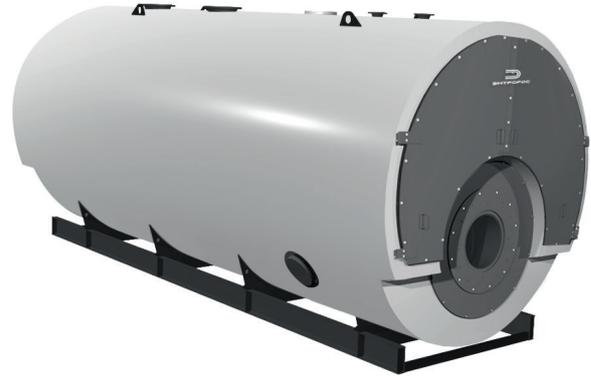


Field application TT100-02 boilers

ENTROPIE boiler TT100-02 is a high-temperature three-pass hot water gas-fired boiler with capacity of 20 MW.

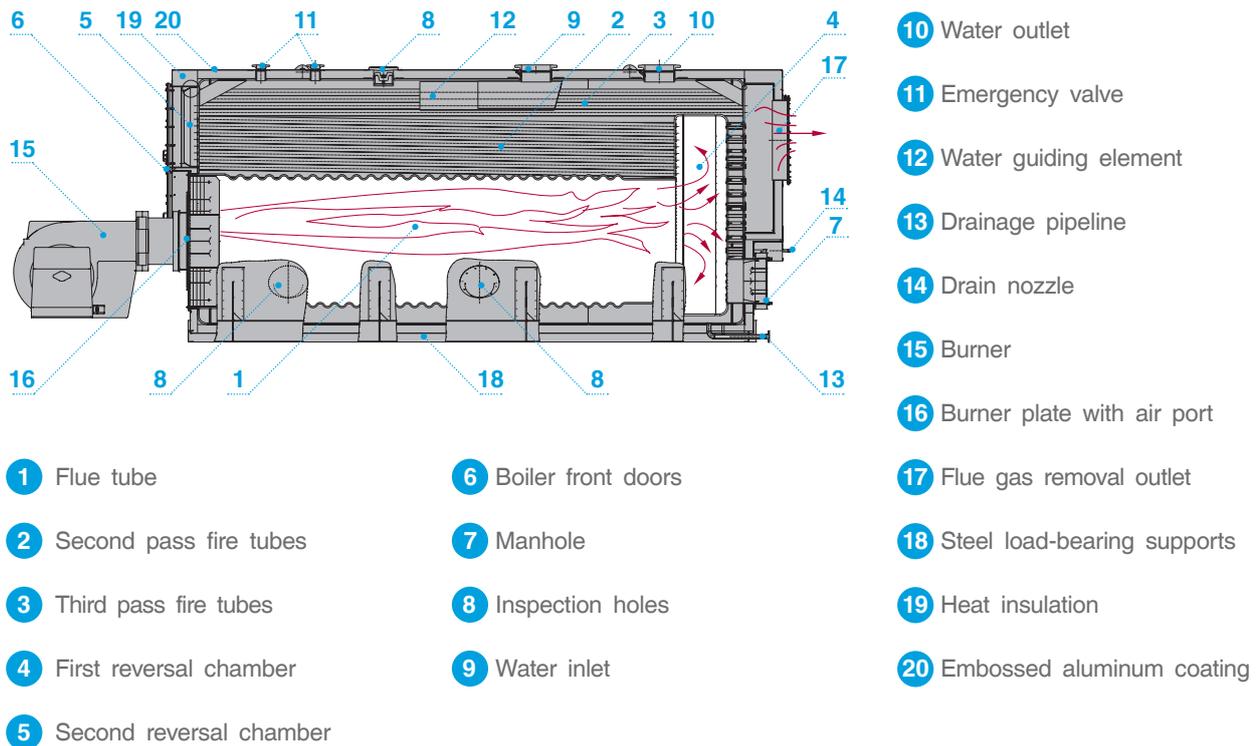
ENTROPIE boiler TT100-02 is designed for heating buildings and facilities and for providing engineering processes for various purposes.

Under the conditions of transport, storage, installation and operation, the warranty period is 36 months from the date the boiler begins operation and no more than 42 months from the date of shipment from the manufacturer.



General view of boiler TT100-02

Diagram of ENTROPIE boiler TT100-02



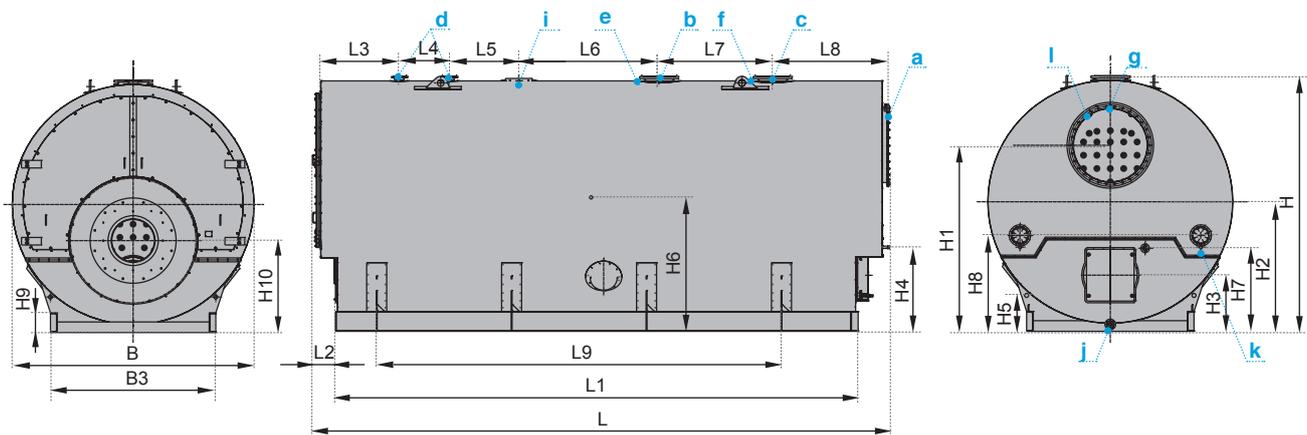
- 1 Flue tube
- 2 Second pass fire tubes
- 3 Third pass fire tubes
- 4 First reversal chamber
- 5 Second reversal chamber
- 6 Boiler front doors
- 7 Manhole
- 8 Inspection holes
- 9 Water inlet
- 10 Water outlet
- 11 Emergency valve
- 12 Water guiding element
- 13 Drainage pipeline
- 14 Drain nozzle
- 15 Burner
- 16 Burner plate with air port
- 17 Flue gas removal outlet
- 18 Steel load-bearing supports
- 19 Heat insulation
- 20 Embossed aluminum coating

Technical characteristics of ENTROPIE boiler TT100-02

Description of parameter	Value
Maximum water temperature, °C	170
Minimum water temperature at the boiler inlet, °C	60
Maximum operating overpressure of water, bar	16
Minimum water flow rate, m ³ /h	Not regulated
Minimum capacity of the first stage of burner, %	Not regulated

Boiler size		20,000
Rated heat output, kW		20,000
Efficiency, %		90.5
Flue gas flow rate, kg/s		9.00
Aerodynamic resistance of gas path for maximum capacity, Pa		1,870
Temperature of outgoing flue gas, °C		220
Firebox volume, m ³		19.6
Boiler water volume, m ³		34.0
Dry boiler weight (weight tolerance 4.5 %), kg		46,000

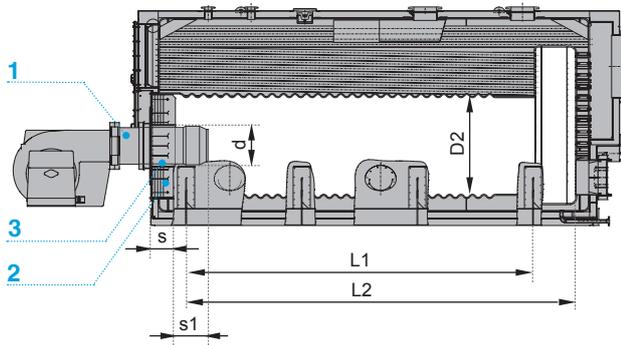
Overall and connecting dimensions of ENTROPIE boiler TT100-02



Boiler size		20,000
Flue gas outlet, DN	a	1,100
Water inlet, DN	b	400
Water outlet, DN	c	400
Safety valve, DN	d	125
Temperature sensor (inlet)	e	G 1/2-B
Temperature sensor (outlet)	f	G 1/2-B
Flue gas temperature sensor	g	G 1/2-B
Inspection hole, mm	i	230x330
Boiler water drainage, mm	j	50
Condensate removal	k	G 1-B
Draft and heat gauge	l	G 1/2-B
Length, mm	L	8,629
Width, mm	B	3,655
Height, mm	H	3,847
Length of supporting frame, mm	L1	7,825
Distance, mm	L2	286
Distance, mm	L3	1,224

Boiler size		20,000
Distance, mm	L4	750
Distance, mm	L5	940
Distance, mm	L6	2,100
Distance, mm	L7	1,700
Distance, mm	L8	1,695
Width of supporting frame, mm	B3	2,500
Distance, mm	H1	2,800
Distance, mm	H2	1,950
Distance, mm	H3	845
Distance, mm	H4	1,250
Distance, mm	H5	540
Distance, mm	H6	2,021
Distance, mm	H7	1,250
Distance, mm	H8	1,443
Distance, mm	H9	300
Distance, mm	H10	1,400
Distance, mm	L9	6,060

Dimensions of ENTROPIE boiler TT100-02 firebox



Boiler size	20,000
Diameter of installation hole, d, mm	650
Cover thickness, taking into account the adapter plate, s, mm	472
Installation size of burner, s1, mm	20–60
Firebox diameter, D2, mm	1,700/1,850
Flue tube length, L1, mm	6,250
Firebox length, L2, mm	6,950

- 1 Burner flame head
- 2 Air port
- 3 Elastic heat-insulating material

Selecting and installing of the burner

The aerodynamic characteristics of the burners and their placement shall ensure that the flame fills the firebox uniformly without affecting the firebox walls and prevent any areas becoming stagnant or poorly ventilated within the firebox volume.

Burners to be used with ENTROPIE boilers TT100-02 shall have a forced air supply with a regulated air excess factor. Starting up burners, combustion chamber blowing, operation, and shutdown shall be performed automatically.

ENTROPIE boilers TT100-02 are operated with excess pressure in the firebox. When selecting the burners, it is necessary to take into account the firebox length and diameter and the boiler's aerodynamic resistance. The use of automatic multistage and modulated

burners (gas, liquid fuel or combined burners) is permitted.

When ordering a burner, check that its connecting dimensions and its flame head dimensions comply with the technical requirements for the boiler and this technical data sheet. An additional extension and/or intermediate flange should be ordered when the burner is fitted with a long flame head. Production of a special air port for burners with individual characteristics is possible.

The burner gas line shall contain a compensator. It will relieve mechanical loads on the gas pipeline during boiler maintenance and operation.

The burner flame head is equipped according to the manufacturer's requirements. The burner flame head

shall be inserted in the firebox, taking into account the dimensions s1.

The space between the burner flame head and rigid heat insulation of the air port shall be sealed

with an elastic heat-insulating material attached to the boiler.

The burner units shall provide safe and efficient operation of boilers and comply with DIN EN 267, 676.

Quality of boiler water

Operating the boiler without water treatment is prohibited. Special attention should be paid to the quality of the boiler water, which in most cases is the main factor affecting the service life of the boiler and the boiler unit as a whole.

The water regime shall ensure that the boiler operates without its parts being damaged by lime-scale or sludge deposits, or as a result of metal corrosion, mostly caused by deviating from the standard quality indicators given in the table to the right. The water composition at the boiler inlet shall comply with the specified indicator values.

The water treatment log-book shall always be available in the boiler room, in which information on the water-chemical conditions of the boiler shall be recorded.

Description of indicator	Value ≤ 150 °C	Value > 150 °C
Transparency of water by font (using the Snellen method), cm, min	30	
Carbonate hardness, mkg-equiv./kg, max	700	600
Content of dissolved oxygen, µg/kg, max	50	30
Content of iron compounds (in terms of Fe), µg/kg, max	500	400
pH value at 25 °C	7–11	
Free carbonic acid, mg/kg	None	
Content of oil products, mg/kg, max	1	

Boiler configuration

Several options of boiler delivery sets are available depending on the equipment: full delivery set, partial delivery set, or delivery without parts.

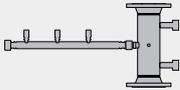
The full delivery set includes a boiler with burner equipment, set of parts and components installed according to the information specified in the

questionnaire. Due to factory installation, the optimal and reliable operation of all boiler units is guaranteed.

On request, the boiler can be supplied with the partial delivery set equipment (boiler fitted with a burner and relief valves) or the customer can independently equip the boilers with burners, safety devices, and automatic controls.

Boiler accessories

On additional request the manufacturer can deliver the following accessories for boilers:

	Plate for burner
	Flange for burner
	Collecting channel of the safety group for connecting sensors and monitoring devices
	Pressure limiters for minimum and maximum pressure
	Safety valves
	Temperature sensors
	Three-way valve
	Boil-off protection sensor
Other accessories for boiler installation and maintenance	

Placement of ENTROPIE boilers

The distance from the boiler front to the wall of the boiler room shall leave enough space for boiler maintenance and repair and no less than 3 m. In this case, for boilers running on gaseous or liquid fuel, the distance from the protruding parts of the burner devices to the boiler room wall shall be at least 1 m. The width of passageways between the boiler and the boiler room wall shall be at least 1 m.

Maintenance of ENTROPIE boiler TT100-02 is via side access. The side passageway shall be wide enough to carry out maintenance and repair and no less than the value specified in effective regulatory documentation.

In case the boiler is installed near walls or columns, the insulation of the boilers shall not be in close contact with the boiler room wall if there is no passageway, and there shall be a minimum distance of 70 mm between them.

The width of the passageway between the boiler and the rear wall of the boiler room shall be wide enough for carrying out maintenance, repair, and installation of the connecting element of flue tube. In this case, the width of the passageway shall be at least 1 m.

Deviations from the recommended distances are allowed but only within the distances specified in the local regulatory documents.

Transportation

Subject to the approval of the customer and relevant authorities, the boiler can be transported by any mode of transport.

During boiler transportation, the open flange and fitting connections, cable insertions shall be plugged, all temporary openings shall be closed.

During transportation and storage it is necessary to take precautions in order to protect the boiler against mechanical damages.

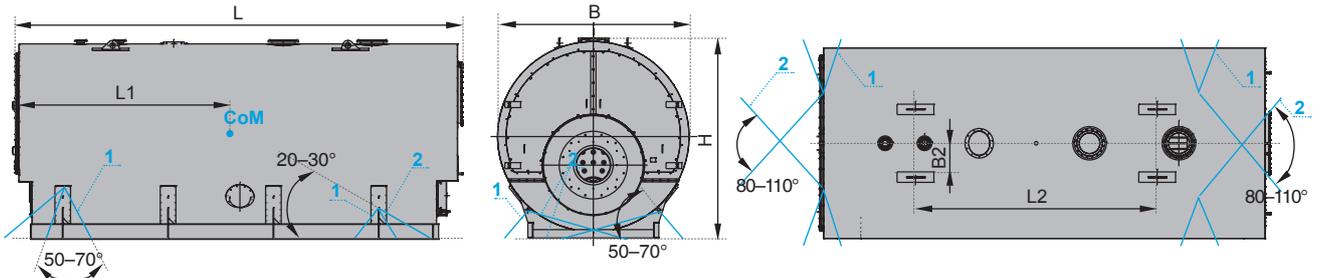
Special slinging devices, namely, eye bolts, are provided for the process of loading, unloading, and placing the boiler (units, boiler elements) in its permanent location. Boiler slinging with the use

of other elements is not allowed. Operation of hoisting devices shall prevent any sliding (dragging) of any part, unit and vehicles along the surfaces of storage areas.

Slinging and lifting from other parts of the boiler is not allowed!

The boiler shall be loaded on a vehicle using cranes with the corresponding lifting capacity, equipped with beams and lifting devices.

The boiler shall be secured to vehicles in accordance with the corresponding specifications for cargo handling and securing for each mode of transport.



Boiler transportation diagram

- – Center of mass
- – Means of fastening
- 1 – Tilt protection
- 2 – Diagonal fastening

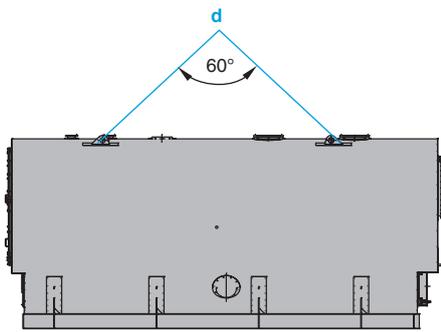


Diagram for boiler slinging

d – Eye bolts for slinging (4)

Description	Numerical value
Rated heat output, kW	20,000
Length, L, mm	8,629
Width, B, mm	3,655
Height, H, mm	3,847
Distance, B2, mm	650
Center of mass, L1, mm	4,114
Distance, L2, mm	4,510
Weight, m, kg	46,000

