

**schuster**

# TOX 2200÷10200



## GENUINE THREE-PASS HOT WATER BOILER

OUTPUT RANGE

from 2200 to 10200 kW

WORKING TEMPERATURE

up to 110°C (safety temperature)

FUEL

natural gas, LPG, light oil, heavy oil jet burners

Low NO<sub>x</sub>  
version MODELS

2200

3050

3800

5000

6300

7500

9500

STD  
version MODELS

2500

3500

4500

5800

7000

8500

10200

CERTIFICATION IN OUTPUT RANGE / Low NO<sub>x</sub> emissions

## DESCRIPTION

Genuine three-pass hot water boiler with wet bottom, horizontal design.

TOX series is a family of packaged smoke tube hot water boilers, designed for a maximum safety pressure up to 6 bar (higher pressure available on request). The range includes different models with an output from 2200 to 10200 kW.

### General features:

The generator with 3 effective smoke passes is made up of a cylindrical furnace with a wet bottom, in which the flame develops and runs through the furnace (1st smoke pass) and, at the bottom, through the inversion chamber, enters the tube bundle of the 2nd smoke pass. The fumes return to the front where they enter the tube bundle of the 3<sup>rd</sup> smoke pass. Exiting the tube bundle, the fumes are collected in the rear chamber and conveyed to the chimney.

■ **Boiler body:** the components of the boiler body, outer shell, furnace, inversion chamber, tube plates and tube bundle are made of quality steel in accordance with current regulations. 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 inversion chamber is made with flat tube plates. The welded joints are carried out according to procedures approved by suitably qualified personnel. Once manufacturing is complete, each pressure carrying part is subjected to testing by carrying out the hydraulic test.

■ **Smoke pipes:** making up the quality steel tube bundle, are welded to the tube plates by means of qualified automatic procedures. Finally, the pipes are headed by counterbore eliminating the protrusions from the plate.

■ **Front door:** made of steel sheet, hermetically sealed against fumes leakage, is internally lined with refractory insulating concrete.

■ **Rear smoke chamber:** made of steel sheet, is insulated by casting of suitable material, it is complete with horizontal flanged connection for flue gas evacuation and with inspection and cleaning doors.

■ **Base:** it consists of a frame in steel profiles electro-welded to the tube plates.

■ **Insulation of the outer shell:** thermal insulation is ensured by a mineral wool mattress, externally protected by an aluminum foil (stainless steel on request).

### Composition of the standard supply: <sup>(1)</sup>

- Plate for burner mounting, complete with sight flame (with drilling on request).
- Lifting eyebolts
- Document envelope containing:
  - Installation, Use and Maintenance Manual.
  - Data sheet relating to the quality of the 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).

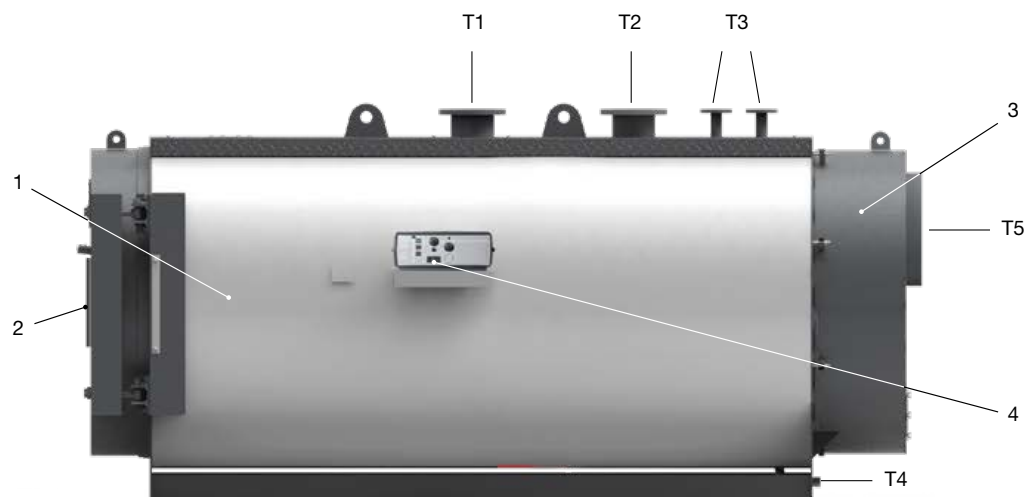
(1) The quantity and the model may vary according to the offered configuration.

### Optional components:

- Economizers for the recovery of the residual heat of the fumes leaving the boiler, available in the versions for gas or light oil.
- Condensers for the recovery of the latent heat of the fumes leaving the boiler, available only in the gas versions.

## MAIN COMPONENTS

1. Boiler body
  2. Front door
  3. Rear smoke chamber
  4. Board panel
- T1. Flow
  - T2. Return
  - T3. Expansion vessel connection
  - T4. Boiler drain
  - T5. Chimney connection



## TECHNICAL DATA (STD version)

TOX STD	Nominal output	Nominal input	Efficiency at full load	Efficiency at part load (30%)	Water content	$\Delta P$ smoke side	Design pressure	Empty Weight	CONNECTIONS (Ø)			
	kW	kW	%	%	lt	mbar	bar	kg	T1/T2 ø mm	T3 ø mm	T4 ø mm	T5 ø mm
2500 STD	1800÷2500	1951÷2753	92.25÷90.8	94.25÷92.8	3790	3.8÷7.5	6	5500	200	50	1"1/2	574
3500 STD	2350÷3500	2537÷3848	92.64÷90.95	94.64÷92.95	4750	7.5÷8.0	6	7000	200	65	1"1/2	624
4500 STD	3000÷4500	3239÷4950	92.62÷90.9	94.62÷92.9	6400	3.6÷8.5	6	8200	250	80	1"1/2	664
5800 STD	4000÷5800	4324÷6381	92.5÷90.9	94.5÷92.9	8060	4.4÷9.5	6	10000	250	80	1"1/2	664
7000 STD	5100÷7000	5528÷7705	92.25÷90.85	94.25÷92.85	9760	4.9÷9.5	6	11500	250	100	1"1/2	724
8500 STD	5700÷8500	6169÷9377	92.4÷90.65	94.4÷92.65	11480	4.8÷11	6	13500	250	100	1"1/2	824
10200 STD	8400÷10200	9128÷11192	92.02÷91.14	94.02÷93.14	14960	8.3÷12.5	6	17300	300	100	1"1/2	824

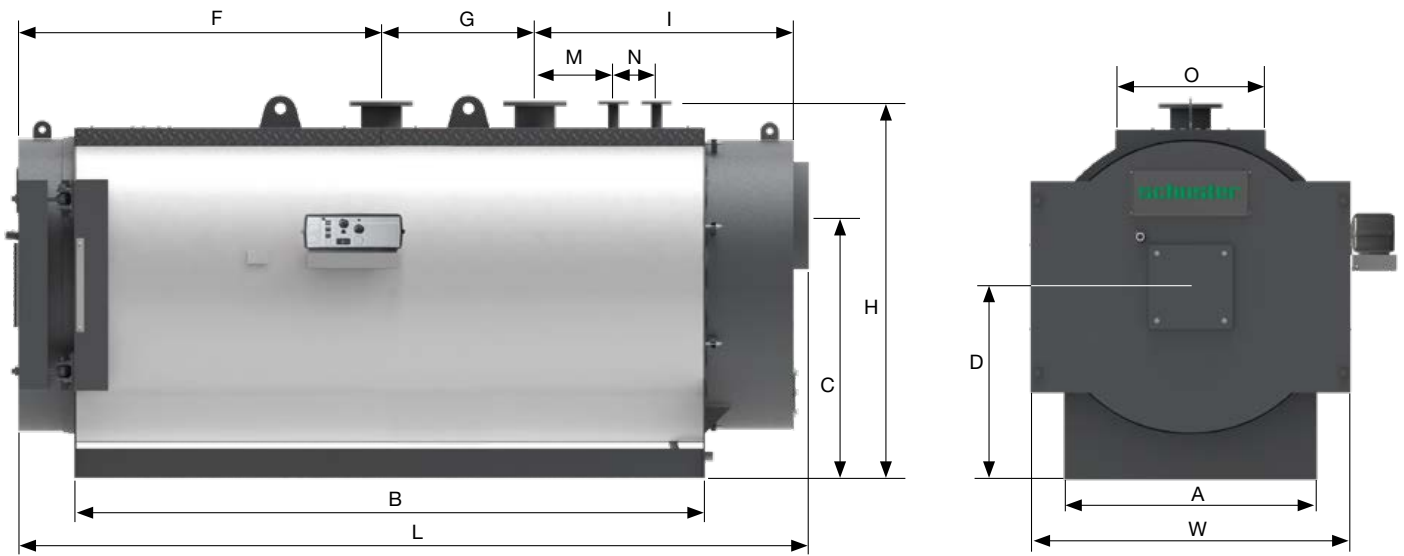
## TECHNICAL DATA (Low NOx version)

TOX Low NOx	Nominal output	Nominal input	Efficiency at full load	Efficiency at part load (30%)	Water content	$\Delta P$ smoke side	Design pressure	Empty Weight	CONNECTIONS (Ø)			
	kW	kW	%	%	lt	mbar	bar	kg	T1/T2 ø mm	T3 ø mm	T4 ø mm	T5 ø mm
2200 Low NOx	1800÷2200	1951÷2406	92.25÷91.45	94.25÷93.45	3790	3.8÷5.7	6	5500	200	50	1"1/2	574
3050 Low NOx	2350÷3050	2537÷3329	92.64÷91.62	94.64÷93.62	4750	3.5÷6.0	6	7000	200	65	1"1/2	624
3800 Low NOx	3000÷3800	3239÷4144	92.62÷91.7	94.62÷93.7	6400	3.6÷6.0	6	8200	250	80	1"1/2	664
5000 Low NOx	4000÷5000	4324÷5457	92.5÷91.62	94.5÷93.62	8060	4.4÷6.9	6	10000	250	80	1"1/2	664
6300 Low NOx	5100÷6300	5528÷6892	92.25÷91.41	94.25÷93.41	9760	4.9÷7.6	6	11500	250	100	1"1/2	724
7500 Low NOx	5700÷7500	6169÷8215	92.4÷91.3	94.4÷93.3	11480	4.8÷8.4	6	13500	250	100	1"1/2	824
9500 Low NOx	8400÷9500	9128÷10377	92.02÷91.55	94.02÷93.55	14960	8.3÷10.7	6	17300	300	100	1"1/2	824

## PRODUCT PLUS VALUES

- **FLEXIBILITY**  
thanks to the certification in output range
- **LOW EMISSIONS NO<sub>x</sub> < 80 mg/kWh**  
thanks to the reduction of the specific thermal load for Low NOx version and in combination with low-emission burners (available on request)
- **EMISSIONS NO<sub>x</sub> < 50 mg/kWh**  
in combination with burners equipped with flue gas recirculation (FGR)
- **SINGLE FRONT DOOR**  
with self centring closing system completely adjustable
- **DOOR INTERNAL INSULATION**  
in super light recyclable refractory concrete
- **BODY INSULATION**  
with anti-tearing mineral wool mattress
- **BOARD PANEL OR ELECTRICAL CABINET**  
thermo-mechanical or electronic
- **POSSIBLE COMBINATION**  
with one/two stage or modulating burners, operated on gas/LPG, light oil or heavy oil
- **EASY TRANSPORTATION**  
thanks to the upper lifting lugs and the strong frame side members

## DIMENSIONS

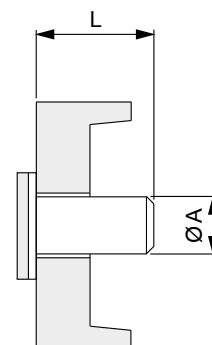


TOX STD	W	L	H	A	B	C	D	F	G	I	M	N	O
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2500 STD	1710	4225	2010	1350	3370	1400	1030	1940	820	1465	420	230	800
3500 STD	1830	4711	2120	1450	3824	1480	1080	1954	1140	1617	570	250	800
4500 STD	1980	5134	2360	1550	4174	1620	1180	2017	1380	1737	550	300	800
5800 STD	2180	5639	2580	1710	4626	1780	1300	2451	1400	1788	600	300	800
7000 STD	2320	5875	2700	1850	4840	1870	1350	2505	1510	1860	550	350	880
8500 STD	2400	6420	2870	1900	5350	1980	1460	2035	2590	1795	480	350	880
10200 STD	2650	6772	3080	2080	5632	2080	1560	1406	3450	1916	550	350	1000

TOX Low NOx	W	L	H	A	B	C	D	F	G	I	M	N	O
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2200 Low NOx	1710	4225	2010	1350	3370	1400	1030	1940	820	1465	420	230	800
3050 Low NOx	1830	4711	2120	1450	3824	1480	1080	1954	1140	1617	570	250	800
3800 Low NOx	1980	5134	2360	1550	4174	1620	1180	2017	1380	1737	550	300	800
5000 Low NOx	2180	5639	2580	1710	4626	1780	1300	2451	1400	1788	600	300	800
6300 Low NOx	2320	5875	2700	1850	4840	1870	1350	2505	1510	1860	550	350	880
7500 Low NOx	2400	6420	2870	1900	5350	1980	1460	2035	2590	1795	480	350	880
9500 Low NOx	2650	6772	3080	2080	5632	2080	1560	1406	3450	1916	550	350	1000

## BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L (min/max) mm
2200 Low NOx / 2500 STD	400	370/520
3050 Low NOx / 3500 STD	400	370/520
3800 Low NOx / 4500 STD	500	410/560
5000 Low NOx / 5800 STD	500	410/560
6300 Low NOx / 7000 STD	500	410/560
7500 Low NOx / 8500 STD	500	450/650
9500 Low NOx / 10200 STD	500	450/650



## ECONOMIZER (optional)

The economizers for the recovery of the residual heat from the smokes at the outlet of the boiler, are available as optional kits.

**Average efficiency recovery: 3 to 4%, with remarkable fuel saving.**

**Material: Carbon steel; on request stainless steel.**

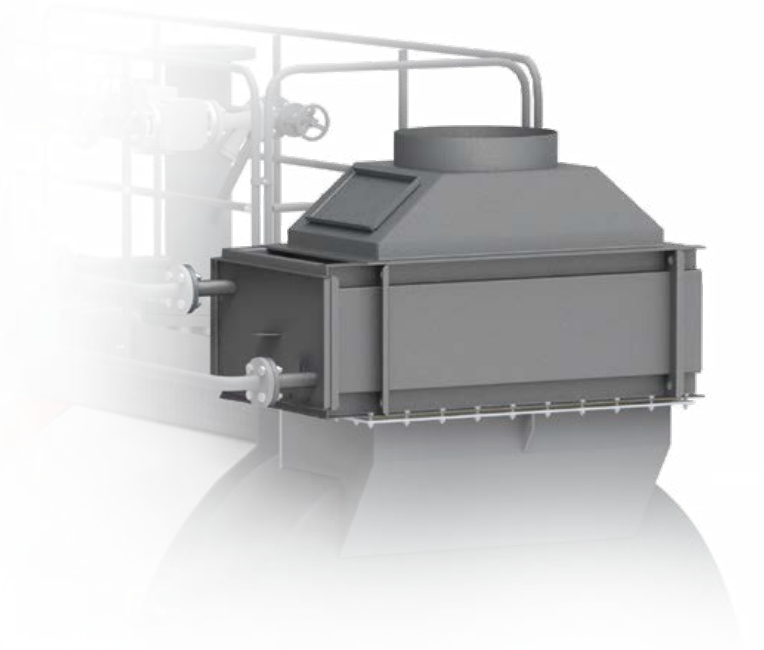
### CONSTRUCTION CHARACTERISTICS OF ECONOMIZER

Heat exchanger smoke / water with exchange battery with finned pipes suitable for operation with natural gas / LPG or light oil.

- Flanged connections for water inlet and outlet
- Box for connection boiler /chimney
- Connection for condensates drain
- Smoke temperature measuring point

The economizers are available in **two versions:**

- Version for operation with gaseous fuels
- Version for operation with light oil or dual fuel (gas & oil) burners



## CONDENSER (optional)

The condenser for the recovery of the residual heat from the smokes at the outlet of the boiler, are available as optional kits.

**Medium efficiency recovery: 6÷8% at 100% load, return temp. 60°C**

**Material: stainless steel, aluminium**

Steel pressurised boilers TOX with condenser reach four stars of efficiency ★★★★★

The inlet temperature at the boiler return connection must be > 55°C in any working conditions.

### CONSTRUCTION CHARACTERISTICS OF CONDENSER

Heat exchanger flue/water, realized in the tube bundle made of stainless steel AISI 316 L tubes:

- Flanged connections for water inlet and outlet
- Box for connection boiler/chimney
- Connection for condensate drain
- Smoke temperature measuring point



BOARD PANELS (optional)

EM	EL MM EL MB	EL CM EL CB
<p>The standard board panel EM is equipped with:</p> <ul style="list-style-type: none"> <li>• Series of switches</li> <li>• Thermometer</li> <li>• Safety thermostat</li> <li>• Two stage working thermostat</li> </ul>	<p>The board panels EL MM and EL MB, for high temperature working, are equipped with:</p> <ul style="list-style-type: none"> <li>• E8 controller</li> <li>• Lago Basic controller for burner</li> <li>• Outer temp. sensor</li> <li>• Boiler temp. sensor</li> <li>• D.H.W. storage tank temperature sensor</li> </ul>	<p>The board panels EL CM e EL CB are equipped with:</p> <ul style="list-style-type: none"> <li>• Lago Basic controller for burner</li> <li>• Boiler temperature sensor</li> <li>• Series of switches</li> <li>• Safety thermostat</li> </ul>

For TOX boilers equipped with **MODULANTING BURNERS**

How many boilers are foreseen for the installation?	Which board panel has to be ordered?
<b>Just ONE BOILER</b>	1 Board panel EL MM
<b>2 TOX in cascade</b>	1 Board panel EL MM 1 Board panel EL CM
<b>(n) TOX in cascade (maximum 8 boilers)</b>	1 Board panel EL MM (n-1) Board p. EL CM

For TOX boilers equipped with **TWO STAGE BURNERS**

How many boilers are foreseen for the installation?	Which board panel has to be ordered?
<b>Just ONE BOILER</b>	1 Board panel EL MB
<b>2 TOX in cascade</b>	1 Board panel EL MB 1 Board panel EL CB
<b>(n) TOX in cascade (max 8 boilers)</b>	1 Board panel EL MB (n-1) Board p. EL CB

For the control of boilers in cascade and for board panel with safety thermostat at 110°C, get in touch with our pre-sale office.

## ELECTRICAL CABINET BASIC\_W (opzionale)

- Management of boiler safety devices with signalling on the burner start terminal board and alarms (boiler safety devices + burner block cumulative)
- Possible anti-condensation pump management
- 3Ph - 400V - 50Hz Power supply; burner power supply, transformer for auxiliary burner power supply
- Metal containment cabinet with IP54 protection rating, size H=700, L=500, D=250, held up by ground support
- Digital control instrument for controlling operating temperatures on the panel, 0-10V or 4-20 mA input for generator set-point remote control
- Built according to European standards



## ELECTRICAL CABINET IML\_W (opzionale)

- Control PLC, 7" touch screen display (or superior) with graphic interface, remote communication via Modbus, 0-10V or 4-20 mA input for generator set-point control, etc.
- Single, two-stage and three-stage or modulating burner control
- Boiler safety devices management with alarm signals
- Possible anti-condensation pump management
- 3Ph - 400V - 50Hz Power supply; burner power supply, transformer for auxiliary burner power supply
- Metal containment cabinet with IP54 protection rating, size H=1000, L=500, D=250, held up by ground support
- Built according to European standards



## BOILER SAFETY KIT (optional)

- Instrument wood log to be mounted on the boiler flow, complete with all connections required for the on-site safety and control instrumentation and in particular:
  - pressure gauge valve with test flange
  - large dial thermometer and pressure gauge of an adequate scale
  - minimum and maximum safety pressure switch
  - manifold with siphon to position the pressure gauge and pressure switches
  - 2 manually resettable safety thermostats
- Available upon request: EC approved safety valves with adequate calibration pressure, designed to discharge the total boiler power.



## ANTICONDENSATION PUMP KIT (optional)

Composed of:

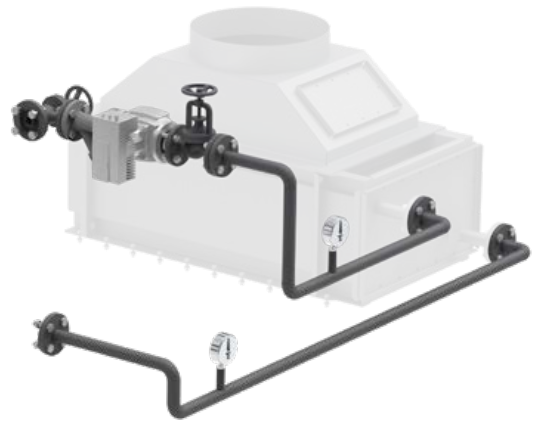
- n. 1 electric pump of the in-line type, of suitable flow rate
- n. 2 shut-off valves
- n. 1 non-return valve
- connection pipes
- power and operating logic inserted inside the boiler panel



## ECONOMIZER CIRCULATION KIT (optional)

Composed of::

- n. 1 electric pump of the in-line type, of suitable flow rate
- n. 2 shut-off valves
- n. 1 non-return valve
- connection pipes
- power and operating logic inserted inside the boiler panel



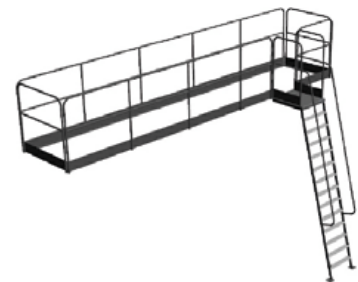
## LADDER AND WALKWAY KIT (optional)

Ladder and walkway with carbon steel railing, painted with special rust-proof paint and welded by joints that ensure the correct coupling of every element.

Easy access to the boiler is guaranteed by:

- a handrail welded to the frame;
- steps with non-slip inserts.

The ladder position and handrail layout can be agreed upon at the time of order, to fit the installation site of the generator.



## HIGH EFFICIENCY OPTION

Option to supply a generator with 94-95% efficiency levels.

An aluminium profile, bound by rolling, is positioned within the smoke pipes forming the tube bundle of the third flue gas pass, namely in the end section, to significantly increase efficiency. This allows you to increase the exchange surface without increasing the generator size or adding external devices, as a result of a higher pressure drops (counter pressure) of the boiler body.

