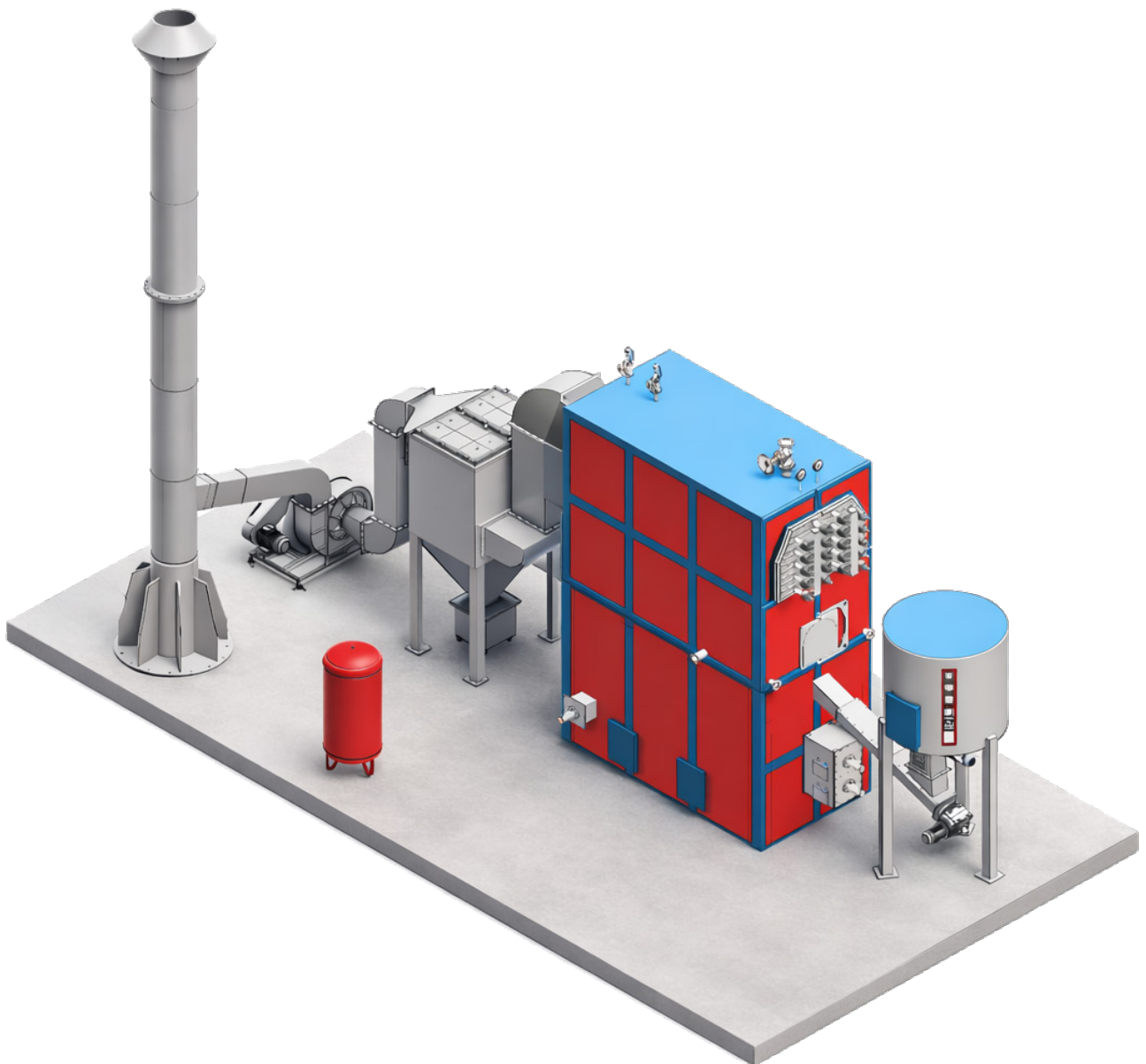




INDUSTRIAL BIOMASS ENERGY SYSTEMS



TURNKEY ENGINEERING SOLUTIONS FOR
BIOMASS AND SOLID FUEL ENERGY SYSTEMS



Tree Bark



Sunflower Shell



Almond Shell



Hazelnut Shell



Coffee Shell



Cocoa Shell



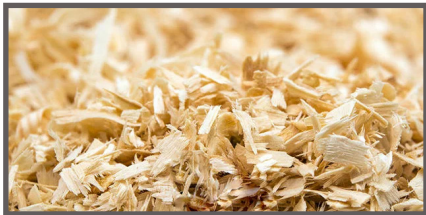
MDF & Particleboard Dust



Corn Straw



Wood Pellets



Wood Chips



Eucalyptus Straw



Forest Residue



Cotton Straw



Rice Shell



Pulper Waste



Chicken Litter



Woodchips



Olive Pomace

Each biomass fuel has a different moisture content, ash structure, and combustion characteristics. Therefore, system design should be done according to the fuel properties.



DEMA THERMATECH SYSTEMS INDUSTRIAL BIOMASS & SOLID FUEL ENERGY SYSTEMS

DEMA Thermatech Systems is an engineering and systems solutions company specializing in industrial biomass and solid fuel energy systems, built upon DEMA's heavy industry manufacturing experience spanning over 45 countries and its international engineering infrastructure.

DEMA's experience in high-precision steel fabrication, pressure vessel manufacturing, and large-scale industrial projects enables us to develop robust, reliable, and sustainable solutions for biomass steam, hot oil, and hot water systems today.

The manufacturing and project discipline gained from major infrastructure projects such as the High Speed Train (HST) Project UK, marine and offshore engineering giants like Allseas, hydroelectric projects under the U.S. Army Corps of Engineers, and substation and concrete energy infrastructure projects with global energy companies like Astor, forms the foundation of Thermatech Systems.

DEMA Group is a strong production platform with world-class references in the production of electrical substations and energy infrastructure concrete systems. This heavy industry and engineering culture forms the basis of Thermatech Systems' systematic and safe approach to biomass energy projects.

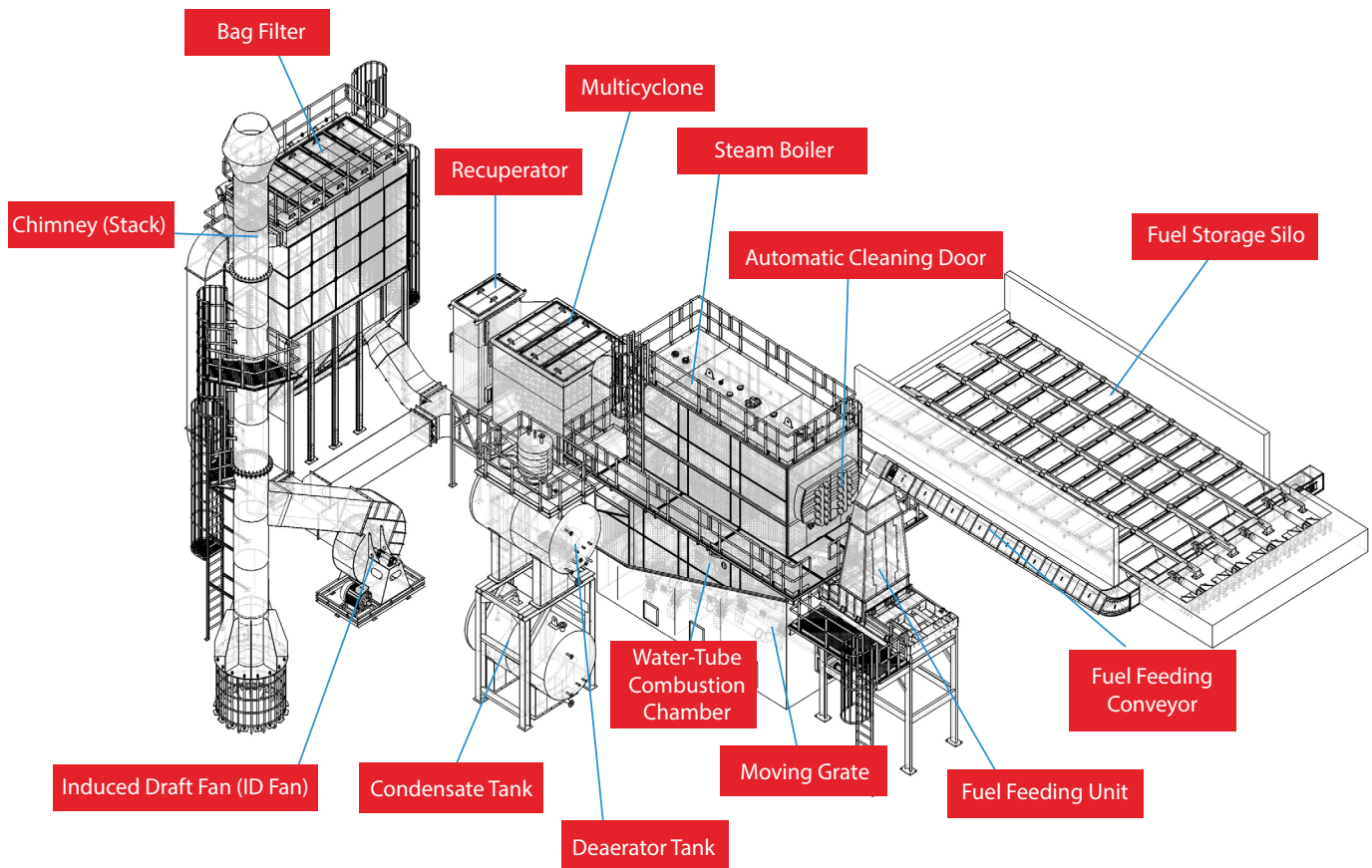
DEMA's high-tonnage steel construction production capacity, experience in pressure equipment manufacturing, and production infrastructure compliant with international quality standards are directly integrated into Thermatech Systems projects.

In this way, projects are not only designed; production, assembly, and commissioning processes are managed in an integrated manner with a single engineering approach.

Thermatech Systems implements turnkey projects in the following areas:

- Biomass Steam Systems
- Biomass Hot Oil Systems
- Biomass Hot & Superheated Water Systems
- Fuel Preparation and Storage Systems
- Filtration and Emission Control Systems

Each solution is specifically designed according to the actual energy needs and fuel conditions of the facility.



BIOMASS FUEL STEAM BOILER SOLUTIONS

We offer system solutions suitable for the combustion characteristics of different biomass fuels to meet the steam needs of industrial facilities.

Each project is designed taking into account the characteristics of the fuel to be used, process requirements, and operating conditions.

AREAS OF USE

- Food industry
- Textile industry

- Wood and forest products
- Agriculture and agricultural product processing plants
- Chemical and similar industrial applications

WHY BIOMASS FUEL STEAM SYSTEM?

- Lower operating costs compared to fossil fuels
- Domestic and sustainable energy source
- Conversion of waste into energy
- Long-term energy cost advantage

Our Engineering Approach

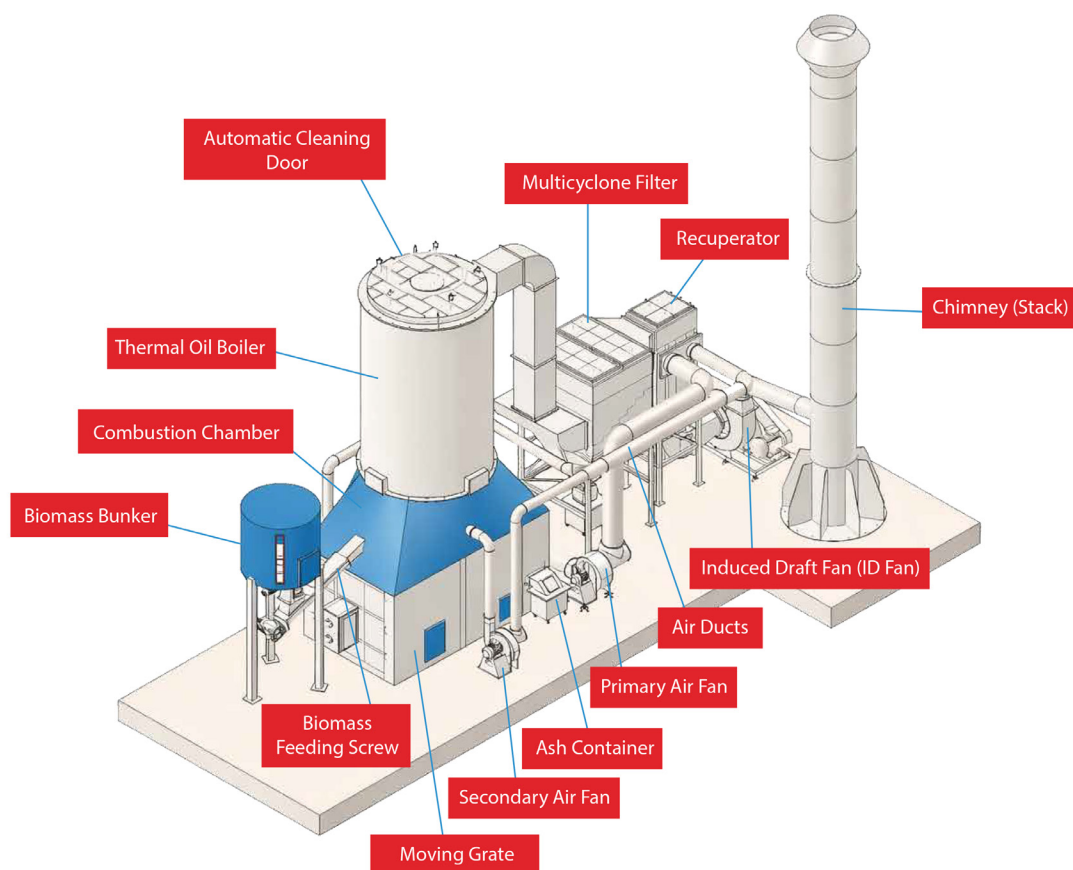
Instead of offering a standard boiler solution;

Considering the moisture content, ash structure, particle size, and combustion behavior of biomass fuel, we design fuel- and process-specific systems.

Biomass systems become efficient and sustainable with the right fuel analysis and engineering approach.

Technical Specifications

- Capacity: Steam production capacity ranging from 2,000 to 25,000 kg/h.
- Fuel Type & Combustion System: Optional combustion systems depending on fuel type and moisture content (Moving Grate / Underfeed Stoker).
- Operating Pressure: Design and operation capability between 3 – 20 bar(g).
- Efficiency: Delivers high performance with up to 90% system efficiency.
- Environmentally Friendly: Eco-friendly solution with low carbon emissions.
- Automatic Control: Fully automatic operation via PLC control system; optional SCADA system integration available.
- Quality Standards: Manufactured in compliance with TSE and EN standards.



BIOMASS FUELLED THERMAL OIL BOILER SOLUTIONS

We design biomass fuelled thermal oil boiler systems to provide energy in high-temperature industrial processes without the need for steam production.

The systems are designed according to the combustion characteristics of different biomass fuels and the process temperature requirements.

Where are they used?

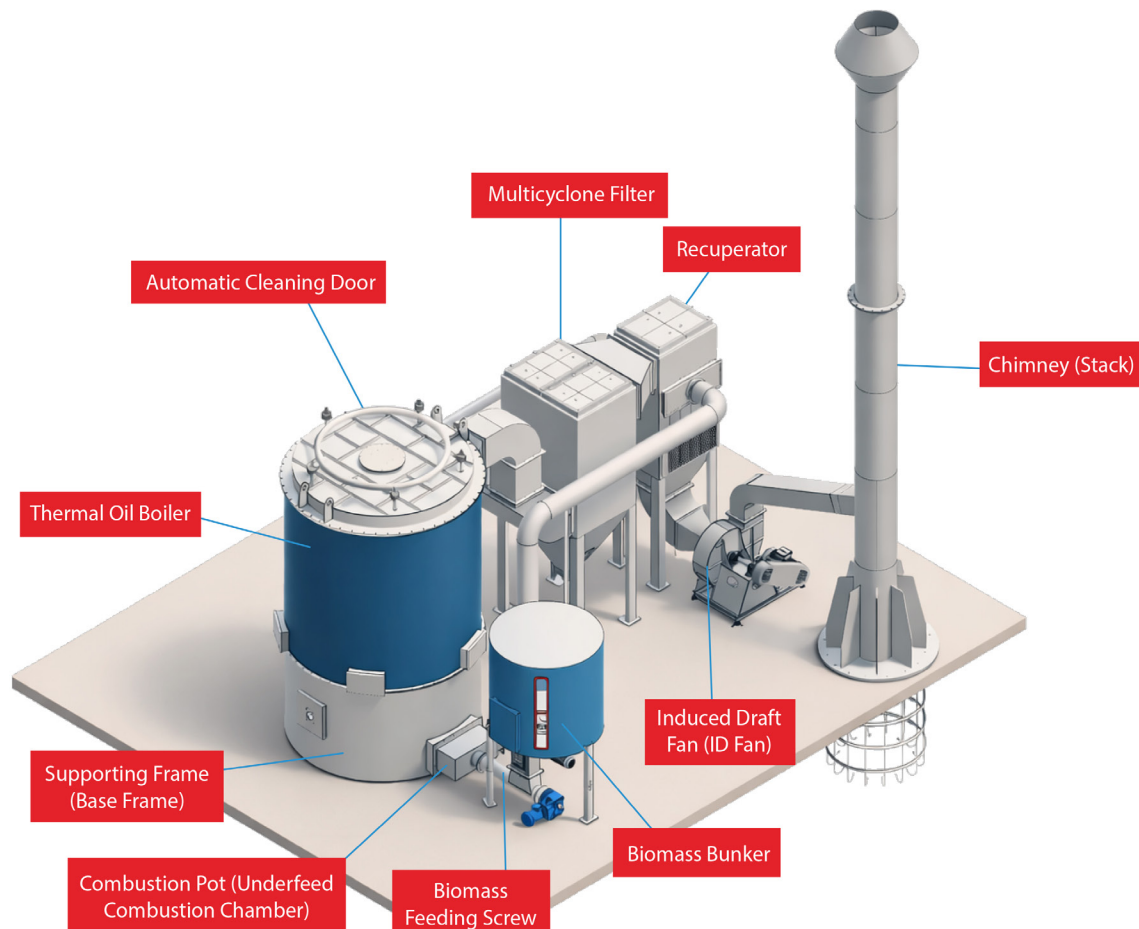
- Food and drying processes
- Chemical and petrochemical plants
- Wood and panel industry
- Textile and dyeing lines
- Reactor and heating applications

Why Biomass Fuelled Thermal Oil Boiler Systems?

- Ability to reach high temperatures at low pressure
- More stable process temperature compared to steam systems
- Alternative to fossil fuels, domestic and sustainable energy use
- Long-term advantage in fuel costs

Our Engineering Approach

Each thermal oil system is specially designed taking into account the moisture content, ash structure and combustion behavior of the biomass fuel to be used, as well as the process temperature, circulation flow rate and operational continuity.

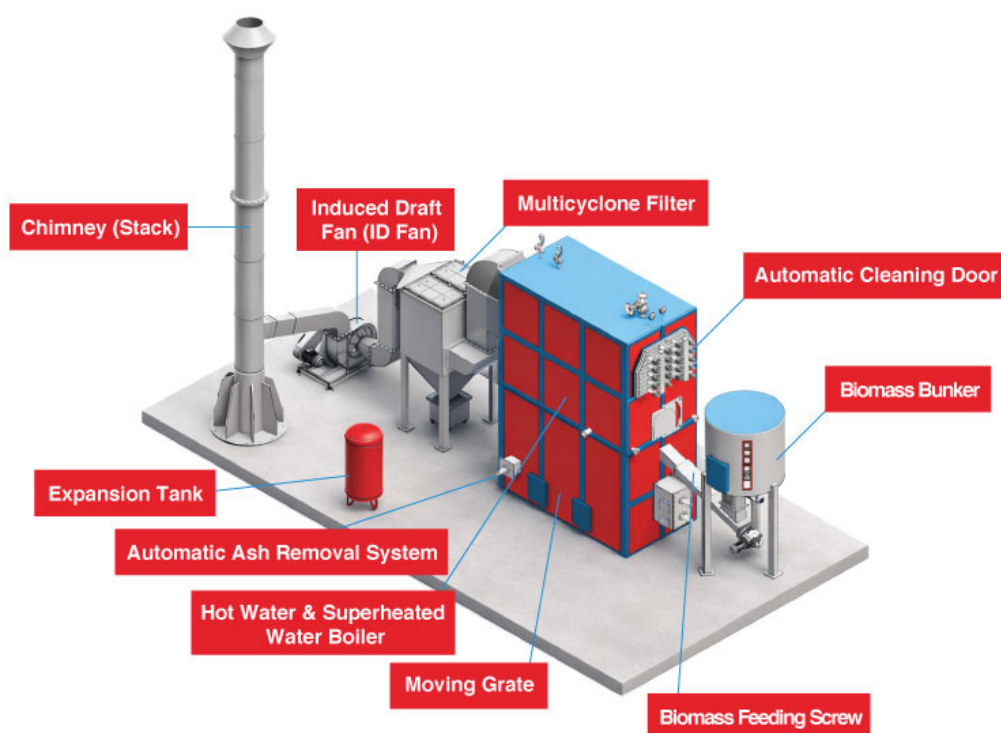


Instead of a standard product approach, we offer system solutions suitable for the fuel and process.

Efficiency in thermal oil systems is achieved through the correct fuel selection and the correct engineering approach.

Technical Specifications

- **Capacity:** Thermal capacity ranging from 500,000 to 6,000,000 kcal/h.
- **Fuel Type & Combustion System:** Optional combustion systems depending on fuel type and moisture content (Moving Grate / Underfeed Stoker).
- **Operating Pressure:** 6 – 10 bar(g).
- **Efficiency:** Provides high performance with up to 90% system efficiency.
- **Thermal Oil Temperature:** Up to 300°C.
- **Environmentally Friendly:** Eco-friendly solution with low carbon emissions.
- **Automatic Control:** Fully automatic operation via PLC control system; optional SCADA system integration available.
- **Quality Standards:** Manufactured in compliance with TSE and EN standards.



BIOMASS FUELLED HOT WATER & SUPERHEATED WATER BOILER SOLUTIONS

We design biomass fuelled hot water and superheated water boiler systems to meet the heating and process needs of industrial facilities.

The systems are designed taking into account the characteristics of the biomass fuel to be used, the desired water temperature, and operating conditions.

Where are they used?

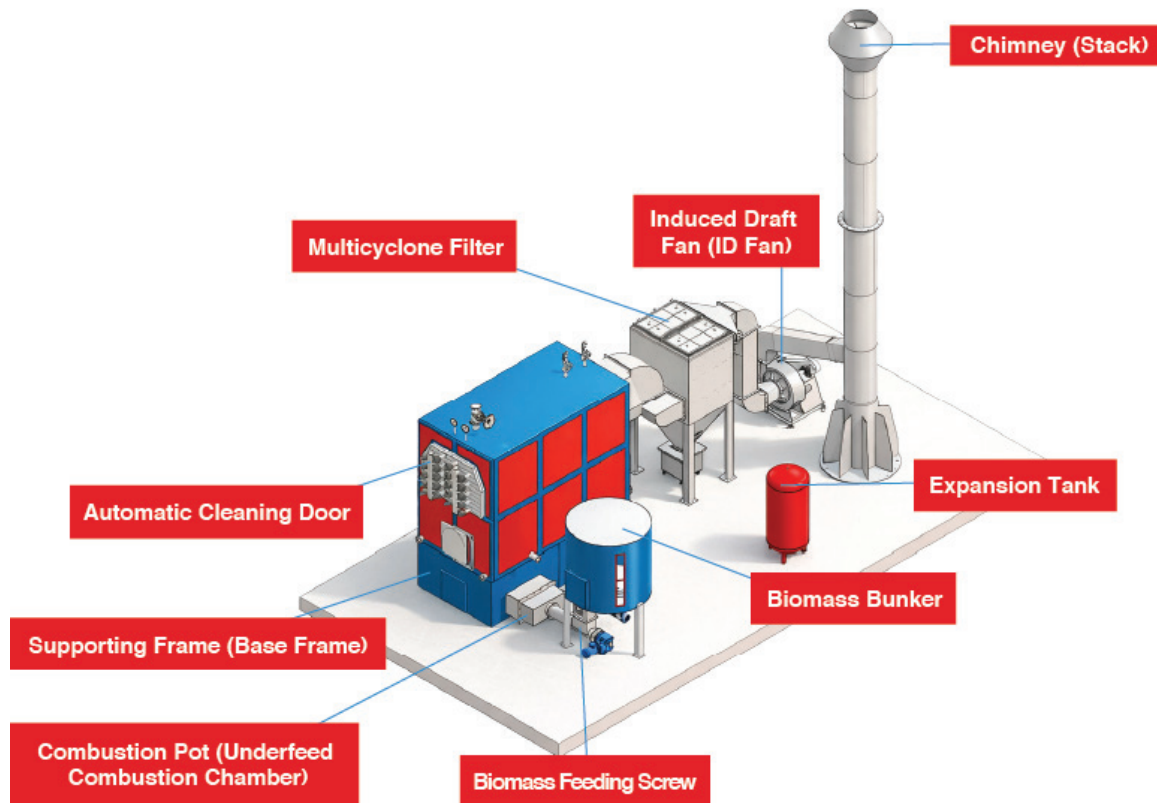
- District heating systems
- Industrial plant heating
- Food and agricultural facilities
- Greenhouses and livestock facilities
- Hotels, hospitals, and large building complexes

Why Biomass Fuelled Hot & Superheated Water System?

- Simpler operating structure compared to steam systems
- Safe operation with low operating pressure
- An alternative to fossil fuels, a domestic and sustainable energy source
- Long-term advantages in heating costs

Our Engineering Approach

Each hot water and superheated water system is specially designed taking into account the moisture content, ash



structure and combustion behavior of the biomass fuel, as well as the desired water temperature, flow rate and heating characteristics of the facility.

Instead of standard solutions, we offer system configurations suitable for the fuel and application. Efficient and safe operation in hot water and superheated water systems is ensured with the right engineering approach.

Technical Specifications

- Capacity: Thermal capacity ranging from 500,000 to 15,000,000 kcal/h.
- Fuel Type & Combustion System: Optional combustion systems depending on fuel type and moisture content (Moving Grate / Underfeed Stoker).
- Operating Pressure: Design and operation capability between 3 – 10 bar(g).
- Efficiency: Provides high performance with up to 90% system efficiency.
- Superheated Water Temperature: Up to 160°C.
- Environmentally Friendly: Environmentally friendly energy solution with low carbon emissions.
- Automatic Control: Fully automatic operation via PLC control system; optional SCADA system integration available.
- Quality Standards: Manufactured in compliance with TSE and EN standards.

BIOMASS STORAGE AND TRANSPORTATION SOLUTIONS

Efficient and uninterrupted operation in biomass energy systems begins with the correct storage of the fuel and its safe transportation to the boiler system.

We offer storage and transportation solutions suitable for the physical properties of different biomass fuels.

The Importance of Storage in Biomass Fuels Biomass fuels;

It exhibits different properties in terms of moisture content, particle size, fluidity, and density. Therefore, storage systems must be specifically designed according to the structure of the fuel.

Improper storage can lead to:

- Fuel bridging
- Feeding problems
- System efficiency losses.

Our Storage Solutions

Depending on the biomass fuel type and plant layout;

- Daily and weekly fuel silos
- Open or closed bunker systems
- Mobile fuel storage solutions
- We design large-volume stock areas.



Transportation and Feeding Systems

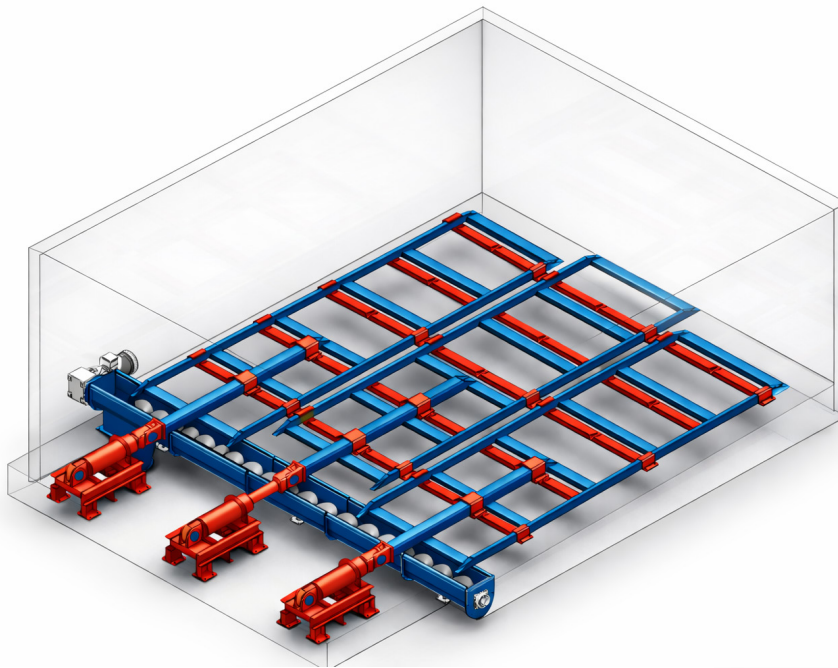
For the controlled and uninterrupted transportation of fuel from the storage area to the boiler system;

- Chain conveyors
- Belt conveying systems
- Hydraulic or mechanical conveyor systems are used. The choice of conveying system is determined according to the particle size, moisture content of the fuel, and the operating conditions of the plant.

Our Engineering Approach

Storage and transportation systems are not independent of the boiler system; fuel, process, and operational continuity are evaluated together in the project. Instead of standard solutions, we offer integrated system solutions tailored to:

- Fuel characteristics



- Plant layout
- Daily consumption amount

Reliable operation in biomass systems begins with the right storage and transportation solutions.

Technical Specifications

DEMA Silos offer easy transportation and the possibility of capacity expansion when required, thanks to their modular structure.

- Capacity: Production range between 50 – 400 m³.
- Safety: Equipped with explosion relief panels for explosion protection and a temperature monitoring system for fire prevention.
- Filtration: Filtration capacity is determined according to customer requirements using special antistatic filter units.
- Automatic Cleaning: Ensures easy operation with a PLC-controlled fully automatic filter cleaning system.
- Flexible Design: Custom manufacturing based on customer requirements, available in legged or skirt-supported configurations.



INDUSTRIAL HEATING SYSTEMS

A properly designed heating infrastructure in industrial facilities is critical in terms of energy efficiency, process continuity, and operating costs.

Our company installs industrial heating systems specifically designed for the production process and fuel type. Our service scope includes hot water and superheated water production, heat distribution lines, pump stations, and process heating solutions. In every project, our goal is to install sustainable systems that provide high performance with low energy consumption.

The existing infrastructure, heating needs, and operating regime of the facility are analyzed in detail. This prevents unnecessary or insufficient system investments.

INDUSTRIAL STEAM AND HOT OIL SYSTEMS

Steam and hot oil systems are the primary energy source for many industrial processes. Proper design of these systems is vital for safety, efficiency, and production continuity. Our company specializes in the turnkey installation of steam and hot oil plants suitable for various fuel types, primarily biomass.

Our services include:

- Installation of steam and hot oil boilers
- Distribution lines and process integration
- Condensate recovery systems
- Safety and automation infrastructure

In every project, our goal is to create systems that reduce fuel costs, are easy to operate, and that have a long lifespan.

BOILER REVISION AND PERIODIC MAINTENANCE

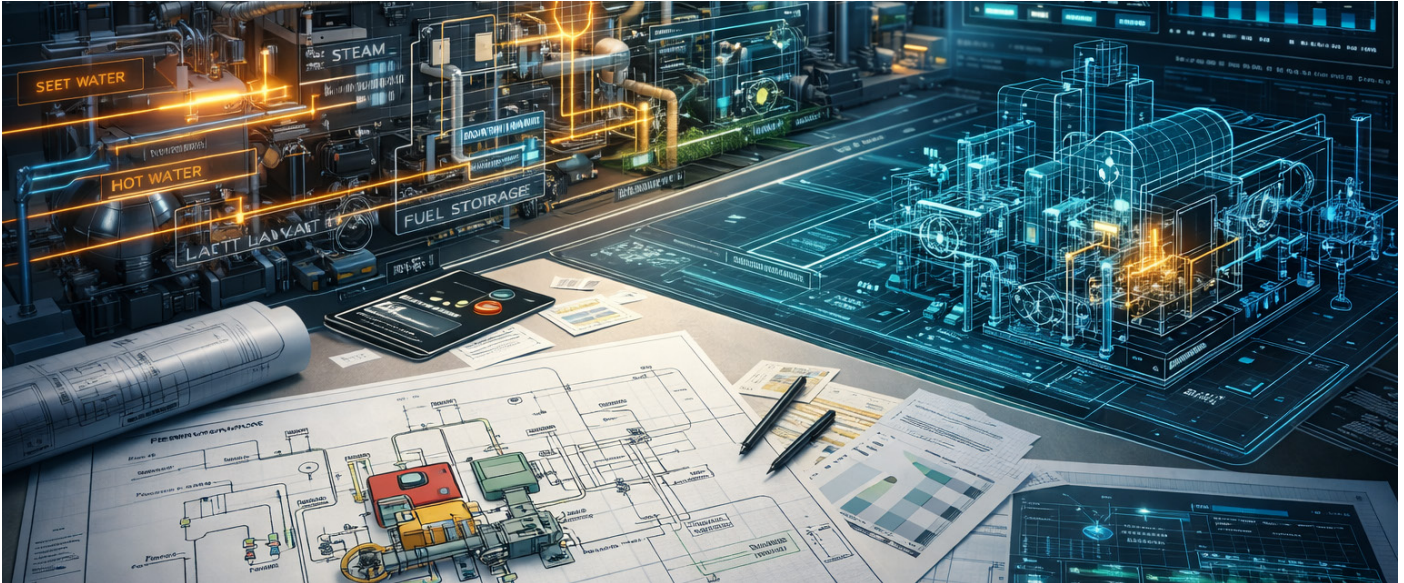
Safe and efficient operation of industrial boilers is possible with regular maintenance and correct revision practices. Unplanned shutdowns lead to production losses and high costs. Our company offers comprehensive maintenance and revision services for boilers of different brands and fuel types.

Our services include:

- Combustion system optimization
- Renewal of grate and fuel feeding equipment
- Emission and efficiency improvement studies
- Updating automation and safety systems
- Performance and Capacity Increase Revisions

PROJECT DESIGN SERVICE

The Right Engineering Approach in Biomass Energy Systems Biomass energy investments differ from standard boiler projects.



Due to the variability of fuel properties, the diversity of process needs, and the differences in operating conditions on site, each project requires a special engineering approach.

A poorly designed biomass system creates serious risks such as low efficiency, capacity loss, high maintenance costs, and an extended return on investment period.

Therefore, in our projects, we aim not only for equipment sales but also for long-term and sustainable energy systems.

1- Preliminary Feasibility and Technical Evaluation

We start each project by understanding the customer's real needs.

The most suitable system configuration is determined by analyzing energy consumption, production capacity, and operating conditions. In this context:

- The existing energy structure and consumption profile are examined.
- Biomass fuel alternatives and supply continuity are evaluated.
- Investment costs and operating expenses are compared.
- Payback period and economic feasibility analyses are performed.

This approach aims to minimize investment risks from the outset.

2- Fuel Analysis and Combustion Design

The key to success in biomass systems is the fuel.

Incorrect fuel-system matching leads to capacity reduction, emission problems, and high operating costs. Therefore, in the design process:

- Critical parameters of the fuel such as moisture, ash, and energy value are evaluated.
- The boiler and grate type suitable for the fuel characteristics are determined.
- Storage, transportation, and feeding systems are designed.

The aim is to ensure stable and reliable operation even under variable fuel conditions.

3- System Design and Process Integration

Biomass systems are not limited to boiler selection alone.

Correct integration with the process is critical for efficiency and operational continuity.

At this stage:

- A system suitable for steam, hot water, or hot oil needs is designed
- Integration with existing production lines is planned
- Energy efficiency and optimization solutions are developed



- Waste heat recovery is evaluated
- Automation and control strategies are created

4- Detailed Engineering and Technical Documentation

Providing technical clarity in the investment process reduces application risks.

The engineering documents prepared within this scope support the correct and safe installation of the system.

- Process flow and P&ID diagrams
- Layout plans
- Equipment technical specifications
- Emission and environmental compliance criteria
- Safety and operating scenarios

5- Implementation Process and Technical Support

Projects are not limited to design only.

Field conditions and operating habits directly affect system performance. Therefore:

- Technical support is provided during manufacturing and assembly processes
- Commissioning and performance tests are carried out
- Operator training is provided
- Long-term operational consultancy is offered

6- Results-Oriented Engineering

Our goal is not just to provide a biomass boiler;

to establish highly efficient, reliable and sustainably operating energy systems. Each project is designed specifically to fuel conditions and process needs. This approach shortens the payback period while reducing long-term operating costs.

Specific Enthalpy

SATURATED STEAM TABLE

Steam	Temperature	Water	Evaporation	Steam	Specific Volume
P (bar)	T (°C)	hf (kJ/kg)	hfg (kJ/kg)	hg (kJ/kg)	v (m³/kg)
1	120.2	504.7	2201.9	2706.6	0.885
2	133.5	561.4	2163.8	2725.2	0.605
3	143.6	604.7	2133.8	2738.5	0.462
4	151.8	640.1	2108.0	2748.1	0.374
5	158.8	670.4	2086.0	2756.4	0.315
6	164.9	697.2	2066.0	2763.2	0.272
7	170.4	721.1	2047.0	2768.1	0.240
8	175.4	743.5	2030.0	2773.5	0.215
9	179.9	763.0	2015.0	2778.0	0.194
10	184.1	781.7	2000.0	2781.7	0.177
11	188.1	798.9	1986.0	2784.9	0.163
12	191.6	815.4	1972.0	2787.4	0.151
13	195.0	830.8	1960.0	2790.8	0.141
14	198.3	845.0	1947.0	2792.0	0.132
15	201.4	859.1	1935.0	2794.1	0.124
16	204.4	872.0	1923.0	2795.0	0.117
17	207.1	885.0	1912.0	2797.0	0.110
18	209.9	897.0	1901.0	2798.0	0.105
19	212.4	909.0	1890.0	2799.0	0.099
20	214.9	920.3	1880.2	2800.5	0.095
21	217.3	931.3	1870.1	2801.4	0.0906
22	219.65	941.9	1860.1	2802	0.0868
23	221.85	952.2	1850.4	2802.6	0.0832
24	224.02	962.2	1840.9	2803.1	0.0797
25	226.12	972.1	1831.4	2803.5	0.0768



5 CONTINENTS, 40+ COUNTRY



DEMA FORMWORK



DEMA THERMATECH

Orhaniye Mah. Orhaniye Küme Evleri No: 330 Kahramankazan / ANKARA / TÜRKİYE

Tel: +90 312 395 91 83 | +90 312 815 15 44 Fax: +90 312 395 91 84

www.demathermatech.com

info@demathermatech.com