



**BYWORTH**  
B O I L E R S

**YORKSHIREMAN  
PACKAGED STEAM BOILERS**

**Including The Yorkshireman 2  
The UK's most efficient Packaged Steam Boiler**

# YORKSHIREMAN

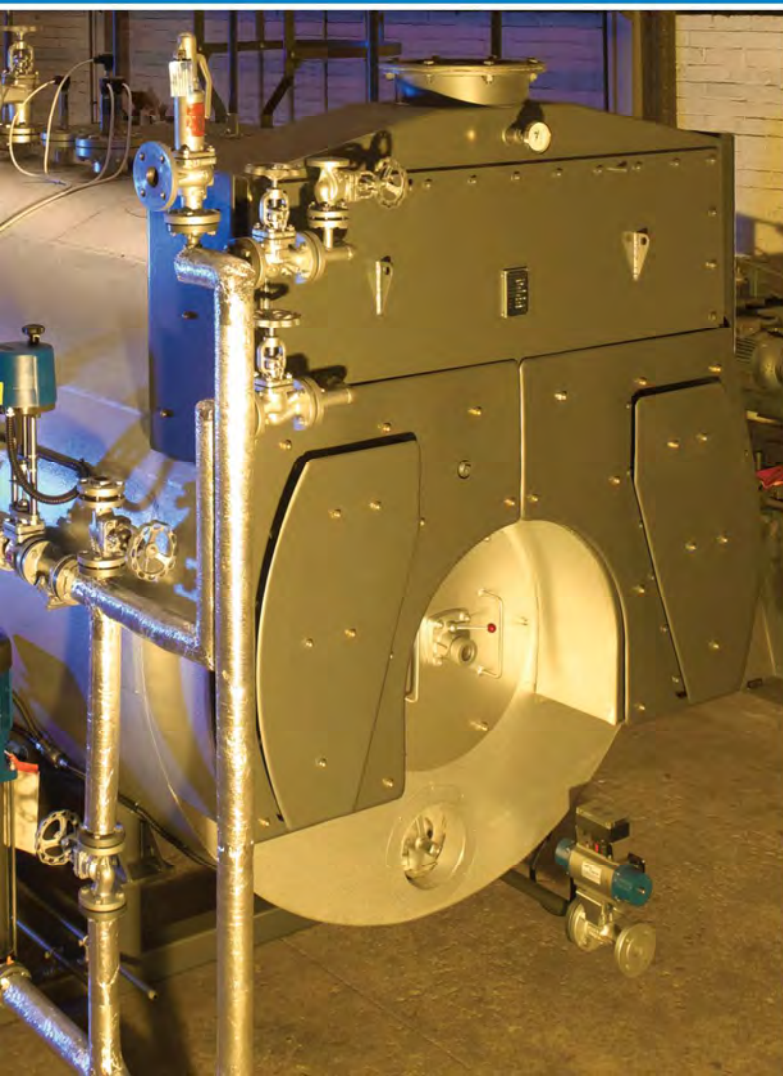
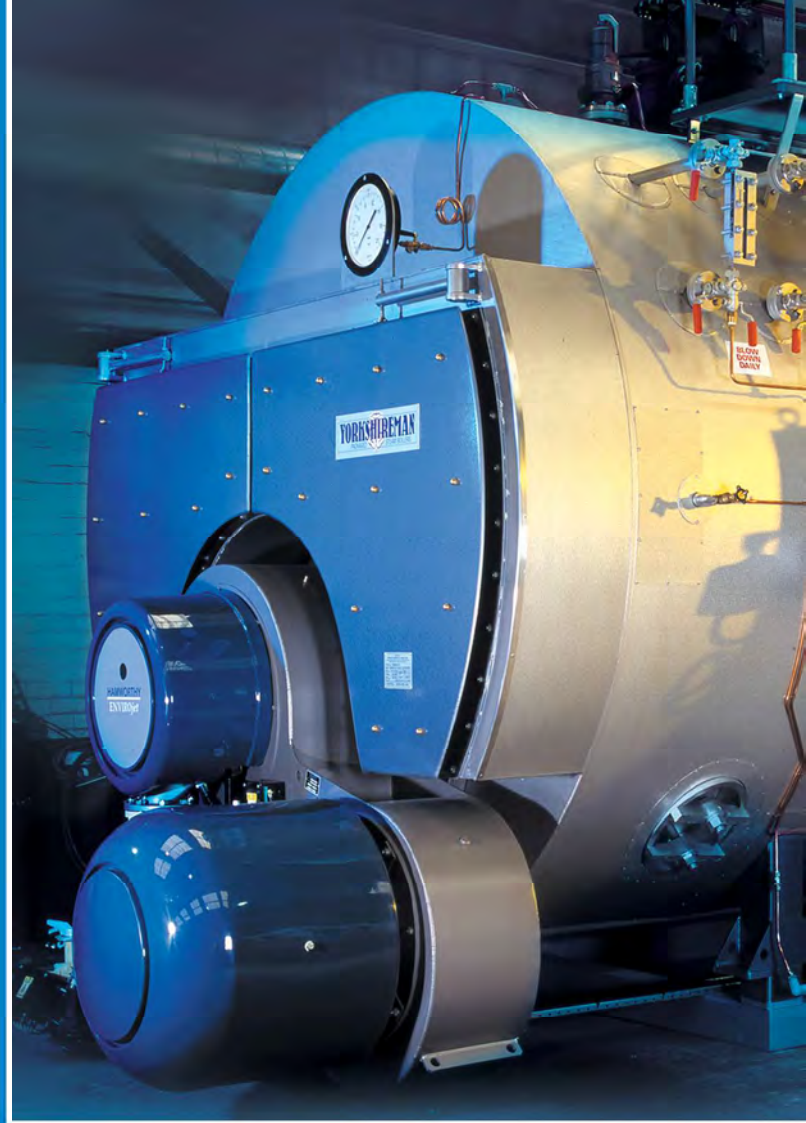
## PACKAGED STEAM BOILERS

Ever since the Yorkshireman boiler was introduced in 1988 it has been held in high esteem by Plant Engineers worldwide. Not only is it regarded as a sturdy and reliable workhorse but is also remarkably thrifty!

The traditional three pass wetback design of the Yorkshireman range is ideally suited for a continual heavy workload. Now with the recent introduction of the Yorkshireman 2, energy efficiency has been taken to new heights.

Every Yorkshireman boiler is individually built to meet specific requirements and is manufactured from start to finish in our own factory, thereby ensuring quality control of the very highest standard. All fittings are mounted in the factory to make installation on site as easy and quick as possible.

Yorkshireman boilers cover a duty range of between 1,000 and 18,000 kgs/hour, with working pressures of up to 20 bar/g.



## PRINCIPAL DESIGN FEATURES & BENEFITS

- Traditional three pass wetback design for reliability and robustness
- Shell and furnace diameters are larger than other boilers to achieve best quality dry steam, low NOx emissions and ensure required output is reached with ease.
- Central furnace fitted with bowling hoops to minimise stress and extend lifespan
- Shell, tube plates and smoke boxes are heavily insulated to minimise heat loss.
- High performance ceramic smoke box insulation and unique ceramic plug in furnace access door.
- 100mm high density shell insulation to minimise heat loss
- Insulated inspection ports
- Quicker and more cost efficient ultra sonic inspections through design features such as removable cladding panels, lack of rear refractory and removable front plates.
- Tubeplate ligaments are in excess of BS2790 requirements, J prepped and TIG welded in the combustion chamber. This avoids tube end and ligament failure common in other makes of boilers.



## QUALITY FITTINGS AND MOUNTINGS

To ensure long and reliable service every Byworth boiler is built using quality fittings and mountings as standard.

### Standard

- Control panel (Byworth or other)
- Feed pump
- Cast steel angle pattern crown valve
- Safety valve
- Screw down feed check valve
- Disk type feed check valve
- In-line pump strainer
- Key operated blow down valve
- Twin water level gauges
- On-off water level controls
- Pressure gauge with inspectors test cock
- Water sample cooler
- Flue thermometer
- Four jacking points and lashing eyes
- Lifting lugs

### Optional

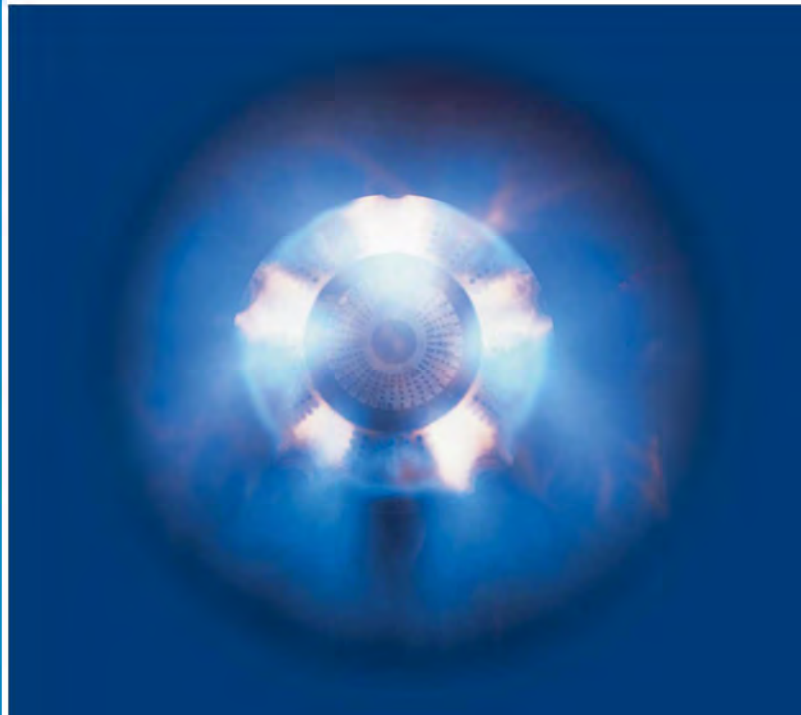
- Column mounted gauge cocks
- Box section base frame
- Elliptical inspection ports
- Standby pump
- Inverter driven pumps and burners
- Second safety valve
- Self monitoring and modulating water level controls
- Automatic TDS controls
- Automatic blow down valves
- Remote panels
- Water softening equipment
- Gas booster
- Auxiliary crown valves

- Jacking points to aid positioning on site
- High quality finish including a corrosion and dent resistant pre-coated sheeting.
- Every Byworth boiler is supplied fully packaged with best quality fittings and mountings. They also come fitted and wired.
- Heavy duty box cradles

## COMBUSTION EQUIPMENT

Every Yorkshireman boiler is offered with a choice of pressure jet and rotary cup burners, each developed in close co-operation with the manufacturer and chosen to provide the very best combustion for the specific application and fuel.

The addition of a combustion management system ensures efficiency levels are continually monitored and trimmed to guarantee peak performance throughout the full firing range. The systems will also electronically monitor demand to make sure the exact amount of fuel and oil is fired to follow the boilers required load pattern accurately.





## YORKSHIREMAN<sup>2</sup>

As part of a 2 year R & D programme, in conjunction with the Mechanical Engineering Department of Leeds University, Byworth has developed the Yorkshireman 2 boiler. With an efficiency of around 92.3% (based on nett calorific values) the Yorkshireman 2 is the most efficient steam boiler available in the UK today.

### YORKSHIREMAN 2 BENEFITS AND FEATURES

- Increased efficiency
- Outstanding efficiency keeps fuel bills to a minimum
- Lower maintenance costs
- Lower NOx emissions
- Ergonomical eye level control panels for ease of operation.



**Yorkshireman 2**  
**The UK's most efficient**  
**Packaged Steam Boiler**

# THE IMPORTANCE OF EFFICIENCY

The government ECA scheme estimates most old boilers that are well maintained and in good condition run at around 80% (nett) efficiency.

Many operate at much lower efficiencies.

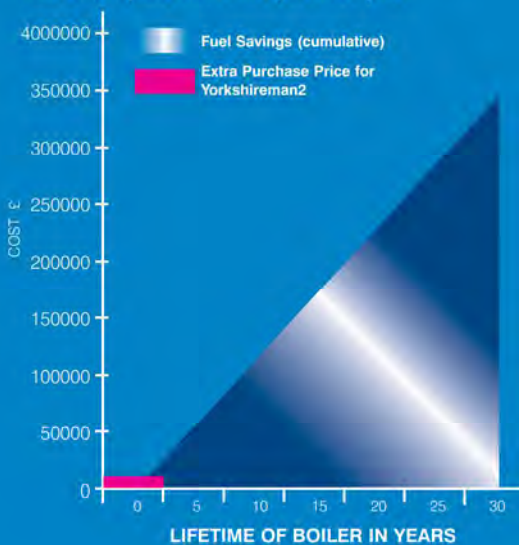
A typical gas bill for a 10 tonne boiler operating at 80% efficiency on a medium load will cost say £30,000 per month.

A Yorkshireman 2 operating at 92.5% efficiency would reduce the monthly fuel bill by around £5000.

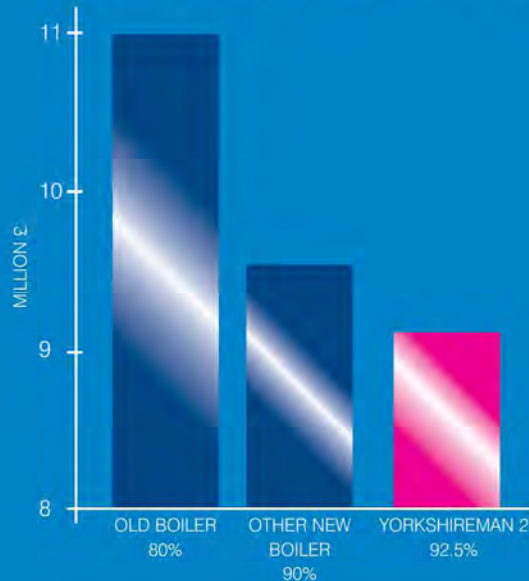
Taken over a typical lifespan of 30 years for a Byworth Boiler this equates to a saving of around £1,800,000

When this saving is taken into consideration the purchase price of a new Yorkshireman 2 boiler makes irrefutable economical sense.

Fuel savings of Yorkshireman2 over other new boilers compared with extra purchase price



RUNNING COSTS OVER LIFETIME OF BOILER



## UNIQUE X-ID TUBES

The outstanding efficiency of the Yorkshireman 2 is achieved through incorporating X-ID Tubes. These tubes, unique to Byworth in the UK, have been proved to greatly enhance the heat transfer rate by up to 85% and increase efficiency by up to 2.5%. They are also self-cleaning, thereby helping to maintain boiler efficiency and reduce maintenance costs.



## TRIED & TESTED

During manufacture every Yorkshireman boiler undergoes rigorous tests and inspections and is subjected to X-Ray and NDT tests of the main welded seams.

All Yorkshireman Boilers are built to BS2790 Class 1 (EN 12953), comply with current Pressure Equipment Directive (PED) requirements and are CE marked on completion. They are also designed to meet governmental and health service standards.

In addition, they are subject to hydraulic testing and are independently inspected and certified by Lloyds Register at all stages of manufacture.

Plate thicknesses of the Yorkshireman are in excess of BS requirements and they are made from best quality, certified materials.

Every Yorkshireman boiler is supplied with a complete operator manual and manufacturing report. This contains 'as built' drawings, electrical wiring diagram, test reports and material certificates.

## SUPPORT SERVICES

Our comprehensive range of boiler support services includes:

- Boiler hire and lease
- Full installation service
- Service, repairs, parts & accessories



**Bespoke Solutions in Waste Heat Boilers**  
Producing steam and hot water from waste heat.

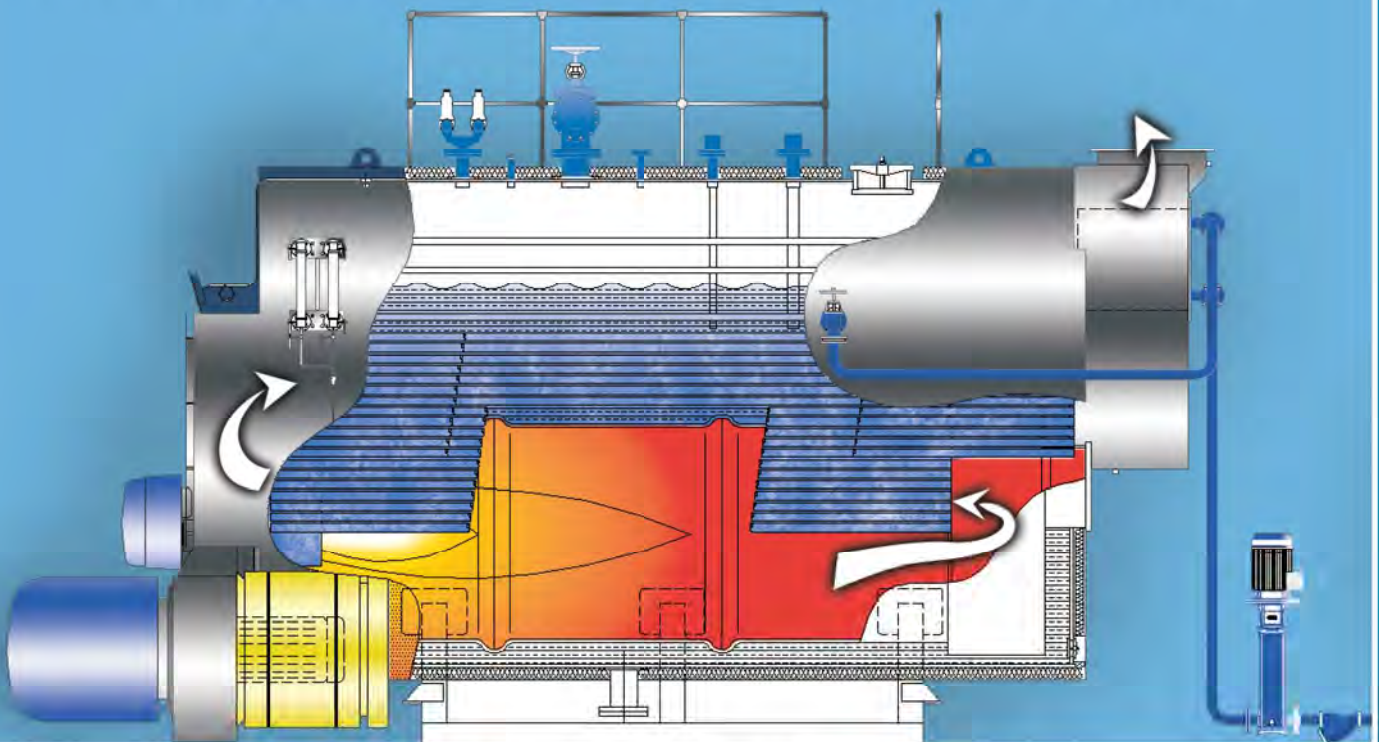
## ANCILLARY EQUIPMENT

To satisfy the diverse operational needs and specifications of different industries Yorkshireman boilers are offered with a choice of ancillary equipment including:

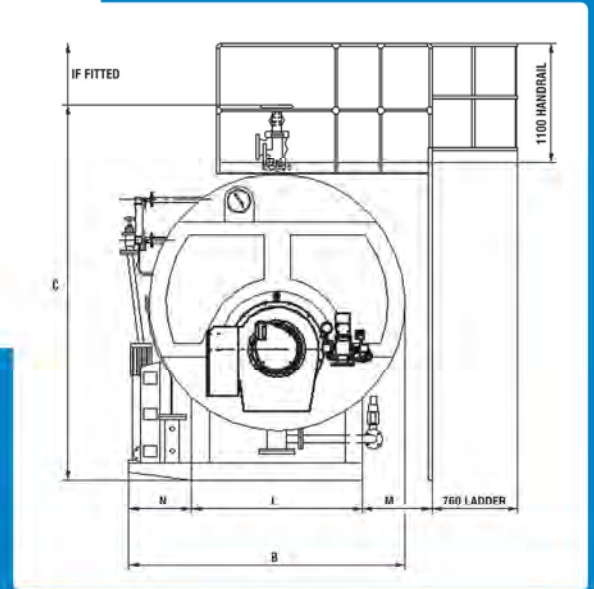
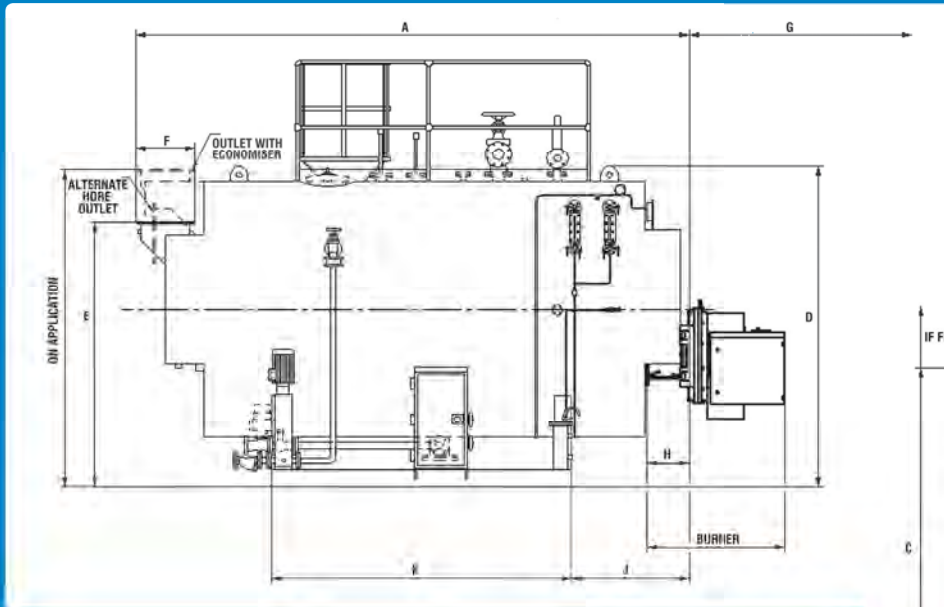
- Flue gas economisers mounted in the rear smoke box to improve efficiency.
- Full PM5 equipment including automatic blowdown and TDS control for unattended operation.
- Variable speed feed pump and burner fan motor to reduce power consumption.
- Modulating water feed.
- Factory mounted standby feed pump.
- Supplied with a Health & Safety compliant working platform and safety rails plus an access ladder which can be mounted on either the left or right.
- Complete containerised boiler houses
- Blow down vessels, steam accumulators and feed tanks

## THE YORKSHIREMAN

### A time proven three pass wetback boiler



**British Boilers at their Best**



This chart relates to the YSX series boilers with working pressure up to 150 psi (10 bar). Please contact our Sales Department for technical details on the YSX plus the YSY with working pressure up to 200 psi (13.6 bar), the YSZ with working pressure up to 250 psi (17 bar) and the YSZZ with working pressure up to 300 psi (20 bar).

## YORKSHIREMAN YSX SERIES - BOILER DIMENSIONS

Model YSX/Y2SX		1000	1500	2000	2500	3000	3500	4000	4500	5000	6000	7000	8000	9000	10000	11250	12500	13750	16000	18000
Duty F & A 100 °C	lb/hr	2200	3300	4400	5500	6600	7700	8800	9900	11000	13200	15400	17600	19800	22000	24800	27600	30300	35100	39700
	kg/hr	1000	1500	2000	2500	3000	3500	4000	4500	5000	6000	7000	8000	9000	10000	11250	12500	13750	15900	18000
	kW	627	940	1254	1567	1881	2194	2508	2821	3135	3762	4389	5016	5642	6269	7053	7837	8620	9968	11285
Overall Length	A	3126	3506	3767	4084	4258	4424	4707	5005	5042	5613	5666	5773	5799	6368	6412	6489	6597	6597	7671
Overall Width	B	1780	2000	2125	2240	2310	2415	2490	2565	2620	2670	2826	3128	3245	3245	3340	3510	3665	3840	3875
Overall Height	C	2280	2505	2693	3336	3457	3538	3740	3795	3895	3960	4142	4406	4570	4550	4750	4889	5095	5129	5164
Minimum Height	D	1940	2115	2258	2336	2457	2538	2740	2795	2895	2960	3142	3406	3570	3550	3750	3889	4095	4129	4164
Chimney Height	E	1660	1810	1873	1973	1975	2115	2245	2300	2350	2435	2444	2736	2740	2660	2724	2815	3112	3172	3720
Chimney I/D	F	200	250	275	326	353	377	402	428	453	504	529	606	606	656	656	707	758	758	760
Tube Withdrawal	G	2220	2480	2660	2900	3010	3110	3350	3580	3570	4050	4030	4000	3970	4450	4430	4400	4400	4400	5330
To End of Smokebox	H	167	207	231	237	257	277	287	307	322	337	357	387	417	436	461	487	487	487	559
To Baseframe Front <sup>1</sup>	J	672	812	866	862	932	962	972	1032	1082	1122	1292	1332	1372	1446	1496	1522	1625	1222	1394
Baseframe Length <sup>1</sup>	K	1660	1760	1900	2170	2200	2300	2550	2720	2650	3100	2800	2780	2760	3150	3100	3100	2980	2920	4500
Half Baseframe Width <sup>1</sup>	L	450	500	550	625	635	700	725	750	800	825	875	925	975	1000	1050	1100	1170	1100	1300
Ladder to Base <sup>1</sup>	M	n/a	n/a	n/a	565	615	615	655	625	625	625	635	745	855	755	795	825	865	875	815
Mounting Plate <sup>1</sup>	N	555	655	655	655	655	655	655	670	625	625	640	760	745	720	675	710	765	765	765
Burner Length*		1075	1075	1255	1255	1255	1360	1360	1360	1360	1409	1409	1548	1548	1548	1548	1700	1700	1700	1700
Feed Pump - 150psi	DN	25	25	25	25	25	32	32	32	32	40	40	40	40	40	40	50	50	50	65
Crown Valve Outlet - 150psi	DN	50	65	80	80	100	100	100	100	125	125	125	150	150	150	200	200	200	200	200
Safety Valve Outlet - 150psi	DN	40	40	50	50	50	65	65	65	65	80	80	80	100	100	100	100	100	125	125
Blowdown Valve	DN	32	32	32	32	32	32	50	50	50	50	50	50	50	50	50	50	50	50	50
Weight Empty	kg	3220	4630	5890	7090	8090	8980	10440	11450	12250	14390	16810	20650	23390	25880	27960	30560	34160	36910	42930
Weight to NWL	kg	5240	7410	9310	11160	12830	14410	16920	18750	20380	23910	27640	33700	37730	41820	45700	50690	54650	59370	80545
Fuel Y'man2 Nat Gas	Nm <sup>3</sup> /hr	69	103	137	171	205	237	271	305	339	406	474	541	609	675	758	843	928	1012	1214
Fuel Y'man2 Oil**	kg/hr	60	89	118	148	177	205	235	264	293	352	410	468	527	584	656	730	803	876	1051

This chart relates to the YSX series boilers with working pressure up to 150 psi (10 bar). For higher working pressures please contact your local sales representative.

Some design features may change depending on the destination country

# BYWORTH B O I L E R S



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