

Inclined Water Tube

WATER HEATING BOILERS FORCED DRAFT

FOR SPACE HEATING AND PROCESS USE

Series WF



- A.S.M.E. STAMPED
For Working Pressure 125 psig.
- Full access to water sections (water side and fire side) and combustion chamber.
- Indirect Heat Exchangers, if required, are of sidearm style with heavy duty ASME construction, sized to meet job requirements.
- Models 15000 - 21000 carry U.L. label on the burner only.
- Capacities up to 21,000,000 BTUs/hr.
- Completely assembled and wired.
- Outdoor Models available without U.L. Label. (WF-W series)
- Water tubes easy to clean or remove
- Models 250 - 15000 are U.L. Listed for natural gas, #2 oil, and combination gas/#2 oil.



U.L. Listed



A.S.M.E.

INCLINED WATER TUBE BOILERS • LOW NOX PACKAGED BOILERS • LOW PRESSURE • HIGH PRESSURE • OUTDOOR BOILERS
• ATMOSPHERIC • FORCED DRAFT • STEAM BOILERS • HIGH EFFICIENCY • GAS/OIL FIRED • COMBINATION GAS OIL FIRED

STANDARD EQUIPMENT

BOILER: Complete water section, including tube sheets and removable head plates, PV quality steel from 3/8" to 1.0" thick. Steel tubes 2" O.D. SA 178 Grade A. Head gaskets, full face, fabric reinforced neoprene, 3/16" thick. Hand hole opening provided in front head plate for inspection on models 2000 and larger. I-beam skid mounted. A.S.M.E. rated for working pressure of 125 psig.

COMBUSTION CHAMBER: 2750° F high temperature castable refractory used in all models. Models 150-800 2.5"; 900-3250 3", 3500-15,000 4". Refractory is backed by a minimum of 2" insulating refractory and 3" of 2200° F mineralwool insulation. Hinged front door Models 150-1750; removable front door and manway (on side of boiler) Models 2000-21000.

CONTROLS AND TRIM: Boilers are built to U.L. and CSD-1 standards. The following burners have been tested on Ajax boilers and are listed by Underwriter's Laboratories for either natural gas, #2 oil, or combination natural gas and #2 oil as a packaged assembly: Power Flame, Gordon Piatt, Webster, Wayne. Not all sizes and models listed. Please consult factory.

Standard for all models are: Operating Control, High Limit with manual reset control, Electronic Low Water Cutoff with manual reset and test switch, Main Gas Valve, Auxiliary Gas Valve, Electric Ignition, Manual Gas Shut-Off Valves (Main and Pilot), Main Gas Pressure Regulator, Pressure Relief Valve (available at 30, 45, 75 or 125 psig) and Pressure Temperature Gauge. Burners are pre-wired at the factory and fire tested for your quality assurance. 120 / 60 / 1 Control voltage. Burner motor voltage - contact representative.

Please specify one of the following:

GAS BURNER: Forced Draft gas burner.

OIL BURNER: Forced Draft #2 oil pressure atomizing.

GAS/OIL COMBINATION BURNER: For natural gas and #2 oil.

OPTIONAL EQUIPMENT

(Available at Extra Cost)

BOILER: Mirror finish stainless steel jacket or painted jacket. Gas train and controls may be factory mounted on the left side of boiler.

BURNERS: Low NOx burners (see form 1050). LPG or Methane gas burners; alternate fuels may not carry U.L. label - contact representative.

ELECTRICAL: All motor voltages available for domestic or foreign markets.

CONTROLS: Factory Mutual or Industrial Risk Insurers; MicroProcessor Flame Safeguard, Control Circuit Transformer, Custom Controls also available.

COPPER TUBES: Hard Drawn 2" O.D. 13 gauge with magnesium anode rods. (Not recommended for oil fired applications).

HEAT EXCHANGERS: Mounted sidearm style on boiler, for indirect heating of water for shower, laundry, dishwashing, swimming pool, snow melting, and many other applications. Available in capacities up to and including full output of the boiler. 125 psig working pressure design.

OUTDOOR MODELS: Consult factory when specifying size.

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SECTION 311
EFFECTIVE
DECEMBER 2003

Efficiency and Endurance by Design

AJAX
HOT WATER
BOILERS,
FORCED DRAFT

Inclined Water Tube Boilers

SERIES "WRF" MODELS and CAPACITIES

MODEL*	INPUT BTU/HR.	GROSS OUTPUT BTU/HR.	BOILER H.P.	HEAT EXCHANGER <i>(Optional, sidearm)</i>		WATER VOLUME GALLONS	SQ. FT. HEATING SURFACE	APPROX. SHIPPING WT. LBS.***
				G.P.H. 60° F. RISE (1)	G.P.H. 100° F. RISE (1)			
WRF_150	150,000	126,000	3.8	252	151	12	20	1,325
WRF_250	250,000	210,000	6.3	420	252	15	32	1,625
WRF_350	350,000	294,000	8.8	588	353	18	43	2,025
WRF_420	420,000	352,800	10.5	706	423	30	50	2,325
WRF_525	525,000	441,000	13.2	882	529	33	70	2,630
WRF_630	630,000	529,200	15.8	1,058	635	37	86	2,830
WRF_735	735,000	617,400	18.4	1,235	741	40	100	3,140
WRF_840	840,000	705,600	21.1	1,411	847	44	113	3,340
WRF_940	940,000	789,600	24	1,579	948	59	121	4,140
WRF_1050	1,050,000	882,000	26	1,764	1,058	63	134	4,340
WRF_1250	1,250,000	1,050,000	31	2,100	1,260	70	161	4,945
WRF_1500	1,500,000	1,260,000	38	2,520	1,512	77	192	5,605
WRF_1750	1,750,000	1,470,000	44	2,940	1,764	84	215	6,205
WRF_2100	2,100,000	1,764,000	53	3,528	2,117	115	274	6,705
WRF_2500	2,500,000	2,100,000	63	4,200	2,520	129	329	7,475
WRF_3000	3,000,000	2,520,000	75	5,040	3,024	143	385	8,280
WRF_3350	3,350,000	2,814,000	84	5,628	3,377	157	440	9,160
WRF_3770	3,770,000	3,166,800	95	6,334	3,800	222	461	10,660
WRF_4200	4,200,000	3,528,000	105	7,056	4,234	234	510	11,260
WRF_5250	5,250,000	4,410,000	132	8,820	5,292	268	642	13,080
WRF_6300	6,300,000	5,292,000	158	10,584	6,350	300	768	14,725
WRF_7350	7,350,000	6,174,000	184	12,348	7,409	336	907	16,655
WRF_8400	8,400,000	7,056,000	211	14,112	8,467	469	1060	20,070
WRF_9500	9,500,000	7,980,000	238	15,960	9,576	503	1196	21,570
WRF_10500	10,500,000	8,820,000	263	17,640	10,584	536	1322	22,970
WRF_11500	11,500,000	9,660,000	289	19,320	11,592	568	1449	24,520
WRF_12600	12,600,000	10,584,000	316	21,168	12,701	603	1585	26,020
WRF_14650	14,650,000	12,306,000	368	24,612	14,767	797	1785	30,165
WRF_16750	16,750,000	14,070,000	420	28,140	16,884	860	2036	32,665
WRF_19000	19,000,000	15,960,000	477	31,920	19,152	931	2319	34,185
WRF_21000	21,000,000	17,640,000	527	35,280	21,168	990	2555	37,550

Boiler input is based on natural gas 1000 BTU/cf. Boiler ratings are based on 84% efficiency. Above models are UL listed as packaged units when supplied with U.L. burners as noted in Standard Equipment. (For Natural Gas, #2 Oil or Combination Natural Gas/#2 Oil.)

(1) Maximum optional side arm heat exchanger capacity (if used), based on 200°F boiler water.

For installation on a non-combustible pad.

* Please replace the "-" in model number with one of the following:

G - Natural Gas (indicate BTU/cf.ft. &/or Altitude)

P - Propane (LPG)

C - Natural Gas/#2 Oil Combination

** Models 150-350 and Models 16000-21000: U.L. or AGA Label on burners only.

*** For weight-critical applications or installations, contact factory.

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EFFECTIVE
DECEMBER 2003

Efficiency and Endurance by Design

AJAX
HOT WATER
BOILERS,
FORCED DRAFT

INCLINED WATER TUBE BOILERS

SERIES "WRF" DIMENSION TABLE

MODEL*	A Length over Jacket	B Width over Jacket	C Height	E/F Inlet (E) Outlet (F) Dia.	G Inlet Loc. **	H Outlet Location	J Vent Dia. ***	K Vent Loc.	T Tube Length	# Of Tubes	U Burner Center Line	V Burner Ext ****	W Lifting Lugs ****
WRF_150	24	32	41 5/8	1 1/2	28	1 7/8	6	12	16	28	14 1/2	22	
WRF_250	34	32	41 5/8	1 1/2	28	1 7/8	6	12	26	28	14 1/2	22	
WRF_350	44	32	41 5/8	1 1/2	28	1 7/8	6	12	36	28	14 1/2	22	
WRF_420	34 3/8	37	48 3/8	1 1/2	32 7/8	3	6	16	25	53	16	22	
WRF_525	39 3/8	37	48 3/8	1 1/2	32 7/8	3	8	17	30	53	16	22	
WRF_630	46 3/8	37	48 3/8	1 1/2	32 7/8	3	8	17	37	53	16	22	
WRF_735	52 3/8	37	48 3/8	1 1/2	32 7/8	3	8	17	43	53	16	22	
WRF_840	58 3/8	37	48 3/8	1 1/2	32 7/8	3	8	17	49	53	16	22	
WRF_940	47	40 1/2	60 3/4	3	40 3/8	3 1/8	10	18	36	77	20	22	
WRF_1050	51	40 1/2	60 3/4	3	40 3/8	3 1/8	10	18	40	77	20	22	
WRF_1250	59	40 1/2	60 3/4	3	40 3/8	3 1/8	10	18	48	77	20	22	
WRF_1500	68	40 1/2	60 3/4	3	40 3/8	3 1/8	12	19	57	77	20	26	
WRF_1750	75	40 1/2	60 3/4	3	40 3/8	3 1/8	12	19	64	77	20	26	
WRF_2100	60 3/4	49 1/2	70 7/8	3	44 3/4	3 1/2	12	19	49 1/2	127	22 1/2	26	
WRF_2500	70 3/4	49 1/2	70 7/8	3	44 3/4	3 1/2	14	20	59 1/2	127	22 1/2	26	
WRF_3000	80 3/4	49 1/2	70 7/8	3	44 3/4	3 1/2	14	20	69 1/2	127	22 1/2	35	
WRF_3350	90 3/4	49 1/2	70 7/8	3	44 3/4	3 1/2	16	21	79 1/2	127	22 1/2	40	
WRF_3770	85 1/4	61 1/2	69 1/4	6	42	5 5/8	16	25	65 3/4	160	21	40	
WRF_4200	92 1/4	61 1/2	69 1/4	6	42	5 5/8	18	26	72 3/4	160	21	40	
WRF_5250	111 1/4	61 1/2	69 1/4	6	42	5 5/8	18	26	91 3/4	160	21	40	
WRF_6300	129 1/4	61 1/2	69 1/4	6	42	5 5/8	20	27	109 3/4	160	21	44	
WRF_7350	149 1/4	61 1/2	69 1/4	6	42	5 5/8	20	27	129 3/4	160	21	44	
WRF_8400	126 1/4	73	81 3/8	8	53	7 7/8	22	32	100 3/4	241	25	44	
WRF_9500	139 1/4	73	81 3/8	8	53	7 7/8	24	33	113 3/4	241	25	44	
WRF_10500	151 1/4	73	81 3/8	8	53	7 7/8	26	34	125 3/4	241	25	44	
WRF_11500	163 1/4	73	81 3/8	8	53	7 7/8	26	34	137 3/4	241	25	45	
WRF_12600	176 1/4	73	81 3/8	8	53	7 7/8	28	35	150 3/4	241	25	45	
WRF_14650	145 1/2	87	90 7/8	10	58	7 7/8	30	38	115	353	27 1/2	47	
WRF_16750	161 1/2	87	90 7/8	10	58	7 7/8	32	39	131	353	27 1/2	47	
WRF_19000	179 1/2	87	90 7/8	10	58	7 7/8	34	40	149	353	27 1/2	47	
WRF_21000	194 1/2	87	90 7/8	10	58	7 7/8	36	41	164	353	27 1/2	47	

Dimensions are in inches and subject to production tolerances.

* Please see other side for fuel options.

** Dimension does not include gas train.

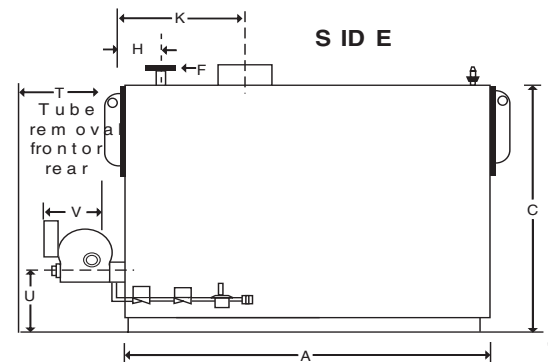
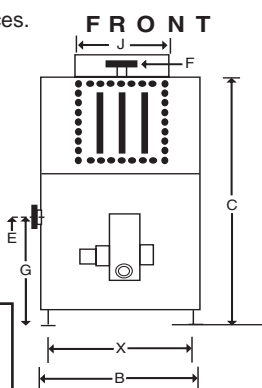
*** t = threaded; fl. = flanged. Flanged Inlets extend approx. 1.5 to 3". Each Outlet extends approx. 3".

**** May vary depending on burner manufacturer.

Vent Stub Height = 3"

Roughing in dimensions only (in inches) Wiring diagrams, and gas train schematics furnished upon request.

Contact factory for specific information.



For installation on a non-combustible pad.



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Efficiency and Endurance by Design

“SERIES WRF” HOT WATER BOILERS GAS, OIL, OR COMBINATION GAS/OIL FIRED SPECIFICATIONS

Boiler shall be an AJAX Model WRF____ U.L. Listed forced draft, gas, or #2 oil or combination gas/ No. 2 oil firing fully automatic package for water heating. Boiler shall have a capacity of _____ MBTU/hr input and _____ MBTU/hr output and be rated to heat _____ GPH at 20° F rise; or _____ GPH at 60° F rise. Boiler shall carry a 20 year prorated warranty against damage caused by “thermal shock”.

Boiler shall be of the horizontal inclined water tube type designed and constructed in accordance with ASME Code Section IV for a maximum allowable working pressure of 125 psig and to carry the appropriate ASME stamp. Boiler tubes shall be straight 2" O.D., 13 gauge, SA 178 Grade A steel. Tubes must be easily obtainable from competitive sources. Proprietary tubes which can only be obtained from the boiler manufacturer are not acceptable.

Note: On direct service water heating applications, swimming pool heaters, or where aggressive water may be encountered, specify 2" O.D. hard drawn, 13 gauge, copper tubes and magnesium anodes instead of steel tubes.

Tubes shall be rolled and flared into flat rectangular tubesheets mounted in two rectangular box headers. Boiler head plates shall be removable to provide easy access to the boiler tubes for inspection and cleaning. Head plates shall be 5/8" thick SA515 Grade 70 steel with reinforcing rib(s). Hand hole(s) shall be provided (on sizes 2100 and up) in the front head plate.

Firebox shall be made of high temperature castable refractory to withstand not less than 2750° F. Access shall be provided to the fire box and burner firing head on models 2100 and larger by means of a removable refractory section. On models 1750 and smaller access shall be provided through a hinged and bolted door.

The boiler jacket shall be of not less than 18 gauge steel with galvanized finish. (Optional 20 gauge mirror finish stainless steel.) (Optional painted jackets shall consist of 100% acrylic paint, water reducible with maximum VOC of 250 gm/L, on surface prepared to SSPC surface preparation specification No. 1).

Boiler shall be equipped with a combination pressure/temperature gauge, ASME rated relief valve (specify working pressure - 30#, 45#, 75#, or 125# can be furnished), operating control, high limit control with manual reset, firing rate control (where applicable), probe type low water cut off with manual reset button and test switch (optional float type low water cut off, manual reset low water cut off, etc.).

Forced Draft Burner. Please replace “_” in model number with one of the following :

1. Forced Draft burners shall be U.L listed **gas fired forced draft flame retention type (G)**. Burner to be equipped for on-off (up to size 2500), low-high-low or full modulation and have flame safeguard controls to meet or exceed U.L. standards. Gas burner is to be equipped with main and pilot gas cocks, main and pilot gas valves, and gas pressure regulators. Gas valves and controls are to be provided to meet U.L. 795 (FM/IRI optional) code requirements.

or

2. Forced Draft burners shall be of the **oil pressure atomizing type (O)**. Burner to be equipped for on-off (up to size 2500), low-high-low or full modulation and have flame safeguard controls to meet or exceed U.L. 726 standards. Oil burner is to be equipped with 3450 rpm blower assembly, 2 stage fuel unit, dual oil safety shut off valves and oil nozzle assembly. Ignition to be by direct spark up to size 5250 and by natural or propane gas pilot in larger sizes, or as per code requirements. Oil valves and controls are to be provided to meet U.L. 726 (FM/IRI optional) code requirements.

or

3. Forced draft burner shall be UL Listed **combination gas/#2 oil forced draft flame retention type utilizing 3450 rpm blower (C)**. Burner to be equipped for on/off (up to size 2500), low-high-low or full modulation. Gas burner is to be equipped with main and pilot gas cocks, dual main and single pilot safety shutoff valves and gas pressure regulators. Oil burner is to be equipped with 2-stage fuel unit, dual oil safety shut off valves and oil nozzle assembly. Ignition for oil and gas fuels is by natural gas (propane) pilot. (Optional direct spark for oil side up to size 5250.)

Blower motor characteristics shall be 120 / 240 V, 60 HZ, single phase up to size 3000, with 208 / 230 / 460 V, 60HZ, three phase on larger sizes.

Control power shall be 115 volts, 60 Hz, 1 phase (with transformer to accept ___volts___Hz___phase).

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