

## Steam boilers and waste heat boilers



Heating systems  
**Industrial systems** ◀  
Refrigeration systems

**VIESSMANN**

## System solutions for cost effective steam generation

Energy efficient and clean provision of steam in conjunction with high levels of operational safety and system reliability are essential requirements for production facilities and industrial plants. In order to design boiler house concepts appropriate for the task in hand, individual requirements must first be established so that tailor-made system solutions can be developed. This requires expert advice, a comprehensive range of services and steam boilers with characteristics that allow cost effective and futureproof steam generation.

Due to their design and configuration, Vitomax industrial/commercial boilers are best placed to meet individual customer requirements in a broad range of applications. Thanks to certain design features particular to the Vitomax boilers, as well as our extensive experience in building large industrial/commercial boilers, we are able to ensure outstanding quality, high levels of operational reliability and a long service life.

Experts from our industrial boiler team cooperate with their local partners in developing economical and futureproof solutions based on your individual plans. Design in accordance with the Pressure Equipment Directive and country-specific regulations takes into account all requirements and safety regulations for every piece of equipment – from the initial concept through to commissioning.

The comprehensive product range from Viessmann includes low pressure and high pressure steam boilers up to 26 t/h as well as waste heat boilers. The flame tube/smoke tube design with low combustion chamber loading, the internal water-cooled reversing chambers and the water-cooled burner opening without refractory linings ensure clean combustion of oil and gas with all conventional, commercially available, advanced burner systems. The design selected for you, into which a number of patents and components with design protection have been integrated, guarantees the highest level of efficiency at all times.

Viessmann industrial/commercial boiler technology means perfectly coordinated system design. This includes:

- Control and monitoring systems
- Instrumentation & control technology
- Combustion systems with fuel supply
- Water treatment
- Feedwater tank with thermal deaeration
- Pipeline systems and flue systems
- Heat recovery systems
- Water analysis





## About this brochure

Anyone searching for a new steam boiler or waste heat boiler for the purpose of modernisation or new build needs comprehensive information. Obtain an overview of the potential solutions and the innovative products and services from Viessmann.



### Introduction

from page 6

The energy saving potential for operators of steam boilers and waste heat boilers is substantial. Take a closer look and find out which solution is best suited to your needs.



### In detail

from page 8

Here you can find information on the Viessmann oil/gas, low/high pressure steam boilers and waste heat boilers.



### System technology, accessories, services

from page 28

Read more about the comprehensive range of accessories for steam boilers and waste heat boilers, engineering aids, training courses and customer service.



### Manufacturing quality

from page 40

Advanced design and production methods ensure high quality.



### Powerful references

from page 42

Top technology from Viessmann in prime locations.



### Wood combustion systems

from page 44

Viessmann Holzfeuerungsanlagen GmbH supplies the Vitoflex 300-FSB and Vitoflex 300-FSR wood fired high pressure steam boilers.



## Saving energy and protecting the climate

Viessmann is well aware of its responsibilities for protecting the environment and conserving natural resources. Our company philosophy and products have been constructed with this duty in mind.



"Nothing is so good that it cannot be improved." This motto is reflected in Viessmann company principles. In this industry, Viessmann can rightfully claim to be the leader in quality and technology, and as such, aims to continually set new standards.

This applies in particular to our product range, which is closely geared towards significantly lowering the consumption of fossil fuels and gradually replacing them with sustainable sources of energy.

At around 40 percent, the heating market actually accounts for the largest proportion of energy consumption. The rest is shared by "goods transport", "personal transport" and "power". These values can also be applied approximately to other industrial countries. Rising energy costs mean that the emphasis is on reducing the consumption of fossil fuels as quickly as possible.

### Steam boilers and waste heat boilers

Steam is used in many industrial processes as an energy source and as a medium for carrying chemical substances.

Typical application areas include the paper and building material industry, refineries, the pharmaceutical industry and the food processing industry. Steam drives turbines for the generation of power, vulcanises rubber products and sterilises packaging.

The generation of steam for industrial purposes and its "handling" differ significantly in some points from conventional heat generation in heating technology using water as the heat transfer medium. In particular, high pressure steam generation in the higher output range requires special equipment for the systems concerned.

Viessmann provides efficient and energy saving heating systems for oil and gas in the medium-sized and industrial/commercial boiler segment. Renewable energy systems, such as solar, biomass, air and geothermal heat, complete the comprehensive product range.

## Low pressure steam boiler



### **VITOPLEX 100-LS**

Type SXD

#### **Oil/gas low pressure steam boiler**

0.26 to 2.2 t/h

0.5 (1) bar

Efficiency: 91 %

## High pressure steam boilers



### **VITOMAX 300-HS**

Type M93A

High pressure steam boiler

1 to 4 t/h

Up to 25 bar (28, 30 bar on request)

Efficiency: over 95.5 %

(with integral economiser)



### **VITOMAX 300-HS**

Type M95A

High pressure steam boiler

5 to 26 t/h

Up to 25 bar (28, 30 bar on request)

Efficiency: over 95.5 %

(with integral economiser)





**VITOMAX 200-HS**  
Type M73A

High pressure steam boiler  
0.5 to 4 t/h  
Up to 25 bar (28, 30 bar on request)  
Efficiency: up to 95.5 %  
(with integral economiser)



**VITOMAX 200-HS**  
Type M75A

High pressure steam boiler  
5 to 26 t/h  
Up to 25 bar (28, 30 bar on request)  
Efficiency: up to 95.5 %  
(with integral economiser)



**VITOMAX 100-HS**  
Type M33A

High pressure steam boiler  
1 to 6.4 t/h  
Up to 16 bar  
Efficiency: 92 %  
(with economiser)

## Waste heat boilers



**VITOMAX 200-RW**

Waste heat boiler for generating hot water

**VITOMAX 200-RS**

Waste heat boiler for generating steam

Low pressure  
steam boiler

Vitoplex 100-LS



## VITOPLEX 100-LS

Low pressure steam boilers for new build and modernisation in commercial premises and industrial facilities

The output ranges of Vitoplex 100-LS low pressure steam boilers meet the requirements for air conditioning and heating technology in commercial nurseries and businesses, such as laundries and bakeries.

The Vitoplex 100-LS is a three-pass boiler with low combustion chamber loading. This means conditions are just right for clean combustion with low nitrogen oxide emissions.



### **VITOPLEX 100-LS**

Type SXD

Low pressure steam boiler

0.26 to 2.2 t/h

0.5 (1) bar

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## Low pressure steam boiler

## Vitoplex 100-LS 0.26 to 2.2 t/h

The Vitoplex 100-LS is a compact three-pass boiler for generating low pressure steam in the output range between 0.26 and 2.2 t/h. This boiler is designed for a permissible operating pressure of 1 bar (high pressure). Subject to requirements, the operating pressure can be reduced to 0.5 bar (low pressure). The output range of the Vitoplex 100-LS meets the requirements for air conditioning and heating technology in commercial nurseries and businesses, such as laundries, where low steam pressures are required. The design of this boiler has been tried and tested in thousands of applications.

Excellent natural circulation and reliable heat transfer are ensured by the large water capacity in conjunction with long distances between the hot gas pipes and large clearances between inbuilt parts and the boiler shell. These features combine to bring about high operational reliability and a long service life.

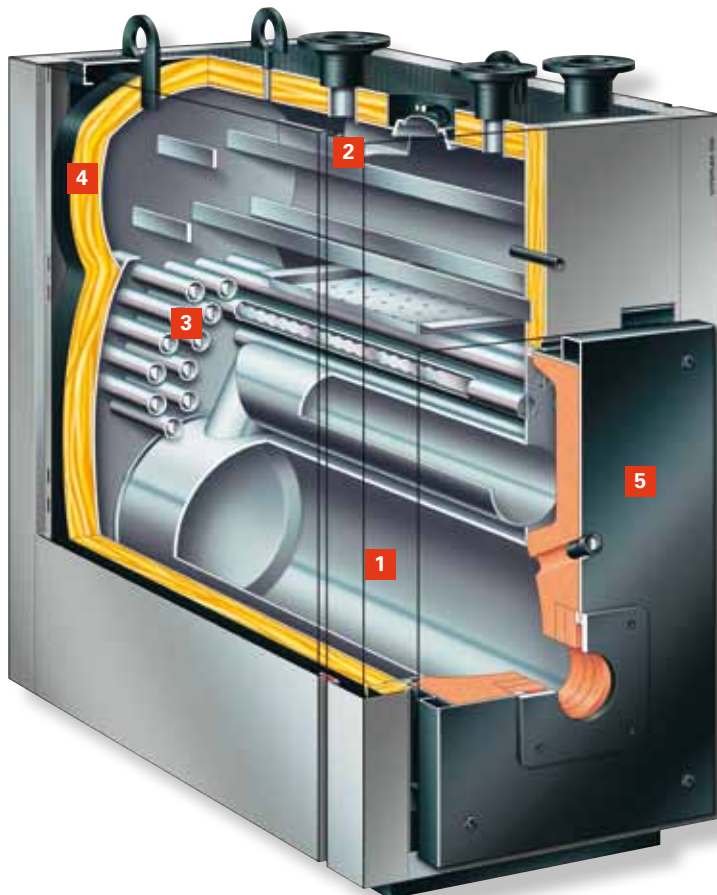
The low material loading through the completely water-cooled rear reversing chamber and the absence of refractory linings result in an extremely low stress boiler construction.

### High steam quality

The versatility of the boiler in the event of load fluctuations brought about by the large water capacity is judged to be extremely positive. Thanks to the boiler design, residual moisture in the steam is prevented, even in the event of sudden or high steam demand, and high quality steam is made available continuously. The large steam chamber, with a correspondingly large evaporator and integral steam drier, supports the versatile characteristics of this boiler.

### Clean combustion

The very low combustion chamber volume loading in conjunction with the three-pass design enable this boiler to comply with even the strictest of emission limits.



### Vitoplex 100-LS

Type SXD

- 1 Generously proportioned flame tube for clean combustion
- 2 Integral steam drier
- 3 Optimum expansion clearances between the pipes themselves and between the pipes and the boiler shell for a long service life
- 4 Highly effective thermal insulation with sheet steel casing
- 5 The hinged boiler door facilitates cleaning and maintenance of the boiler





System with one Vitoplex 100-LS low pressure steam boiler and two Vitoplex hot water boilers



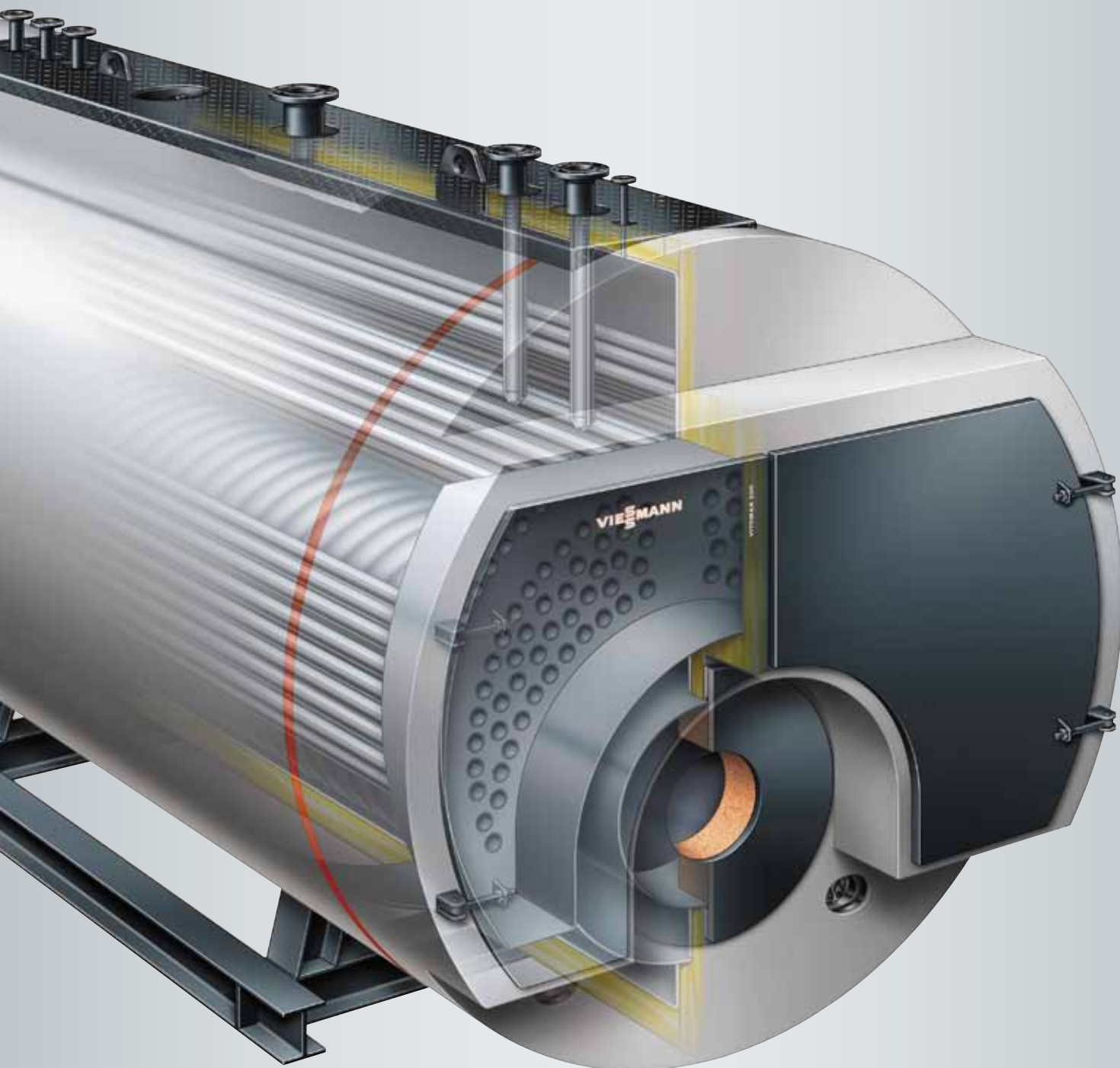
Safety fittings of the Vitoplex 100-LS

#### Take advantage of these benefits:

- Low pressure steam boiler with steam output from 0.26 to 2.2 t/h
- Economical energy consumption – boiler efficiency: 91 %
- Three-pass boiler with low combustion chamber loading, resulting in clean combustion with low emissions
- Large steam chamber and large evaporator increase the steam quality
- Low heat losses due to thermal insulation of the entire boiler body
- Connectors for mounting necessary instrumentation, control and safety fittings
- Extensive range of matching accessories available
- With load bearing boiler cover – for easier installation and maintenance
- Thousands of boilers in long term use

High pressure  
steam boilers

Vitomax 300-HS  
Vitomax 200-HS  
Vitomax 100-HS  
0.5 to 26 t/h



# VITOMAX 300-HS

# VITOMAX 200-HS

# VITOMAX 100-HS

High pressure steam boilers are designed for the generation of saturated or superheated steam.

The Vitomax-HS boilers are high pressure steam boilers that comply with category IV of the Pressure Equipment Directive 97/23/EC, with a permissible operating pressure of 6 to 25 bar. As early as the development phase for the steam boilers, our engineers collaborated closely with globally represented burner manufacturers. The result is three boiler types in this series that offer minimum emissions and a high degree of flexibility:

## ■ Vitomax 300-HS

### (type M93A and type M95A)

Thanks to 3-pass technology and its generously proportioned combustion chamber, this boiler complies with the most stringent emission requirements.

## ■ Vitomax 200-HS (type M73A)

A classic boiler design with the flame tube arranged on the side.

## ■ Vitomax 200-HS (type M75A)

A classic boiler design. The flame tube is arranged centrally, offset slightly downwards; the hot gas flues of the second and third passes are arranged symmetrically above.

## ■ Vitomax 100-HS (type M33A)

A steam boiler employing the reversing flame principle for typical applications, such as laundries, the meat processing industry, etc.

For the generation of superheated steam, a superheater is integrated into boiler types M95A and M75A between the second and the third pass, above the front reversing chamber. This allows temperatures above saturation pressure to be achieved.



## VITOMAX 300-HS

High pressure steam boiler  
Type M93A  
1 to 4 t/h  
Up to 25 bar  
(28, 30 bar on request)

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## VITOMAX 300-HS

High pressure steam boiler  
Type M95A  
5 to 26 t/h  
Up to 25 bar  
(28, 30 bar on request)

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## VITOMAX 200-HS

High pressure steam boiler  
Type M73A  
0.5 to 4 t/h  
Up to 25 bar  
(28, 30 bar on request)

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## VITOMAX 200-HS

High pressure steam boiler  
Type M75A  
5 to 26 t/h  
Up to 25 bar  
(28, 30 bar on request)

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## VITOMAX 100-HS

High pressure steam boiler  
Type M33A  
1 to 6.4 t/h  
Up to 16 bar

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Vitomax 300-HS (type M93A and type M95A) high pressure steam boilers satisfy all of the latest legal requirements for combustion with particularly low emissions. The efficiency of these boilers is over 95.5 percent, even at 100 percent load.

Irrespective of the fuel used, the Vitomax 300-HS, type M95A delivers an output of up to 26 tonnes of steam per hour. It has been designed especially for manufacturing industries, where large amounts of steam are constantly required. Thanks to its large evaporator, high steam quality with low residual moisture is a key feature. The Vitomax 300-HS can be operated very flexibly with light or heavy fuel oil, bio-oil or even (bio) natural gas.

#### **Low NO<sub>x</sub> levels and high efficiency**

Due to their special design, Vitomax boilers need not be fitted with refractory linings for the installation of the burners. This guarantees a constant temperature around the burner head, with low NO<sub>x</sub> levels – the otherwise usual reflection from a refractory lining does not occur. The burner entry point and the rear flue gas reversing chamber of the Vitomax 300-HS are water-cooled, so the energy in the flue gases is used exclusively for steam generation.

#### **Long term boiler operation**

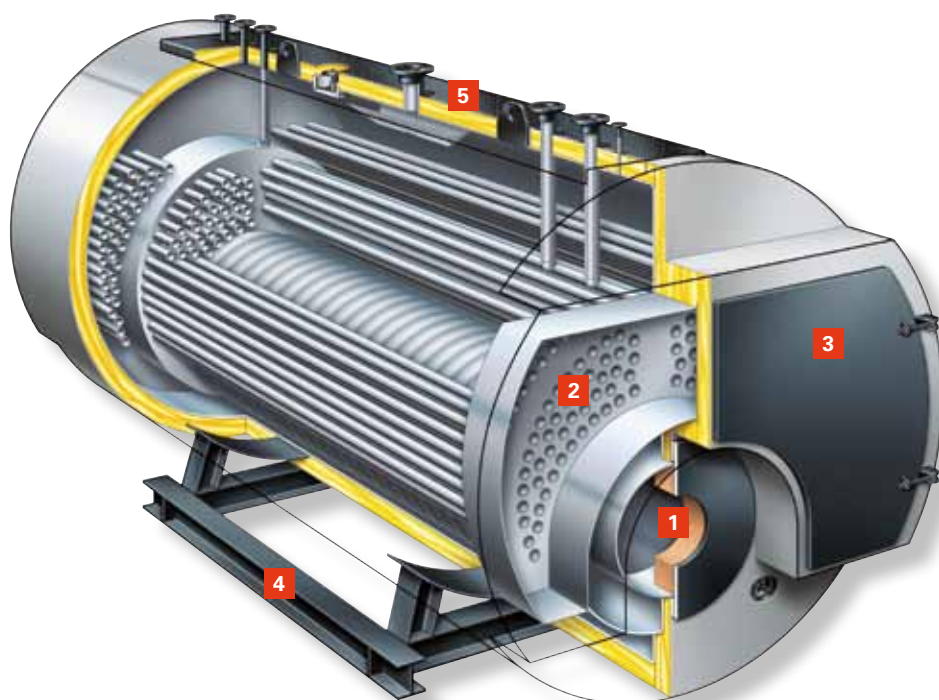
The spacing between the smoke tubes, as well as from the smoke tubes to the boiler shell and to the flame tube, are in compliance with statutory requirements. The shearing force on the end face flanges caused by different linear expansion in the smoke tubes and the flame tube is therefore extremely low. This design guarantees a long service life for the Vitomax 300-HS.

#### **Particularly easy to service and maintain**

Just like all other Vitomax boilers, the Vitomax 300-HS is equipped with sufficient inspection and access ports for carrying out important checks inside the boiler. As a result, Vitomax high pressure boilers achieve the longest possible inspection intervals. Easy-to-open boiler doors and a cleaning door at the end of the boiler also ensure that maintenance is simple and contribute to low operating costs.

#### **Flexible application**

Customer-specific requirements can be taken into consideration in the design of boilers in this series.

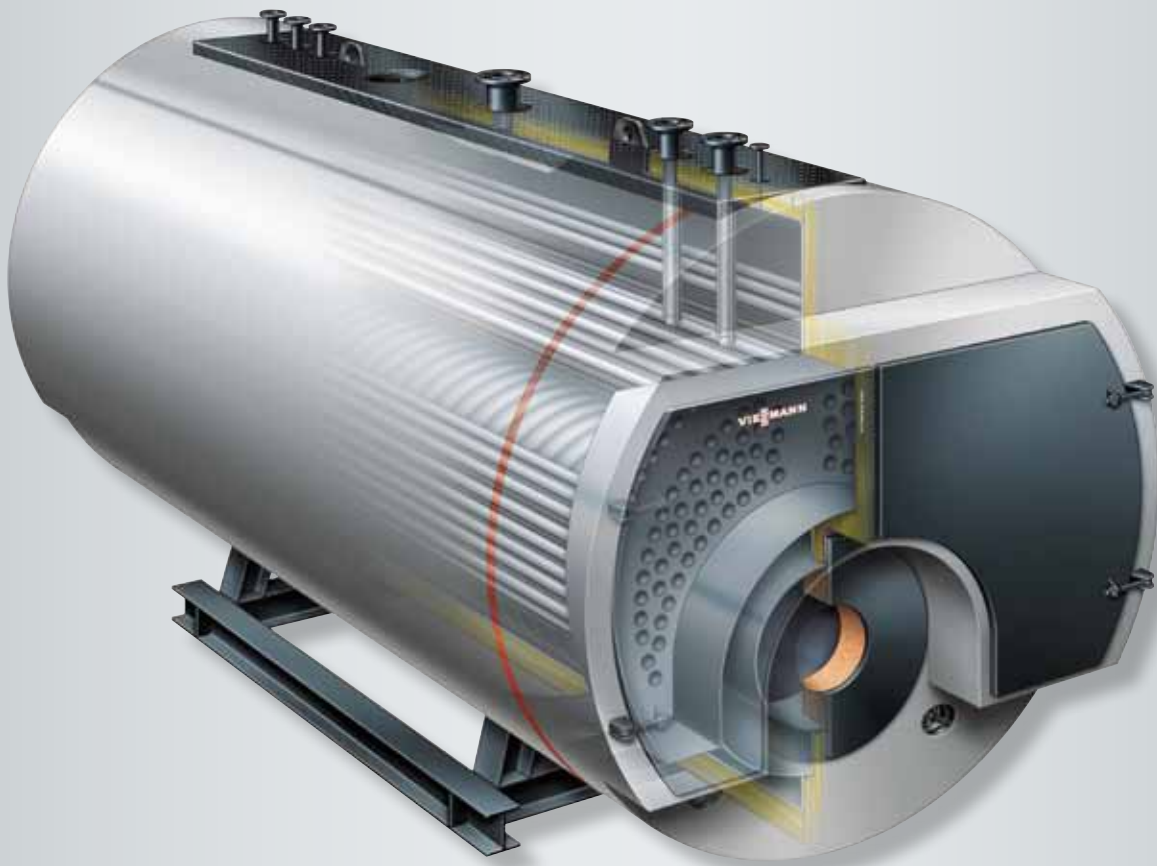


#### **Vitomax 300-HS**

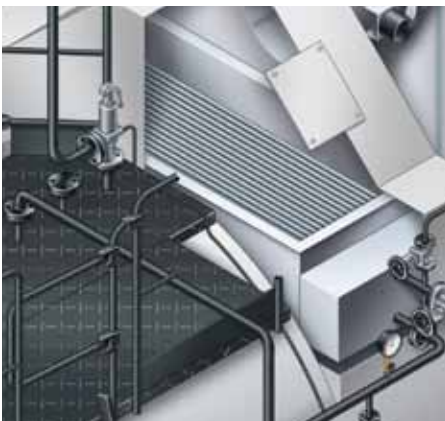
Type M93A and M95A

- 1 Water-cooled burner entry point with large combustion chamber to the rear
- 2 Optimum expansion clearances
- 3 Hinged, lightweight cleaning doors without refractory linings facilitate cleaning and maintenance
- 4 Stable base frame with longitudinal supports that can be lengthened according to requirements
- 5 Load bearing cover





Vitomax 300-HS (type M95A) high pressure steam boiler



View of the integral economiser in a steam boiler

**Take advantage of these benefits:**

- Vitomax 300-HS (type M93A and type M95A) high pressure steam boilers
- Output: 1 to 26 t/h, irrespective of fuel type
- Pressure levels: 6, 8, 10, 13, 16, 18, 20, 22, 25 bar
- Fuel: Fuel oil (HEL), NO<sub>x</sub> emissions (< 150 mg/m<sup>3</sup> flue gas)  
heavy fuel oil, mazut 100,  
natural gas, NO<sub>x</sub> emissions(< 70 mg/m<sup>3</sup> flue gas)
- 3-pass steel boiler without refractory lining
- Dry reversing chamber at the front; rear reversing chamber completely surrounded by water
- High efficiency in excess of 95.5 %
- 120 mm thermal insulation
- Appropriately sized steam chamber with low steam chamber loading
- Integral steam drier for high steam quality
- Corner stays arranged in pairs reduce stress in the boiler
- Generously sized flame tubes for clean combustion
- Longest possible inspection intervals
- Easy to service due to sufficient inspection and access ports
- Use in manufacturing industries such as food processing, fertiliser production, construction materials, paper, beverages, chemical and pharmaceutical industries, hospitals and refineries

## High pressure steam boilers

## Vitomax 200-HS 0.5 to 4 t/h



Economiser fitted on  
a Vitomax 200-HS

With the Vitomax 200-HS (type M73A) high pressure steam boiler, Viessmann meets the requirements for efficient steam generation. The permissible operating pressure ranges from 6 to 30 bar. The output range extends from 0.5 to 4 tonnes of steam per hour.

The Vitomax 200-HS is used in manufacturing industries such as food processing, fertiliser production, construction materials, paper, beverages, chemical and pharmaceutical industries, hospitals and refineries. The high pressure steam boiler can be operated with light fuel oil (HEL), LPG or (bio) natural gas.

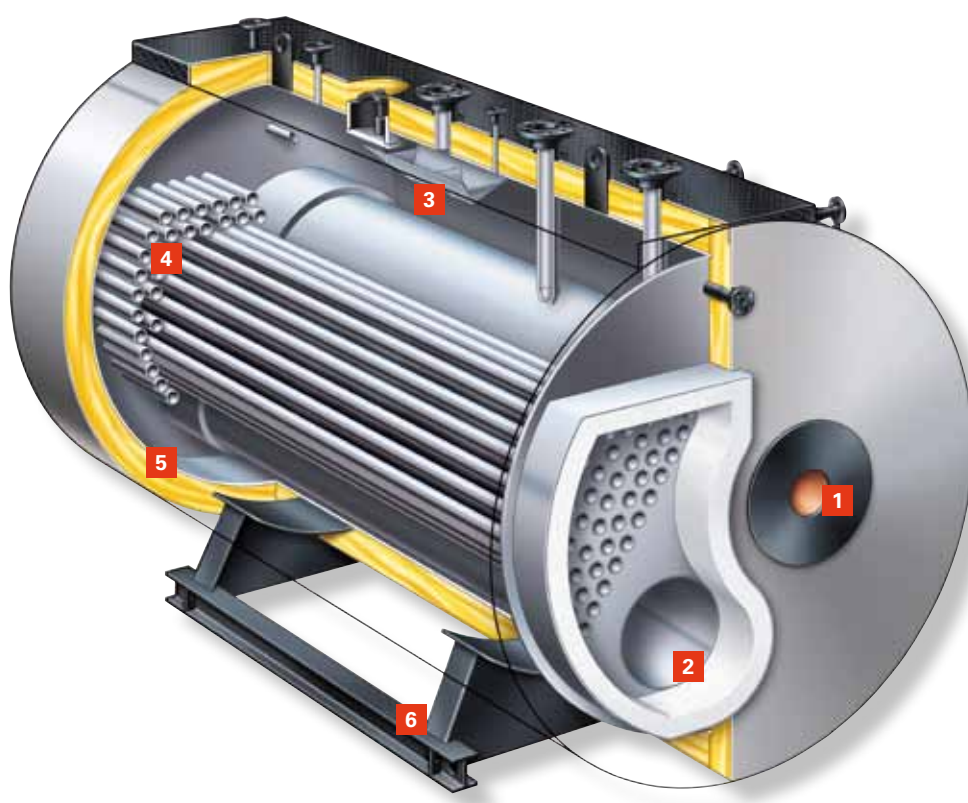
### Reliable design

The spacing between the smoke tubes, as well as from the smoke tubes to the boiler shell and to the flame tube, are in compliance with statutory requirements. The shearing force on the end face flanges caused by different linear expansion in the smoke tubes and the flame tube is therefore extremely low, guaranteeing a long service life for these steam boilers.

The corner stays of the boiler are always arranged in pairs. As a result, the forces are distributed, reducing the stress in the boiler and increasing the service life. In every case, the values lie well below the limits permitted by the FDBR trade association.

### Flexible application

Customer-specific requirements can be taken into consideration in the design of boilers in this series.



### Vitomax 200-HS

Type M73A

- 1 Flame tube with water-cooled burner entry point
- 2 Front flue gas end chamber
- 3 Steam drier
- 4 Optimally sized pipe spacing to reduce stress
- 5 120 mm thermal insulation with sheet steel casing
- 6 Stable base frame (I-beam supports as option)



Vitomax 200-HS high pressure steam boiler



Vitomax 200-HS steam boiler with downstream economiser

#### Take advantage of these benefits:

- High pressure steam boiler with steam output from 0.5 to 4 t/h
- Three-pass boiler – clean combustion with low nitrogen oxide emissions
- Unaffected by load fluctuations
- High steam quality due to large steam chamber, large evaporator and integral steam drier
- Frugal energy consumption
- Low radiation losses due to 120 mm composite thermal insulation and water-cooled burner entry point
- Low pressure drop on the hot gas side through convection heating surfaces with large hot gas pipes
- Load bearing boiler cover on top of the boiler included in the standard delivery – simplifies installation and maintenance and protects the thermal insulation against damage – extendible to platform
- Robust base frame makes boiler foundations superfluous
- Large selection of matching accessories simplifies system integration
- Approval to European Pressure Equipment Directive 97/23/EC and specific national regulations. By exceeding the minimum requirements set out in the FDBR guidelines, Viessmann boilers achieve the longest permissible inspection intervals



The Vitomax 200-HS high pressure steam boiler meets all current requirements for advanced steam boilers. With the optional integral economiser and associated system technology, the steam boiler utilises fuel with particular efficiency.

#### Clean combustion

Operation of the three-pass boiler is environmentally responsible with clean combustion throughout the entire output range. A defined and constant temperature where the flame is created supports stable flame formation and reduces  $\text{NO}_x$  formation.

#### High steam quality

A refractory lining is not required, since both the burner entry point and the rear reversing chamber on the flue gas side are fully water-cooled. This results in all the generated heat being used completely for steam generation. A high steam quality with low residual moisture is generated in the steam chamber with its large evaporator. The burner is inserted through a water-cooled jacket.

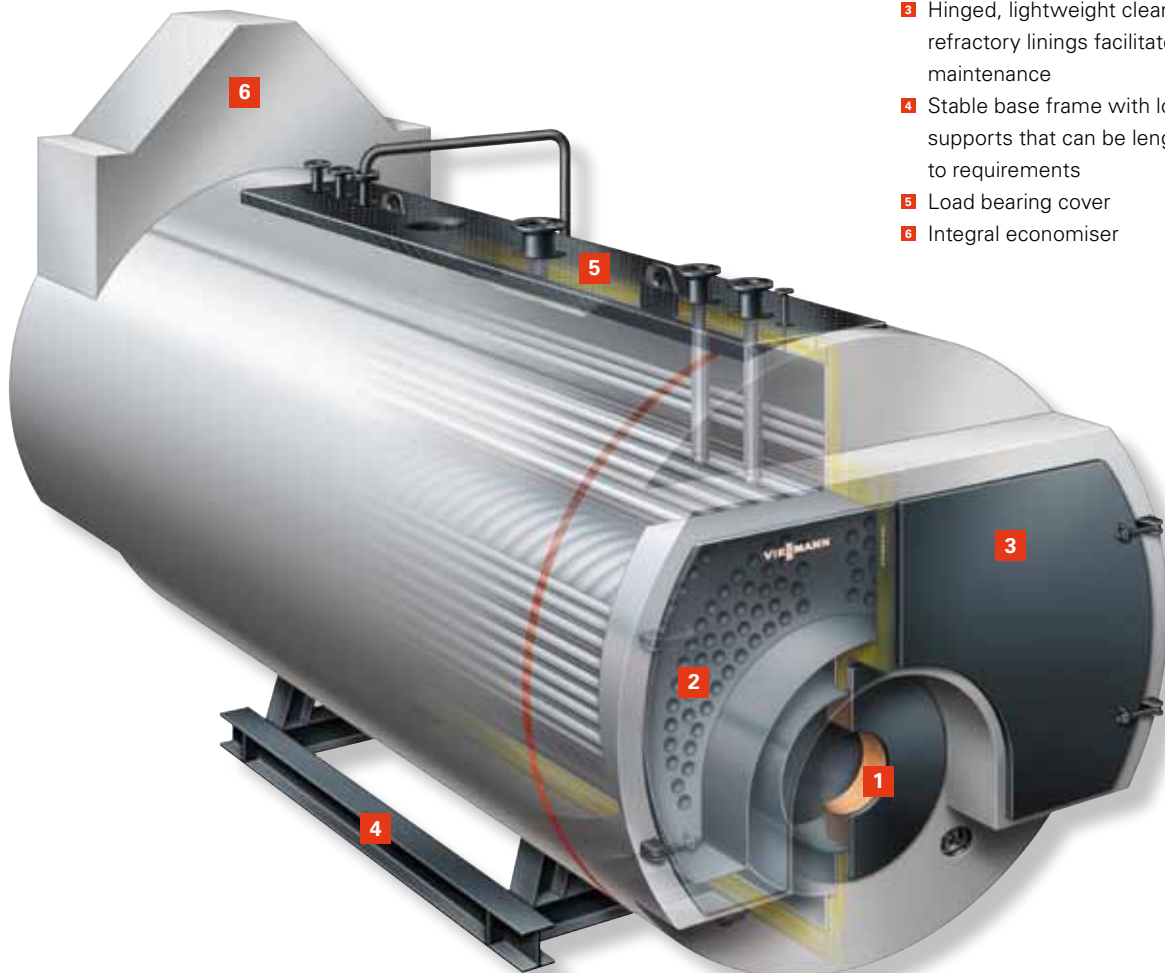
#### Flexible application

Customer-specific requirements can be taken into consideration in the design of boilers in this series.

#### Vitomax 200-HS

Type M75A

- 1 Water-cooled burner entry point for consistently low emissions
- 2 Front flue gas reversing chamber
- 3 Hinged, lightweight cleaning doors without refractory linings facilitate cleaning and maintenance
- 4 Stable base frame with longitudinal supports that can be lengthened according to requirements
- 5 Load bearing cover
- 6 Integral economiser







Special version of the Vitomax 200-HS steam boiler for burning animal fat



Vitomax 200-HS steam boiler with superheater

#### Take advantage of these benefits:

- High pressure steam boiler with steam output from 5 to 26 t/h
- Three-pass boiler with and without economiser
- Permissible operating pressure 6 to 25 bar (up to 30 bar on request)
- Boiler support in the form of an open steel beam construction (I-beam)
- New optimised arrangement of connectors (water level indicator, TDS electrode)
- Manostat support on the boiler side
- Integral economiser can also be fitted and welded on site if required
- Two dewatering connectors on the flue gas collector form part of the standard delivery
- Load bearing boiler cover for installation and maintenance supplied as standard; extendible to platform
- Greatest flexibility due to customer-specific design
- Approval to European Pressure Equipment Directive 97/23/EC and TRD regulations, in conjunction with [German] trade association agreements

The attractively priced Vitomax 100-HS can be employed in production industries, such as the meat processing industry, laundries, hospitals, the beverage industry (small breweries, dairies) and small scale industrial concerns. It is the ideal boiler "for everyone who simply needs steam". The high pressure steam boiler can be operated with light fuel oil (HEL), LPG, natural gas or biogas.

The permissible operating pressure ranges from 6 to 16 bar. The output range extends from 1 to 6.4 tonnes of steam per hour. Efficiency of over 92 percent is possible with the integral economiser.

#### Reliable design

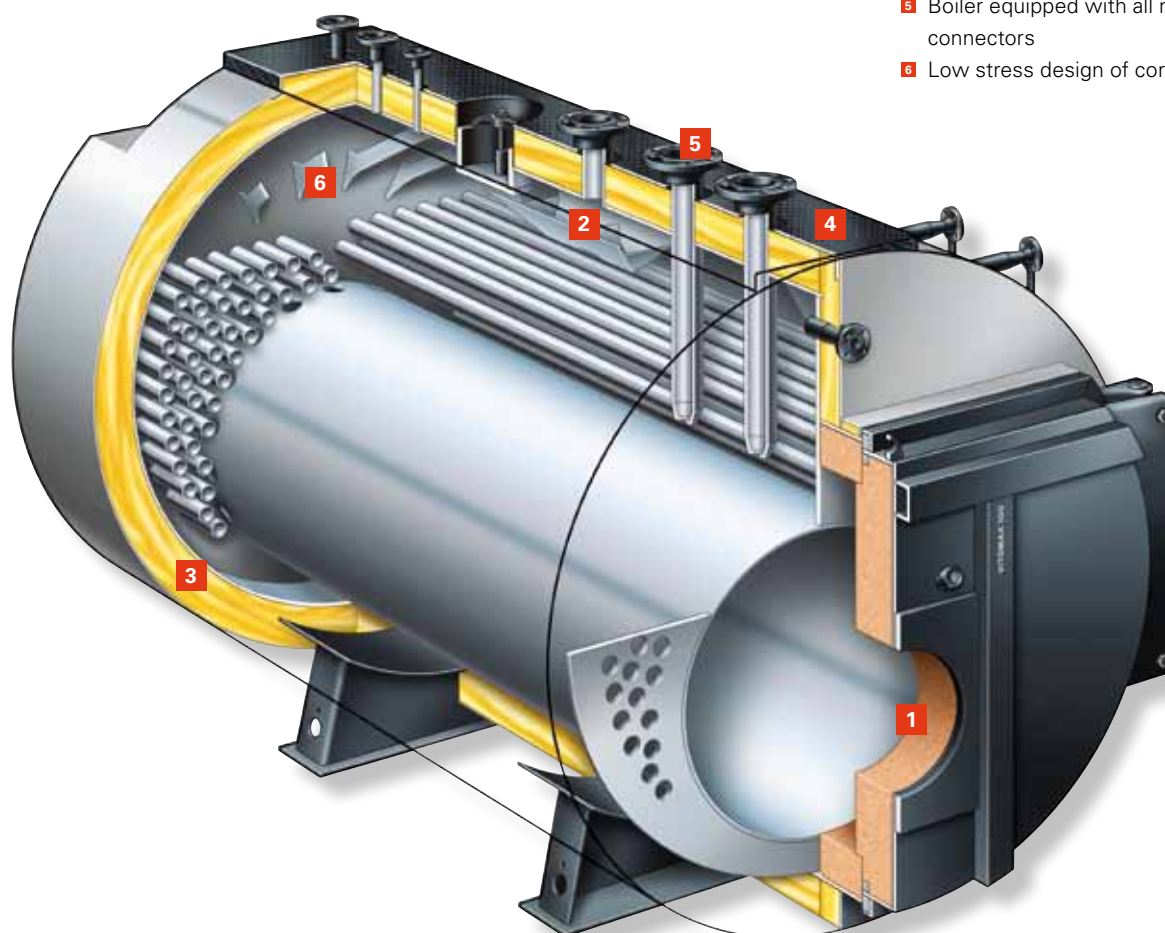
The spacing between the smoke tubes, as well as from the smoke tubes to the boiler shell and to the flame tube, are in compliance with statutory requirements. The shearing force on the end face flanges caused by different linear expansion in the smoke tubes and the flame tube is therefore extremely low, guaranteeing a long service life for these steam boilers.

The corner stays of the boiler are always arranged in pairs. As a result, the forces are distributed throughout the boiler, reducing stress and increasing the service life. In every case, the values lie well below the limits permitted by the FDBR trade association.

#### Vitomax 100-HS

Type M33A

- 1 Burner entry point with flame tube to the rear
- 2 Steam drier
- 3 Generous thermal insulation (120 mm)
- 4 Load bearing boiler cover (as option available in the form of a platform)
- 5 Boiler equipped with all necessary connectors
- 6 Low stress design of corner stays





Vitomax 100-HS high pressure steam boiler



Downstream economiser

#### Take advantage of these benefits:

- High pressure steam boiler with steam output from 1 to 6.4 t/h, irrespective of the fuel type
- Pressure levels: 6, 8, 10, 13, 16 bar
- Reverse flame boiler without refractory lining
- Efficiency over 92 % (with economiser)
- Water-cooled flame tube mounting
- 120 mm thermal insulation
- Flame tube in the form of a smooth or corrugated pipe depending on pressure level
- Generously sized flame tubes for clean combustion
- Optimally sized steam chamber with low steam chamber loading
- Integral steam drier for high steam quality
- Corner stays arranged in pairs reduce stress in the boiler
- Longest possible inspection intervals due to low stress design
- Easy to service due to numerous inspection and access ports
- Use in production industries such as the meat processing industry, laundries, hospitals, the beverage industry (small breweries, dairies) and small scale industrial concerns



High pressure  
waste heat boiler

Vitomax 200-RS





## VITOMAX 200-RS

High pressure waste heat boiler for the generation of high pressure hot water or high pressure steam.

Waste heat boilers utilise the heat in flue gases from combustion processes or hot waste air flows from industrial processes to generate hot water or saturated steam.

Due to economic and legislative considerations, waste heat boilers are frequently used in conjunction with gas turbines and combined heat and power units. The impact of rising energy costs, however, has also led to increased use of waste heat boilers to exploit the waste heat generated by industrial processes.

There are two different types of Viessmann waste heat boiler:

- **Waste heat boilers without additional combustion**

Here, only the flue gases/waste air flows are used for generating hot water or saturated steam.

- **Hot water or steam boilers with waste heat utilisation**

These are conventionally fired boilers that make additional use of waste heat.

The boiler should be selected according to the conditions under which it will be used.



### VITOMAX 200-RS

Waste heat boiler for generating steam without additional combustion

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### VITOMAX 200-RS

Waste heat boiler for generating steam with additional combustion

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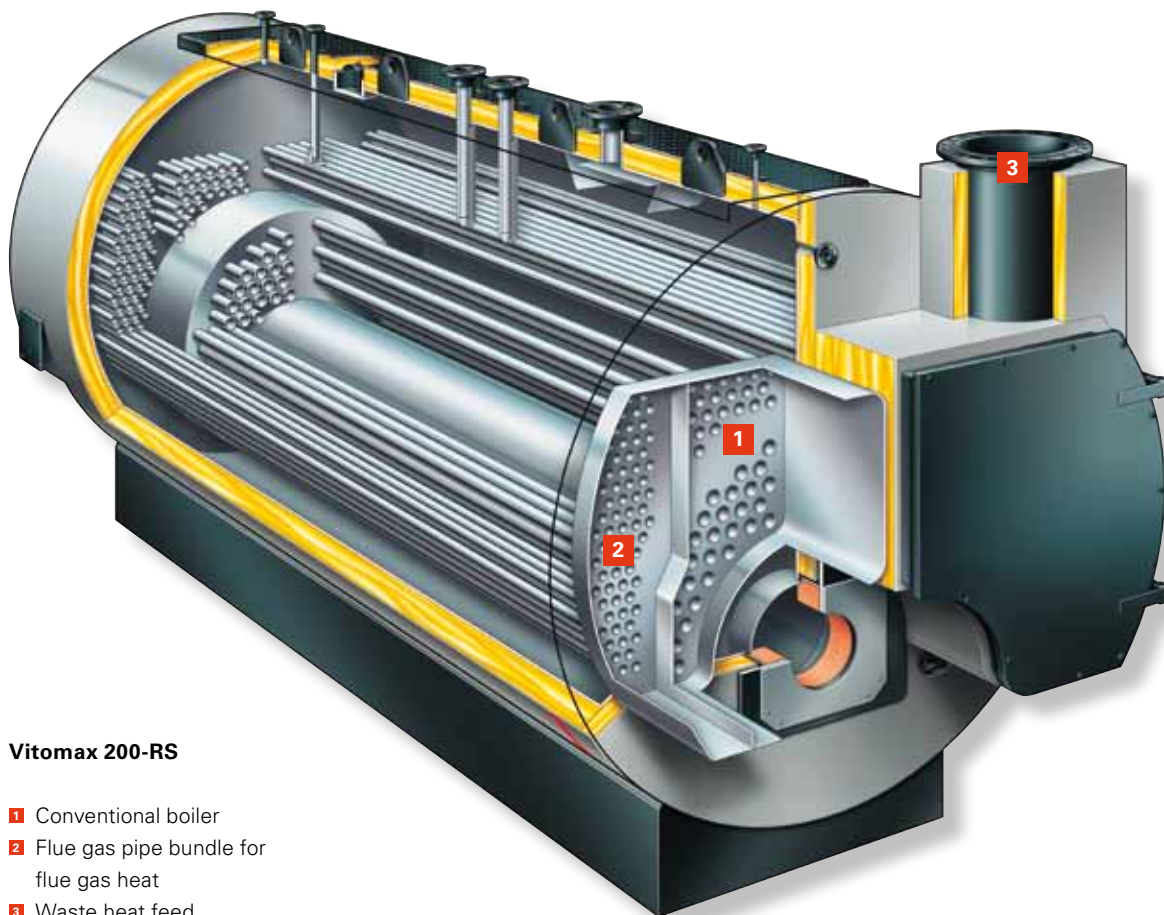
Waste heat boiler – shown here as a single pass hot water boiler

Viessmann waste heat boilers are designed according to the flame tube/smoke tube boiler principle. Hot flue gas is directed through pipe bundles, where heat present in the gas is transferred to water inside the boiler body. Flue gas collectors are attached to the inlet and outlet sides of the waste heat boilers, where cleaning apertures are located and flue pipes are connected.

By contrast, in flue gas heat exchangers, the water flows through pipe bundles while the flue gas flows around the pipes inside the heat exchanger casing. Flue gas heat exchangers are preferred when using "cooler" flue gases for generating hot water at lower temperatures.

To minimise radiation losses, the waste heat boiler is fitted with 120 mm composite thermal insulation and a painted sheet steel jacket.

Like all Vitomax boilers, the waste heat boiler stands on a base frame that spreads the load evenly across a large floor area.



#### Vitomax 200-RS

- 1 Conventional boiler
- 2 Flue gas pipe bundle for flue gas heat
- 3 Waste heat feed

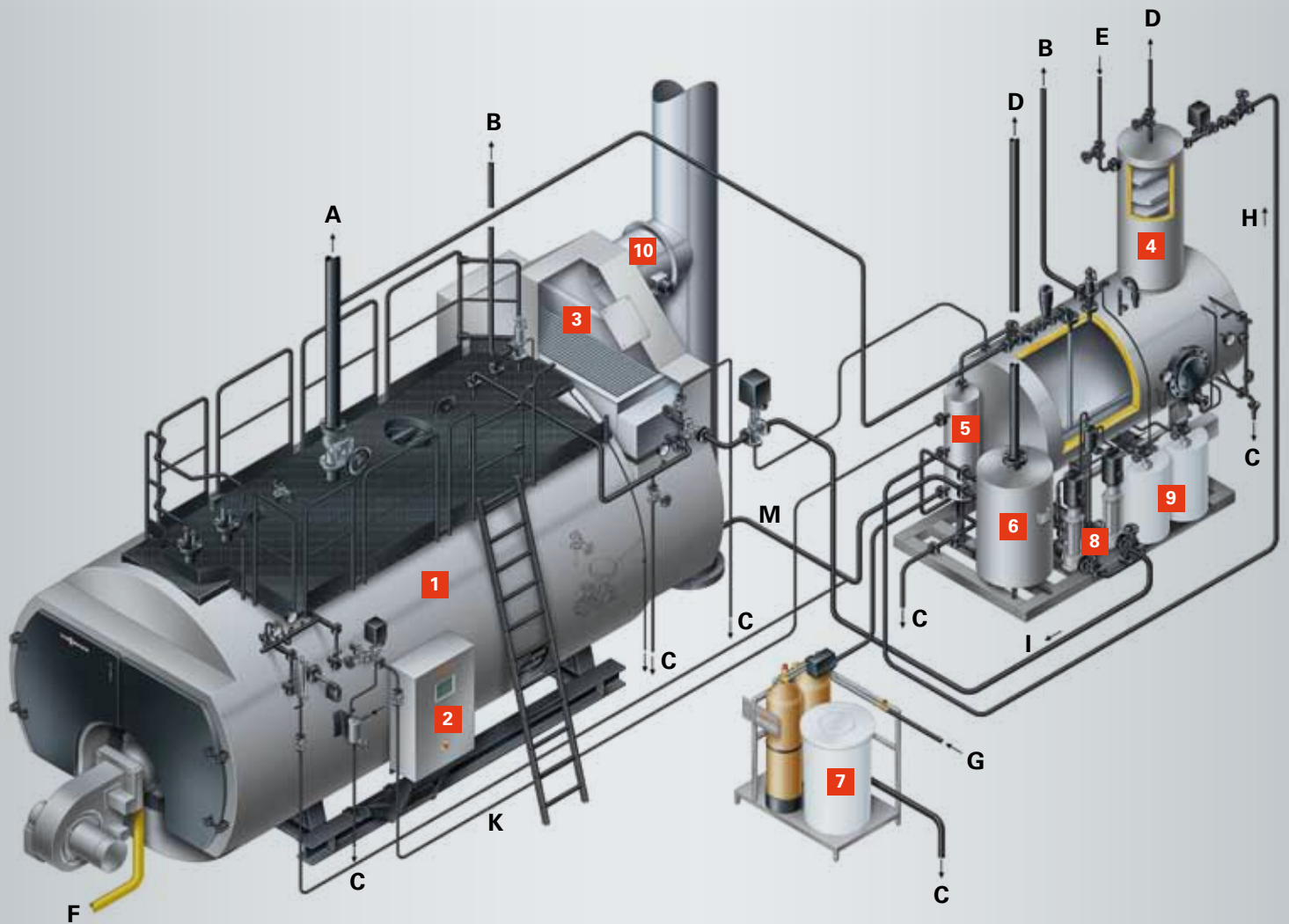


Vitomax 200-RS steam boiler with waste heat utilisation at the Maribor hospital, Slovenia (6 t/h, 13 bar saturated steam)



Steam boiler with waste heat utilisation combined with a conventional steam boiler





**Steam boiler system for generating saturated and/or superheated steam**

- |  |  |
|--|--|
| <b>1</b> Steam boiler                    | <b>A</b> Steam to the consumer         |
| <b>2</b> Control system (PLC)            | <b>B</b> Discharge pipe – safety valve |
| <b>3</b> Integral economiser             | <b>C</b> Ventilation and drain line    |
| <b>4</b> Total thermal deaeration system | <b>D</b> Vapour line                   |
| <b>5</b> TDS expander with heat recovery | <b>E</b> Condensate inlet              |
| <b>6</b> Mixing cooler                   | <b>F</b> Fuel feed                     |
| <b>7</b> Chemical water treatment        | <b>G</b> Raw water inlet               |
| <b>8</b> Feedwater pumps                 | <b>H</b> Softened water                |
| <b>9</b> Dosing modules                  | <b>I</b> Feedwater                     |
| <b>10</b> Flue gas damper                | <b>K</b> TDS line                      |
|  | <b>M</b> Blow-down line                |



## Components of a steam boiler system

Steam generation requires a wide range of thermal equipment aside from the steam boiler for treating the feedwater and recovering energy, as well as pumps, burners and other fittings.

In contrast to hot water boilers, steam boilers are continuously supplied with chemically and thermally treated feedwater. So that the constituents of water, such as calcium, magnesium, oxygen and carbon dioxide, do not permanently damage the steam boiler over the course of time through pitting corrosion or limescale deposits, for example, appropriate measures must be taken to remove all harmful substances.

Furthermore, burners, fittings and pumps are required to provide the steam boiler with the necessary energy. A control system based on a modular PLC controls the boiler and activates other components if required. The interplay between all these components forms a steam boiler system.



Water treatment module WAS 200



Feedwater pumps



Thermal equipment



Vitocontrol control panel

## Comprehensive energy management

### Vitocontrol control system for maximum performance and safety of the heating system

An essential part of the steam boiler system is its control technology. Here too, Viessmann consistently draws on the best technology available on the market. To ensure safe and convenient operation for you, we use control panel technology with an integral PLC.

#### Function

A programmable logic controller (PLC) regulates all boiler processes that are not relevant to safety. These include boiler steam output and water level control, as well as TDS and blow-down control. If required, auxiliary equipment, such as dosing pumps, thermal water treatment, bypass dampers, flue gas dampers etc., can also be controlled by the PLC.

All safety functions are implemented, in accordance with specific national requirements, by means of safety-compliant instrumentation and control equipment outside the PLC.

An auxiliary module, which is connected to the telephone network, enables remote monitoring to be conducted if required, with operational and fault messages sent automatically to a control centre. You can therefore communicate with the system from anywhere in the world. Updates, checks and optimisation are possible from any location.

The control program includes the functions of all boiler equipment versions. When retrofitting the relevant devices, it is therefore simple for a Viessmann engineer to activate previously inactive functions on the user interface without additional programming.

### Operation

The system is operated and programmed on a touchscreen in the control panel door. It is equipped with a colour graphic user interface. The most important system measurements can be read at a glance from the standard screen. Orientation on the screen is made easier by the combination of pictorial representation and short texts. The system is well prepared for use in the destination country. The appropriate national language can be selected directly on the user interface.

### Messages

Operating and fault messages are issued in plain text in the selected language and recorded in a log file that can be exported if required. An Ethernet interface is available for connection to home automation or a SCADA system. A Profibus interface can be retrofitted as an option.

### The advantages of the control system Vitocontrol at a glance:

- Ergonomic graphic user interface on a scratch-resistant 10.4 inch touch panel
- Process data interface via Ethernet (optional Profibus)
- Modular design for system-specific extension
- Convenient due to complete integration of all system components
- High operational reliability
- Optional remote maintenance interface
- Multilingual
- Factory-tested
- Worldwide spare parts service



Detailed information relating to boiler parameters



Representation of the setting level for a feedwater control valve



Reverse osmosis system



Water treatment module WAS 200

Double-pendulum softening system  
from Viessmann

Any system is only as good as its weakest component. This is the motto which guides Viessmann in selecting the system components on offer. Apart from the demands for highest quality and flexibility, matching the individual components to each other is of vital importance.

Whether chemical or thermal water treatment, boiler control devices or safety assemblies, all of the components we supply are perfectly coordinated with each other in terms of their functions.

Depending on your individual requirements and subject to freshwater quality and the amount of condensate, we can supply you with a module for water softening, chemical dosing and thermal deaeration. Depending on the water quality and the process, either double-pendulum softening systems, complete desalination systems or reverse osmosis systems are employed.

The benefits of excellent and reliable system technology are obvious: Fully automated operation can ensure that the operating mode of the boiler system is in line with requirements for any period you choose. This improves the steam quality and extends the service life of the boiler. One side effect that cannot be ignored is the significant reduction in running costs. Fewer TDS and blow-down losses of boiler water mean less topping up with treated and heated feedwater.



### Feedwater pumps

No compromise is accepted in the case of feedwater pumps either – whether continuous feedwater control via control valves with pump spill back or the use of inverter-controlled pumps. We only work with renowned manufacturers.

Naturally, the pump is supplied as an assembly which includes all fittings and shut-off valves. This simplifies system design, installation and commissioning. We take responsibility for assigning the right pumps to each boiler, taking into consideration the required operating pressure. You need not concern yourself with such details.

### Boiler platform

Another feature that simplifies installation: Our boilers are equipped as standard with a boiler cover. Work on or above the boiler can therefore be completed with little effort and without damaging the boiler. The load bearing boiler covers can easily be extended to form a platform with railings and ladders. Our standard platforms comply with both German accident prevention regulations and the Machinery Directive.

### Sound insulation

To reduce the level of pump and combustion noise, we supply sound insulation hoods and/or silencers and anti-vibration mounts as standard. These sound insulation measures can be extended on a system-specific basis with encapsulated combustion air fans, silencers for safety valve discharge lines, etc.



Vitomax 200-HS, type M237  
with boiler equipment



Boiler fittings



Installing the Vitomax  
by mobile crane



Transportation of a Vitomax boiler

Apart from a high steam output, industrial/commercial boiler technology also requires system solutions and services. Viessmann provides both, i.e. coordinated and flexible system components and experienced specialists who offer competent advice. Vitomax industrial/commercial boilers are designed and built to order, in line with customer and country-specific requirements.

Technology alone is not enough. Services for everything related to the product are becoming increasingly important, from finance to installing the boiler by mobile crane, through to the commissioning and maintenance of the boiler system.

### Viessmann industrial/commercial boiler technology – everything from a single source

Viessmann industrial/commercial boiler technology from Berlin/Brandenburg and from your local Viessmann representative meets all the requirements for solution-oriented collaboration.

- Consultation – comprehensive and competent
- Manufacture – according to country-specific requirements with short delivery times
- Equipment – safety accessories, burners, control panels, boiler platforms, flue gas/water heat exchangers, water treatment systems (both chemical and thermal), flue gas components
- Transportation and installation – with a mobile crane and a team of specialists
- Training and induction – at the Viessmann information centre in Berlin and locally in your region
- Commissioning – worldwide by specialist engineers
- Service – from a qualified technical service team

This company concept is further enhanced by the Viessmann information centre and hospitality complex in Berlin. In this facility, design engineers, heating contractors and operators are trained in preparation for the operation of their industrial/commercial systems. The close proximity of this centre to our production facility in Mittenwalde allows guests to follow every stage of the manufacturing process on site.



Viessmann information centre in Berlin



Training and induction



Service engineers in action

Aside from reliability, specific system solutions, optimum settings and environmental responsibility, many kinds of services relating to boiler operation are expected of advanced industrial/commercial boiler technology.

Viessmann Industrieservice provides you with competent specialist personnel to take care of all your concerns. We are there for you with technical expertise and advice, whether the matter relates to an existing or a new system.

**Our services for all makes of shell boiler encompass:**

- Steam boilers
- Hot water boilers (above 110 °C)
- Hot water boilers (up to 110 °C) and industrial boilers
- Waste heat boilers

**Our services include:**

- Commissioning
- Maintenance services
- TRD inspection/annual service
- Boiler cleaning (dry and chemical)
- Burner maintenance
- System maintenance
- Checking the water system and chemical consistency
- Preparing the boiler for internal inspection
- 24-hour emergency service (requires a maintenance contract)



### Commissioning

- Boilers
- Burners
- Control systems
- Thermal water treatment
- Chemical water treatment

### Maintenance services

- TRD inspections (EN12953-6)
- Burner maintenance
- System maintenance
- Boiler cleaning (dry and chemical)
- Water analysis in accordance with guidelines
- 24 hour service hotline and emergency service

### Repairs

- Welding work on boilers (also approved for high pressure systems)
- Conversion of control systems
- Expansions and upgrades of OWS systems (operation without supervision for 72 hours)
- Clarification, purchase, delivery and replacement of spare parts

### Service

- Training of operating personnel
- Remote servicing
- Advice
- Installation work
- On-site assembly
- Site management

### Analyses

- Borescope inspections (of the insides of boilers)
- Sound measurements
- Thermography
- Analyses and assessments of water analyses

### Boiler inspections

- Preparation and execution of internal inspections (with TÜV)
- Execution of pressure tests

### Special projects

- Specialised engineering, programming, commissioning of power station systems



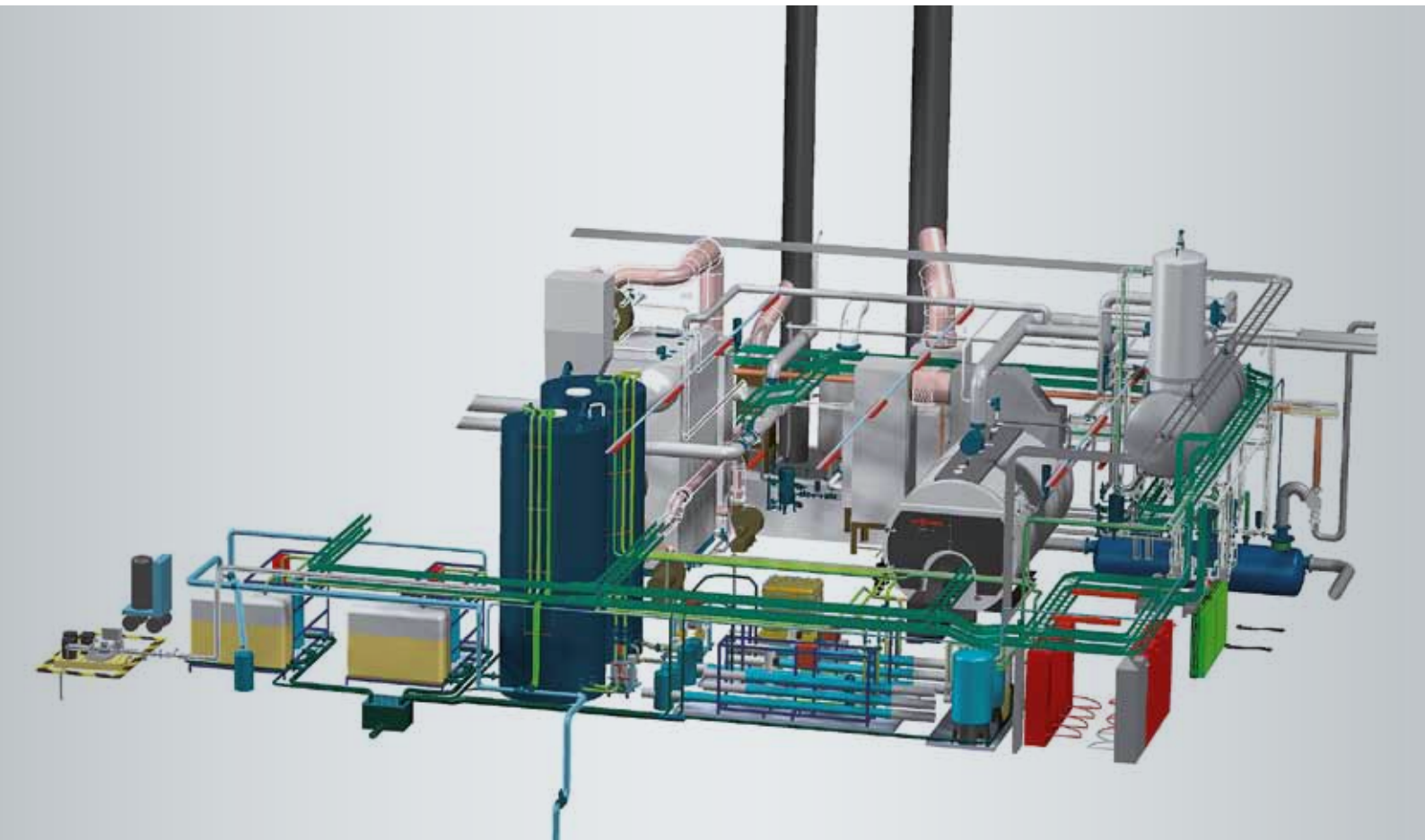
Boiler undergoing maintenance



### Our advice

Regular inspections and maintenance assure you optimum availability as well as long term value retention for your system.

Prudent use of energy is not only beneficial to you as the user, but also to our environment.



3-D boiler room planning

## Vitodesk – software expertise from a single source

Vitodesk is the complete software support package for heating contractors, design engineers and architects. All programs support automatic data exchange.

### **Vitodesk 100**

Vitodesk 100 is the free data service from Viessmann. It enables users to select Viessmann products for use in engineering and tendering.

### **Vitodesk 200**

Vitodesk 200 is tailored to the engineering and sizing of smaller and medium-sized projects. It is divided into three areas: RES (renewable energy systems), sanitary/heating and air conditioning.

### **Vitodesk 300**

Viessmann has developed its own OEM version based on the industry standard AutoCAD program. Apart from the main functions of the full version, this software package offers numerous additional assistants that make engineering and presentation even more convenient and efficient.

Complex heating centres can be designed much more efficiently and precisely with this 3-D program than with conventional software tools. With the help of the 3-D boiler room planning program, you can see in advance whether the system will fit into the existing boiler room together with all of the required components. This means errors can be avoided during the engineering phase.

The program assistants not only support you in creating the pipework design, but also provide tools for to-scale engineering of distributors and tanks. The necessary cross-sections and views, plus all labels, can be created on the design and are updated automatically in the event of changes.

Product management runs unobtrusively in the background. This enables detailed bills of material to be produced, up to and including the cutting list. With the support of rendered diagrams, the system can be clearly and professionally presented, providing clear benefits prior to order placement.

Clever software supports design engineers and trade experts alike in realising their projects.



## Manufacturing quality

## Advanced design and production methods ensure high quality



Welding the pressure vessel in the optimum welding position

The industrial/commercial boiler systems are manufactured in Berlin/Brandenburg. Specialist engineers provide consultation and project management tailored to your individual requirements.

Alongside industrial/commercial boiler manufacture with advanced production systems, such as welding robots, flexible manufacturing systems with CNC machines, laser and plasma cutting and blanking tools, the facility has its own research and development department.

Stresses are analysed using finite element calculation methods, assisting in the optimisation, for example, of pipe layouts or welded joints. These all support and ensure design in compliance with relevant regulations.

Our production technology meets the requirements of all current country-specific regulations. Furthermore, we have high expectations of the materials used and their workmanship. In addition to regulations, for example, our welders are subject to supplementary monitoring. Delivery conditions to restrict tolerances and material properties beyond standard levels are also agreed with our suppliers.



A sufficient number of large cleaning and access ports are located on all Viessmann high pressure hot water, high pressure steam and low pressure steam boilers



Our design philosophy is based on the principle of keeping the impact of boiler loading as low as possible. At the same time, particular attention is paid to ensuring low stress design. This is achieved, for example, by optimum expansion clearances between components themselves and their relative wall thickness.

Vitomax industrial/commercial boilers are manufactured in small batches or made to order. At the end of production, all boilers are subjected to a pressure test of at least 1.85 times the operating pressure, in accordance with the Pressure Equipment Directive.

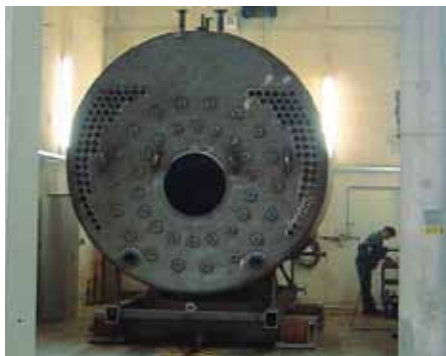
In accordance with country-specific regulations, weld seams undergo non-destructive testing with ultrasound and X-ray methods.



Welding the smoke tube with mechanical welding equipment



CNC flame-cutting machine with bevel cutter



X-ray chamber

## Reference systems around the world

## Top references – top technology from Viessmann in prime locations



L.I.F.E. pharmaceutical plant B.  
Braun Melsungen AG:  
Two Vitomax 200-HS high pressure  
steam boilers deliver up to 40 t/h for  
the production of infusion solutions



Every day Viessmann industrial/commercial boiler systems face a wide variety of challenges around the world. Whether in listed buildings, modern industrial complexes or other large sites, Viessmann takes care of them all.

Products from the comprehensive Viessmann range satisfy every demand and provide solutions for every requirement: for oil, gas, wood, solar collectors and heat pumps. And they set benchmarks in terms of operational reliability, ease of operation, environmental protection and durability.



Steam boiler with superheater at  
Klaipėdos Kartonas, Lithuania



Vitomax 200-HS high pressure  
steam boiler in a commercial  
nursery



Vitomax 200-HS, 4 t/h, 16 bar,  
StoVerotec, Germany



Steam boiler at AZM Asur,  
Belgium



Steam boilers at the General Hospital of the People's Liberation Army in Beijing, China



Steam boilers at Sanovel in Istanbul, Turkey



Steam boilers at the Rivolta Carmignani textile plant in Milan, Italy

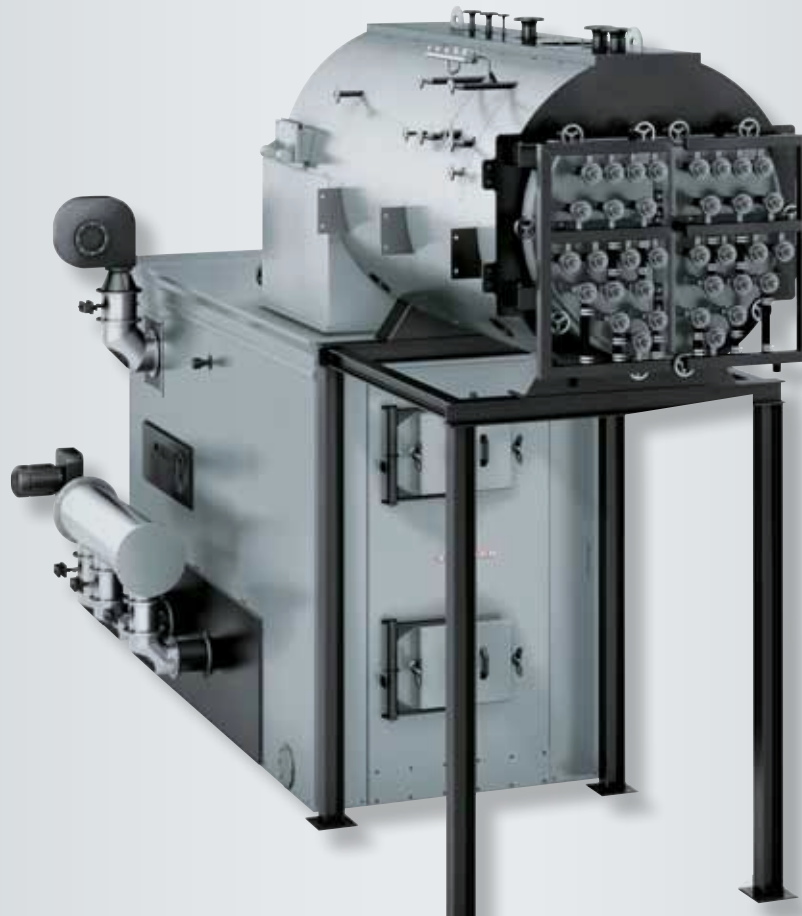


Vitomax 200-HS producing 10 t/h, 13 bar, Emmi dairy in Lucerne, Switzerland



Steam boiler in Göttingen, Germany





The comprehensive range also includes products from the biomass sector in the output range from 110 to 13,000 kW for industrial, commercial and municipal customers.

From boilers to fuel discharge and fuel supply systems, the products are suitable for all types of wood. All system components are supplied from a single source. This remarkable range of combustion systems can be charged with all forms of wood fuel.

#### **Turnkey systems from a single source**

Viessmann Holzfeuerungsanlagen GmbH supplies commercial customers with turnkey systems from a single source:

- Combustion systems
- Water and steam boilers, thermal oil boiler heat exchangers
- Fuel discharge
- Supply systems
- Flue gas particulate removal
- Chimneys
- Control units and management systems
- Accessories



### Wood combustion

An ever increasing number of industrial and commercial enterprises – not only from the wood processing sector – are turning to wood for fuel. Wood is subject to lower price fluctuations than fossil fuels, it need not be imported and, as a renewable and CO<sub>2</sub> neutral energy source, it makes a major contribution to environmental protection and sustainability.

Vitoflex 300-FSB, Vitoflex 300-FSR and Vitoflex 300-SRT are used as the wood combustion system (combustion chamber with infeed grate) in steam generation systems. The main difference between the Vitoflex 300-FSR and the Vitoflex 300-FSB is the volume of the combustion chamber and the size of the grate, whereby the Vitoflex 300-FSB represents the more compact wood combustion system. The shape of the grate in the Vitoflex 300-SRT makes it suitable for a wide range of fuels with a high ash content (up to 10 % on dry basis). Due to the inertia of combustion, the steam present in the boiler must be removed using a separate valve in the case of quickly responding steam consumers.

### Design and function

The Vitoflex with infeed grate is not only suitable for the combustion of biomass, but also in particular for burning special fuels with an elevated ash content or fuels containing a high proportion of foreign matter, e.g. sand, metal residues, etc. The major benefits of Vitoflex infeed grate combustion are, on the one hand, its ability to use different biogenic fuels and, on the other hand, a lower particulate content in the flue gas, due to the static fuel bed.

### Low NO<sub>x</sub> reduction technology

The combustion chamber is supplied as standard with low NO<sub>x</sub> reduction technology for fuels with a high nitrogen content. The low NO<sub>x</sub> combustion chamber is a two-stage combustion chamber with an air stage for reducing NO<sub>x</sub> emissions. In addition, this effect is amplified by the use of a flue gas recirculation system. The geometry of the combustion chamber in the reduction zone (primary zone) and the oxidation zone (secondary zone) was developed by means of detailed research on a test system.



View into the combustion chamber of the Vitoflex

Fuel types (wood fuels)



High pressure steam boilers

### Wood fired high pressure steam boilers

The high pressure steam boilers with operating pressure from 6 to 25 bar can be used in combination with the flat moving grate combustion system Vitoflex 300-FSB (rated output: 180 to 1700 kW), Vitoflex 300-FSR and Vitoflex 300-SRT (rated output: 850 to 13,000 kW).

The boiler is designed as a 2-pass boiler with cooling shield.

The design of the steam boilers is characterised by the following special features:

- Modular construction – can be used for the wood combustion systems: Vitoflex 300-FSB, Vitoflex 300-FSR and Vitoflex 300-SRT
- The boilers can be either freestanding or sited directly on top of the combustion chamber
- Lowest thermal stresses through the cooling shield incorporated into the design
- Simply geometry of the pressure bearing parts
- Low running costs through 2-pass design (low pressure drop on the flue gas side)
- Low radiation losses through 120 mm thick thermal insulation
- Large steam chamber and large evaporator, as well as integral mist collector for improved steam quality
- The sturdy cover on top of the boiler is part of the standard delivery and simplifies the maintenance, as well as protecting the thermal insulation against accidental damage
- Alternatively with a boiler control platform
- A pneumatic cleaning system is available to increase the cleaning intervals

### Steam output standard values in t/h combined with ECO at a feedwater temperature of 102 °C

Pressure level [bar]*	Rated output [kW] (boiler with ECO)												
	850	1100	1400	1700	2100	2600	3300	4200	5200	6500	8000	10000	13000
6	1.31	1.69	2.15	2.62	3.23	4.00	5.08	6.47	8.01	10.02	12.33	15.41	20.04
8	1.30	1.68	2.14	2.60	3.22	3.99	5.06	6.44	7.98	9.97	12.27	15.34	19.95
10	1.30	1.68	2.14	2.60	3.21	3.97	5.04	6.42	7.95	9.94	12.23	15.29	19.88
13	1.29	1.67	2.13	2.59	3.20	3.96	5.03	6.40	7.92	9.91	12.19	15.24	19.82
16	1.29	1.67	2.12	2.58	3.19	3.95	5.01	6.38	7.90	9.88	12.16	15.20	–
18	1.29	1.67	2.12	2.58	3.19	3.94	5.01	6.38	7.89	9.87	12.15	–	–
20	1.29	1.66	2.12	2.58	3.18	3.94	5.00	6.37	7.89	–	–	–	–
22	1.28	1.66	2.12	2.57	3.18	3.94	5.00	6.37	–	–	–	–	–
25	1.28	1.66	2.12	2.57	3.18	3.94	–	–	–	–	–	–	–

\* Safety valve response

### Fuel discharge/transport

Pushrod discharge systems or silo discharge systems are employed for drawing fuel from silos or bunkers. Chain conveyors, pushrods or pipe screw conveyors can be used as fuel transport systems, subject to the structural situation and fuel grain size.

### Flue gas particulate removal

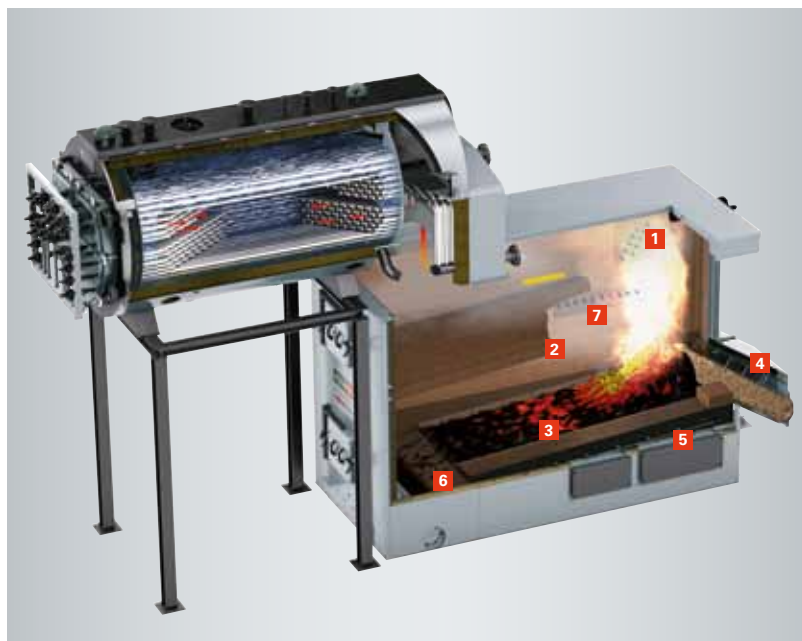
Multi cyclone scrubbers are used as flue gas particulate removal systems. These achieve flue gas particle values of  $< 60$  to  $< 150 \text{ mg/Nm}^3$ , subject to fuel (reference oxygen content 11 or 13 %). Fabric filters, metal mesh filters or electrostatic filters are used, subject to fuel, to achieve clean particle values from 10 to  $50 \text{ mg/Nm}^3$ .

### Controller Logic

The Logic microprocessor controller with touchscreen regulates the system. A modem for remote maintenance, a process control system (MaVis) and a Telenot unit are also available.

The design of the Vitoflex infeed grate is characterised by the following special features:

- Minimised radiation losses through complete thermal insulation of the entire boiler system
- Static firebed results in significantly lower emissions
- Flame temperature control with integral, adapted residual oxygen control
- Advanced microprocessor controller regulates the system with modulation from 25 to 100 % load whilst staying within the specified emission limits



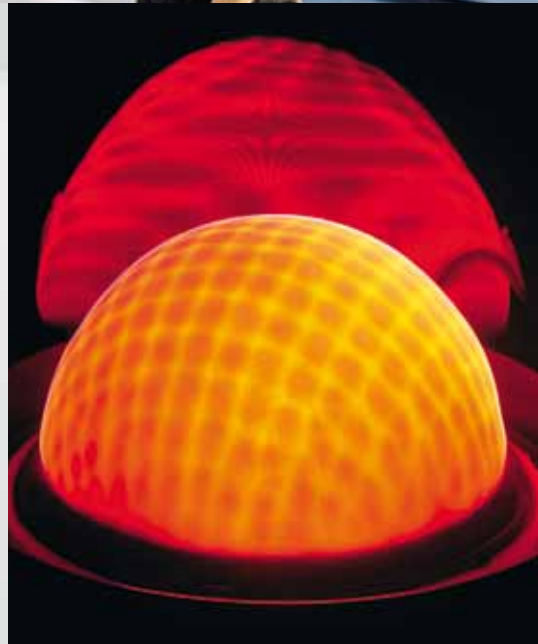
- 1 Secondary air injection nozzles
- 2 Low  $\text{NO}_x$  combustion chamber
- 3 Flat moving grate
- 4 Fuel supplied via hydraulic feed or screw conveyor
- 5 Primary combustion air routing
- 6 Automatic combustion chamber ash removal
- 7 Flue gas recirculation "via the grate"

Sectional view of the Vitoflex 300-FSB flat moving grate combustion system

- Regulated burnout through infeed grate split into 2 or 3 sections operating at different speeds
- High wear resistance through generously sized grate surface, plus water cooling when using the hydraulic feed
- Overlapping pre-tensioned grate rods ensure little fuel falls through the grate; permanently automatic ash removal



## The company





## Viessmann – climate of innovation

Viessmann is one of the world's leading manufacturers of intelligent, convenient and efficient systems for heating, cooling and decentralised power generation.

As a third generation family run business, Viessmann has been supplying highly efficient and clean heating systems for many decades.

### A strong brand creates trust

Together with our brand label, our key brand message is an identifying feature throughout the world. "Climate of innovation" is a promise on three levels: It is a commitment to a culture of innovation. It is also a promise of enhanced product benefits and, at the same time, an obligation to protect the environment.

### Acting in a sustainable manner

For Viessmann, taking responsibility signifies a commitment to acting sustainably.

This means to harmonise ecology, economy and social responsibility so that the needs of

today are met without compromising the quality of life of future generations.

We consider climate protection, environmental responsibility and resource efficiency to be key priorities throughout our company, which has more than 11,400 employees worldwide.

### Example of Best Practice

With its strategic sustainability project, Viessmann demonstrates at its own head office in Allendorf (Eder) that the energy and climate policy goals set for 2050 can in fact be achieved today with commercially available technology. The results speak for themselves:

- Expansion of renewables to 60 percent
- CO<sub>2</sub> emissions reduced by 80 per cent

The long-term goal is for the company to sustainably meet all of its own heating energy requirements.



2009/2011/2013:  
German Sustainability Award  
for Production/Brand/Resource  
Efficiency



Energy Efficiency Award 2010

### Viessmann Group

#### Company details

- Established in: 1917
- Employees: 11,400
- Group turnover: 2.1 billion euros
- Export share: 55 percent
- 27 production companies in 11 countries
- 74 countries with sales companies and representation
- 120 sales offices worldwide

#### The comprehensive product range from the Viessmann Group for all energy sources and output ranges

- Boilers for oil or gas
- Combined heat and power units
- Heat pumps
- Wood combustion technology
- Biogas production plants
- Biogas upgrading plants
- Solar thermal systems
- Photovoltaics
- Accessories
- Refrigeration technology



climate of innovation

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