schuster

DE 1 CB

LOW PRESSURE STEAM BOILER, THREE PASS REVERSE FLAME EFFICIENCY UP TO 95%									
OUTPUT RANGE	from 67 kW (100 kg/h) to 671 kW (1000 kg/h)								
TYPE	CB						CB HP		
	smooth pipe						ESALU pipe (with PolySil nanotechnological treatment)		
FUEL	Natural gas/light oil/heavy oil						gas/gasolio		
DESIGN PRESSURE	0.98 bar								
DESIGN TEMPERATURE	119.6°C								
MODELS	100	150	250	300	400	500	600	800	1000

DESCRIPTION

Low pressure steam generator, flame inversion type, with wet bottom, efficiency from 91% (STD) to 95% (HP) depending on the type of pipe used.

The DE 1 CB series is a family of steam generators designed for a maximum safety pressure up to 0.98 bar. The range includes various models with steam production from 100 to 1000 kg/h. In accordance with current legislation, the DE 1 CB family of low-pressure steam generators has been subjected to a conformity assessment by a Notified Body. Compliance with the Essential Safety Requirements of the European Directive 2014/68 / EU of the pressure body is evidenced by the CE P.E.D marking.

General characteristics:

Designed in compliance with the EN12953-3: 2016 standard the flame inversion generator consists of a cylindrical furnace, with a wet bottom, in which the flame develops and where the inversion of the combustion gases takes place. The fumes then enter the tube bundle at the front tube plate and are conveyed towards the rear tube plate from which they exit through the smoke chamber.
The boiler is sized to ensure low thermal loads.

- **Boiler body:** it consists of cylindrical outer shell, furnace, furnace bottom and flat tube plates in quality steel, in compliance with current technical standards. The materials used are accompanied by manufacturing certificates certifying the chemical and mechanical characteristics and the controls during the production cycle and therefore their suitability for use. Welding is carried out according to procedures approved by suitably qualified personnel and subjected, in accordance with an internal "Manufacturing and Control" plan to non-destructive tests. Once manufacturing is complete, each pressurized body is subjected to testing by carrying out the hydraulic test in accordance with requirement 7.4 - Annex 1 of Directive 2014/68 / EU.
- **The smoke pipes:** making up the quality steel tube bundle, are welded to the tube plates using qualified automatic procedures. Finally, the pipes are headed by counterbore eliminating the protrusions from the plate. The smoke pipes are equipped with turbulators or inserts according to the type of pipe used.
- **Front door:** is built in welded steel sheet, internally lined with a layer of insulating material and a layer of high-thickness refractory material. It is mounted on hinges that allow it to be opened quickly and is equipped with a self-cleaning flame sight glass suitably positioned to check the correctness of the combustion in operation. The burner attachment plate is bolted onto it and can be drilled for the type of burner indicated by the customer.
- **Rear smoke chamber:** made of welded steel sheet, it is fixed to the rear tube plate by means of bolts to allow its removal. Insulated on the bottom, it is equipped with a suitable cleaning inspection door, and a horizontal axis flue pipe with a diameter suitable for the power of the generator.
- **Base:** it consists of a frame in boxed steel profiles, welded to the tube plates.
- **Upper cover:** located in the upper part of the generator, it is made up of a frame in steel sections, covered with sheet metal (not walkable).
- **Insulation of the outer shell and the front upper part:** the thermal insulation is obtained with a 50 mm thick rock wool mattress, bonded with high-density thermosetting resins, supported and covered externally by the 10/10 thick painted steel sheet casing. The front upper part of the boiler is protected externally by a metal box.

Composition of the standard supply: (2)

- n. 1 steam outlet shut-off flow valve.
- n. 1 weight-lever safety valve
- n. 1 reflective level indicator, with threaded connections and shut-off and drain valves
- n. 2 test taps
- Electric panel for automatic operation, IP55 400V-3+N-50Hz complete with:
  - n. 1 large dial pressure gauge with 3-way tap for calibration
  - n. 1 safety pressure switch with manual reset, CE PED approved
  - n. 1 limit pressure switch
  - n. 1 pressure transducer for regulation of two-stage burner (high / low flame) or pressure probe for modulating burners
  - n. 2 low water level safety probes, with self-diagnosis, with manual reset on the control panel, CE certified
  - n. 2 water level probes for pump/s ON-OFF
- n. 1 centrifugal electric pump for water loading
- Water loading line circuit with pipes and shut-off valve
- n. 1 group of water drain / sludge discharge with quick opening manual valve
- Upper inspection port with flange of large diameter.
- Moisture separator on the main steam outlet, for high-titer steam without dripping
- Turbulators (for DE 1 CB version) or high efficiency inserts (for DE 1 CB HP versions)
- Documents envelope containing:
  - Declaration of Conformity by the Manufacturer in accordance with Annex VII of the PED Directive and related attachments of the checks and tests performed on each individual equipment during the manufacturing process.
  - Installation, Use and Maintenance Manual.
  - Certifications relating to the safety components installed (PED declarations of conformity, instruction booklets)
  - Diagram of the characteristic curves of the electric feed pump
  - Electrical diagram of the control panel and relative Declaration of Conformity

Options:

- "Second boiler water feed pump" kit
- "Feed water inlet filter" kit
- "Maximum level safety" kit
- "TDS" kit (from mod. 300)
- "Automatic bottom drain" kit
- "24 hr" or "72 hr" (*) kit for standard generator
- Burner plate drilled according to burner requirements
- Burner

Special versions

DE 1 CB 24 hr:

- equipped with dedicated panel board and "24 hr KIT" to obtain the certification to operate "without continuous supervision" up to a maximum of 24 hours

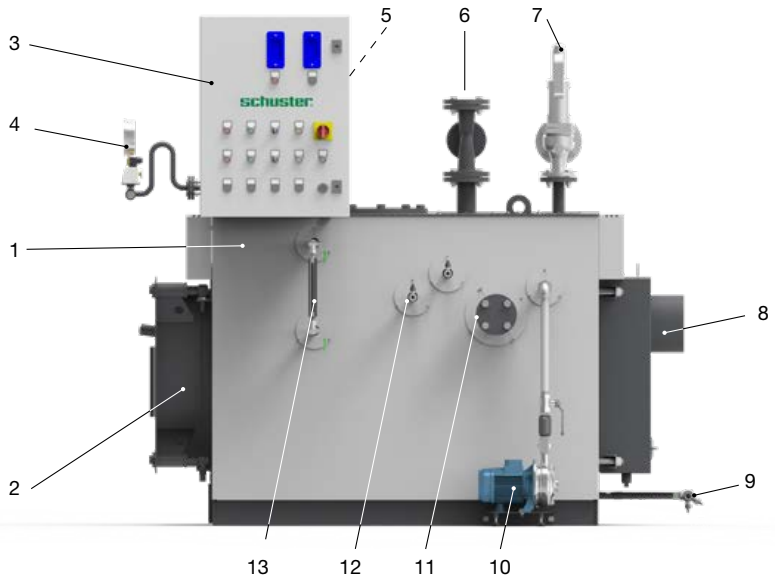
DE 1 CB 72 hr:

- equipped with dedicated panel board and "72 hr KIT" to obtain certification to operate "without continuous supervision" up to a maximum of 72 hours (from mod. 300)

(1) This value is intended as an economizer and may vary according to the operating pressure and load.
(2) Quantities, types or models may vary according to the configuration offered.
(*) 72 hr kit from mod. 300

MAIN COMPONENTS

1. Boiler body
2. Front door
3. Electric panel board
4. Instruments assembly
5. Level safety sensors
6. Steam valve
7. Safety valve
8. Rear smoke chamber
9. Drain
10. Pump feeding group
11. TDS connection
12. Test taps
13. Level gauge



TECHNICAL DATA

Model	Steam production	Nominal output (*)	Inlet power CB (**)	Inlet power CB HP (**)	ΔP smoke side CB	ΔP smoke side CB HP	Burner head min. length
	kg/h	kW	kW	kW	mbar	mbar	mm
100	100	67	75	70.5	1.32	1.50	290
150	150	101	112	106	1.22	1.81	330
250	250	168	186	176	1.50	2.94	330
300	300	201	224	212	1.66	2.78	340
400	400	268	298	282	2.54	3.53	340
500	500	335	373	353	1.67	2.77	350
600	600	402	447	424	1.50	2.50	350
800	800	537	597	565	1.46	2.70	370
1000	1000	671	746	706	2.78	4.00	370

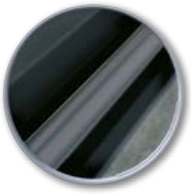
*with feeding water temperature = 70°C and pressure = 1 bar ** in function of the thermal load and working pressure

PRODUCT PLUS VALUES

- **EXCELLENT EFFICIENCY**
  up to 95% with special ESALU
- **EFFICIENT THERMAL INSULATION** given by:
  - high total thickness, made by joining two rock wool layers with aluminium foil
  - insulation between the casing and the hot parts of the boiler body for thermal bridges elimination
- **REVERSIBLE OPENING DOOR**
  hinges and closing bolts adjustment in all directions
- **SIMPLIFIED ELECTRICAL CONNECTION**
  terminal board
- **ELECTRIC PANEL BOARD**
  electromechanical or electronic, expandible (optional)
- **POSSIBLE COMBINATION**
  with one, two, three stage or modulating burners
- **IMPLEMENTABLE FUNCTIONS**
  design to integration with 24/72h kit

TYPE OF PIPES

SMOOTH PIPES



The smooth smoke pipes, suitable for gas, light and heavy oil operation, constituting the tube bundle, increase the thermal exchange and allow the removal of the residual combustion products. They are formed by pipes with, inside, helical turbulators.

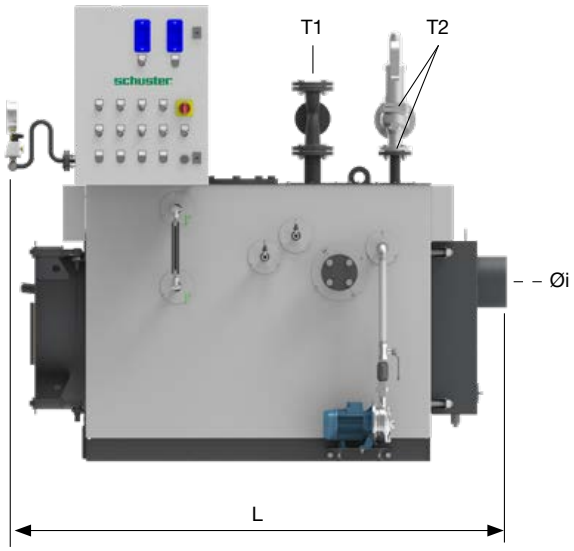
Efficiency up to 90%, in function of working pressure of the boiler.

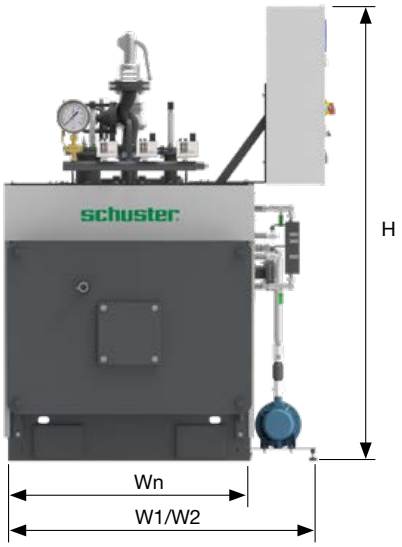
ESALU PIPES

The ESALU smoke pipes suitable for gas and ESALU with PolySil nanotechnological treatment suitable for light oil fuel, constituting the tube bundle, allow to reach a very high thermal exchange. They are formed by pipes with, inside, special inserts of different types and shapes. The adoption of the ESALU pipes allowed to reach high performances in terms of efficiency, with important reduction in terms of running costs, fuel consumption and polluting emissions.

Efficiency up to 95% with gas and 93% with Light oil fuel, in function of working pressure of the boiler.

DIMENSIONS





Model	Wn	W1/W2	L	H	Øi	T1	T2 IN/OUT	Empty weight
	mm	mm	mm	mm	mm			kg
100	885	1243	1622	1878	224	1” 1/4	DN25/DN40	550
150	1043	1413	1984	1956	224	2”	DN32/DN50	780
250	1043	1413	1984	1956	224	2”	DN32/DN50	780
300	1124	1427	2240	2048	224	DN65	DN40/DN65	1230
400	1124	1427	2240	2048	224	DN65	DN40/DN65	1230
500	1246	1550	2458	1892	224	DN80	DN50/DN80	1430
600	1246	1550	2458	1892	224	DN80	DN50/DN80	1430
800	1393	1695	2826	2003	254	DN100	DN65/DN100	2060
1000	1393	1695	2826	2003	254	DN100	DN65/DN100	2060