Circulating Fluid Bed (CFB) Boilers

The two proven solid fuel boiler technologies are Pulverized Coal (PC) and Circulating Fluid Bed (CFB). Pulverized Coal (PC) is the more established technology finding application in boilers rated up to hundreds of megawatts. Circulating Fluid Bed (CFB) technology is a more recent technology commercially proven up to 215 MW. PC boilers employ conventional burners to combust coal at very high temperatures whereas CFB boilers combust coal in a fluidized bed of fuel, sulphur dioxide sorbent and sand at relatively low temperature. The two technologies were compared on various technical points.

CFB boilers can burn high-sulphur solid fuels using limestone as a sorbent in the fluid bed. Although this results in increased bottom and fly ash production (primarily calcium sulphate), it offsets the requirements for high cost FGD. Limestone is a low cost material readily available near any plant sites.

CFB boilers are able to burn a wide variety of solid fuels of variable sulphur content, volatility and ash content. The low bed temperatures permit burning lower grade solid fuels without the slagging and fouling problems encountered in conventional PC fired boilers. There is significant experience demonstrating CFB's ability to burn low volatile fuels including low grade coal or petroleum coke. Variations in moisture, ash content and heating value are inevitable over time – even in solid fuels from the same source. In CFB boilers, such variations do not materially affect combustion and heat flux due to the circulating fluid bed. PC boilers are not as accommodating to variability in solid fuel.

CFB boilers can also accommodate solid fuel types individually or in combination providing flexibility in choosing the best economic mix to minimize fuel costs. Furthermore, this allows the prospect of sourcing local solid fuels as they become available.

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Compared with a PC boiler, a CFB boiler has significantly larger heat capacity due to the fluid bed. This allows a CFB boiler to follow load changes with less difficulty than its PC counterpart. Also, a CFB can turn down to as low as 30 to 40% of its rating without supporting fuel such as HFO. The minimum load of a PC boiler is typically 50 to 60% of its rating resulting in higher support fuel costs in turndown conditions. Hence a CFB boiler is more suitable in an industrial application where load variability and turndown conditions are the norm. This is in contrast to PC boilers which typically find application in large size utility power plants installations (several hundreds of MW or more) where load is also generally constant.

These CFB boilers are watertube type unit with natural circulation and superheat. The superheater will have two stages with interstage attemperation for control of the final superheater outlet temperature. The boilers are also equipped with an economizer and a tubular or rotary airheater.

Specifications & Range

Model No.	BL-WX-15	BL-WX-50/60	BL-HB-135	Unit
Power Plant Size	15	50/60	135	MW
Steam Output	75	220	440	ton/hr
Steam Pressure	5.3	9.8	13.7	MPa
Steam Temperature	450	540	540	°C
Water Supply Temperature	150	220	249.3	°C
Smoke Temperature	150	140	130	°C
Design Efficient	89	90	92	%
Desulphurization Efficient (≥)	90	90	490	%
Nox Emission (≤)	300	300	300	mg/Nm³

Note:

(1) The above data represent the maximum values of the specification of the machine.

(2) The vendor reserves the right to make changes to the specifications in order to improve the products.