

# BRILEY

**CAST IRON PREMIX HIGH  
EFFICIENCY GAS FIRED  
BOILER  
60 – 140 kW**



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## DESIGN MANUAL

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**BEESTON**  
**HEATING**

0604.2

**DESIGN MANUAL**

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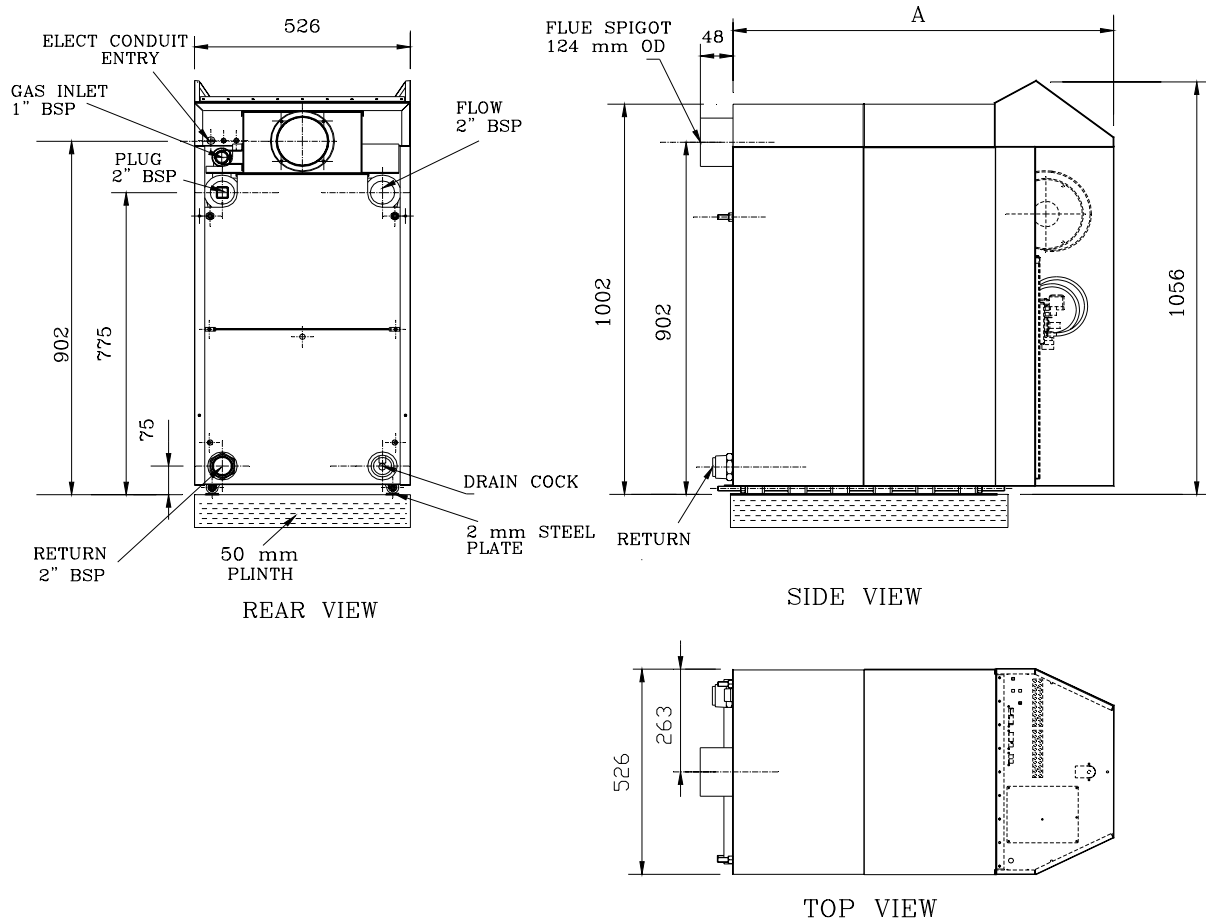
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### 1.0 Boiler specification

- 1.1 The Briley is a high efficiency, premix fan-assisted, gas-fired cast-iron sectional boiler, which incorporates two premix burners and is suitable for natural gas firing only. The controls and two burners allow for a High / Low operation giving both 100% and 50% rates.
- 1.2 The appliance complies with all relevant European Directives, the Gas Appliance Directive (GAD), the Boiler Efficiency Directive (BED), and complies with the building regulation **part L** requirements.
- 1.3 The boiler is CE certified and has a full CE certificate for use in GB and IE with Gas Category I<sub>2H</sub> (Natural gas G20 @ 17.5 mbar inlet pressure when the burner is firing).
- 1.4 The boiler is a Low-Nox appliance with Nox emissions <65mg/kwh dry air free.
- 1.5 The flue classification is an appliance without a draught diverter and with a fan up stream of the combustion chamber and heat exchanger. The burner has gas valve air-to-gas ratio control which ensures the appliance shuts down to a safe condition should the flue become blocked.
- 1.6 The boiler utilises a 125 mm diameter flue, care should be taken to ensure the specification of the flue system is suitable for the application. Beeston Heating can provide further assistance if required and further details can be found later in this manual.
- 1.7 The combustion chamber has a water-cooled base to prevent excessive heat loss to the floor and surrounding area.
- 1.8 The appliance is supplied as a finished assembly with only the control panel, jacket and insulation to be site fitted. The burner is factory preset and **will require a final combustion check at both high and low fire following installation at commissioning.**
- 1.9 The heat exchanger is insulated with mineral wool foil-faced slabs and is cased with powder coated enamel steel panels.
- 1.10 The appliance incorporates an electronic control panel which controls the full sequence direct burner ignition system, and a flow sensor which monitors the boiler flow temperature, together with the electronic control panel this adjusts the burner operation between high, low and off as required. It has a display unit which shows the boiler status, temperature and alarm signals in the event of a fault. Pump **over-run** facility is built in, with maximum current rating of 1 Amp.
- 1.11 Electrical supply: single phase 230 V 50 Hz permanent supply via on/off switch fused at 5 A is required. The wiring must be in accordance with IEE (BS7671), to the health and safety document No 635, the electricity work regulation 1989 and all local regulations that apply. **This appliance must be earthed.**
- 1.12 General design consideration
- The Boiler installation must be in accordance with the following:  
Local/ national Building Regulations,  
Local Water Byelaws,  
Local Gas Region Recommendations,  
Local Authority Recommendation,  
BS5440 Pt 1 Flues,  
BS6644 Pt 2 Air Supply,  
BG Publications:  
IM/2 Purging,  
IM/5 Soundness,  
IM/11 Flues and IM/16,  
C.I.B.S (I.H.V.E) Parts A, B and C.*

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**2.0 General dimensions:-**



Appliance Model			BL60	BL100	BL140
Number of Sections			4	6	8
Max Output (High)	kw		60	100	140
Min Output (Low)	kw		30	50	70
Dimension (A)	mm		722	928	1135
Flue Spigot (OD)	mm		125	125	125
Minimum Clearance	Front	mm	400	500	600
	Rear	mm	250	250	250
	Sides	mm	40	40	40
Weight	Empty	kg	287	412	535
	Full	kg	318	459	597

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**3.0 Appliance technical data**

Appliance model		BL60	BL100	BL140	
Max output (High)	kw	60.0	100.0	140.0	
Min output (Low)	kw	30.0	50.0	70.0	
Max input (Gross)	kw	71.4	119.0	166.5	
Max input (Net)	kw	64.3	107.2	150.1	
Gas group (N.G)	G20 Natural Gas CAT I2H				
Firing rate (High Fire)	m³/h	6.8	11.3	15.8	
Firing rate (Low Fire)	m³/h	3.4	5.5	7.8	
Gas connection size	1" BSP				
Efficiency	Full load (100%)	93.3% (Net), 84% (Gross)			
	Part load (30%)	91.5% (Net), 81.5% (Gross)			
Combustion	High fire	CO <sub>2</sub> %	9.1	9.2	9.0
	Low fire	CO <sub>2</sub> %	4.6	4.6	4.6
		NOX	< 65mg/Kwh		
Flue size	Ø125 mm (nominal)				
Flue gas temp	°C	150	150	150	
Maximum working press	bar	4.0			
Maximum working temp.	°C	90.0			
Electrical supply	Single phase 230 V 50 Hz, fused at 5 amps				

**4.0 Location:**

4.1 The boiler should be situated on a level foundation of brick or a concrete plinth with minimum height of 50mm, capable of supporting the weight of the boiler when filled.

4.2 The plinth dimensions must exceed the plan area of the boiler by 75mm. The minimum clearances must be observed.

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**5.0 Hydraulic:**

5.1 Flow rates and resistance:-

Appliance Model		BL 60	BL 100	BL 140
Hydraulic resistance at 11K $\Delta T$	m H <sub>2</sub> O	0.35	0.44	0.71
Flow rate	l/s	1.298	2.164	3.03
Matched full flow pump see note below		BP32.1-1 * At 25 KPA	BP32.2-1 * At 25 KPA	BP406.1-1 * At 28 KPA
Hydraulic resistance at 20 K $\Delta T$	m H <sub>2</sub> O	0.14	0.25	0.32
Flow rate	l/s	0.71	1.19	1.67
Boiler matched shunt pump		BP25.1-1	BP32.1-1	BP32.1-1

**Note:**

*The full rate pump is matched at (25 to 28) KPA System Resistance, the pump sized at speed setting 2. The customer or user is responsible to ensure that the pump is suitable for the system. Please contact Beeston for matching pumps to suit different system flow rates and resistance.*

5.2 Water circulation:

- The water circulation system should be installed in accordance with the standards referred to in section 1.1.
- The boiler is suitable for indirect domestic hot water supply only. The flow and return connections must be made in accordance with our instructions. No other connection arrangements may be used. If 3-way mixing valves or diverting valves are used in the system, they should not be of a type that flow through the boiler is totally interrupted.
- Beeston recommend that the installation of a boiler shunt pump to maintain the minimum flow rate through the boiler when the burner is firing, and the pump to over-run for 10 minutes after the burner goes off to dissipate the residual heat. **Pump over-run facility is built in the boiler control panel, with a pump rating 1 Amp maximum.**
- It is essential when installing the boiler in a system, to avoid by design a return water temperature below 55 °C as this can lead to condensation.
- For satisfactory operation, the pressure including any effect of the circulation pump imposed on the boiler should not be less than 3.0 metres head of water.

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- Systems should be thoroughly flushed and cleaned before a new boiler is installed, system water should be treated by a reputable specialist and best practice observed.
- Consideration should be given to the fitting of sludge traps and strainers if site conditions warrant them.
- The boiler does not contain aluminium, suitable water treatment products are Sentinel X100 manufactured by Grace Dearbon Ltd, and Copal manufactured by Fernox Ltd

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**6.0 Flue and ventilation**

6.1 The Nominal flue size should not be less than the boiler flue outlet listed in the technical data (125 mm I.D).

6.2 The flue system should be designed to overcome the boiler flue resistance and to give a flue draught in the chimney of 5 to 15 Pa, in some installation

larger diameter flue may be required, and in installation where the draught is excessive flue stabilizers should be used.

6.3 The boiler flue spigot is non-load bearing and the flue system should be supported independently.

Appliance Designation			BL60	BL100	BL140
Number of Sections			4	6	8
Max Flue gas volume		l/s	23.7	39.3	55.0
Min Flue gas volume		l/s	11.8	19.1	27.1
Natural ventilation free area	Low	cm <sup>2</sup>	592	806	1020
	High	cm <sup>2</sup>	296	403	510
Mechanical ventilation air flow rates	Inlet	m <sup>3</sup> /s	0.093	0.11	0.15
	Extract	m <sup>3</sup> /s	0.064	0.071	0.10

**7.0 General Notes on installation and commissioning**

7.1 This appliance must be installed in accordance with the rules in force and used only in a **sufficiently ventilated space**.

7.2 Consult all instructions before installation and use of the appliance.

7.3 This appliance must be installed to the specifications listed in this manual by a competent person, CORGI registered Installer, and in accordance with the Gas safety regulations, The relevant British

standards, the IEE wiring regulations, the Building regulations and the Water bylaws.

7.4 The boiler must be commissioned and serviced to the manufacture instruction by a competent (CAS) Corgi registered Engineer.



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