

DE OR 12



HIGH PRESSURE STEAM BOILER, THREE PASS REVERSE FLAME, 90% EFFICIENCY

RANGE	from 204 kW (300 kg/h) to 4089 kW (6000 kg/h)							
TYPE	OR							
	smooth pipe							
FUEL	gas, light & heavy oil							
DESIGN PRESSURE	12 bar (higher pressure on request)							
MODELS	300	400	500	600	800	1000	1250	1500
	1750	2000	2500	3000	3500	4000	5000	6000

DESCRIPTION

High pressure steam boiler, three pass reversed flame, smooth pipes with turbulators, 90% efficiency ⁽¹⁾.

DE 12 is a family of packaged smoke tube steam boilers, three pass reversed flame, wet back. Standard safety pressure up to 12 bar (higher pressure available on request) and output from 300 to 6000 kg/h. It can be operated with liquid or gaseous fuels. Every model is complete with regulations and safety accessories for automatic operation and easy commissioning.

In compliance to the current laws, each steam boiler undergoes a conformity assessment, carried out by a Notified Body. The conformance to the essential safety requirements demanded by the European Pressure Equipment Directive 2014/68/UE (PED) is guaranteed by the CE mark.

Design features:

By means of the reverse flame principle the smoke gases in the combustion chamber are diverted to the front, then reversed again to the smoke tube sections and discharged through the chimney connection. The appliance is designed to ensure low heating loads in the combustion chamber and low superficial loads.

- **Boiler body:** is made up of a cylindrical shell and a wet back furnace, made of high quality steel. All the materials have certificates attesting their chemical and mechanical characteristics, the controls are carried out during each production stage, and, their suitability for use as well. The welding seams are carried out by qualified personnel in compliance to certified procedures and are subjected to Non Destructive Tests, in accordance to an internal "Manufacturing and Control" program. Once the boilers have been manufactured they are subjected to hydraulic testing in accordance to the requirement 7.4 – Annex I, laid down in the Directive 2014/68/UE (PED).
- **Smoke tubes:** made of high quality steel, are welded to tube plates. Pipes are equipped with helical turbulators.
- **Front door:** is built in welded steel plate, completely clad internally with a layer of insulation material and with a layer of high density refractory material. The door is fitted with hinges which enable it to be easily adjusted and quickly opened. Moreover, the door is fitted with a self-cleaning sight glass for combustion control during boiler operation.
- **Rear smoke-box:** is built in welded steel plate and fixed on to the tube plate by nuts for an easy access to it. It is fitted with a small door for cleaning purposes and the horizontal flue connection (vertical on request), with a diameter sized to the boiler's output. The rear smoke-box can be accessorized with an external economizer.
- **The base:** is built with a steel frame, welded to the tube plates and closed with steel plates.
- **Walkway:** positioned on the top part of the boiler, is made of steel, covered with chequered plate and completed; on request with handrail and access ladder.
- **Insulation:** the shell is thermally insulated with a 100 mm rock wool cladding bonded with high density, thick thermosetting resins, suitably supported and covered externally in 10/10 thick enamelled aluminum.

Standard equipment: ⁽²⁾

- Steam main globe valve.
- 2 spring loaded safety valves.
- n. 2 reflecting level indicators, with flanged connections, purging and cut-off cocks.
- n. 1 large manometer with 3 way cock for manometer calibration.
- n. 1 safety pressure switch with manual reset onto the board panel, CE PED certified.
- n. 1 limit working pressure switch.
- n. 1 regulation pressure switch for two stages burners or probe for modulating burners.
- n. 2 safety minimum level switches, with manual reset CE certified.
- n. 2 water level probes for ON-OFF pump regulation.
- Feeding group complete with 2 vertical multistage centrifugal pumps.
- Valve assembly for feeding circuit, with relevant pipes already fitted.
- Automatic group for level control.
- n. 1 manual bottom blowdown valve.
- Man-hole on top and hand-hole on water side.
- Integral steam drier for high steam quality.
- Blind burner plate.
- Carbon steel turbulators.
- Lifting lugs.
- Control board panel IP55 400V - 3+N - 50Hz
- Document folder enclosing:
 - Manufacturer's Declaration of Conformity in compliance with the Annex VII of the European Directive 2014/68/UE (PED)
 - Installation, operation and service manuals.
 - Certificates of safety components.
 - Control board's electric schemes and related Declaration of Conformity.
 - Water characteristics: requirements concerning the quality of water supply, the water in the boiler, frequency and type of sample tests to do.

Options:

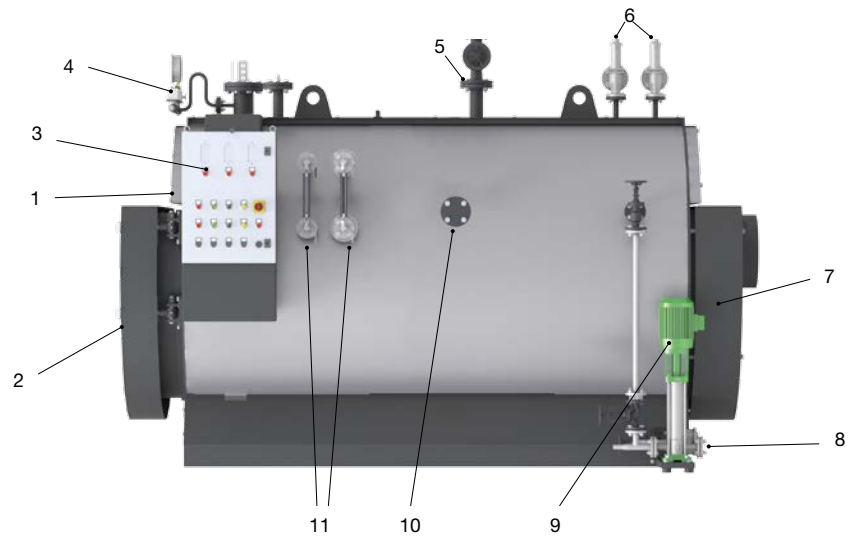
- Kit of "Second boiler water feeding pump"
- Kit of "maximum safety level"
- Kit TDS (Total Dissolved Salts)
- Kit of "Automatic de-sludging" (Blow down)
- Kit "72 hr" Supplied with electronic board panel Schuster, model IML (Industrial Multi Logic) or Schuster IMC
- Kit EC (gas) / Kit EC (oil)
- Pre-drilled burner plate according to request
- Oil or gas fired burner
- Emergency boiler water feeding group (steam injector)

(1) This value is intended without economizer and may change according working pressure and load conditions.

(2) The quantity and the model may vary according to the configuration.

MAIN COMPONENTS

1. Boiler body
2. Front door
3. Board panel
4. Instruments assembly
5. Steam valve
6. Safety valves
7. Rear smoke chamber
8. Drain
9. Pump feeding group
10. TDS connection
11. Level gauge



TECHNICAL DATA

Model	Steam production	Nominal output *	Nominal input OR **	Max. working pressure	Water content at level	Total volume	ΔP smoke side	Burner head min. length	Burner head max. dia.
	kg/h	kW	kW	bar	l	l	mbar	mm	mm
300	300	204	226.7	12	540	730	2.2	340	210
400	400	273	303.3	12	540	730	2.6	340	210
500	500	341	378.9	12	820	1030	2.8	340	240
600	600	409	454.4	12	820	1030	3.5	340	240
800	800	560	622.2	12	1080	1500	3.8	380	240
1000	1000	700	777.8	12	1080	1500	4.2	380	240
1250	1250	852	946.7	12	1555	2195	4.5	400	280
1500	1500	1022	1135.6	12	1555	2195	5.1	400	280
1750	1750	1193	1325.6	12	2005	2810	5.5	420	280
2000	2000	1363	1514.4	12	2005	2810	6.0	420	280
2500	2500	1704	1893.3	12	2890	3950	6.8	420	360
3000	3000	2045	2272.2	12	2890	3950	7.0	420	360
3500	3500	2386	2651.1	12	3370	4600	7.3	450	360
4000	4000	2726	3028.9	12	4155	5780	8.0	450	400
5000	5000	3408	3786.7	12	5800	7730	8.8	450	400
6000	6000	4089	4543.3	12	6760	8600	8.8	450	420

* with feeding water temperature = 80°C and pressure = 12 bar

** According working pressure and load conditions

PRODUCT PLUS VALUES

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 DOOR OPENING

hinges and closing bolts adjustment in all directions

PLATFORM

in checker plate, placed in the upper part

SIMPLIFIED ELECTRICAL CONNECTION

via fast coupling connectors (optional)

BOARD PANEL

electromechanical or electronic, expandible (optional)

POSSIBLE COMBINATION

with one, two, three stage or modulating burners

IMPLEMENTABLE FUNCTIONS

boiler and board panel designed for the integration of optional kits, also with boiler already installed

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.

They are standard supplied for gas, light and heavy oil operation.

TYPE OF PIPES

SMOOTH PIPES

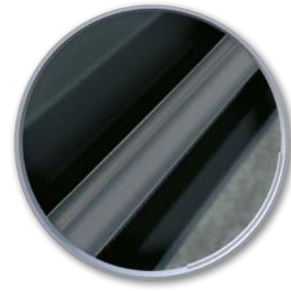
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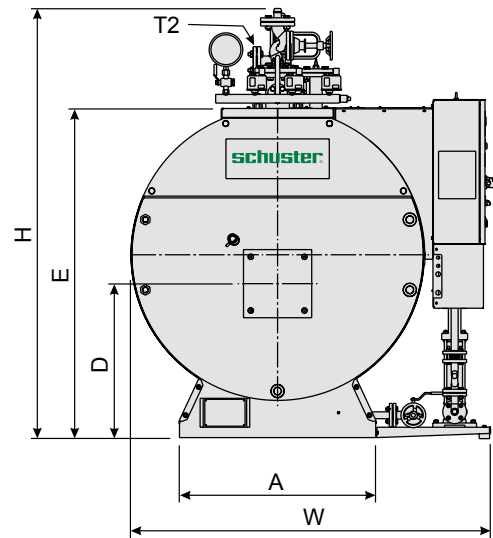
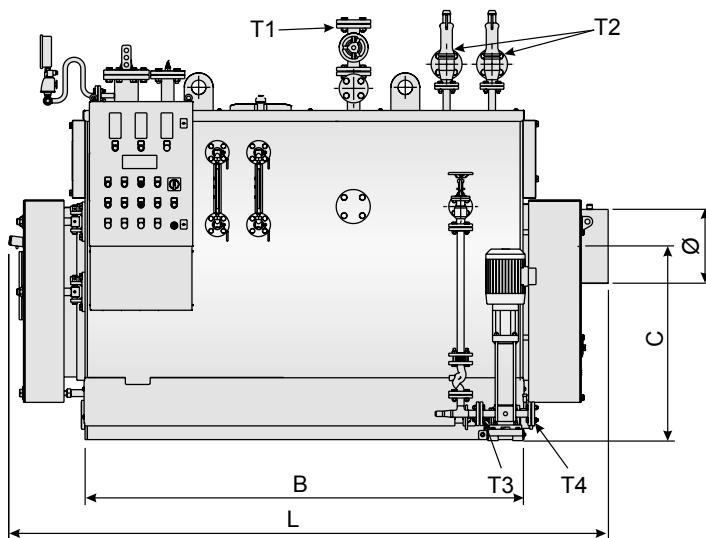
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Efficiency up to 90%.

In function of working pressure of the boiler.



DIMENSIONS



Model	W	L	H	A	B	C	D	E	Ø	T1	T2	T3	T4	Empty weight	Total weight
	mm	mm	mm	mm	mm	mm	mm	mm	mm					kg	kg
300	1474	2320	1820	780	1550	815	635	1333	219	DN32	DN40	DN25	DN25	1620	2145
400	1474	2320	1820	780	1550	815	635	1333	219	DN32	DN40	DN25	DN25	1620	2145
500	1861	2530	1940	860	1750	880	695	1453	258	DN40	DN40	DN25	DN25	2010	2770
600	1861	2530	1940	860	1750	880	695	1453	258	DN40	DN40	DN25	DN25	2010	2770
800	1996	2900	2077	950	2120	935	745	1593	358	DN50	DN40	DN25	DN25	2830	3910
1000	1996	2900	2077	950	2120	935	745	1593	358	DN50	DN40	DN25	DN25	2830	3910
1250	2126	3259	2294	1090	2526	1015	860	1783	408	DN65	DN40	DN25	DN25	3710	5265
1500	2126	3259	2294	1090	2526	1015	860	1783	408	DN65	DN40	DN25	DN25	3710	5265
1750	2246	3559	2422	1200	2750	1170	905	1918	408	DN65	DN40	DN25	DN40	4610	6615
2000	2246	3559	2422	1200	2750	1170	905	1918	408	DN65	DN40	DN25	DN40	4610	6615
2500	2296	3640	2774	1470	2830	1405	1080	2243	508	DN80	DN40	DN32	DN40	6560	9450
3000	2296	3640	2774	1470	2830	1405	1080	2243	508	DN80	DN40	DN32	DN40	6560	9450
3500	2296	4140	2774	1470	3330	1405	1080	2243	508	DN80	DN40	DN32	DN40	7650	11020
4000	2756	4107	3031	1700	3300	1500	1170	2473	608	DN100	DN40	DN32	DN40	8980	13135
5000	2856	4590	3173	1800	3800	1525	1195	2548	658	DN125	DN50	DN32	DN40	10540	16340
6000	3026	4810	3315	1850	4003	1600	1210	2618	658	DN150	DN50	DN40	DN40	11750	18510