Calder

Steel Hot Water Boiler
Suitable for Pressure Jet burners
Oil, gas, LPG or dual fuel firing

Outputs 70 - 3500 kW

Calder Model 70 - 1300

Calder Model 1400 - 3500

ORMANDY
Hartley & Sugden
STEAM & HOT WATER BOILERS

ORMANDY
Hartley & Sugden

Calder - Steel Hot Water Boiler

The Calder is a range of three pass reverse flame steel shell and tube hot water boilers. They are available in sizes ranging from 70 - 3500 kW, suitable for firing on natural gas, LPG and oil with a choice of burner manufacturers.

Calder Model 70 - 1300

Design features

- Manufactured to EN303
- Flanged front and rear tube plates
- High density insulated casing
- Left or right hand hinged front door
- Ancillary boiler connections incorporated

Performance features

- High efficiency up to 92.3% (net CV)
- Standard outputs from 70 - 3500 kW
- Standard working pressure up to 5 bar (up to 10 bar on request)
- Maximum flow water temperature 100°C
- Minimum return water temperature 55°C

Calder Model 1400 - 3500

General Description

Calder boilers are designed to provide high efficiency up to 92.3% (net CV), focusing on fuel savings, low flue gas temperatures and low emissions. The boilers have a high water volume and the design reduces thermal stress and the build up of scale, which improves the longevity of the boiler.

Calder boilers are generally available in outputs of up to 3500 kW, however details of outputs above this are available on request.

The boilers have a standard maximum working pressure of 5 bar, with higher pressures up to 10 bar available on request. The maximum standard water flow temperature is 100°C and the minimum return water temperature is 55°C, with a maximum temperature drop across the boiler of 30k.

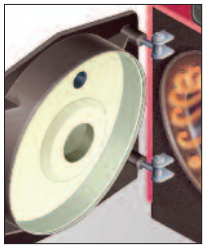
Each boiler is supplied with a factory tested control panel. The panel is pre wired and connected to the control and safety limit thermostats and burner.

Where appropriate, Calder boilers should be installed in accordance with BS 6644 and other relevant standards, codes of practice and current building regulations. Water treatment is recommended for all steel shell and tube boilers and a water treatment specialist should be consulted for advice on this matter.

All Calder boilers are supplied with a set of cleaning tools.

Design & Construction

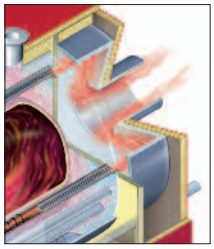
The Calder is a three pass wet back reverse flame shell and tube design and comes complete with a removable stainless steel turbulator within each firetube.



Calder boilers are manufactured in accordance with European standards and are CE certified. The boiler is manufactured using high quality steel and is constructed generally in accordance with EN303.

Laser cut precision components are used during manufacture and robotic welding machines ensure high quality workmanship. The boiler incorporates a flanged front and rear tube plate design, which minimises thermal stresses within the boiler.

The boilers are supplied complete with a high density insulated casing. The 70 - 1300 models have painted steel panels, which can be supplied fully factory fitted or loose for fitting on site by the purchaser. The 1400 - 3500 models have a circular stucco aluminium casing, which is supplied fully assembled and factory fitted.



The boilers have an insulated hinged front door, which is available for left or right hand opening. However this needs to be specified at the time of order.

To ensure the highest quality standards, every Calder boiler is hydraulically pressure tested in the factory.

Electrical Connections and Controls

A control panel is supplied with each Calder boiler. The standard control panel features include a main switch, panel live lamp, boiler thermometer, control thermostats, safety thermostat with manual reset, burner on/off switch and pump on/off switch. The standard control thermostats have an operating range from 60 - 90°C, (control thermostats up to 100°C are available on request).

Additional control options are available, including volt free kits, weather compensation, optimised start/stop, cascade control, room and outdoor sensors, hours run meter, flue gas thermometer, etc. details available on request.

A 230v single phase electricity supply is required to the control panel from a suitable fused isolator. For single phase burners the electrical supply can be direct from the control panel.

For three phase burners a seperate three phase isolated supply direct to the burner is necessary, with a flexible connection for boiler door opening.

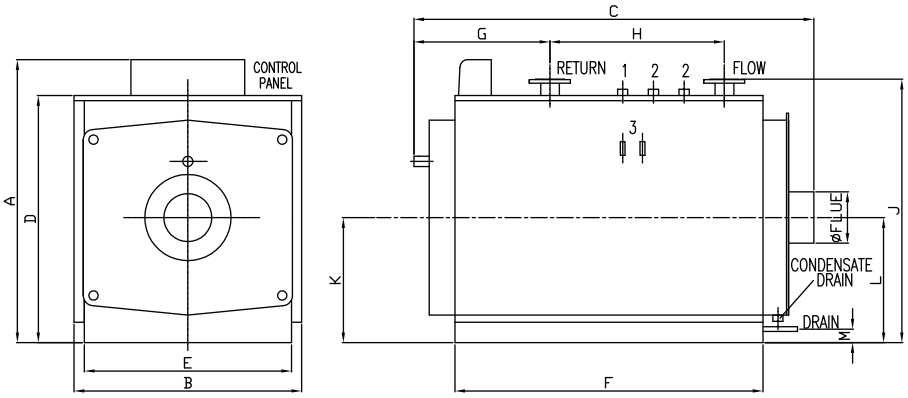
The standard panel is supplied with the following :-

- main switch
- panel live lamp
- boiler thermometer
- control thermostats
- safety thermostat with manual reset
- burner on/off switch and pump on/off switch
- Fully wired and connected to burner

Technical Data & Dimensions

Calder Model 70 to 1300

1 1" INSTRUMENT CONNECTION FOR SAFETY/PRESSURE GAUGE ON BOILERS UP TO 350kW
2 CONNECTION FOR SAFETY VALVES. 1 x ON 400kW BOILER & 2 x ON BOILERS ABOVE 400kW
3 1/2" POCKETS



Calder Model	70	80	90	100	120	150	200	250	300	350	400	500	620	750	850	950	1000	1200	1300
Output (kW)	70	80	90	100	120	150	200	250	300	350	400	500	620	750	850	950	1000	1200	1300
Dimensions & Weight																			
A	1030	1030	1030	1030	1030	1080	1080	1080	1180	1180	1190	1380	1380	1510	1510	1510	1660	1660	1660
B	750	750	750	750	750	800	800	800	900	900	940	1160	1160	1290	1290	1290	1440	1440	1440
C	994	994	1119	1119	1119	1364	1364	1614	1614	1864	1872	1946	2235	2247	2247	2497	2477	2477	2477
D	855	855	855	855	855	905	905	905	1005	1005	1015	1205	1205	1335	1335	1335	1485	1485	1485
E	700	700	700	700	700	750	750	750	850	850	890	1110	1110	1240	1240	1240	1390	1390	1390
F	630	630	755	755	755	1000	1000	1250	1250	1500	1502	1502	1792	1753	1753	2003	2003	2003	2003
G	413	413	513	513	513	513	513	513	523	523	600	663	663	704	704	704	703	703	703
H	240	240	265	265	265	475	475	725	700	980	850	850	1150	1100	1100	1200	1200	1200	1200
J	911	911	911	911	911	961	961	961	1061	1061	1095	1285	1285	1417	1417	1417	1568	1568	1568
K	415	415	415	415	415	440	440	440	490	490	500	610	610	675	675	675	750	750	750
L	415	415	415	415	415	440	440	440	490	490	500	610	610	675	675	675	750	750	750
M	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	50	60	60	60	60	60	60	60	60	60	60
Approx. dry weight (kg)	216	216	258	258	258	346	346	431	475	542	584	853	963	1205	1205	1417	1843	1843	1843
Efficiency based on net CV																			
Efficiency (%) @ 100% load *	92.1	91.9	91.8	91.7	91.6	92.0	91.7	91.9	92.3	92.1	92.3	92.2	92.2	92.2	92.2	92.2	92.2	92.2	92.2
Efficiency (%) @ 30% load *	90.2	90.2	90.3	90.4	90.4	91.1	91.3	90.4	90.6	90.6	90.8	90.7	90.7	90.6	90.7	90.7	90.6	90.6	90.6
Combustion and flue data																			
Gas flow rate G20 (m³/h)	8.1	9.2	10.4	11.5	13.9	17.2	23.1	28.8	34.4	40.2	45.8	57.4	71.1	86.0	97.5	109.0	117.1	137.7	149.1
Oil flow rate (l/h)	7.9	9.0	10.2	11.3	13.6	17.0	22.6	28.3	33.9	39.6	45.2	56.5	70.1	84.8	96.1	107.3	113.0	135.6	146.9
Flue Gas Volume (m³/min)	3.0	3.4	3.9	4.3	5.1	6.5	8.7	10.8	13.0	15.2	17.3	21.7	26.9	32.5	36.9	41.2	43.4	52.1	56.4
Approx Flue Gas Temp. (°C)	188	192	194	197	200	190	197	193	184	188	182	185	185	185	184	185	186	185	185
Comb. Chamber Resistance (mbar)	0.8	1.0	0.8	1.0	1.1	1.2	1.9	2.0	2.0	2.9	4.1	4.2	6.4	5.2	7.2	5.2	4.0	5.5	6.5
Water system																			
Hydraulic Resistance (11k) (mbar)	10.7	10.7	11.9	14.3	15.5	16.7	17.9	17.9	19.0	21.4	23.8	26.2	32,1	29.8	32.1	38.0	30.9	35.7	38.1
Hydraulic Resistance (20k) (mbar)	3.2	3.2	3.6	4.3	4.7	5.0	5.4	5.4	5.8	6.5	7.2	7.9	9.7	9.0	9.7	11.5	9.4	10.8	11.5
Minimum flow rate (11k) (l/s)	0.38	0.43	0.49	0.54	0.65	0.81	1.08	1.35	1.62	1.90	2.16	2.71	3.36	4.10	4.60	5.14	5.41	6.50	7.03
Minimum flow rate (20k) (l/s)	0.21	0.24	0.27	0.30	0.36	0.45	0.60	0.74	0.89	1.04	1.19	1.49	1.85	2.23	2.53	2.83	3.0	3.57	3.87
Water content (l)	105	105	123	123	123	172	172	220	300	356	360	540	645	855	855	950	1200	1200	1200
Connections																			
Flue gas spigot dia. (mm)	200	200	200	200	200	250	250	250	250	250	250	300	300	350	350	350	400	400	400
Flow & Return Flanged PN16	50	50	50	50	50	50	50	50	65	65	80	80	80	100	100	100	125	125	125
Drain Male thread	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"
Safety Valve Female thread	-	-	-	-	-	-	-	-	-	-	1.1/4"	1.1/4"	1.1/4"	1.1/2"	1.1/2"	1.1/2"	1.1/2"	1.1/2"	1.1/2"

For models 350 and below a seperate safety valve connection is not provided, as the safety valve is connected to the 1" instrument connection
*Based on 80-60°C flow & return temperatures
All dimensions in (mm) unless stated otherwise

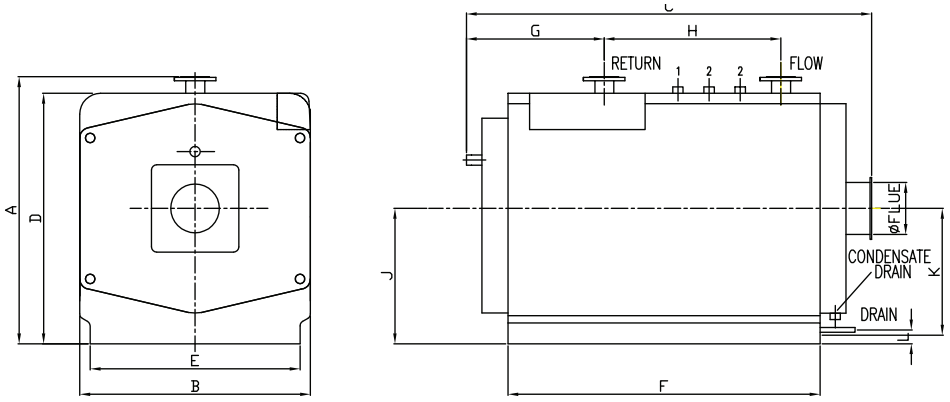
ORMANDY Hartley & Sugden

Technical Data & Dimensions

Calder Model 1400 to 3500

1 1" INSTRUMENT CONNECTION FOR PRESSURE GAUGE

2 CONNECTION FOR SAFETY VALVES.



Calder Model	1400	1600	1800	2000	2400	3000	3500
Output (kW)	1400	1600	1800	2000	2400	3000	3500
Dimensions & weight							
A	1746	1746	1746	1876	1876	2146	2146
B	1470	1470	1470	1600	1600	1870	1870
C	2886	2886	3096	3220	3480	3480	3225
D	1630	1630	1630	1760	1760	2030	2030
E	1270	1270	1270	1400	1400	1670	1670
F	2300	2300	2510	2510	2770	2770	3935
G	831	831	771	903	903	903	903
H	1300	1300	1850	1550	1950	2050	2050
J	880	880	880	945	945	1080	1080
K	880	880	880	945	945	1080	1080
L	150	150	150	150	150	150	150
Approx. dry weight (kg)	2600	2600	2750	3650	3900	5200	5700
Efficiency based on net CV							
Efficiency (%) @ 100% load *	92.3	92.3	92.3	92.3	92.3	92.3	92.3
Efficiency (%) @ 30% load *	91.7	91.8	91.8	91.7	91.8	91.8	91.7
Combustion and flue data							
Gas flow rate G20 (m^3/h)	160.5	183.4	206.4	229.3	275.2	343.9	401.3
Oil flow rate (l/h)	166.6	190.4	214.2	238.0	285.6	357	416.5
Flue Gas Volume (m^3/min)	60.8	69.6	78.3	87.0	104.4	130.5	152.2
Approx Flue Gas Temp. (°C)	184	183	184	184	184	184	184
Comb. Chamber Resistance (mbar)	6.0	6.5	7.0	6.0	7.5	8.0	9.0
Water system							
Hydraulic Resistance (11k) (mbar)	33	32	37	35	40	49	60
Hydraulic Resistance (20k) (mbar)	10	10	11	11	12	15	18
Minimum flow rate (11k) (l/s)	7.6	8.7	9.7	10.8	13.0	16.2	18.9
Minimum flow rate (20k) (l/s)	4.2	4.8	5.4	6.0	7.1	8.9	10.4
Water content (l)	1500	1500	1650	2000	2300	3150	3650
Connections							
Flue gas spigot dia. (mm)	400	400	400	500	500	550	550
Flow & Return Flanged PN16	150	150	150	200	200	200	200
Drain Male thread	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"	1.1/4"
Safety valve Female thread	1.1/2"	1.1/2"	1.1/2"	2"	2"	2"	2"

* Based on 80 - 60°C flow & return temperatures.

All dimensions in (mm) unless stated otherwise

ORMANDY Hartley & Sugden

Installation

Clearances
Calder boilers should be installed and positioned so that there is adequate access to the flue and pipework connections. Consideration should also be given to the position and projection of the burner with the boiler door in the open position. All boilers should also be installed so that there is enough room at the front for cleaning of the tubes and combustion chamber and for removal of the turbulators.

Burners
A burner is normally supplied and matched to the boiler to give either on/off, high/low or fully modulating operation, which ensures optimum operating efficiency to suit specific requirements. The burner is bolted to the boiler front door and pre-wired to the control panel.

Ancillary items
A pressure gauge, safety valves and drain valve are supplied loose for connection to the boiler on site by the purchaser.

For models 70 - 350 the safety valve and pressure gauge can be connected to a 1" instrument connection provided on the top of the boiler. Alternatively the purchaser may connect the pressure gauge and safety valve directly to the system flow pipework between the boiler and the isolation valve. For model 400 a safety valve connection is provided on the boiler and on models 500 and above, two safety valve connections are provided on the top of the boiler as standard.

Boiler base
Calder boilers should be located on a surface capable of supporting the fully flooded weight of the boiler and burner and it should be smooth, level and constructed from a non flammable material.

Delivery
Delivery to site can be arranged.

Commissioning
Commissioning of the boiler/burner can be arranged.

Dual Boiler Options

Calder boilers can be supplied in a special dual formation, for mounting either side by side or one on top of the other. Flow and return headers and special control panels are also available, for these arrangements. Dual boilers can be supplied with a total output of up to 2600 kW. Details of these boiler configurations are available on request.

Ormandy Group Associated Products

The Ormandy group has an extensive range of boiler-house products, which compliment the Ormandy Hartley & Sugden boiler range.

All Ormandy products can be skid mounted to specific requirements. Detailed information on all Ormandy products is available on request.

Additional products include:

- Pressurisation units
- Storage and Non Storage Calorifiers
- Plate heat exchangers
- Package plant rooms which can be designed to incorporate any of the above equipment

Please visit **www.ormandyltd.com**
to access comprehensive information on
Ormandy Hartley & Sugden products and services.

The Ormandy Group: Ormandy Offsite / Ormandy Rycroft / Ormandy Electric
Ormandy Hartley & Sugden / Ormandy Newade / Ormandy Dreh / Ormandy Aquatherm

For full information on the Ormandy Group and all its products and services, please visit **www.ormandyltd.com Tel +44 (0)1422 350111**

ORMANDY
Hartley & Sugden
STEAM & HOT WATER BOILERS

Ormandy Hartley & Sugden, Atlas Works,
Gibbet Street, Halifax, HX1 4DB England

Tel +44 (0)1422 355651 **Email** sales@hartleyandsugden.co.uk

Issue 1 April 2011