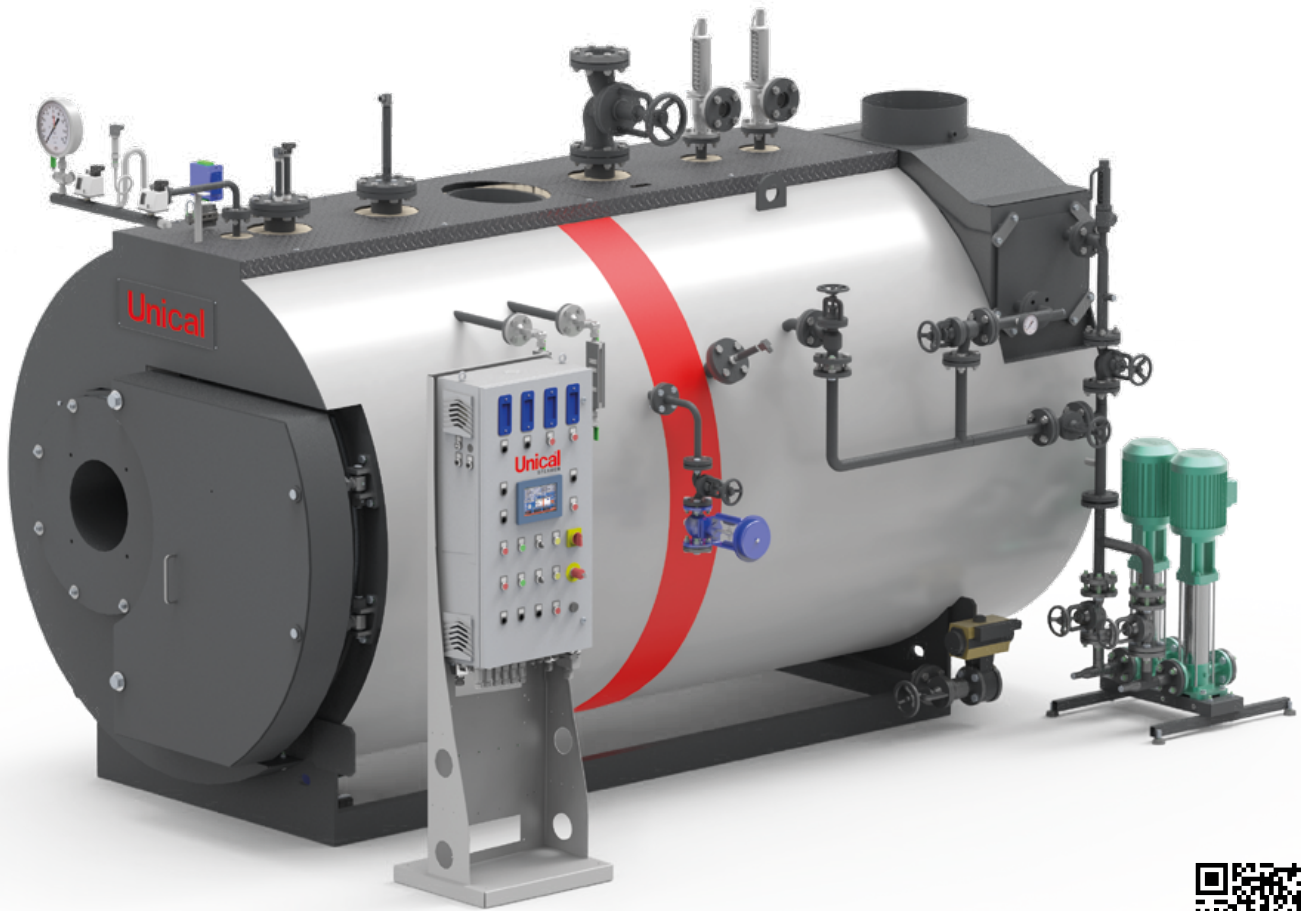


# Unical

## BAHR'12 3G



**HIGH PRESSURE PACKAGED STEAM BOILER,  
GENUINE THREE PASS FIRETUBE, EFFICIENCY UP TO 96%**

OUTPUT RANGE	from 341 kW (500 kg/h) to 2728 kW (4000 kg/h)					
TYPE	STD			HP		
	smooth pipe			ESALU pipe		
FUEL	gas, light & heavy oil			gas		
DESIGN PRESSURE	12 bar (higher pressure on request)					
MODELS	500	800	1000	1250	1500	1750
	2000	2500	3000	3500	4000	-

## DESCRIPTION

High pressure monobloc steam generator, with 3 effective smoke passes, horizontal, efficiency 90% <sup>(1)</sup> for the OR version, 94% <sup>(1)</sup> for the HP version, and up to 96% <sup>(1)</sup> 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 NOx 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 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: <sup>(2)</sup>

- 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
- Document envelope containing:
  - Manufacturer's Declaration of Conformity in accordance with Annex VII of the PED Directive 2014/68 / EU
  - Installation, Use and Maintenance Manual.
  - File of the technical documentation relating to the safety, protection, management and control devices installed (Certificates, declarations of conformity, installation, use and maintenance manuals)
  - Diagram of the characteristic curves of the electric feed pump.
  - Electrical diagram of the control panel and relative Declaration of Conformity.
  - Data sheet relating to the quality of supply / make-up and operating water, with the parameters that must be subjected to periodic checks, maximum and minimum limits of acceptability, frequency of checks and required interventions (information contained in the manual).
- Conformity of in factory tested Assembly according to B + D PED modules

### Options:

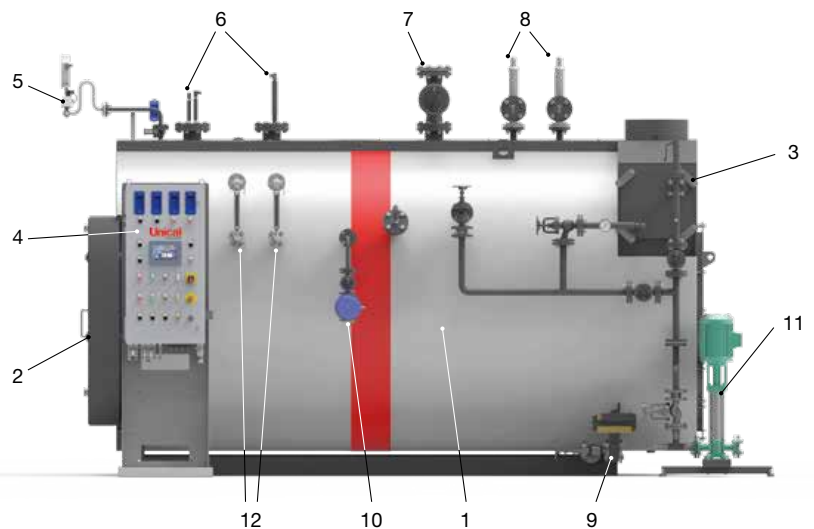
- "Second boiler water feed pump" kit
- "Feed water inlet filter" kit
- "Economizer" kit, of integrated type, laterally removable (instrumentation side), equipped with connection pipes and downstream thermometer, pressure gauges upstream and downstream of the economizer, upstream thermometer, wafer-type shut-off and by-pass ball valves pass, safety valve
- "Maximum level safety" kit
- "TDS" kit
- "Automatic bottom drain" kit
- "24 hr" or "72 hr" kit
- Burner supporting plate drilled to the customer requirements
- Burner

(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.

## 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/surface blow down (optional)
11. Feed water pump
12. Water level indicator



## TECHNICAL DATA

Model	Steam production*	Nominal output	Nominal input STD **	Nominal input HP **	Max. working pressure	Water content at level	Total volume	$\Delta P$ smoke side STD	$\Delta P$ smoke side HP	Burner head min. length
	kg/h	kW	kW	kW	bar	lt	lt	mbar	mbar	mm
500	500	341	378.9	362.8	12	1205	1800	2.5	4.5	350
800	800	547	607.8	581.9	12	1240	1950	3	5	350
1000	1000	682	757.8	725.5	12	2310	3040	6	10	350
1250	1250	853	947.8	907.4	12	2400	3220	9	13.5	350
1500	1500	1023	1136.7	1088.3	12	2867	3524	4	6	350
1750	1750	1194	1326.7	1270.2	12	3372	4282	5	7	350
2000	2000	1364	1515.6	1451.1	12	3550	4493	6	10	350
2500	2500	1705	1894.4	1813.8	12	4050	5100	7	10	350
3000	3000	2046	2273.3	2176.6	12	4783	5955	9.5	11	350
3500	3500	2387	2652.1	2539.4	12	5050	6220	9.5	13.5	350
4000	4000	2728	3031.1	2902.1	12	5259	6457	11.5	17	350

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

## PRODUCT PLUS VALUES

- **Low NO<sub>x</sub> EMISSION < 80 mg/kWh**  
thanks to 3 pass and Low NO<sub>x</sub> 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

## 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

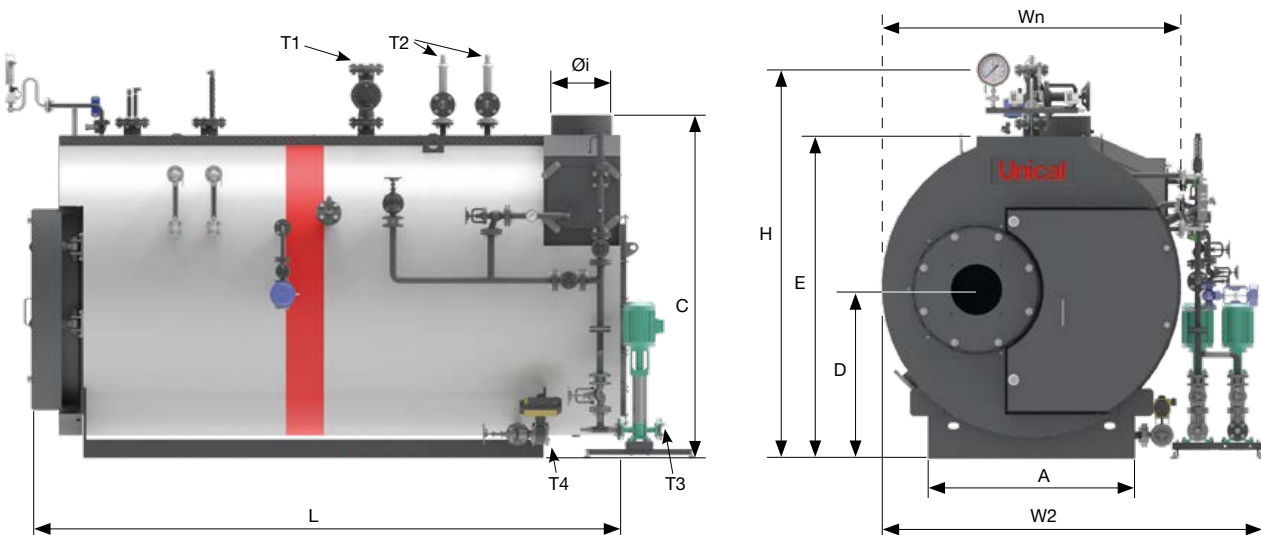
The ESALU smoke pipes (UNICAL patent), suitable for gas, constituting the tube bundle, allow to reach a very high thermal exchange. They are formed by pipes with, inside, special inserts of different types and shapes. The adoption of the ESALU pipes allowed to reach high performances in terms of efficiency,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

**Efficiency up to 94%**  
in function of working pressure of the boiler.



BREVETTO  
**Unical**  
PATENT

## DIMENSIONS



Model	Wn	W2	L	H	A	C	D	E	Øi	T1	T2	T3	T4	Empty weight	Total weight
	mm	mm	mm	mm	mm	mm	mm	mm	mm	DN	DN	DN	DN	kg	kg
500	1775	2275	3455	2141	1215	1950	900	1840	254	40	40	25	25	2600	3805
800	1775	2275	3455	2141	1215	1950	900	1840	254	50	40	25	25	3000	4240
1000	1775	2275	3455	2141	1215	1950	900	1840	254	50	40	25	25	4825	7135
1250	1840	2275	3455	2141	1215	1950	900	1840	304	65	40	25	25	4878	7278
1500	1840	2388	3630	2300	1250	2050	1025	1925	304	65	40	40	25	5692	8559
1750	2062	2850	3588	2588	1250	2050	1025	1925	354	65	40	40	25	6660	10032
2000	2062	2724	3738	2565	1450	2400	1175	2200	354	65	40	40	25	7287	10837
2500	2062	2513	3958	2584	1450	2400	1175	2200	404	80	40	40	32	7471	11521
3000	2062	2593	4343	2586	1450	2400	1175	2200	404	80	40	40	32	7892	12675
3500	2205	2593	4158	2770	1600	2450	1215	2330	404	80	50	40	32	8680	13730
4000	2205	2810	4498	2773	1600	2450	1215	2330	454	100	50	40	32	9000	14259

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.