

Safe, Efficient, and Environmentally Friendly
Circulating Fluidized Bed Boilers

BOSCH
Invented for life

Introduction to Bosch Thermotechnology

Bosch Thermotechnik GmbH is a leading supplier of resource-efficient heating products and hot water solutions in Europe. In fiscal 2013, the company generated sales of 3.1 billion Euros (68% outside Germany) and employed approximately 13,500 people. Bosch Thermotechnology has strong international and regional brands and manufactures a diversified product range in 21 plants in 11 European, North American and Asian countries. In 2013, Bosch Thermotechnology invested 129 million Euros in research and development. Intelligent networks and local systems for heating, ventilation, air-conditioning and electricity generation are fundamental technologies for the future building standard, which will generate more energy than is used.

As a pioneer enterprise in the global market, Bosch Thermotechnology provides boiler systems that are appropriate for use in various commercial and industrial applications. We have not only successfully provided high quality boiler system equipment and complete services to large and medium sized mining enterprises, we have also provided customized boiler system solutions to small enterprises, office buildings, and residential buildings.

In Southeast Asia, Bosch Thermotechnology has been established in the middle of 2011 to provide a closer support to its local customers as well as to further extend its market position. The regional headquarter office is based in Singapore, overseeing business development in the Southeast Asia region. Nowadays, Bosch Thermotechnology has successfully established its sales offices in Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam, with a representative office in Myanmar.

National A-grade boiler manufacturing license

ASME certification

Boiler I-grade installation, alteration, and maintenance license

Pressure vessel D1- and D2-grade manufacturing license

Pressure vessel D2-grade design license

Circulating Fluidized Bed Boilers

Product Evolution

- 1978: The first fluidized bed boiler became operational
- 1987: Partnered with Huazhong University of Science and Technology to develop medium temperature separation and two-stage separation series of circulating fluidized bed boilers
- 1992: The first 35t/h circulating fluidized bed boiler became operational
- 1998: Partnered with the Institute of Engineering Thermophysics and Chinese Academy of Sciences to commit to R&D of a new generation of high-temperature separation circulating fluidized bed boilers

Strong Technical Support

Working closely with domestic and international research institutes, Bosch achieves leading global standards. In the area of clean coal combustion technology and applications, Bosch has achieved an internationally cutting-edge level in terms of circulating fluidized bed boiler on technical R&D platforms and standards. Existing circulating fluidized bed boiler products of Bosch include 6-220 t/h steam boilers and 14-174MW hot-water boilers.

Main Structure and Technical Characteristics

- Whole membrane wall structure
- Water-cooled air distribution plate and water-cooled air chamber
- Volute cyclone separator
- Non-mechanical self-balancing U-type fly ash return device
- Embedded bell-type hood
- Membrane wall bends avoidance structure
- Low position secondary air
- Under-bed hot air fluidized ignition

Summary of Product Advantages

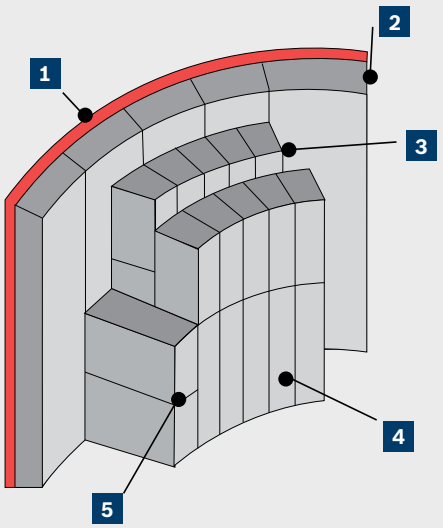
- By using a volute cyclone separator, efficiency of the cyclone separator is increased by 2-5 %. Fuel is highly adaptable with high combustion efficiency
- Reinjection system utilizes quantitative breeze system and refined design for reinjecting air distribution system, making boiler running continuous, stable and safe
- High efficiency separator system can increase limestone utilization rate in obtaining clean and environmentally friendly combustion
- Compact furnace, even temperature field, ample heat exchange and high combustion efficiency
- Optimal selection of separator injection angle, increasing separator efficiency as well as anti-abrasion capability
- Furnace membrane wall uses bends avoidance structure and are jet plated with anti-abrasion materials, increasing the usable lifespan of membrane wall
- Components of the boiler use 3D non-metal expansion joints and metal expansion joints, keeping it clean and tidy
- Innovative exterior design is aesthetically pleasing as well as practical

Effective anti-clogging Measures

- Reasonably allocates the ratio of primary and secondary air, ensures that the primary air volume is higher than the lowest fluidized air-flow, which ensures the furnace fuel is fully fluidized
- Evenly distributed hood and selects reasonable wind speed, thereby ensuring that bed materials are fully fluidized
- Sufficient safety margin between boiler designed operating temperature and fuel softening temperature
- Refined design of return flow air distribution system
- Return flow utilizes quantitative breeze system to achieve smooth reinjection while controlling temperature of reinjecting materials, thereby ensuring that the circulating system does not clog up

Reliable Anti-Abrasion Measures

- Furnace dense phase zone is welded densely with pins and high temperature anti-abrasion castables
- Interface between dense and dilute phase zones utilizes special bends avoidance structure and jet-plated anti-abrasion metal materials
- High efficiency volute cyclone separator is positioned at the furnace outlet, so that the rear heating surface is not bombarded with large fly ash particles
- Separator utilizes highly abrasion resistant bricks and new high temperature abrasion resistant clay with even higher bond ability and strength for construction
- Separator central cylinder is manufactured from anti-abrasion high temperature special materials
- Rear heating surface largely uses an in-line arrangement, using thick-walled pipes along with anti-abrasion tiles, boards and casing
- For convection heating surface, a relatively low flue gas velocity and add anti-abrasion casing is selected



High temperature abrasion resistant structure

1 Outer shell
2 Insulating brick
3 Fire resistant insulating brick
4 Abrasion resistant brick
5 Drag hook brick

Core Components

Volute High Temperature Thermal Insulated Separator

- Volute structure can effectively capture the small particulates in the flue gas with a separation efficiency of up to 99.5%. Fuel is highly adaptable, with high combustion efficiency
- Flue gas enters the separator tangentially, chooses the appropriate separator injection speed, and optimizes the injection angle, reducing abrasion while offering relatively high separation efficiency at the same time
- High efficiency separator system can increase limestone utilization rate, allowing boilers to achieve clean, and environmentally friendly combustion
- Outer shell uses steel plate construction with no heating surface arrangement. Safe, reliable, and easy to maintain

Volute cyclone separator

Fly Ash Reinjection System

- Non-mechanical, self-balancing U-type fly ash reinjection system, automatically balances return flow
- It optimizes air supply to control the temperature of reinjection materials to avoid any clinker formation in reinjection through the feeding chute so boiler operates safely and reliably
- Loose air damper chamber and conveyance chambers are arranged separately so that reinjection system can be easily adjusted
- Refined design of reinjection system air distribution system, increasing the uniformity of return flow, realizing the continuous and stable operation of the return flow device
- Temperature and pressure test points are reasonably arranged, operating adjustments are easy and reliable
- Reinjection pipe uses (non-) metal 3D expansion joints with good sealing properties, leaving the site clean and neat

Reinjection System

Water-cooled Air Distribution Plate and Water-cooled Isobaric Air Chamber

- Membrane water-cooled air distribution plate and isobaric air chamber ensure safe ignition
- Isobaric air chamber, even air distribution
- Membrane wall encapsulates the isobaric air chamber and has good sealing property, leaving the site clean

Water-cooled air distribution plate and water cooled isobaric air chamber

Special Bends Avoidance Structure

- Membrane wall interface of dense and dilute phase zones uses special bends avoidance structure
- Jet-plated special anti-abrasion metal materials
- Fundamentally solves the issue of membrane abrasion

Embedded bell-type hood

- Heat resistant abrasion resistant precision casting steel, with long useful life
- Uniform air distribution, easy to adjust, stable to operate
- Hood and connector pipe are designed separately for ease of replacement
- Bell-type structure, hood does not leak ash during operation

Membrane bends avoidance pipe

CFB Steam Boiler Product Range Offerings

Rated Steam Pressure (MPa)	1.25		1.6		2.5		3.82	5.3	
Nominal steam temperature /°C	Saturation	250	Saturation	350	Saturation	400	450	450	485
Rated Steam Capacity [t/h]									
6	✔	✔	✔						
10	✔	✔	✔	✔					
15	✔	✔	✔	✔					
20	✔	✔	✔	✔	✔	✔	✔		
25	✔	✔	✔	✔	✔	✔	✔		
35	✔	✔	✔	✔	✔	✔	✔	✔	✔
40	✔	✔	✔	✔	✔		✔	✔	✔
45	✔	✔	✔	✔	✔		✔	✔	✔
55	✔	✔	✔	✔	✔		✔	✔	✔
65	✔	✔	✔	✔	✔		✔	✔	✔
75	✔	✔	✔		✔		✔	✔	✔
130							✔	✔	✔
220									✔

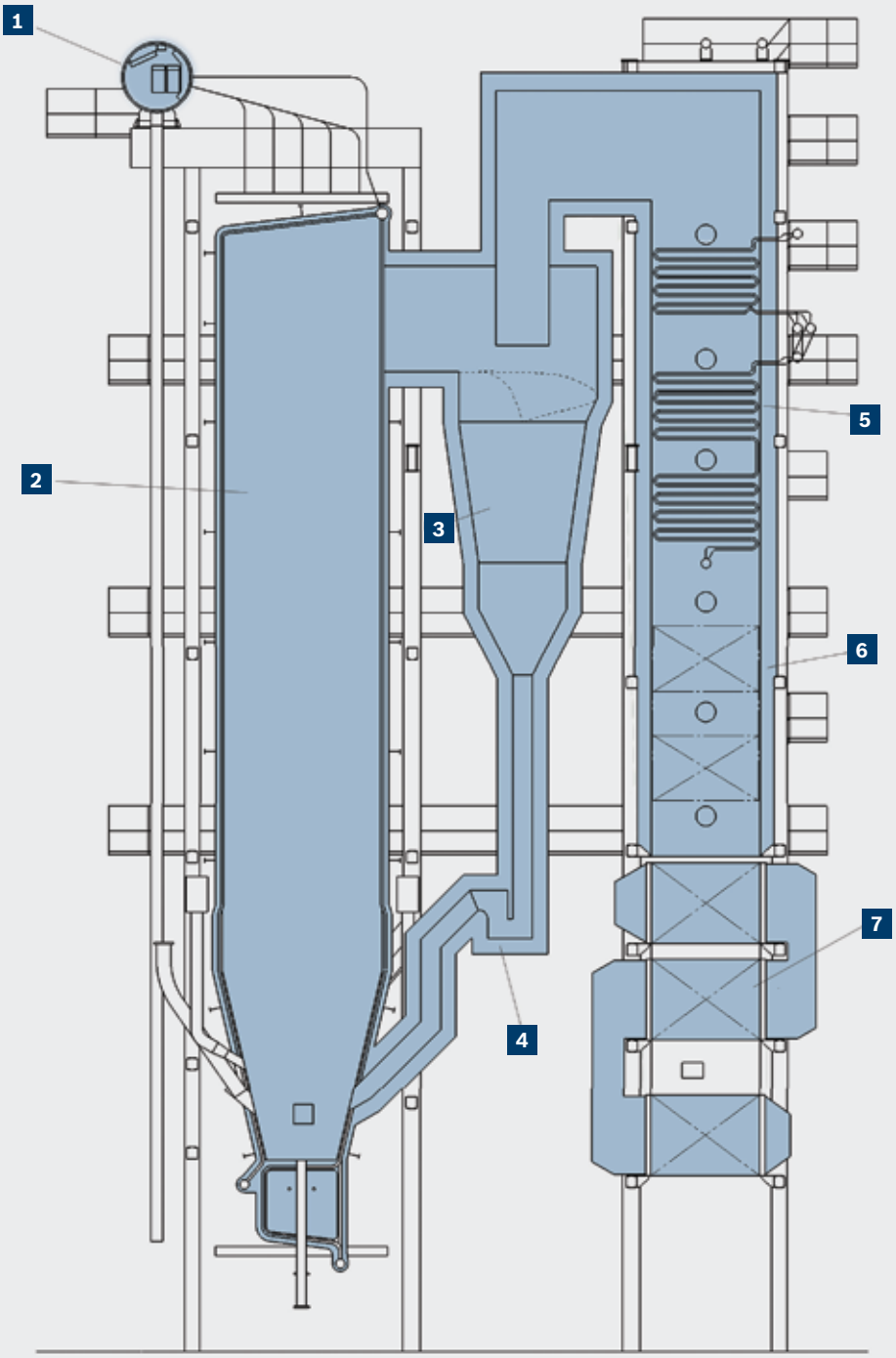
Other capacities and pressures can be supplied on demand.

List of CFB Hot Water Boiler Product Range Offerings

Nominal water outlet pressure (guage pressure) MPa	1.25				1.6	2.5
Nominal water outlet temperature / water inlet temperature /°C	95/70	115/70	130/70	150/90	150/90	180/110
Nominal thermal power (MW)						
14	▷	▶	▷			
29		▷	▶		▷	
46			▶	▷	▶	▷
58			▶	▷	▶	▷
64			▷	▷	▷	▷
70			▶	▷	▶	▷
116					▶	▷
174					▷	▶

Description:

1. Products labeled with ▶ are primary recommendations. Products labeled with ▷ are secondary recommendations. Products with other parameters can also be provided based on specific customer needs
2. Steam boiler water supply temperature falls into two classes: 105°C and 150°C. Must be specified during order confirmation
3. Besides the appropriate over-bed ignition method, a standard under-bed ignition device is also available as an option
4. There are 4 standard coal feeding methods available for selection:
   Screw coal feeder with negative pressure, screw coal feeder with positive pressure, belt coal feeder with negative pressure, and belt coal feeder with positive pressure
5. Boiler flue gas temperature is generally 140-160°C (when not configured with economizer)
6. Boiler efficiency is generally 80-90% (when not configured with high efficiency economizer)
7. Boiler is designed to use coal types including bituminous coal, lean coal, anthracite, lignite, coal gangue, blended coal, and flammable gas mixture
8. Boilers with other technical parameters and designed coal types can be provided based on specifications provided by customers
9. We believe in the continuous improvement of products. Some changes to products may not be reflected. The content in these parameter tables is for reference only



Medium pressure steam boiler product structural diagram

1 Boiler drum
2 Furnace
3 Cyclone separator
4 Reinjection system
5 Superheater
6 Fuel economizer
7 Air pre-heater

High Efficiency Energy Saving Device - Economizer

In order to further reduce energy loss and emissions, Bosch has developed an economizer that is installed behind the main boiler body as an accessory option for users.

The energy saving device utilizes anti-corrosion alloy pipe construction, further reducing the 150°C flue gas emissions from the boiler body. The energy saving device can be used to heat up feed water and condensate, further reducing boiler flue gas temperature to below 120°C. Residual heat from the flue gas is recovered, thereby further increasing boiler thermal efficiency.

Energy Saving Device Product Features

- Advanced heat transfer technology – high quality heat exchange components, highly efficient heat transfer coefficient
- Reliable anti-corrosion measures – controls dew point temperature, uses corrosion-resistant alloy materials
- High efficiency residual heat recovery – further reduces boiler flue gas temperature to ~120°C
- Significant energy saving gains – cuts down on fuel consumption and lowers operating costs

Energy Saving Device Benefits Analysis Using 35 t/h Boiler as an Example

After the energy saving device is added to the boiler, flue gas temperature is lowered, and boiler thermal efficiency rises from 86% to 88%. 0.16t of coal can be saved per hour

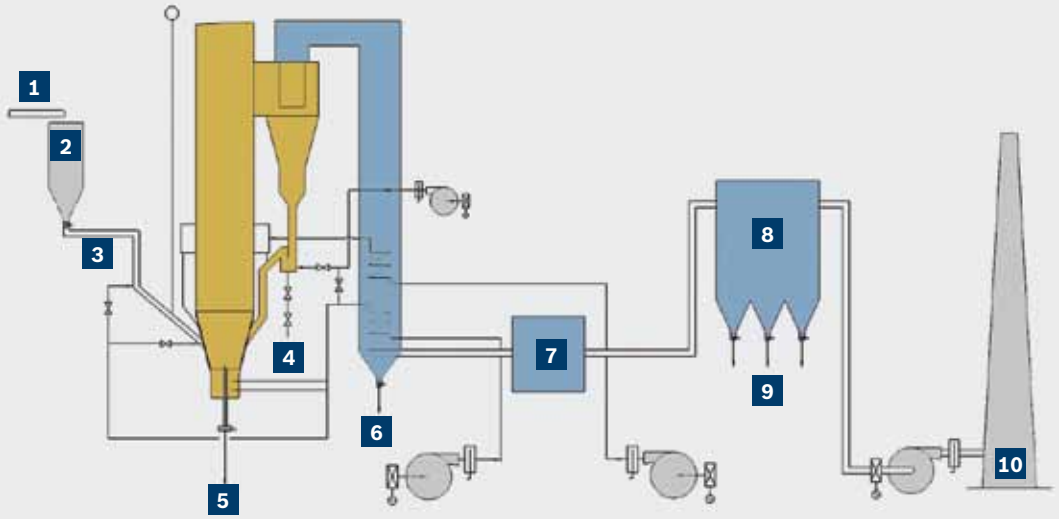
Parameter	No energy saving device	With energy saving device
Flue gas temperature °C	150	120
Operating efficiency %	86	88
Fuel consumption [kg/h] (thermal value 4,000kcal/kg)	7052	6892
Annual coal savings (tons) (annual operation of 8,000 hours)	0	1,280
Annual monetary savings (TEuro) (coal price of 76.34 Euro/ton)	0	97.7

After adding the energy saving device, the investment cost for the device can be recouped within a short time. Calculated according to annual operation of 8,000 hours, the device can lead to saving 1,280 tons of coal and 97,715 Euro per year. The economic benefits are clear.

Energy saving device utilizes alloy materials and is corrosion and abrasion resistant. Maintenance and repair costs are also relatively low.

System Package Capabilities and Advantages

- We make a long-term commitment to serving customers with high quality energy saving and environmentally friendly boiler products
- System package projects utilize advanced, internationally accepted modern project management models and thermal system devices and also feature excellent service. With cascading boiler system as well as small-and-medium size operation and management, these system packages achieve maximal client satisfaction. A qualified thermal power plant general contractor.



1 Coal
2 Coal bunker
3 Coal feeder
4 Circulating ash discharge
5 Furnace slag
6 Fly ash
7 Energy saving device
8 Dust separator
9 Fly ash
10 Stack

Project Examples

130 t/h circulating fluidized bed boiler

75 t/h circulating fluidized bed boiler

35 t/h circulating fluidized bed boiler
water cooled air distribution

Service Motivates Action

Service breakdown mean high costs. Do you need fast, professional assistance when they occur? When upgrading existing systems, do you need support? Bosch Thermotechnology will always be standing by to provide you with highly efficient, safe, and professional first class service.

Always Standing-by: First Rate Service

Thanks to our carefully cultivated regional service network, we can guarantee the fastest possible reaction times. Besides maintenance service, service breakdow, and repair, we also provide regular inspection support for systems. Should you be uncertain about whether or not your system is still at the cutting edge and whether or not it is still operating at high efficiency, we are also very happy to assist you. We will analyze your system, and if necessary, can also upgrade it.

During normal working hours, you can contact local customer service engineers directly with the specific contact information available on the cover of the switch cabinet of your boiler system. We are committed to providing service to individual clients, and contacting the local customer service engineer directly can save you a significant amount of valuable time.

We will provide professional, reasonable suggestions over the phone in response to your questions or arrange for customer service engineers to analyze the problem, thereby creating an optimal solution.

A Reliable Spare Parts Supply

You can make immediate spare parts orders through our local sales office. Even for spare parts of older models that have been in service for many years, Bosch will provide you with sufficient inventory.

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