IEC 27001: 2017 Information Security

Biomass Wood Fuels

BSL Certification

Woodsure

FSC

Confor

Vehicle Management Systems

UK Operators License

International Operators Licence

Fleetmatics

General Industry Accreditations

FTA

RSABI

WRA

REA


SCOT HEAT & POWER
Best in Biomass
V500 SHC

SCOT HEAT & POWER

BEST IN BIOMASS

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Email: info@scotheating.co.uk

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