

# Aquatherm EM Series



Energy Maximising Range  
Hot Water Boilers

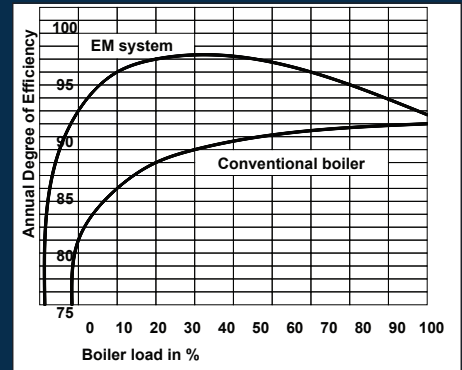
# Energy Maximising Range Hot Water Boilers

## The EM Concept

Traditionally boiler efficiency has only been considered under steady state conditions - the EM Concept looks at annual operating efficiency. The average load on a heating boiler is about 35% of maximum output and often a boiler is selected with a generous margin about maximum demand. High turndown Modulating Burners with precise air and fuel control achieve good efficiencies at partial loads.

The adoptions of fully Modulating Burners gives two advantages:

- The Burner modulates steadily to match the load at all times.
- The Burner is always firing unless the load falls to less than 25%. This gives a reduction in standby losses when the Burner is shut down as with Hi / Lo Burners. There are no pre and post purge losses such as on start up and shut down with Hi / Low Burners.



Model EM	Loss in availability qB*	Radiation Losses (watts) qs		Boiler efficiency (%) nk	
		At half load	At full load	At half load	At full load
400	825	960	920	94.3	91.7
500	905	960	920	94.1	91.8
600	1020	1085	1035	94.1	91.8
750	1100	1230	1185	94.1	91.8
950	1260	1395	1330	94.1	91.8
1200	1465	1615	1545	94.2	91.8
1500	1645	1815	1735	94.2	91.8
1850	1905	1815	1735	94.2	91.9
2300	2190	2470	2360	94.2	91.9
2900	2545	2470	2360	94.3	91.9
3500	2860	3140	3000	94.2	91.9
4000	3285	3500	3250	94.2	91.9

Losses in watts  
Efficiency in %

## Measurements According to EDI

Mean boiler water temperature : 70C  
Boiler with burner cover.

Draft at boiler flue outlet : 0.05mbar.

Annual efficiency, among other things depends on : Boiler size, output and type of operation. On the basis of 2650 operating hours pa (1/5 full load, 4/5 part load) efficiency is approximately 92.5 - 94% based on nett CV of fuel.

## Annual Operating Efficiency

High efficiency installation with insulated boiler, sound absorber hood and flue draft control.

**Note:** for flue gas temperatures below 160C stainless steel chimneys are recommended. For long chimneys the stack draft at partial load must not exceed 20% of flue gas side pressure loss. A draft regulator may be required.



## Correction calculation

\* For boiler water temperature (T)

$$qB(T) = \frac{T - 20}{70 - 20} \text{ watts}$$

Excess air at half load - 30%

Excess air at full load - 20%

## **AQUATHER YGNIS EM**

### **Energy Maximising Concept**

The EM Concept features - the fully modulating burner, insulated burner, acoustic shroud and preheated combustion air system - are optional features on the standard unit and will be fitted on request.

### **Construction**

The boilers are one of the three pass design based on the YGNIS reverse flame principle as developed and perfected by YGNIS.

The substantial combustion chamber is fully water jacketed and a water cooled front skirt is incorporated to maintain high heat transfer co - efficiencies. The tube plates are 'V' prepared prior to welding and a substantial stay bar gives an evenly stressed arrangement allowing high flow and return differentials. Easily cleaned tubes are fitted with spiral retarders which allow in situ tuning of flue gas temperatures.

### **Thermal Noise and Insulation**

Standard insulation is 50mm foil backed FEI covering the complete boiler shell. An optional burner hood is supplied for high efficiency and specially quiet installations. In such cases the cladding panels are additionally lined with insulation material and combustion air is drawn through the space between the panels and boiler shell and down across the boiler door to provide combustion air pre heating and a consequential reduction in standing losses.

### **Fuel Types**

Boilers can be supplied for firing with Natural Gas, LPG, Light diesel oil or Heavy fuel oil. The refractory insulated front door is purposely designed to accept this full range of fuels.

### **Insulation**

Package units are pre-assembled and test fired prior to despatch from our Works. Standard installation and maintenance manuals together with wiring diagrams are despatched with each boiler. Cladding panels can be packaged separately for fitting to the boiler on completion of the installation to prevent damage if requested.

### **Burner and Control System**

Continuous development work is carried out between YGNIS of Switzerland and the leading European burner manufacturers to ensure perfect matching with burners for each model. Packaged units can be supplied as standard with CUENOD Burners. We recommend consultation with the Temperzone design department for matching data should other brands be required. Compact packaged control systems are supplied for on / off, two stage Hi / Lo or Electronic Modulating Control.

### **Service and Commissioning**

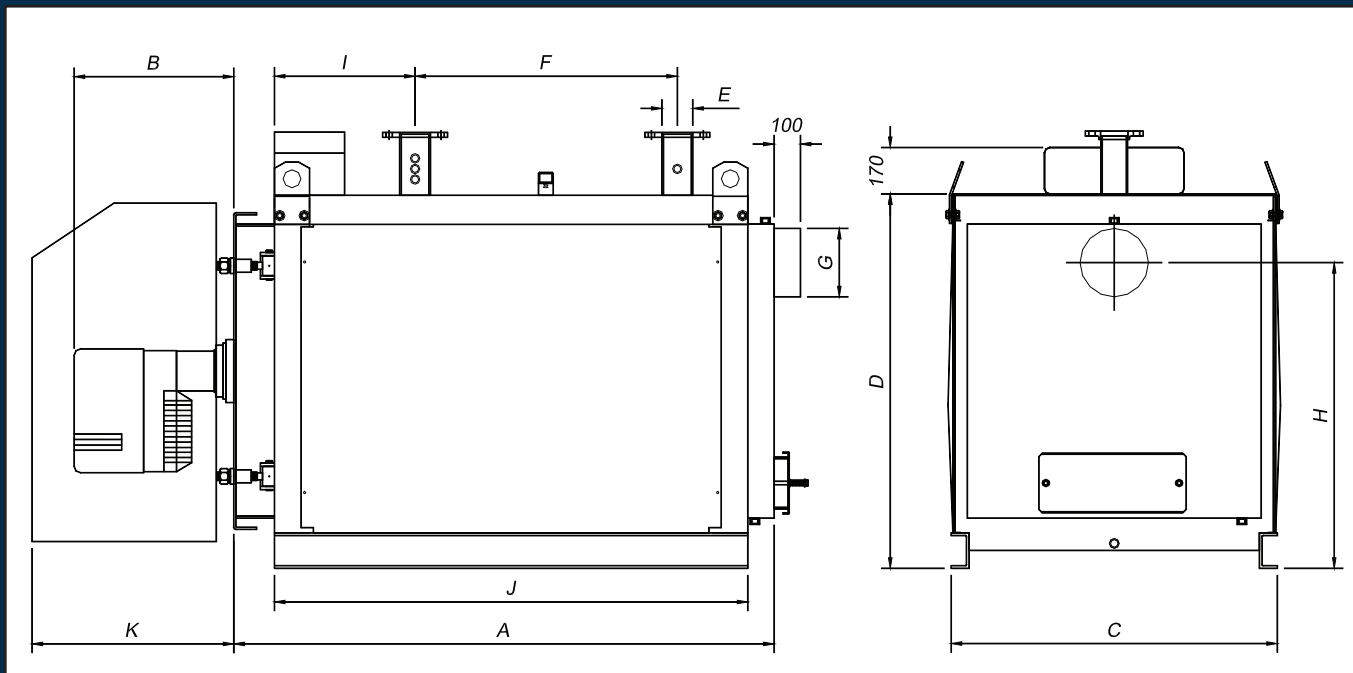
Temperzone and their agents throughout the country are fully conversant with these packaged unit and particularly with CUENOD Burners. A full commissioning service is available and for long term economy and reliability Service Contracts can be arranged to best suit each individual need.



### **Flue Systems**

Pre-insulated modular stainless steel flues can be supplied on request, with all boilers. There are especially necessary in low temperatures or partial load installation. This modular system simplifies installations and offers many advantages.

# Aquatherm EM Series Boiler



Model	Output	Dimensions											
		A	B (gas)	B (oil)	C	D	E	F	G	H	I	J	K
400	400	1942	614	611	1020	1155	100	950	250	770	400	1652	735
500	500	1942	614	611	1020	1155	100	950	250	950	400	1652	735
600	600	2076	764	764	1080	1225	100	950	250	1010	400	1766	885
750	750	2301	764	764	1150	1295	100	1150	300	1065	400	1951	885
950	950	2396	764	764	1220	1365	125	1150	350	1125	400	2046	885
1200	1200	2486	1057	1057	1365	1510	125	1220	350	1235	400	2106	1180
1500	1500	2970	1057	1057	1505	1620	150	1490	400	1155	400	2490	1180
1850	1850	3419	1057	1057	1655	1705	200	1585	450	1318	325	2939	1180
2300	2300	3724	1600	1600	1805	1800	200	2035	500	1323	325	3244	1720
2900	2900	4094	1600	1600	1805	1800	200	2035	550	1323	325	3614	1720
3500	3500	4094	1600	1600	2070	2130	200	2165	600	1615	325	3614	1720

Model	Output	Dryweight (No Burner)	Water Content	Water Side Pressure Drop*	Combustion Side P**	Fuel Consumption	
						Gas MJ/h	Oil Kg/h
EM	kW	Kg	Ltr	Mbar	Mbar	Gas MJ/h	Oil Kg/h
400	400	1090	530	7	3.5	1573	37.3
500	500	1090	530	9	4.0	1800	42.6
600	600	1270	700	13	4.5	2245	53.5
750	750	1610	850	22	4.5	2922	69.3
950	950	1860	1050	14	4.7	3594	85.3
1200	1200	2280	1480	21	5.0	4495	106.6
1500	1500	3600	1940	14	5.0	5615	133.2
1850	1850	4990	2850	9	5.5	7188	170.5
2300	2300	5690	3400	13	6.5	8989	213.1
2900	2900	5990	3730	19	6.6	11230	266.4
3500	3500	8670	4830	28	7.2	13508	319.7
4000	4000	9145	4780	38	8.0	15463	366.9

\* At  $\Delta t = 20^\circ\text{C}$

\*\* At Nominal Rating

Temperzone reserve the right to alter specification without prior notice. Certified drawing are available on request.

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