

# WMK 250÷1000



## LARGE WATER CONTENT, CONDENSING MODULAR BOILER

OUTPUT RANGE

from 250 to 1000 kW

OPERATION TEMPERATURE

no limit on the return temperature

SUPPLY

Natural Gas or LPG

MODELS

250

375

500

625

750

875

1000

Boiler body entirely in stainless steel - large water content - two return connections  
wide modulation ratio premix burners - predisposed for outdoor installation IPX5D

## MAIN COMPONENTS

**WMK** is a modular gas boiler constituted by a whole of large water content condensing modules in stainless steel AISI 316L, and complete of modulating premix burners, suitable for both, indoor and outdoor installation.

**WMK** can be assembled in battery, in order to create a modular heat generator, so that to increase its total capacity.

The construction satisfies completely the prescriptions given in the EN 303-1.

The components of the pressure vessel parts, such plates and pipes, are built in stainless steel AISI 316L, according to the tables EURONORM 25 and EURONORM 28. The welders and the WPS (Welding Procedure Specifications) are approved by Notified Bodies.

The outer shell of the each module is covered by a mineral wool mattress, 80 mm thick, protected, at its turn, by a tearing resistant foil.

Each module is constituted from:

- downward reversed furnace with direct flame.
- tube bundle composed of patented progressive pipes in stainless steel AISI 316L with, inside, multi-fin inserts in Al/Si/Mg, that assures: functional outflow of the condensates, absence of wet acidic deposits, self cleaning for gravity of the exchange surfaces.
- two C.H. Return collectors, for high and low temperature, that can be connected on both, front and rear part the modules group
- smoke chamber in stainless steel with connexion for condensate evacuation and level control.
- combustion chamber doors with shock absorbing closing system
- the control panel board with Master thermoregulator (Ufly P), inside the casing
- Premix modulating burners down ward oriented

- two 1/2" connections for bulb holders with inside diameter of 15 mm (able to accept 3 bulbs each).
- casing side panels provided with holes for cable glands (for lodging the electrical supply and other auxiliary devices cable).
- Safeties: each module is equipped with its own safety valve set at 5.4 bar.
- Air / gas mixing at constant CO<sub>2</sub> on the whole range of modulation (modulation ratio, of every single module, of 1:4)
- Global modulation ratio up to 1:31

Easy handling with forklift, transpallet or with crane through the upper hooks.

**The logic of operation foresees the optimization of the operation in this way:**

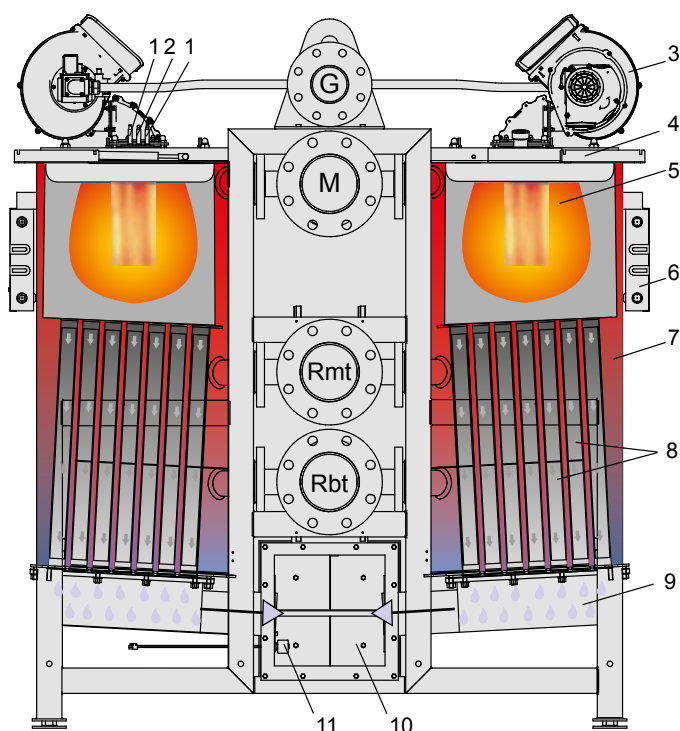
- Distribution of the power on the largest possible number of modules in order to work at the smallest possible output (down up to 30 kW) for the obtainment of the maximum efficiency.
- Automatic system of distribution of the working hours among the different modules in order to guarantee an homogeneous exploitation (optimal).

**Optional accessories:**

- Multifunction PCBs of zones management
- Modulating pumps
- Complete additional safety devices kit
- Modules preassembled in factory
- Trasportation: the boilers up to the model 500 are sent pre-assembled in groups of 2 - 3 or 4 modules; for the models from 625 to 1000 they are sent in 2 groups: one of 4 modules and one group with the remaining modules. The casing is always sent packaged separately.
- Different way of delivery can be agreed at the order stage.

Key:

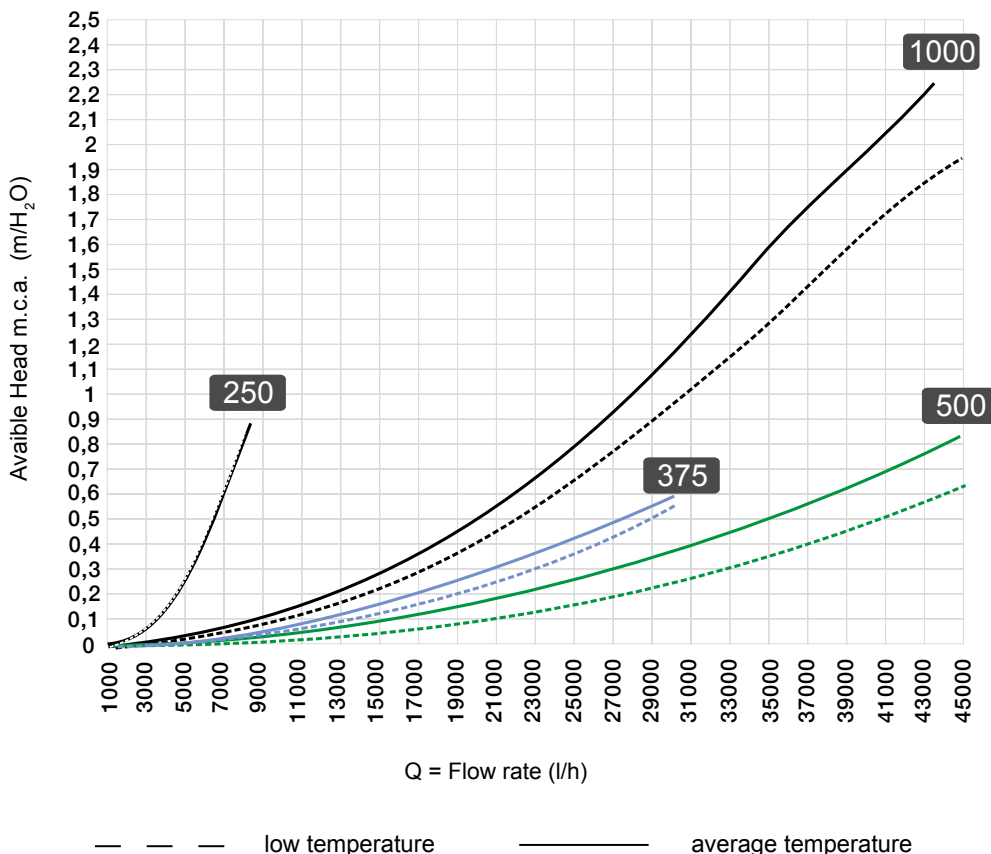
- 1 - Ionization electrodes (2x)
- 2 - Ignition electrode
- 3 - Fan
- 4 - Combustion chamber door
- 5 - Chamber of combustion
- 6 - Electrical junction box
- 7 - Boiler water
- 8 - Smoke pipes in stainless steel with inside aluminum profiles
- 9 - Bacinella raccogli condensata
- 10 - Smoke chamber
- 11 - Condensate level sensor
- M - C.H. Flow
- Rmt - C.H. Return Medium Temperature
- Rbt - C.H. Return Low Temperature



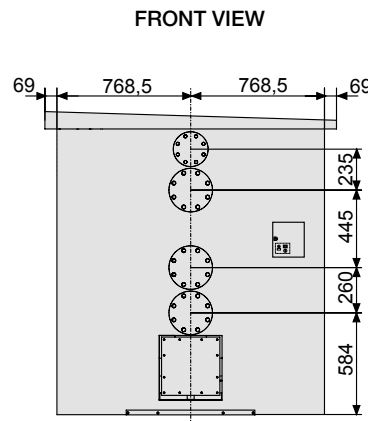
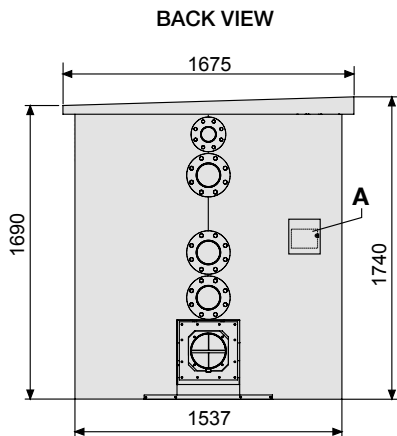
## PRODUCT PLUS VALUES

- **WIDE RANGE**  
7 condensing gas models,  
with outputs from 250 to 1000 kW
- **FOR DIRECT OUTDOOR INSTALLATION (IPX5D)**
- **MAXIMUM EFFICIENCY**  
up to 106.2% at the minimum modulated output
- **HIGH MODULATION RATIO**  
up to 1:31
- **LARGE WATER CONTENT THERMAL ELEMENTS**  
90 liters each
- **VERTICAL THERMAL ELEMENTS ENTIRELY IN STAINLESS STEEL AISI 316L** complete with premix modulating burners and all safety devices
- **SPECIAL SMOKE PIPES (patented)**  
in stainless steel with multifin, high thermal conductivity aluminium alloy (Al/Si/Mg) inserts, on purpose designed to improve the condensates evacuation and to optimize the water circulation.
- **CYLINDRICAL COMBUSTION CHAMBER**  
with passing flame
- **SMOKE NON RETURN VALVE**
- **STANDARDIZED HYDRAULIC MANIFOLDS**  
without interceptions between the elements and hydraulically balanced
- **ELECTRONIC CONTROL PANEL BOARD Ufly P** with proportional regulation of one/all thermal elements
- **SEASONAL EFFICIENCY + 30%**  
in comparison to the conventional boilers
- **MODULATING PUMP (optional)**  
directly managed by the panel board to assure the maximum condensation at all regimes
- **COMPACT DIMENSIONS**  
height 1740 mm  
width 1675 mm  
depth 870 to 2830 mm
- **FOR IN BATTERY MOUNTING**  
to constitute complex THERMAL MODULES and to increase the total output
- **KIT GATEWAY P (optional)**  
for Ufly P remote connection

## DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



DIMENSIONS

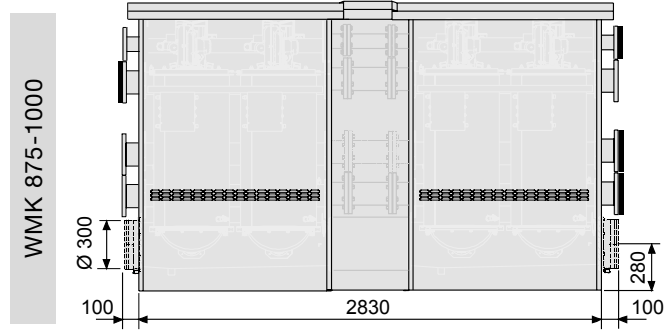
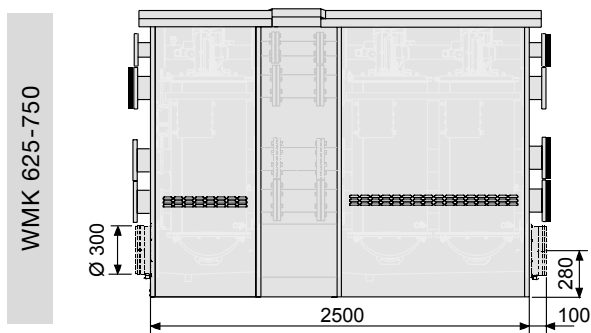
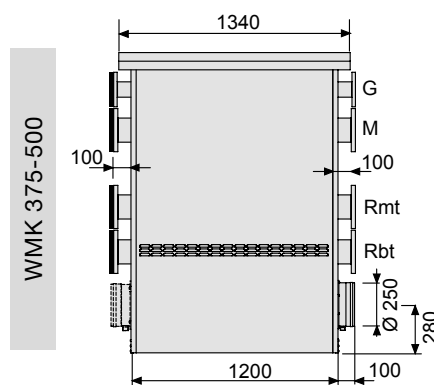
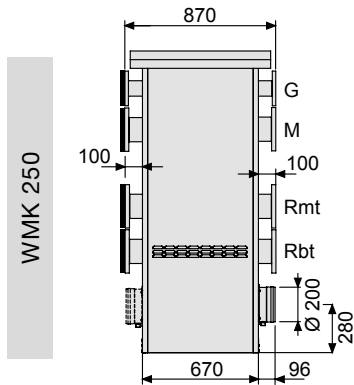


NOTE:

The **Ufly P** control, with magnets, is designed to be placed in the rear part of the boiler, inside the compartment indicated with **A**.

However, it is possible to remote it externally, by replacing the wiring.

SIDE VIEW



WMK		250	375	500	625	750	875	1000
<b>Dimensions</b>		<b>(M)</b>	<b>(M)</b>	<b>(M)</b>	<b>(M+S)</b>	<b>(M+S)</b>	<b>(M+S)</b>	<b>(M+S)</b>
Modules Number		2	3	4	2+3	2+4	4+3	4+4
Height	mm	1740	1740	1740	1740	1740	1740	1740
Total depth	mm	670	1200	1200	2500	2500	2830	2830
Width "L"	mm	1675	1675	1675	1675	1675	1675	1675
<b>Connections dimensions</b>								
Gas connection <b>G</b>	DN mm (inch)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)
C.H. Flow <b>M</b>	DN mm (inch)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
C.H. Return <b>Rmt</b> (middle temp.)	DN mm (inch)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
I return plant <b>Rbt</b> (low temp.)	DN mm (inch)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
Smoke manifold	mm	300	300	300	300	300	300	300
Chimney connection	mm	200	250	250	300	300	350	350
Condensate evacuation	mm	40	40	40	40	40	40	40
Net weight	kg	625	977	1250	1602	1875	2227	2500

## TYPE AND SHAPE OF FURNACE

The thermal modules WMK are endowed with a truncated cone shaped furnace in which the flame develops.

The smokes are carried downward and are distributed in the multifinned pipes slightly tilted to favor a better thermal exchange with the boiler water.

The combustion gases are collected in the underlying smoke chamber and from here are sent to the chimney.

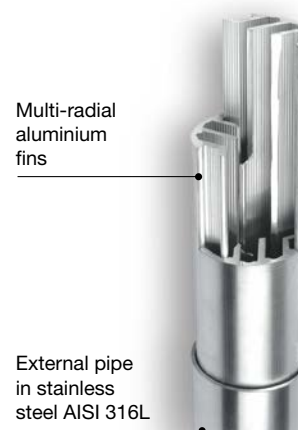
During the burner operation, within the operation field of the boiler, the combustion chamber is always under positive pressure.

- Boiler body with vertical bundle vertical integrally in stainless steel.
- Smoke pipes of diameter 42.4 mm in stainless steel, with self-cleaning multifin inserts in aluminum/silicon/magnesium.

## SPECIAL SMOKE PIPES (patented)

### SMOKE PIPES:

- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration



Multi-radial aluminium fins

External pipe in stainless steel AISI 316L

## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS** can be unloaded from the web site [www.schusterboilers.com](http://www.schusterboilers.com) at the page of the product

WMK			250	375	500	625	750	875	1000
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	227	340					
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	92	93					
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>			<b>A</b>	<b>A</b>	*	*	*	*	*
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>									
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	226.6	340.2					
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	89	89					
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	74.0	110.8					
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	97	97					
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO					
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>									
WITH A FULL LOAD	$e_{l_{max}}$	kW	0.313	0.470	0.626	0.782	0.939	1.095	1.252
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	0.035	0.035	0.035	0.035	0.035	0.035	0.035
STANDBY MODE	$P_{SB}$	kW	0.010	0.010	0.010	0.010	0.010	0.010	0.010
<b>OTHER ELEMENTS</b>									
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.460	0.690					
NITROGEN OXIDES EMISSIONS referred to GCV	$NO_x$	mg/kWh	59 (53)	60 (54)					
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	706	1059					

\* (Appliances not covered by Directive 2009/15 / EC)

## TECHNICAL DATA

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WMK		250	375	500	625	750	875	1000
Modell (M+S = Master + Slave)		(M)	(M)	(M)	(M+S)	(M+S)	(M+S)	(M+S)
Number of thermal modules		2	3	4	2+3	2+4	4+3	4+4
Boiler category		II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation ratio		1:7.76	1:11.5	1:15	1:19	1:23	1:27	1:31
Rated heat output on P.C.I. Qn	kW	230	345	460	575	690	805	920
Minimum heat output on P.C.I. Qmin	kW	30	30	30	30	30	30	30
Rated useful power (Tr 60 / Tm 80 °C) Pn	kW	226.6	340.2	453.2	568.9	681.9	796.3	913.5
Minimum useful power (Tr 60 / Tm 80 °C) Pn min	kW	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Rated useful power (Tr 30 / Tm 50 °C) Pcond	kW	257.6	353.3	471.0	588.2	706.6	822.7	934.7
Minimum useful power (Tr 30 / Tm 50 °C) Pcond min	kW	31.85	31.85	31.85	31.85	31.85	31.85	31.85
Rated power performance (Tr 60 / Tm 80°C)	%	98.5	98.6	98.5	98.95	98.8	98.9	99.3
Minimum power performance (Tr 60 / Tm 80°C)	%	104.2	104.2	104.2	104.2	104.2	104.2	104.2
Rated power performance (Tr 30 / Tm 50°C)	%	103.9	102.4	102.4	102.3	102.4	102.2	102.6
Minimum power performance (Tr 30 / Tm 50°C)	%	106.2	106.2	106.2	106.2	106.2	106.2	106.2
Performance at 30% of the load (Tr 30°C)	%	107.7	107.7	107.7	107.7	107.7	107.7	107.7
Combustion efficiency at nominal load	%	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Combustion efficiency with reduced load	%	98.5	98.5	98.5	98.5	98.5	98.5	98.5
Heat loss at chimney with burner on	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat loss at chimney with burner off	%	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Net flue gas temperature tf-ta (min)(*)	°C	30.9	30.9	30.9	30.9	30.9	30.9	30.9
Net flue gas temperature tf-ta (max)(*)	°C	38.2	38.2	38.2	38.2	38.2	38.2	38.2
Maximum permitted temperature	°C	100	100	100	100	100	100	100
Maximum operating temperature	°C	80	80	80	80	80	80	80
Flue gas mass flow rate (min)	kg/h	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Flue gas mass flow rate (max)	kg/h	260.7	391.1	521.4	651.8	782.2	912.5	1042.9
Excess air	%	25.59	25.59	25.59	25.59	25.59	25.59	25.59
Heat loss at chimney with burner on (min)	%	1.48	1.48	1.48	1.48	1.48	1.48	1.48
Heat loss at chimney with burner on (max)	%	1.91	1.91	1.91	1.91	1.91	1.91	1.91
Minimum heating circuit pressure	bar (kPa)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)
Maximum heating circuit pressure	bar (kPa)	6 (600)	6 (600)	6 (600)	6 (600)	6 (600)	6 (600)	6 (600)
Water content	l	208	301	401	509	570	702	802
Methane gas consumption G20 (pow.sup. 20 mbar) at Qn	m <sup>3</sup> /h	24.3	36.5	48.6	60.8	73	85.1	97.3
Methane gas consumption G20 (pow.sup. 20 mbar) at Qmin	m <sup>3</sup> /h	3.17	3.17	3.17	3.17	3.17	3.17	3.17
Gas consumption G25 (pow.sup. 20/25 mbar) at Qn	m <sup>3</sup> /h	28.3	42.4	56.6	70.7	84.9	99.0	113.1
Gas consumption G25 (pow.sup. 20/25 mbar) at Qmin	m <sup>3</sup> /h	3.69	3.69	3.69	3.69	3.69	3.69	3.69
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	17.9	26.8	35.7	44.6	56.3	62.5	71.4
Propane gas consumption (pow. sup. 37/50 mbar) at Qmin	kg/h	2.33	2.33	2.33	2.33	2.33	2.33	2.33
Chimney base maximum pressure available	Pa	70	70	70	70	70	70	70
Max condensate production	kg/h	37	56	74	93	111	130	148
<b>Emissions</b>								
CO at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	32	32	32	32	32	32	32
NO <sub>x</sub> at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	71	72	73	73	73	73	73
NO <sub>x</sub> Class		6	6	6	6	6	6	6
<b>Electrical data</b>								
Power supply voltage/frequency	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Fuse on the power supply	A (R)	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Protection rating	IP	X5D	X5D	X5D	X5D	X5D	X5D	X5D

Room Temperature = 20°C (\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)

Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs < = 400 kW. See Erp TableStandstill heat losses at  $\Delta t$  30K - P<sub>stby</sub> - See Erp TableStandstill electrical consumption - P<sub>sb</sub> - See Erp Table