



Foyle Ltd - Gloucester

Environmental Permit Application

EPR Ref: UP3700PX/A001

Emissions to Atmosphere

Document Ref: Attachment B.3.2

EMISSIONS TO ATMOSPHERE

FOYLE, CINDERFORD, GLOUCESTER, UK

1.0 SUMMARY LIST OF ALL EMISSIONS TO ATMOSPHERE

A summary of all emission points to atmosphere within the site is presented within the tables below.

A site map, indicating the point sources and fugitive sources emission points, is also detailed in **Appendix A**.

2.0 POINT EMISSION SOURCES

There are two items of equipment on-site that are considered to be emission point sources to atmosphere:

- 1 x natural gas fuelled 60-HP steam generating boiler
- 1 x natural gas fuelled 30-HP steam generating boiler

Periodic visual assessment takes place to ensure emissions are colourless, free from persistent trailing mist or fume and are free from droplets.

3.0 AIR EMISSION SOURCES

There are currently two boilers on-site:

Table 3.1: Foyle - Gloucester Boiler Data

Ref	Manufacturer	Function	Model	Output	Thermal Input
B-1	CFB Steam Boiler	Steam Generation	4VT – 60HP	270-970 kW	750 KW
B-2	CFB Steam Boilers	Steam Generation	4VT – 30HP	185-420 kW	440 KW

Scheduled Activities

As can be seen in Table 3.1 above, the sites combustion plant has a combined thermal input of 1,190 KW or 1.19 MW and therefore has a rated thermal input less than 50MW.

As a result of this, the site has not included the following scheduled activities as part of their environmental permit application:

The Environmental Permitting (England and Wales) Regulations 2016,
Schedule 1: Activities, Installations and Mobile Plant,
Part 2: Activities,
Chapter 1: Energy Activities,
Section 1.1: Combustion Activities,
Part A(1): (a) *Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.*

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These natural gas fuelled *CFB Boilers* supply steam to the entire site and are located within the site's maintenance workshop.

This steam is also supplied to the on-site heat exchanger, located to the rear of the boilers, where it is used to generate hot water.

Both boilers operate at 100% capacity, while the larger 60-HP Boiler (B-1) only operates during daytime production hours and ceases operation at approximately 18:00pm daily.



Figure 3.1: Steam Boiler Layout (B-1)



Figure 3.2: Steam Boiler Layout (B-2)

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4.0 AIR EMISSION POINT LOCATION

Both boiler (B-1 & B-2) exhausts exit from the rear of the structures and combine into a single horizontal pipe. This pipe exits the maintenance workshop at the rear of the building, before travelling vertically, creating a single emission point to atmosphere. (See Appendix A)



Figure 4.1: Boiler Exhaust (B-1)



Figure 4.2: Boiler Exhaust (B-2)



Figure 4.3: Horizontal Exhaust Pipe (internal)



Figure 4.4: Horizontal Exhaust Pipe (external)

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Table 4.1: Foyle – Gloucester Air Emission Point Locations

Reference	Emission Point	Location	Grid Ref
AP-1	Boiler Stack	Rear of the Maintenance Workshop	SO 64803 14013

Grid Ref Source: <https://gridreferencefinder.com/>

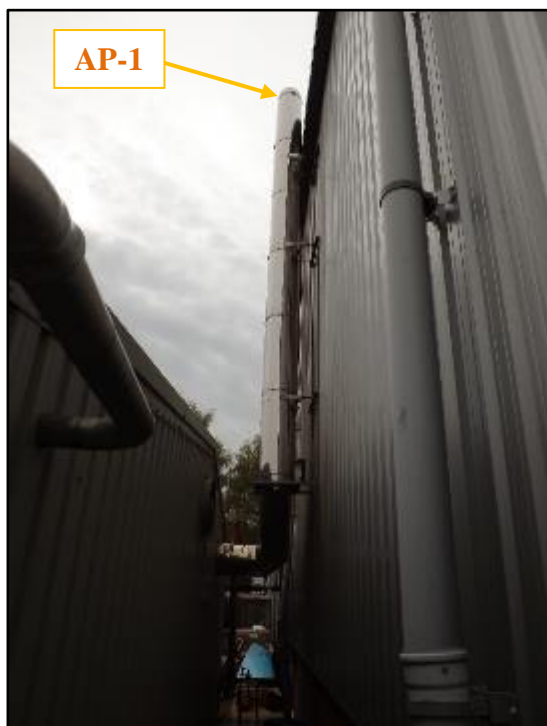


Figure 4.5: Vertical Stack



Figure 4.6: AP-1 Point Source

Table 4.2: Foyle – Gloucester Air Emission Type

Ref	Emission point	Source	Parameters	Quantity	Concentration
B-1	Boiler Stack AP-1	Natural Gas	CO	7 ppm	8.02 mg/m ³
			CO ₂	9.3 %	65,286 mg/m ³
			NO _x	Not measured	N/A
			SO _x	Not measured	N/A
B-2	Boiler Stack AP-1	Natural Gas	CO	12 ppm	13.75 mg/m ³
			CO ₂	9.0 %	63,189 mg/m ³
			NO _x	Not measured	N/A
			SO _x	Not measured	N/A

See Appendix C for Boiler Servicing Sheets dated 16th December 2018.

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5.0 SERVICE SCHEDULE

The site boilers are serviced by the CFB Boilers Ltd.
Registered office: 62 Brunel Road, Gorse Lane Industrial Estate, Clacton, Essex, CO15 4LU.
Registered No: 02846857.

The boilers undergo servicing twice annually.

Both boilers were last serviced on 16th December 2018, while the next servicing has been scheduled in June/July of 2019.

6.0 POTENTIAL FUGITIVE AIR EMISSIONS

Table 6.1 below contains a list of all the Potential Fugitive Air Emission Sources within the site.

See Appendix B of a map containing Potential Fugitive Air Emission Point Locations

Table 6.1: Foyle - Gloucester Potential Fugitive Air Emissions

Ref No.	Emission	Source Location
AF-1	General Waste Odour	General Waste Compactor
AF-2	Effluent/Sludge Odour	WWTP Sumps & Screen
AF-3	Effluent Odour	WWTP Balance Tank
AF-4	Effluent Odour	WWTP DAF Unit
AF-5	Animal By-Product Odour	CAT1&3 Trailers
AF-6	Manure Odour	Cattle Lairage
AF-7	Natural Gas	Main Valve Hut
AF-8	R407a Refrigerant	Refrigeration Units

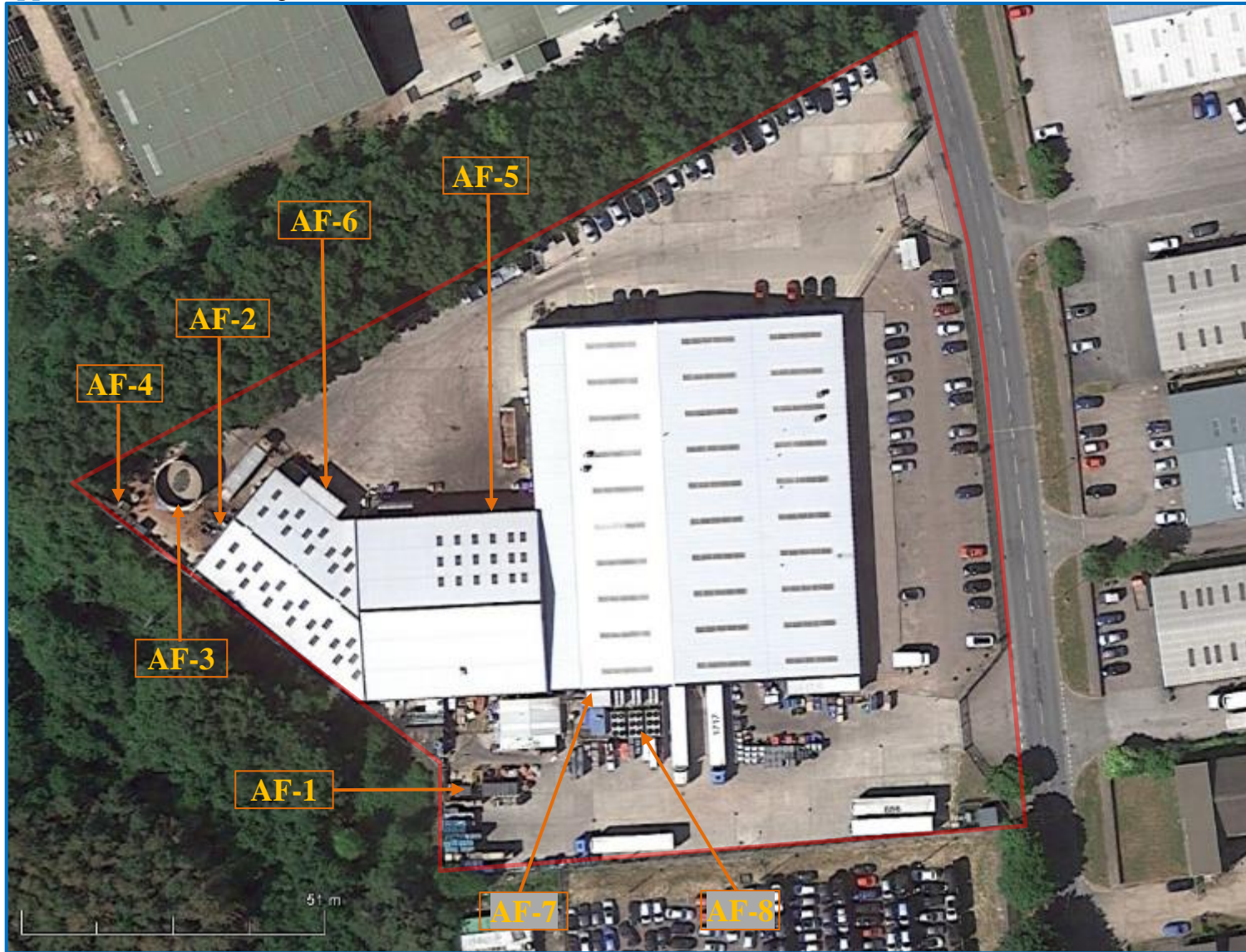
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Appendix A: Emissions to Atmosphere Point Source Locations



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Appendix B: Potential Fugitive Air Emission Points Sources



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Appendix C: Boiler Servicing Sheet

B-1: CFB Steam Boiler (60HP)

16

Date : 16/12/18
 Time : 12:53
 Address No. : 72
 Fuel : Natural Gas

----- Report -----

CO(ppm): 4.7
 O2(%): 4.4
 CO2(%): 9.3
 Ratio(CO/CO2): 0.0000
 Excess Air(%): 26
 Net St(1(%): 94.8
 T1-ST(C): 136.0
 T2-AT(C): Open
 Diff(T1-T2): -----
 Pressure(mbar): 0.011
 Pump(cc/min): 1035

Customer : -----

 Reading Accepted by : -----

12:53 16/12/18

S. No : 25200670070
 N.Cal. Date: 08.02.2019

B-2: CFB Steam Boiler (30HP)

TPI 16

Date : 16/12/18
 Time : 12:47
 Fuel : Natural Gas

----- Report -----

CO(ppm): 12
 O2(%): 5.0
 CO2(%): 9.0
 Ratio(CO/CO2): 0.0001
 Excess Air(%): 31
 Net St(1(%): 91.6
 T1-ST(C): 217.7
 T2-AT(C): Open
 Diff(T1-T2): -----
 Pressure(mbar): 0.011
 Pump(cc/min): 971

Smoke : 1 2 3 4 5

Customer : -----

 Reading Accepted by : -----

12:48 16/12/18

S. No : 25200670070
 N.Cal. Date: 08.02.2019

Appendic D: Boiler Data Sheets



HURST

BOILER & WELDING CO., INC.

AVAILABLE WITH LOW NOX

HURST SERIES 4VT

4-PASS VERTICAL BOILER
Compact Tubeless Design

HIGH PRESSURE BOILER
Capacities from 6 to 100 BHP.
201 to 3450 MBTU/HR.

STEAM
Pressures to 15-250 PSI.

HOT WATER
Section IV
30-160 PSI.



SKID MOUNTED
MODULAR PACKAGED



*"Heat transfers evenly ... eliminating
the metal stress due to uneven heat
transfer common in other designs."*

HURST PERFORMANCE SERIES BOILERS

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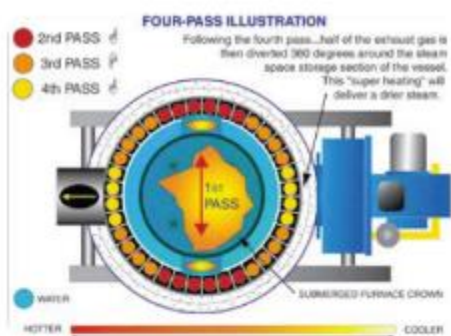


Illustration Shows the Progression of Four Gas Paths Around the Circumference of the Boiler Shell.

SIMPLE INSTALLATION

- Unit is skid mounted for easy handling.
- Factory wired with wiring schematic included in the manual.
- Efficient and space saving layout.

FOUR-PASS DESIGN

- The gases leaving the furnace are split four ways and travel through four individual serpentine fin passages to the stack outlet.
- Each quarter of the heat travels its own four-pass path (see illustration).
- Heat transfers evenly to the fins and boiler shell, eliminating the metal stress due to uneven heat transfer common in other designs.

AVAILABLE ACCESSORIES

- The 4VT is available in a complete package with an optional compact skid-mounted feedwater system for a finished wired and piped, ready-to-fire.
- Blowdown separators are also available.

First-Pass in furnace pipe.

Second-Pass follows path through fins along outside of shell.

Third-Pass follows path through fins along outside of shell.

Fourth-Pass follows path through fins along outside of shell, then merges together to exit exhaust stack.

INSPECTION ACCESS

- The waterside openings are located in the most effective positions. The lower handholes offer far better access for both cleanout and inspection.
- These more functional locations avoid the obstructing handhole "tunnels" used by our competitors.
- The top opening offers a strategic view of the furnace crown sheet.

OPTIONS AND ALTERNATIVES

- We specialize in customizing your boiler. The 4VT can be equipped to suit a wide variety of installations and specifications. We will help direct you to the most cost effective models and features.

MORE STEAM STORAGE

- Capacity to handle swing and spike loads – quick recovery quick response.
- The larger steam release surface is calmer, reducing carry over of unevaporated water.
- The resulting drier steam also reduces system scaling.
- In addition, dry steam helps to eliminate unnecessary extra condensate. Energy and fuel are saved. Longer life results.

DURABILITY

- Fire does not pass under the bottom mud ring, eliminating the blistering that occurs with other designs.
- Cooler furnace gases are located at the bottom of the vessel where scale is most likely to occur. Baking of scale is alleviated.

EASIER SERVICE

- Fireside fin access in top and bottom.
- Access opening above feed water inlet for easy cleaning.
- Thoughtfully engineered with the owner in mind.
- No heavy doors or covers to complicate service procedures.

LOW NOX

Pre Certified

Hurst Pre Certified 4VT LOW NOx boilers can achieve less than 30 PPM NOx at 3% O2 without the need for induced flue gas recirculation.

4VT LN Series

Shown with PowerFlame Burner



Pre Certified Under
SCAQMD RULE 1146.2



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TURBULENT FLAME

- Heat is forced down, with the fire whirling and spinning against its natural flow. This pattern enhances recirculation, mixing and heat transfer, driving more energy into the water for greater fuel-to-steam efficiency.

RELIABILITY

- The furnace crown is water cooled, eliminating refractory breakdown inherent in units of inferior design.
- No fire tubes, water coils or "in the fire" mud rings to burnout.

"EYE HIGH" BURNER

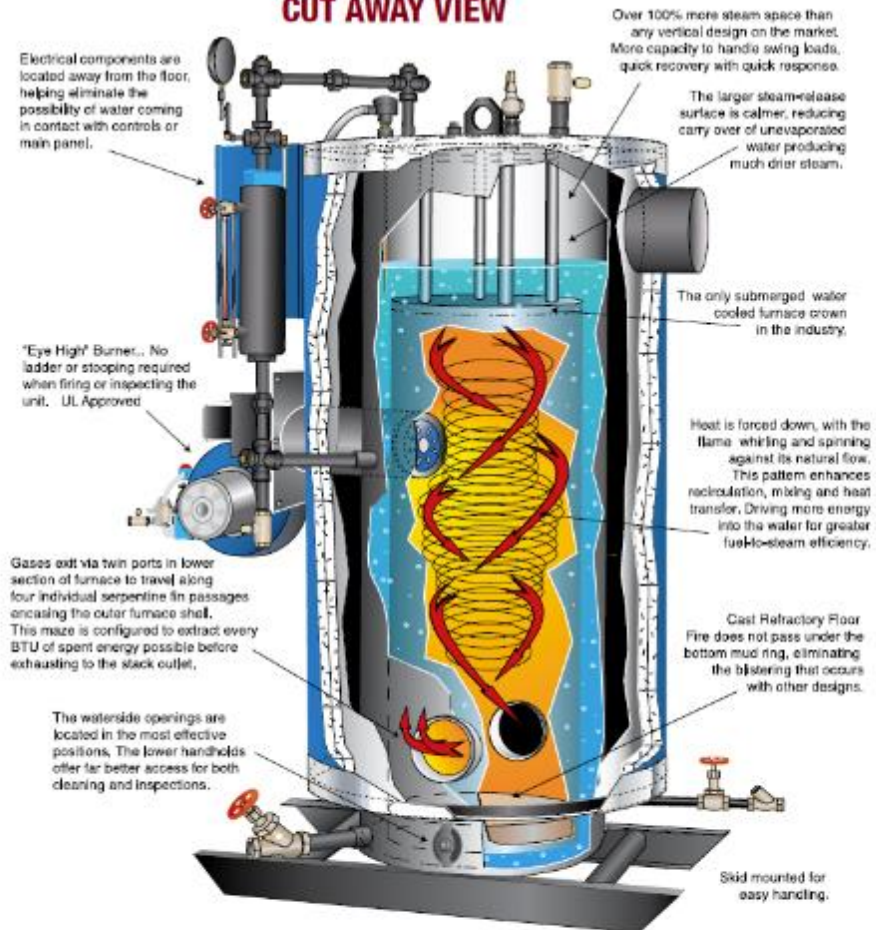
- No step ladder is needed to service.
- No bending over or sitting on the floor.
- The air intake is located in the center of the unit so dust is not pulled from the floor.

SAFETY

- Electrical components are located away from the floor, helping eliminate the possibility of water coming in contact with electricity.
- Boiler built to ASME Section 1, High Pressure Boiler Code.
- CSD-1 approved.
- Burner/Boiler UL Packaged

FOUR PASS EFFICIENCY
ALL STEEL CONSTRUCTION

CUT AWAY VIEW



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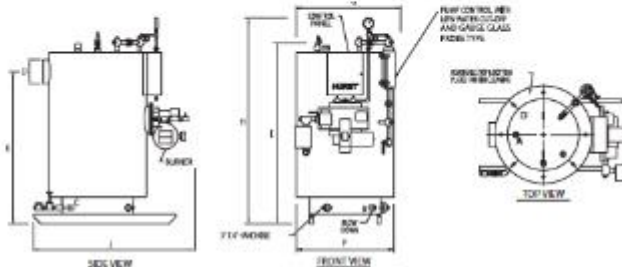
HURST

HURST PERFORMANCE SERIES BOILERS



Skid Packaged Options

- Feedwater System
- Water Softener
- Blow Down Flash Separator
- Chemical Mix Systems



BOILER SPECIFICATIONS			BOILER HORSEPOWER											
			5	10	15	20	25	30	40	50	60	70	80	100
STEAM OUTPUT	FROM & @ 212° F	LBSP-HR	207	345	510	630	850	1025	1380	1725	2070	2415	2760	3450
GROSS OUTPUT		MMH	94	156	235	313	391	489	636	783	930	1065	1252	1565
INPUT REQUIRED		BTU X 1000	251	418	628	807	1048	1265	1674	2082	2511	2929	3348	4184
		KCAL X 1000	83.3	135	198	271	354	437	574	707	839	971	1104	1354
FIRING RATE NAT. GAS	1000 BTU/LP FT.	FT ² /HR	251	418	628	807	1048	1265	1674	2082	2511	2929	3348	4184
		M ² /HR	7.1	11.8	17.8	23.7	29.6	35.5	47.4	59.2	71.1	82.9	94.8	110.5
FIRING RATE LP GAS	91,500 BTU/LAL	CPH	2.7	4.6	6.9	9.1	11.4	13.7	18.3	22.9	27.4	32	36.6	45.7
		CPH	10.4	17.3	26	34.5	43.5	51.9	68.2	85.6	103.9	121.2	139.5	173.1
FIRING RATE OIL #2	140,000 BTU/LAL	CPH	1.8	3	4.5	6	7.5	9	12	14.8	17.6	20.3	23.9	29.9
		CPH	6.8	11.3	17	22.0	28.3	33.8	43.3	53.6	63.9	74.2	84.5	113.1
A STEAM OUTLET	HIGH PRESS.	IN MM	1 25	1 25	1 25	1 25	1 25	1 25	2 30	2 30	2 30	2 30	2 30	2 30
A STEAM OUTLET	LOW PRESS.	IN MM	2 51	2 51	2 51	2 51	2 51	2 51	3 102	3 102	3 102	3 102	3 102	3 102
B BLOWDOWN	100 PSI	IN MM	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25
B BLOWDOWN	LOW PRESS.	IN MM	2 51	2 51	2 51	2 51	2 51	2 51	2 51	2 51	2 51	2 51	2 51	2 51
C FEEDWATER		IN MM	1 12	1 12	1 12	1 12	1 12	1 12	1 12	1 12	1 12	1 12	1 12	1 12
D STACK DIA.		IN MM	8 203	8 203	8 203	8 203	8 203	8 203	10 254	10 254	10 254	10 254	10 254	10 254
E STACK HEIGHT		IN MM	52 1321	52 1321	52 1473	52 1625	52 1625	52 1625	64 1625	64 1625	64 1625	64 1625	64 1625	64 1625
F WIDTH WITHOUT TRIM		IN MM	35.2 894	35.2 894	35.2 894	35.2 894	35.2 894	35.2 894	43.7 1111	43.7 1111	43.7 1111	43.7 1111	43.7 1111	43.7 1111
G WIDTH WITH TRIM		IN MM	42 1067	42 1067	42 1067	42 1067	42 1067	42 1067	49.5 1257	49.5 1257	49.5 1257	49.5 1257	49.5 1257	49.5 1257
H OVER ALL HEIGHT		IN MM	79 2007	79 2007	79 2159	79 2159	79 2159	79 2159	85 2159	85 2159	85 2159	85 2159	85 2159	85 2159
I HEIGHT WITHOUT TRIM		IN MM	65 1651	65 1651	65 1803	65 1803	65 1803	65 1803	77 1803	77 1803	77 1803	77 1803	77 1803	77 1803
J LENGTH		IN MM	80 1504	80 1504	80 1504	80 1504	80 1504	80 1504	87 1504	87 1504	87 1504	87 1504	87 1504	87 1504
SHIPPING WEIGHT	DRY	LBG KG	1801 870	1881 870	2101 953	2181 989	2181 989	2621 1185	2621 1185	2621 1185	2621 1185	2621 1185	2621 1185	2621 1185
WATER CONTENT - WATER SERIES	FLOODED	GALS LITERS	60 226	60 226	66 257	79 299	79 299	113 429	113 429	113 429	113 429	113 429	113 429	113 429
WATER CONTENT - STEAM SERIES	NWL	GALS LITERS	48 182	48 182	54 204	54 204	54 204	73 277	73 277	73 277	73 277	73 277	73 277	73 277
BOILER HORSEPOWER			5	10	15	20	25	30	40	50	60	70	80	100

- CONNECTIONS OVER FOUR INCHES ON LOW PRESSURE MODELS ARE #150 FLANGES. ALL OTHER CONNECTIONS ARE NPT.
- DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE. CERTIFIED DRAWING AVAILABLE UPON REQUEST.

Inspired and registered with the National Board of Boiler & Pressure Vessel Inspectors.



Designed, constructed and stamped in accordance with the requirements of the ASME Boiler Code.

HBC-09505
07/2014



HURST BOILER & WELDING Co., Inc.

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