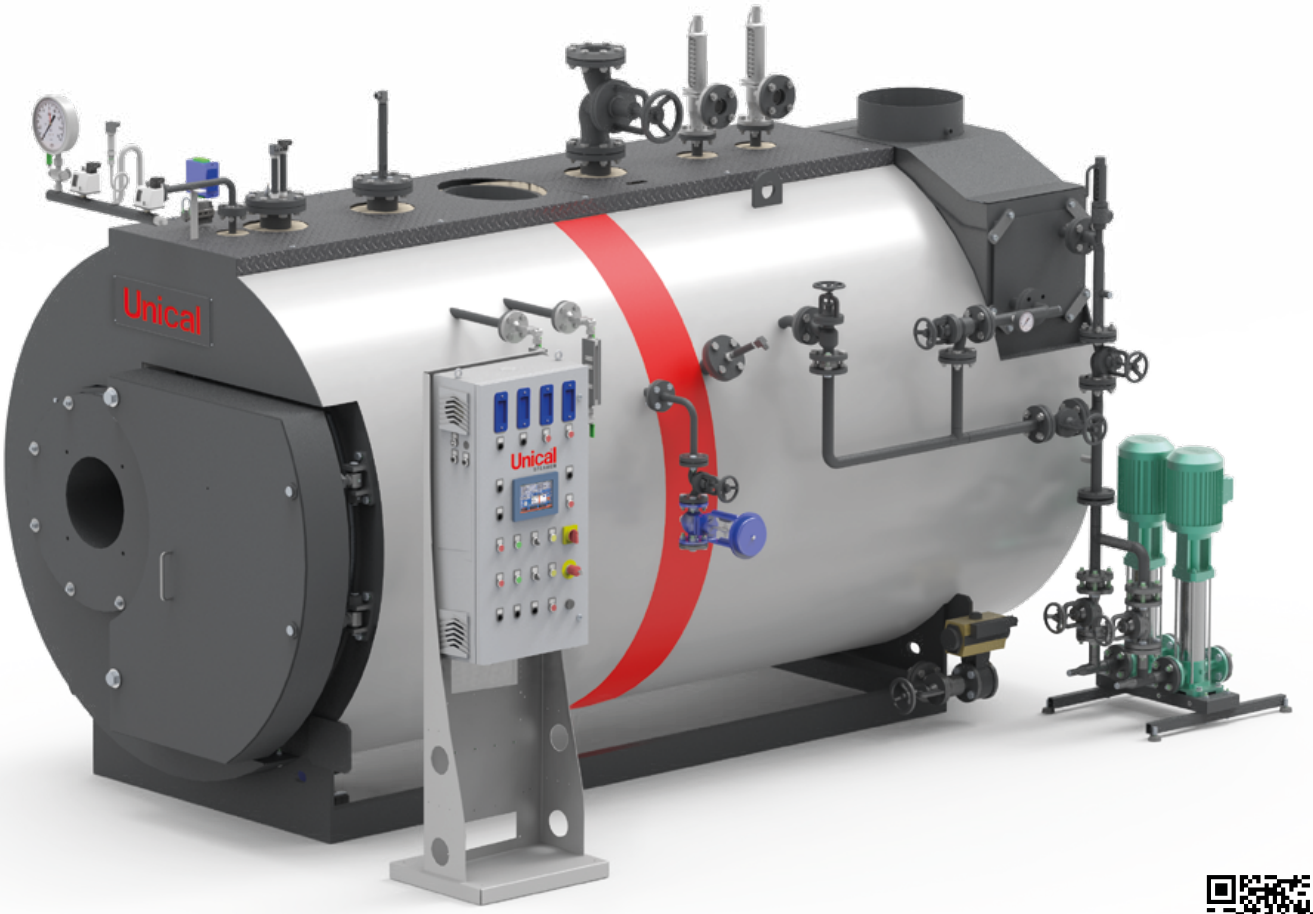
Unical

BAHR’12 3G



HIGH PRESSURE PACKAGED STEAM BOILER, GENUINE THREE PASS FIRETUBE, EFFICIENCY UP TO 96%					
OUTPUT RANGE	from 547 kW (800 kg/h) to 2728 kW (4000 kg/h)				
TYPE	STD		HP		
	smooth pipe		HP pipe		
FUEL	gas, light & heavy oil		gas		
DESIGN PRESSURE	12 bar (higher pressure on request)				
MODELS	800	1000	1250	1500	1750
	2000	2500	3000	3500	4000

DESCRIPTION

High pressure monobloc steam generator, with 3 effective smoke passes, horizontal, efficiency 90% (1) for the OR version, 94% (1) for the HP version, and up to 96% (1) for the EC versions

Thanks to the large evaporating chamber optimally sized, the title of the saturated steam leaving the generator is of the highest quality.

General characteristics:

The 3 effective smoke passes generator consists of a horizontal cylindrical furnace in which the flame develops, an inversion chamber, a first tube bundle (second pass) and a second tube bundle (third pass), to optimize heat exchange and emissions. Thanks to the large evaporating chamber, optimally sized, the title of the saturated steam leaving the generator is of the highest quality.

The appliance is sized to ensure low thermal loads and low polluting emissions (when equipped with Low NO_x burner)

- **Boiler body:** designed in compliance with the EN 12953-3: 2016 standard with set-in type tube plates, it is made up of cylindrical outer shell, furnace, inversion chamber and flat tube plates in quality steel, in compliance with current technical standards. The body is equipped with 2 still pipes diam. 100 mm for housing all safety and control devices.
  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. The welds are carried out according to procedures approved by suitably qualified personnel and subjected, in accordance with an internal "Manufacturing and Control" plan to Non-Destructive Testing. Upon completion of manufacturing, each pressurized body is subjected to testing by carrying out the hydraulic test in accordance with requirement
  7.4 - Annex 7 of the PED Directive 2014/68 / EU
- **Smoke tubes,** making up the quality steel tube bundle, are welded to the tube plates using qualified automatic procedures. Finally, the tubes are headed by counterbore eliminating the protrusions from the plate. They are equipped with helical turbulators (STD versions), or special Unical patented ESALU turbulator composed of a combination of aluminum inserts (HP).
- **Rear reversing chamber:** built in welded steel sheet.
- **Front door:** built in welded steel sheet, internally lined with layers of insulating and refractory cement. Mounted on hinges that allow a quick opening.
- **Rear smoke-chamber:** built in welded steel sheet covered externally with a layer of insulating material.
  It is equipped with a pipe inspection and cleaning door, a horizontal axis flue gas connection (vertical on request) with a diameter suitable for the power of the generator.
  Prepared for connection to a removable internal economizer.
- **Basement:** it consists of a frame made of steel sections, electro-welded to the tube plates and boxed by means of welded steel sheets.
- **Service walkway:** located in the upper part of the generator, it consists of a steel profile frame, covered with checkered plate on the walkway floor and (on request) completed by a parapet with handrail and access ladder compliant with the EN ISO 14122 standard.
- **Insulation:** the thermal insulation of the outer shell is obtained with a 100 mm thick rock wool mattress, bonded with high density thermosetting resins, supported and protected externally by a 10/10 mm thick painted sheet metal casing.

Composition of the standard supply: (2)

- n. 1 steam outlet shut-off flow valve.
- n. 2 spring-loaded safety valves.
- n. 2 reflective level indicators, with flanged connections, shut-off and drain valves.
- n. 1 large dial pressure gauge with 3-way tap for sample pressure gauge.
- n. 1 safety pressure switch with manual reset from the electrical panel, CE PED certified.
- n. 1 limit pressure switch.
- n. 1 regulation pressure switch for 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 from the control panel, CE certified.
- n. 2 low water level safety probes, with self-diagnosis, with manual reset from the control panel, CE certified.
- n. 1 vertical centrifugal pump for water loading
- Water supply circuit with started flow shut-off valve, downstream of the pump, and disc check valve
- n. 1 water drain / sludge discharge unit with quick opening manual valve.
- Manhole 420x320 mm in the upper part and a DN150 inspection port in the lower part of the outer shell.
- Moisture separator on the steam outlet, for a high titre steam
- Blank burner plate (on request it can be drilled according to customer specifications)
- Turbulators in steel, aluminum or steel + aluminum, depending on the model
- Lifting eyebolts
- Electrical panel board, IP55 400V - 3 + N - 50Hz
- Standard documentation supplied (3):
  - EC declaration of conformity of:
  - pressure equipment (boiler body)
  - pressure equipment safety valve(s).
  - pressure equipment safety pressure switch
  - pressure equipment minimum level safety probes
  - electrical panel (if supplied)
  - feed pump/s (if supplied)
  - economizer (if provided)
  - economizer safety valve (if supplied)
  - warranty
  - manufacturer's declaration concerning the operation of the pressure equipment
  - installation, use and maintenance manual for the boiler and any accessories provided
  - drawing of the steam generator completely equipped
  - wiring diagram of the electrical panel (if supplied)

(1) This value is intended with an economizer and may vary according to the operating pressure and load.

(2) Quantities, types or models may vary according to the offered configuration.

(3) The above documentation will be provided in electronic format, except for the use and maintenance manual which will be supplied in paper format together with the equipment

OPTIONAL ACCESSORIES

Options:

- "Second boiler water feed pump" kit
- "Inlet water filter" kit
- EC kit: integrated economiser, extractable from the side (instrument side) to further increase the value the efficiency of the generator, without affecting the dimensions, equipped with connection pipes and downstream thermometer.
  The EC economizer kit is specific to each model and is available for both, gas and diesel versions.
  Upon request: pressure gauges upstream and downstream of the economizer, upstream thermometer, wafer type ball valves of shut-off and by-pass, safety valve.
- "Maximum level safety" kit
- "TDS" kit
- "Automatic bottom drain" kit
- Burner plate drilled according to burner requirements
- Burner

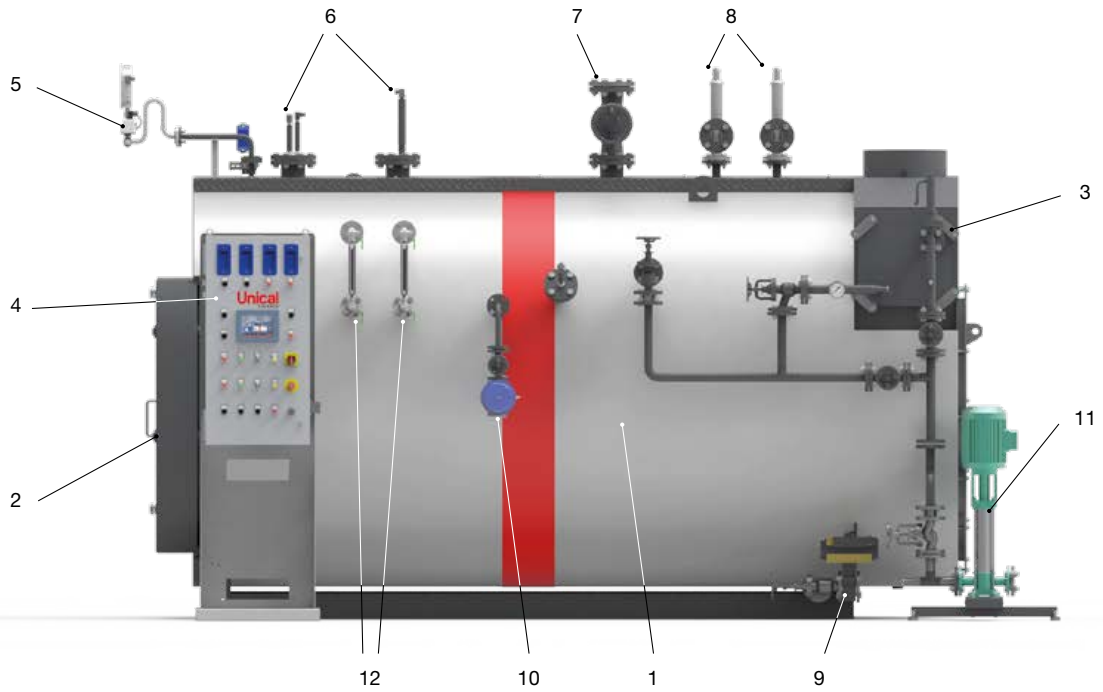
Special versions

BAHR'12 3G 24 hr / 72 hr

- equipped with dedicated panel and "24 hr KIT" to obtain the certification to operate "without continuous supervision" up to a maximum of 24 hours
- equipped with dedicated panel and "72 hr KIT" to obtain certification to operate "without continuous supervision" up to a maximum of 72 hours

MAIN COMPONENTS

1. Boiler body
2. Front door
3. Rear smoke chamber
   (with optional integrated removable economizer)
4. Electric panel board
5. Instruments assembly
6. Level safety sensors
7. Steam valve
8. Safety valve
9. Automatic bottom blow down (optional)
10. Salinity control (optional)
11. Feed water pump
12. Water level indicator

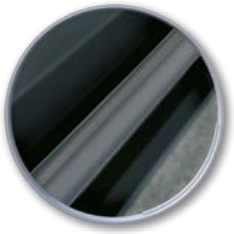


TECHNICAL DATA

Model	Steam production *	Nominal output	Nominal input STD **	Nominal input HP **	Water content at level	Total volume	ΔP smoke side STD	ΔP smoke side HP	Burner head min. length
	kg/h	kW	kW	kW	l	l	mbar	mbar	mm
800	800	547	607.8	581.9	2310	3040	3	4	350
1000	1000	682	757	725	2310	3040	3	5	350
1250	1250	853	947	906	2630	3428	4	5	350
1500	1500	1022	1136	1088	2867	3524	4	6	350
1750	1750	1193	1326	1269	3670	4580	4	7	350
2000	2000	1363	1514	1450	3920	4883	4	9	350
2500	2500	1704	1893	1813	4050	5100	6	12	350
3000	3000	2045	2272	2175	4785	5955	8	13	350
3500	3500	2385	2650	2538	4961	6143	9.5	15	350
4000	4000	2726	3029	2900	5440	6720	11.5	18	350

*with feeding water temperature = 80°C ** According working pressure and load conditions

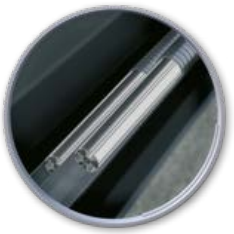
TYPE OF PIPES



SMOOTH PIPES

The smooth smoke pipes, constituting the tube bundle, suitable for gas, light and heavy oil operation, 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.



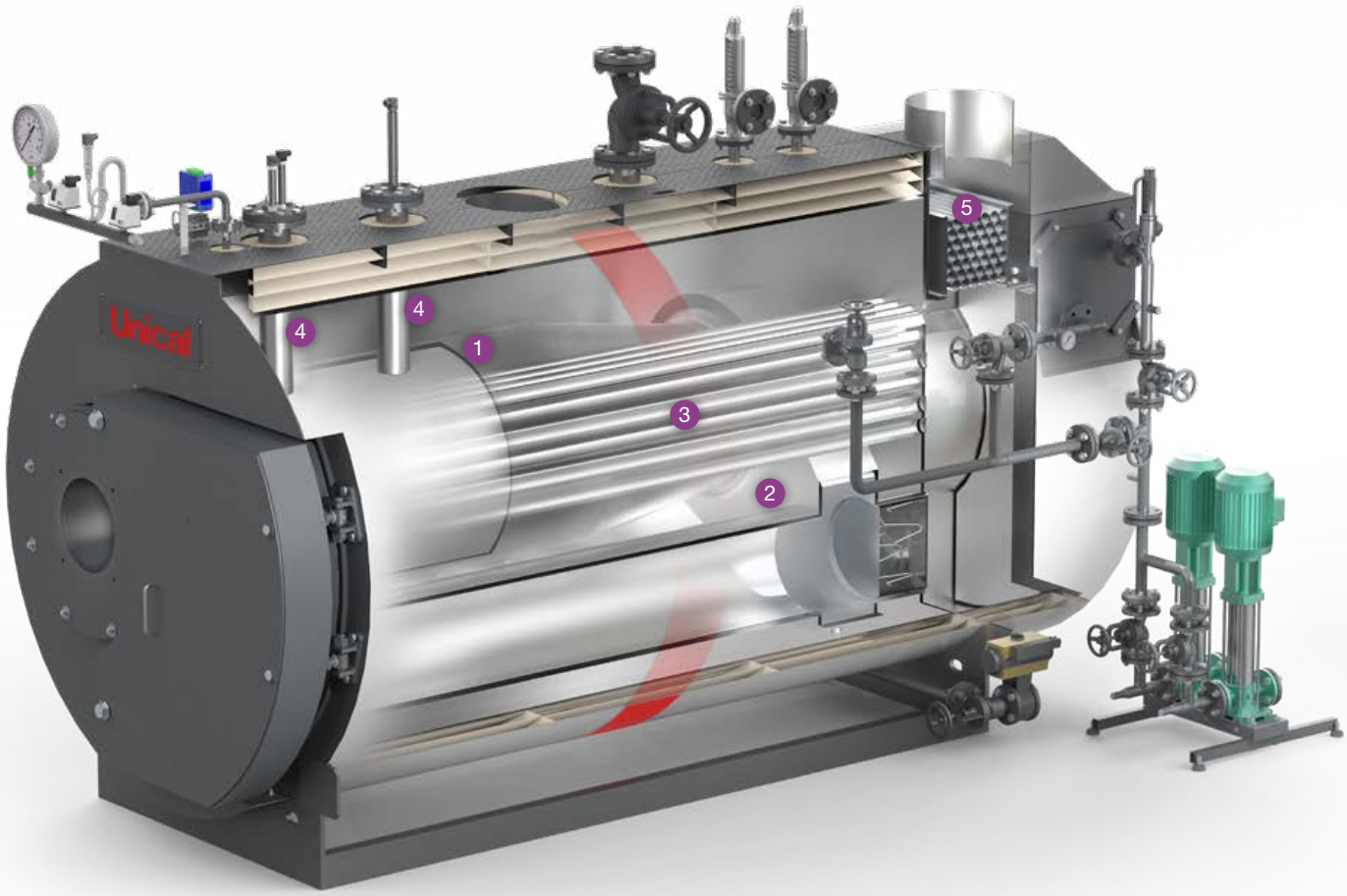
HP PIPES

The HP smoke pipes (UNICAL patent), constituting the tube bundle, suitable for gas and light oil operation, increase the thermal exchange and allow the removal of the residual combustion products. They are formed by pipes with, inside, six 60° sectorial pipes. The adoption of the HP 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 94%
in function of working pressure of the boiler.

PRODUCT PLUS VALUES

- **Low NO_x EMISSION < 80 mg/kWh**
  thanks to 3 pass and Low NO_x burner (on request)
- **HIGH EFFICIENCY**
  thanks to the 3 pass design and the possibility to install economizers (optional)
- **FRONT AND REAR DOORS**
  can be opened without removing the burner and the flue for inspection and cleaning of the tube bundles
- **ELECTRIC PANEL BOARD**
  electromechanical or electronic, expandible with optional kits
- **24/72 HOUR UNATTENDED OPERATIONAL**
  by the means of specific equipment
- **UPPER PLATFORM WALKWAY**
- **IMPLEMENTABLE FUNCTIONS**
  boiler and board panel designed for the integration of optional kits, also with boiler already installed
- **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

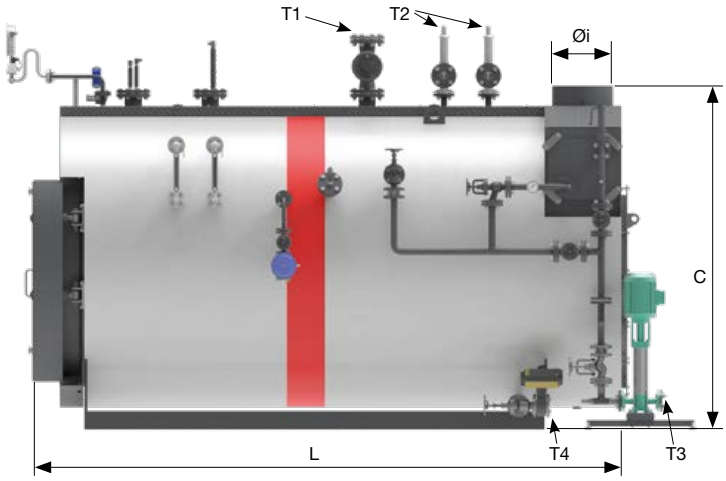


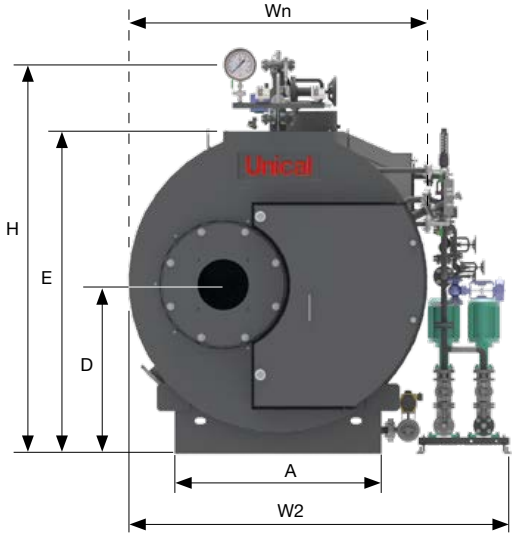
IML electric panel board

Very thick high quality insulation

1. Furnace
2. Inversion chamber
3. Tube bundles
4. Still water pipe
5. Economizer tube bundle (optional)

DIMENSIONS





Modello	Wn	W2	L	H	A	C	D	E	Øi	T1	T2	T3	T4	Empty weight (vers. STD)	Total weight (vers. STD)
	mm	mm	mm	mm	mm	mm	mm	mm	mm	DN	DN	DN	DN	kg	kg
800	1775	2275	3305	2141	1215	1950	900	1835	254	50	25/40	25	25	4550	6860
1000	1775	2275	3305	2141	1215	1950	900	1835	254	50	25/40	25	25	4550	6860
1250	1775	2275	3455	2141	1215	1950	900	1835	304	50	25/40	25	25	4880	7510
1500	1830	2388	3530	2300	1250	2006	1025	1928	304	65	25/40	32	25	5490	8357
1750	2060	2657	3588	2565	1450	2300	1175	2200	354	65	25/40	32	40	6660	10330
2000	2060	2657	3738	2565	1450	2300	1175	2200	354	65	25/40	32	40	7100	11020
2500	2060	2740	3958	2587	1450	2300	1175	2200	404	80	25/40	32	40	7470	11520
3000	2060	2783	4298	2587	1450	2300	1175	2200	404	80	25/40	32	40	7890	12675
3500	2205	2810	4158	2773	1600	2431	1236	2353	404	100	32/50	32	40	8860	13821
4000	2205	2810	4498	2773	1600	2431	1236	2353	454	100	32/50	32	40	9380	14820

The company reserves the right to modify / adapt the technical and dimensional information of the products included in this catalog, even without notice, in order to improve the quality of the products themselves.

Unical AG S.p.A. 46033 castel d'ario - mantova - italy - tel. +39 0376 57001 - fax +39 0376 660556 - export@unical-ag.com - www.unical.eu