

FB-C/FB-D horizontal wet-back steam and hot water boilers are Fulton's best sellers



Improving Life through Heat Transfer Solutions



The Fulton Companies
972 Centerville Road
Pulaski, NY USA 13142
Phone:(315)298-5121
Fax:(315)298-6390
www.fulton.com

Fulton China LLC
No.9 18th Street
HETZ Hangzhou China 310018
Phone:(86)571-86725890
Fax:(86)571-86725896
www.fulton.cn

Sales Representative



Fulton China LLC is part of the Fulton Companies and manufactures high grade industrial/commercial heat transfer products



Industrial/Commercial Division
The Fulton Companies

Fulton FB-C/FB-D Series Fuel-Fired Steam and Hot Water Boilers

The 3-pass and 4-pass horizontal boilers are designed and built at or above the ASME code and/or Chinese Boiler Standard



FB-C / FB-D

Fulton's Design Concept High Efficiency, Energy Saving and Environmental-Friendly

- 300BHP-1650BHP output (5ton/hr-25ton/ hr)
- Standard maximum working pressure is 1.0MPa and 1.25MPa, other pressure is available upon customer's request
- The standard model is a 3-pass, wetback design with corrugated furnace boiler
- Optional 4-pass and wetback design same with corrugated furnace and higher efficiency
- Seamless tubes thicker than our competitors'
- Welded tubes avoid the problem of leaking caused by shipping normally seen in the rolled tubes
- Light oil, heavy oil, natural gas or dual fuel options
- Low NOx emissions options

Operating Principle

Fuel is injected from the burner into the combustion chamber, and then ignited and burned. The combustion chamber is considered as the first pass. Then a combustion turnaround section directs the flue gases to the second pass fire tubes. The turnaround section is water surrounded and thus called the "wetback". In the third pass, gases which are from the second pass tubes travel to the third pass tubes and finally exit from the stack.

4-pass design for optimum efficiency

Fulton's FB-C/FB-D boilers' 4-pass design adds additional heating surfaces to the traditional 3-pass products, and further enhances the heat exchanging effects between the flue gas and boiler water. This 4-pass design combining with the fully matched IC burner can achieve optimum efficiency for FB-C/FB-D boilers.

Wetback and corrugated furnace design

Both the 3-pass and 4-pass FB-C/ FB-D boilers feature the wetback and corrugated furnace design. The corrugation of the furnace provides additional heat transfer surfaces. It also reinforces the strength of the combustion chamber and increases the longevity of the pressure vessels. Corrugation greatly reduces the thermal and mechanical fatigue caused by cyclic expansion and contraction. Wetback design eliminates the need for refractory lining, baffles, gaskets and provides additional heating surfaces.

Furnace located well below the water level

Furnace is arranged in the center line of the pressure vessel and is well below the water level. The second pass tubes locate evenly above the furnace; the third and fourth pass tubes are above the second pass tubes. Low combustion chamber provides additional safety margin between furnace and water level. It also reduces water carryover and hence supplies higher quality steam. The generous clearance between combustion chamber and the bottom of boiler provides proper water circulation and evenly water heating.

Multiple safety devices ensure the boiler safety

FB-C series steam boiler has at least two safety valves. It also has 1st low water, 2nd low water, high water level cutoffs and safety interlocks; operating pressure, high pressure cutoffs and safety interlocks and flame failure interlocks. FB-D series hot water boiler has low water, high temperature and flame failure safety interlocks.



Burner/Boiler Integration is Fulton's Specialty

Burners are fully matched with the boilers, and the burner/boiler integration has become Fulton's design highlight.



High Efficiency and fully modulation burners

- High turndown ratio fully modulation burners maintain boiler operations steady in the low load mode
 - The turndown ratio for gas-fired burners is 10:1, and for oil-fired burners is 8:1
 - Fully modulation burners minimize boiler on-off cycles, pre-purging and post-purging time, hence increase efficiency
- It also improves the control accuracy of boiler's pressure and temperature

Unique air-atomization oil-fired burner

Unique air-atomization, no matter light oil or heavy oil, can get the optimum atomization mist and mix completely with the air. Oil burners can work cleanly and efficiently just like gas burners. With its self-purging device in the heavy oil burners, oil coking in the nozzle and congealing in the pipe are eliminated. The manual and automatic ignition modes of heavy oil burner can provide customers the flexibility to manually start the burner when there is a minor but not safety related malfunction. This is important to the field operation of heavy oil boilers.

High velocity gas fired burner

Gas is introduced into the combustion zone from a circular manifold through multiple ports in the blast tube. Fulton uses the high quality Siemens valves in the gas trains.

The fuel combination can be either two or three of the fuels chosen from light oil, natural gas and heavy oil. There is no need to replace any components; you just need to turn a switch and have the fuel changed.

Low Emissions Options

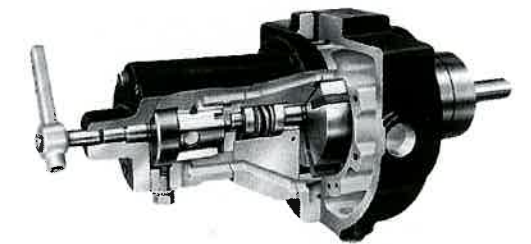
For low NOx emission, Fulton has two choices for the customers. One is using the Flue Gas Recirculation (FGR) technology, the other is using the mesh burners. The mesh burners mix air and gas completely in the burner head. It does not need to re-circulate the flue gas to achieve the Low NOx level. It is ideal for the customers who seek for simple installation and effective way to achieve the Low NOx emission.

Advanced burner control systems for safety and high efficiency

Fulton FB-C/FB-D series burner control system has strong control, test and diagnose functions. The burner programmer monitors the burner ignition, operation and flame. It also works with water relay and pressure control to ensure the boilers' safety. FB-C/FB-D boiler has flame failure, oil pump/water pump, and air motor overload protection; low water cut-off, high pressure cut-off, high temperature cut off for hot water boiler and high-low gas pressure interlocks.

Complete factory mounted gas trains

Factory mounted and wired gas trains complete with Siemens series valves. Our standard gas trains comply with the most updated Chinese burner code. UL, IRI, FM and other code required gas trains are available upon to customer's requirement.



Integral air/oil unit



oil nozzle

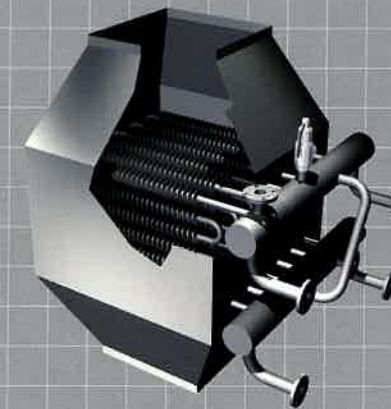


Low NOx mesh burner



Low NOx FGR burner

Fulton's fully designed and manufactured boiler economizers increase boiler efficiency and save customers the precious energy.



Boiler Economizer inside



Boiler Economizer outside

Operating Principle of Boiler Economizer

The Economizer of Fulton FBC/FBD boiler is designed with self-expansion structure at operating temperature. The Economizer uses spiral-fin tubes for heating surface which have 6-8 times more area than bare tubes. The top end of fins are working at temperature nearly the same as gas temperature, which could reduce gas condensation and increase the life of the Economizer. The Economizer is arranged at horizontal position, in which flue gas sweeps Fin tubes crosswise at safety speed to avoid high gas pressure resistance.

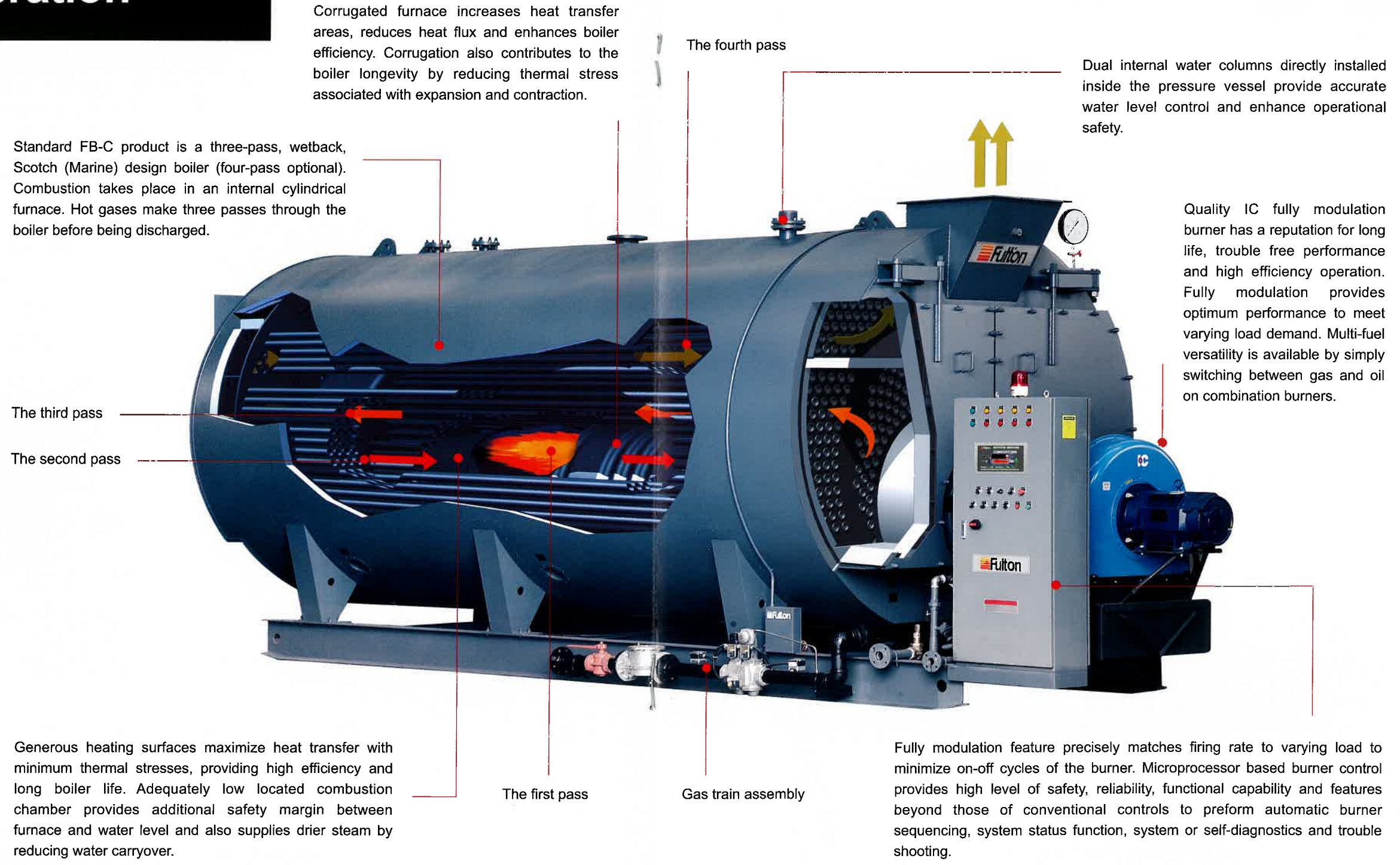
Feed water from return-tank or deaerator tank is pumped into lower inlet header of the Economizer. Feed water is flowed in several rows of fin tubes with elbows and then into higher outlet header of the Economizer. Cold water flows in tubes from down to up direction. Water flow and Flue gas flow could be designed in current or counter-current based on boiler and economizer arrangement. After water is heated by flue gas, water temperature will be enhanced and boiler thermal efficiency is increased.

FB-C / FB-D Boiler Economizer



According to boiler capacity and user's request, an economizer can be designed or arranged either in boiler gas box or in gas pipe after a boiler. the inner Economizer which arranged in Boiler gas box is more suitable for small capacity boiler. It has compact structure, big thermal power in unit space and does not need extra boiler area. While the outer Economizer for big boilers is designed in Gas pipe after a boiler, which need an independent steel structure to support it.

High Efficiency & Easy Operation



Optional Ancillaries

Aside from the standard ancillaries, selected high quality optional ancillaries are also available in Fulton to meet customers' different requirement.

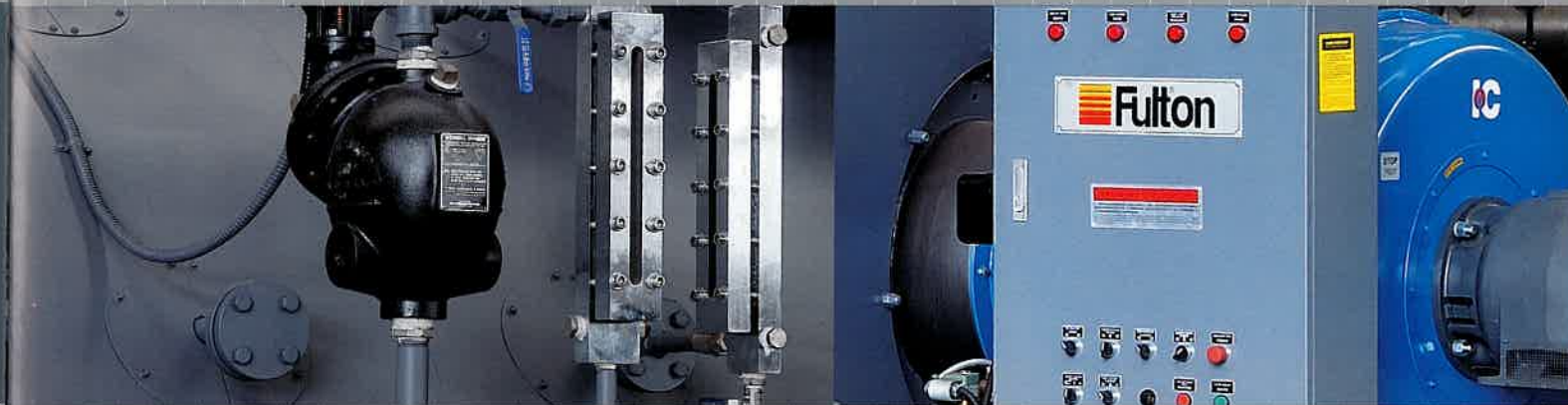


PLC control system

PLC control system is available in Fulton upon customer's requirement. Fulton's PLC control system monitors the boiler operating status constantly. Its user-friendly screen makes the boiler operating data easy-to-read for customers. The recommended PLC settings can monitor and show the followings: boiler operating pressure, pump operating status, boiler water level, and burner operating status. PLC is also expandable to show more operating data and measurement values upon customers' requirement.

Blowdown energy saving system

Blowdown protects boiler from severe scaling or corrosion problems. Fulton's blowdown system has expansion and transfer functions. It can recover energy that would be wasted in boiler blowdown, and transfer heat to the cold feed water.



Boiler Economizer

Fulton's boiler economizer is also an optional ancillary. It is wise to choose it to save energy and achieve higher efficiency.

Other main optional ancillaries:

- Automatic feed water system
- Water treatment and chemical dosage
- Automatic TDS blowdown system
- Automatic boiler bottom blowdown
- Flue gas temperature interlock

FB-C Boiler Specification

Model:FBC		FBC-300	FBC-350	FBC-400	FBC-500	FBC-650	FBC-800	FBC-1000	FBC-1300	FBC-1650
Rated boiler output	1000Kcal/hr	2629	3077	3357	4370	5595	6714	8393	11190	13988
	MBtu/hr	10.4	12.2	13.3	17.3	22.2	26.6	33.3	44.4	55.5
Rated steam output	l/h	4.7	5.5	6	7.8	10	12	15	20	25
	lb/hr	10352	12125	13228	17218	22385	27528	33069	44092	55115
Standard operating pressure	MPa	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	psig	150	150	150	150	150	150	150	150	150
Rated steam temperature	°C	185	185	185	185	185	185	185	185	185
	°F	365	365	365	365	365	365	365	365	365
Feed water temperature	°C	105	105	105	105	105	105	105	105	105
	°F	212	212	212	212	212	212	212	212	212

Maximum fuel consumption under altitude 610m(2000 ft)

		FBC-300	FBC-350	FBC-400	FBC-500	FBC-650	FBC-800	FBC-1000	FBC-1300	FBC-1650
Light oil	kg/h	279	307	334	443	553	665	834	1113	1412
	U.S.GL/hr	85.4	93.9	102.2	135.5	169.2	203.4	255.2	340.5	432.2
Natural gas	m ³ /h	352	386	400	557	695	838	1050	1400	1777
	ft ³ /hr	12431	13632	14126	19670	24544	29594	37081	49441	62755
Heavy oil	kg/h	285	313	341	453	565	680	853	1137	1443
	U.S.GL/hr	76.5	84.0	91.5	121.6	151.7	182.6	229.0	305.2	441.7

Electric Requirement

		FBC-300	FBC-350	FBC-400	FBC-500	FBC-650	FBC-800	FBC-1000	FBC-1300	FBC-1650
Light oil	KW	12.8	19.1	23.1	28.7	36.2	51.2	53.0	67.5	75.0
Natural gas	KW	15.0	18.8	22.5	28.1	35.6	50.6	52.3	67.5	75.0
Heavy oil	KW	20.4	24.1	30.1	38.7	46.2	61.2	54.0	77.9	90.0
Oil pump	KW	1.1	1.1	1.5	1.5	2.2	2.2	3.0	3.0	4.0
Feed water pump	KW	5.5	5.5	7.5	11.0	11.0	15.0	18.5	18.5	18.5
Natural gas piping	DN mm	DN65	DN65	DN65	DN80	DN80	DN100	DN100	DN125	DN125
	NPS	2-1/2	2-1/2	2-1/2	3	3	4	4	5	5

Note: 1. The above feed water pump is the standard Fulton pump, other please consult factory.
 2. All steam output rating from OPSI at 212°F, fuel consumption based on light oil 20,160 Btu/lb (11200 KCal/kg), heavy oil 19728 Btu/lb (10960KCal/kg), natural gas 1,000 Btu/ft³ (8900Kcal/m³).
 3. Specifications and Dimensions are according to ASME standard boilers and are for your reference only. The Fulton Companies reserve the right to change dimensions and/or specifications. Please refer to the factory's most current drawings.

FB-C Boiler Dimension

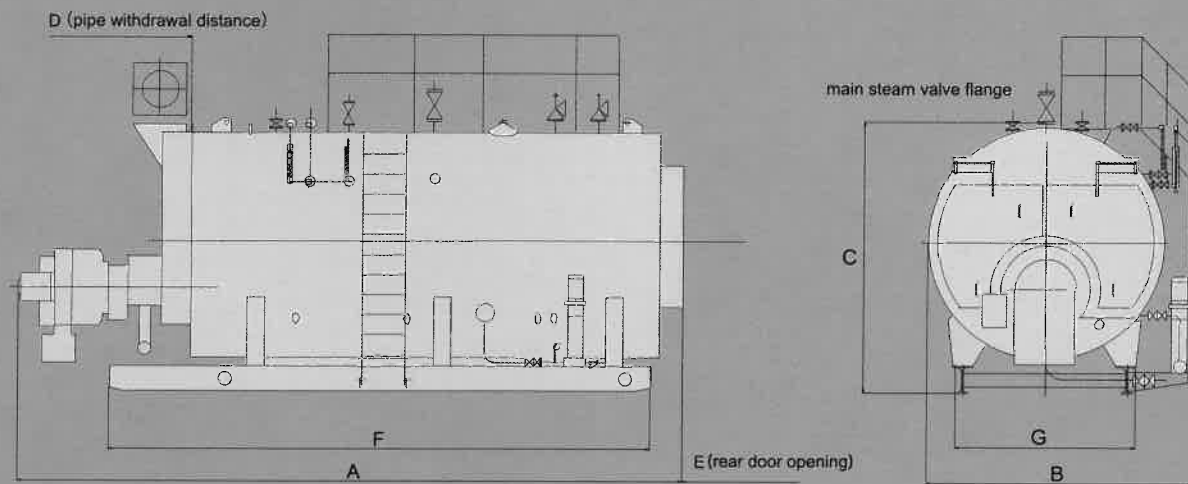
Boiler model		FBC-300		FBC-350		FBC-400		FBC-500		FBC-650		FBC-800		FBC-1000		FBC-1300		FBC-1650	
		3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P
A	mm	7405	6681	6550	6500	6530	6530	7262	7680	8352	7682	9140	8200	8655	8655	10460	10605	11000	11000
	inch	291.5	263	257.9	255.9	257.1	257.1	285.9	302.4	328.8	302.4	359.8	322.8	340.7	340.7	411.8	417.5	433.1	433.1
B	mm	2401	2390	2830	2880	2850	2930	3037	3080	3068	3161	3058	3200	3520	3500	3620	3640	3770	3820
	inch	94.5	94.1	111.4	113.4	112.2	115.4	119.6	121.3	120.8	124.4	120.4	126	138.6	137.8	142.5	143.3	148.4	150.4
C	mm	2470	2459	3114	3164	3214	3246	3100	3264	3146	3314	3144	3386	3516	3556	3916	3814	4015	4040
	inch	97.2	96.8	122.6	124.6	126.5	127.8	122	128.5	123.9	130.5	123.8	133.3	138.4	140	154.2	150.2	158.1	159.1
D	mm	5316	4506	4350	4300	4300	4300	4916	5500	6026	5346	6776	5800	6200	6200	7210	7276	7210	7210
	inch	209.3	177.4	171.3	169.3	169.3	169.3	193.5	216.5	237.2	210.5	266.8	228.3	244.1	244.1	283.9	286.5	283.9	283.9
E	mm	1200	1200	1350	1350	1350	1350	1350	1350	1380	1410	1455	1455	1560	1560	1660	1685	1735	1760
	inch	47.2	47.2	53.1	53.1	53.1	53.1	53.1	53.1	54.3	55.5	57.3	57.3	61.4	61.4	65.4	66.3	68.3	69.3
F	mm	6540	5730	5300	5250	5160	5160	6000	6280	7100	6770	7850	6700	7205	7205	8560	8500	8560	8560
	inch	257.5	225.6	208.7	206.7	203.1	203.1	236.2	247.2	279.5	266.5	309.1	263.8	283.7	283.7	337	334.6	337	337
G	mm	1566	1616	1920	1920	2030	2030	1926	2030	1976	2026	1976	2130	2180	2180	2230	2426	2450	2450
	inch	61.7	63.6	75.6	75.6	79.9	79.9	75.8	79.9	77.8	79.8	77.8	83.9	85.8	85.8	87.8	95.5	96.5	96.5

Note: 1. The above number is based on light oil burner.
 2. Specifications and Dimensions are for your reference only. The Fulton Companies reserve the right to change dimensions and/or specifications. Please refer to the factory's most current drawings.

FB-C Boiler Connection

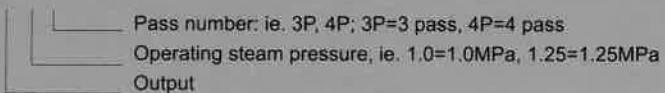
Boiler model		FBC-300		FBC-350		FBC-400		FBC-500		FBC-650		FBC-800		FBC-1000		FBC-1300		FBC-1650	
		3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P
Main steam valve	DN	100	100	125	125	125	125	150	150	150	150	200	200	200	200	200	200	250	250
	inch	4	4	5	5	5	5	6	6	6	6	8	8	8	8	8	8	10	10
Safety valves	DN	50(2)	50(2)	40, 80	40, 80	50, 80	50, 80	100(2)	100(2)	100(2)	100(2)	50,65(2)	50,65(2)	80(3)	80(3)	100(2)	100(2)	125,100	125,100
	inch	2(2)	2(2)	1-1/2,3	1-1/2,3	2, 3	2, 3	4(2)	4(2)	4(2)	4(2)	2,2-1/2(2)	2,2-1/2(2)	3(3)	3(3)	4(2)	4(2)	5,4	5,4
Blowdown	DN	40(2)	40(2)	40(2)	40(2)	40(2)	40(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)
	inch	1-1/2(2)	1-1/2(2)	1-1/2(2)	1-1/2(2)	1-1/2(2)	1-1/2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)
Surface blowdown	DN	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	inch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flue outlet	DN	500	500	500	500	560	560	560	560	650	650	650	650	750	750	850	850	900	900
	inch	20	20	20	20	22	22	22	22	25.6	25.6	25.6	25.6	29.5	29.5	33.5	33.5	35.4	35.4
Pump inlet		R1-1/4	R1-1/2	R1-1/2	R1-1/2	R1-1/2	R1-1/2	R2	R2	R2	R2	R2	R2	R2-1/2	R2-1/2	R3	R3	R3	R3
Boiler water volume (full)	m ³	11	11	12.2	12.6	13.57	13.57	17.7	17.7	17.8	18.1	20	20	23	23	29	29	30	32
	Lb	33070	33070	35270	35270	37040	37040	50705	50705	55115	61730	66140	68340	88180	88180	105820	105820	114638	121252

Note: 1. Electric requirement is based on the standard fittings.
 2. Shipping weight doesn't include the burner system.
 3. Specifications and Dimensions are for your reference only. The Fulton Companies reserve the right to change dimensions and/or specifications. Please refer to the factory's most current drawings.

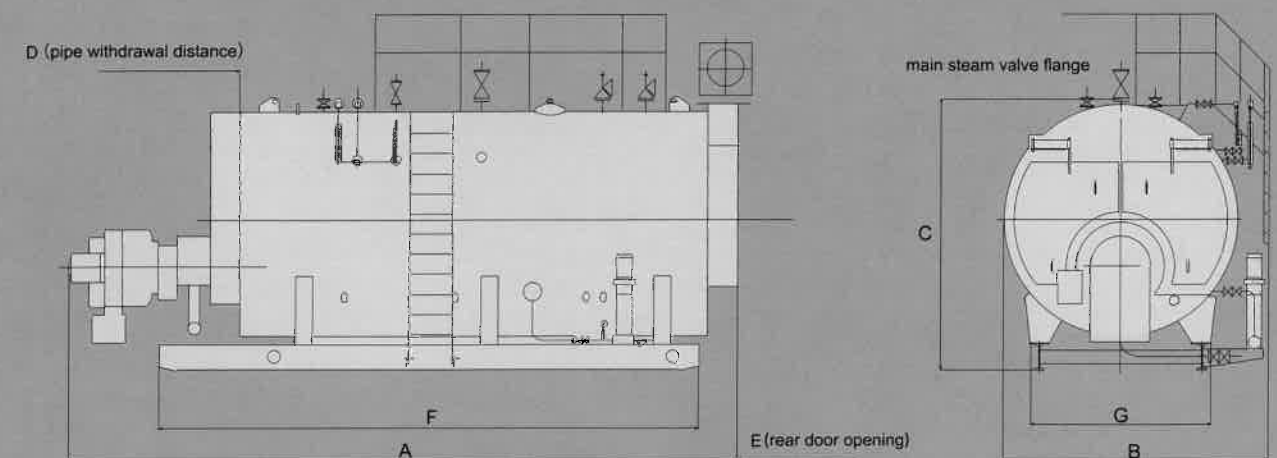


FB-C 4 pass steam boiler

FB-C Boiler Designation: FBC-X-X-X



Typical Boiler Designation: FBC-400-1.25-3P; FBC-400 steam boiler, 1.25MPa operating pressure, three pass design.



FB-C 3-pass steam boiler

FB-D Boiler Specification

Model: FBD		FBD-2.8 -1.0/95/70	FBD-4.2 -1.0/95/70	FBD-5.6 -1.0/115/70	FBD-7.0 -1.0/115/70	FBD-8.4 -1.0/115/70	FBD-10.5 -1.0/115/70	FBD-14 -1.0/115/70
Rated thermal power	MW	2.8	4.2	5.6	7	8.4	10.5	14
	MBtu/hr	9.6	14.3	19.1	23.9	28.7	35.8	47.8
Rated working pressure	Mpa	1	1	1	1	1	1	1
	psig	150	150	150	150	150	150	150
Hot water temperature	°C	95	95	115	115	115	115	115
	°F	203	203	239	239	239	239	239
Return water temperature	°C	70	70	70	70	70	70	70
	°F	158	158	158	158	158	158	158
Water Flow	m ³ /h	96	144	107	134	160	201	268
	US GI/hr	25360	38040	28266	35400	42267	53098	70798
Outlet / Inlet	DN mm	DN150	DN200	DN200	DN200	DN200	DN250	DN250
	NPS	6	8	8	8	8	10	10
Water volume	m ³	8.4	12.4	14.2	18.3	21.8	23.0	29.0
	US GI	2219	3276	3751	4834	5759	6076	7661
Shipping weight	tons	11.5	17.5	22	26	31	40	48
	lb.	25350	38580	48500	57320	68340	88180	105820

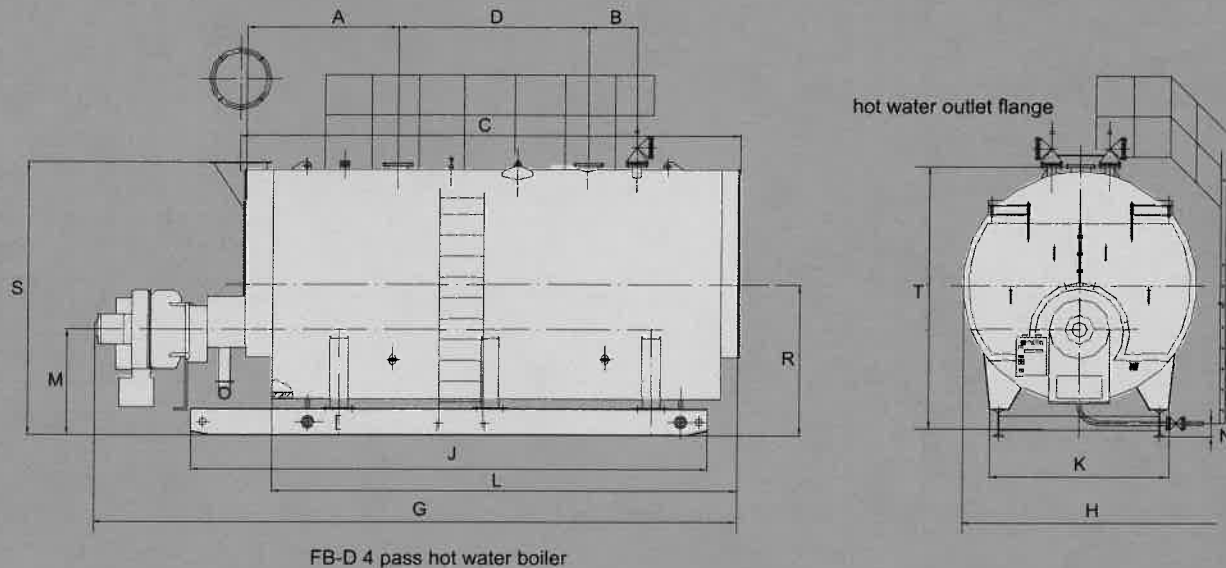
Maximum fuel consumption under altitude 610m (2000 ft)

Light oil	kg/h	236	353	472	590	707	890	1183
	U.S.GI/hr	72.2	108	144.4	180.5	216.3	272.3	361.9
Natural gas	Nm ³ /h	297	445	594	742	889	1120	1488
	ft ³ /hr	10489	15715	20977	20204	31395	39553	52549
Heavy oil	kg/h	241	360	482	603	722	910	1209
	U.S.GI/hr	64.7	96.6	129.4	161.9	193.8	244.3	324.6

Electric Requirement

Light oil	kW	9.0	23.1	28.7	36.2	51.2	53.0	67.5
Natural gas	kW	9.0	22.5	28.1	35.6	50.6	52.3	67.5
Heavy oil	kW	15.1	30.1	38.7	46.2	61.2	54.0	77.9
Oil pump	kW	1.1	1.5	1.5	2.2	2.2	3.0	3.0
Natural gas piping	DN mm	DN50	DN65	DN80	DN80	DN100	DN100	DN125
	NPS	2	2-1/2	3	3	4	4	5

Note: 1. All steam output rating from 0PSI at 212°F, fuel consumption based on light oil 20,160 Btu/lb (11200 KCal/kg), heavy oil 19728 Btu/lb (10960 KCal/kg), natural gas 1,000 Btu/ft³ (6900 KCal/m³).
2. Specifications and Dimensions are according to ASME standard boilers and are for your reference only. The Fulton Companies reserve the right to change dimensions and/or specifications. Please refer to the factory's most current drawings.



FB-D Boiler Designation: FBD-X-X/X-X-X

- Pass number: ie. 3P, 4P; 3P=3 pass, 4P=4 pass
- Return water temperature
- Outlet water temperature
- Operating pressure, ie. 1.0=1.0MPa
- Output

Typical Boiler Designation:

FBD-4.2-1.0/95/70-3P: 4.2MW hot-water boiler, 1.0MPa operating pressure, outlet water temperature 95°C, return water temperature 70°C, three pass design.

FB-D Hot Water Boiler Exterior Dimension

Model: FBD		FBD-2.8 -1.0/95/70	FBD-4.2 -1.0/95/70	FBD-5.6 -1.0/115/70	FBD-7.0 -1.0/115/70	FBD-8.4 -1.0/115/70	FBD-10.5 -1.0/115/70	FBD-14 -1.0/115/70
A	mm	790	1420	1700	1780	1700	1700	1800
	inch	31.0	55.9	66.9	70.1	66.9	66.9	70.9
B	mm	500	480	550	550	700	700	700
	inch	19.7	18.9	21.7	21.7	27.6	27.6	27.6
C	mm	105	105	105	115	115	115	115
	inch	4.1	4.1	4.1	4.5	4.5	4.5	4.5
D	mm	1450	1650	2000	2100	2150	2150	2550
	inch	57.1	65.0	78.7	82.7	84.6	84.6	100.4
G	mm	4860	6530	7460	7460	7245	8655	10250
	inch	191.3	257	293.7	293.7	285.2	340.7	403.5
H	mm	2800	3000	3050	3100	3150	3220	3320
	inch	110.2	118.1	120.1	122	124	126.8	130.7
J	mm	4386	5160	5820	6285	6700	7605	8350
	inch	172.7	203.1	229.1	247.4	263.8	299.4	328.7
K	mm	1820	2030	2030	2030	2030	2130	2180
	inch	71.7	79.9	79.9	79.9	79.9	83.9	85.8
L	mm	4000	4320	5250	5460	5900	7605	7000
	inch	157.5	170.1	206.7	215	232.3	299.4	275.6
M	mm	1210	1219	1261	1242	1238	1345	1571
	inch	47.6	48	49.6	48.9	48.7	53	61.9
N	mm	150	150	150	150	150	150	150
	inch	5.9	5.9	5.9	5.9	5.9	5.9	5.9
R	mm	1600	1750	1850	1800	1870	1940	2225
	inch	63	68.9	72.8	70.9	73.6	76.4	87.6
S	mm	3000	3300	3420	3356	3486	3610	3966
	inch	118.1	29.9	134.6	132.1	137.2	142.1	156.1
T	mm	2914	3204	3264	3264	3520	3910	3966
	inch	114.7	126.1	128.5	128.5	138.6	153.9	156.1
Safety Valve	DN mm	50	50(2)	100(2)	100(2)	100(2)	125(2)	125(2)
	NPS	2	2(2)	4(2)	4(2)	4(2)	5(2)	5(2)
Water outlet / inlet	DN mm	DN150	DN200	DN200	DN200	DN200	DN250	DN250
	NPS	6	8	8	8	8	10	10
Blowdown	DN mm	40(2)	40(2)	50(2)	50(2)	50(2)	50(2)	50(2)
	inch	1-1/2(2)	1-1/2(2)	2(2)	2(2)	2(2)	2(2)	2(2)
Flue outlet I.D.	mm	Φ 450	Φ 560	Φ 560	Φ 650	Φ 800	Φ 800	Φ 850
	inch	17.7	22	22	25.6	31.5	31.5	33.5

1. Specifications and Dimensions are for your reference only. The Fulton Companies reserve the right to change dimensions and/or specifications. Please refer to the factory's most current drawings.

