



**IJT BOILERS**

# CFBC Boilers

(Under exclusive license from Sumitomo SHI FW Energia Oy, Finland)

*Ideal for meeting Stringent Pollution Norms*



**ENGINEERING FOR EXCELLENCE**



## Circulating Fluidised Bed Combustion Boilers

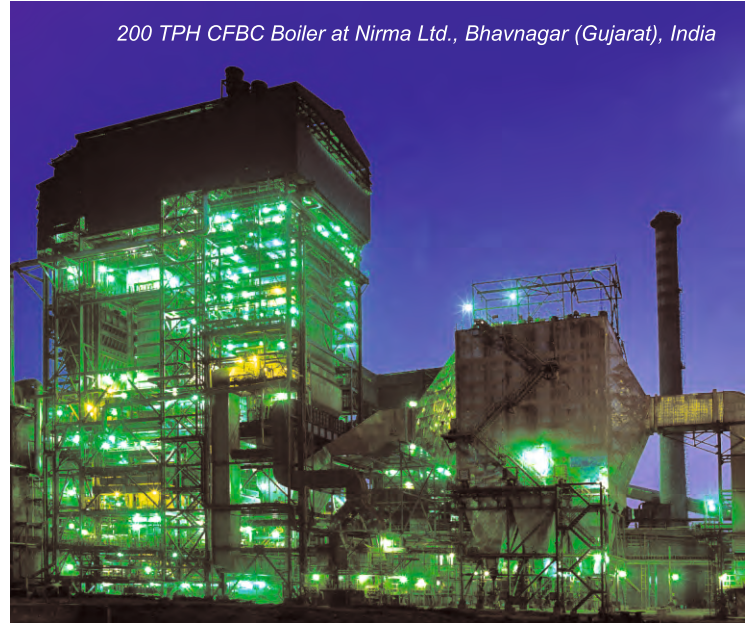
Sumitomo SHI FW Energia  
&  
Isgec  
**500<sup>+</sup> CFBC**  
Installations Worldwide  
including  
**85<sup>+</sup>**  
in India

Isgec has an exclusive technology tie-up with Sumitomo SHI FW Energia Oy, Finland for Circulating Fluidised Bed Combustion (CFBC) Boilers.

Sumitomo SHI FW is a world leader in CFBC technology. What sets this technology apart is the patented high efficiency steam / water cooled Compact Separator design which has been proven worldwide to improve availability & minimise maintenance, lower SO<sub>x</sub> & NO<sub>x</sub> emissions, minimise start-up time, and eliminate erosion & choking. It also reduces the boiler footprint.



The relationship between Isgec & Sumitomo SHI FW Energia goes deeper, since we also have a Joint Venture company - Isgec SFW Boilers Pvt. Ltd.



200 TPH CFBC Boiler at Nirma Ltd., Bhavnagar (Gujarat), India

### Key Features

for meeting Stringent Environmental Norms and  
Higher Combustion Efficiency

- > Advanced CFB Technology
- > Cleanest Burning Process
- > Low Combustion Temperature
- > High Turbulent Mixing



2 x 275 TPH CFBC Boilers & 2 x 67.5 MW IPP  
at Bhubaneswar Power Pvt. Ltd of the Tata Group (Orissa) India

Cover Picture:

410 TPH Reheat type CFBC Boiler at Nirma Ltd., Bhavnagar, Gujarat for 70 MW Cogeneration Plant

# Advantages / Features

## Widest Fuel Flexibility

- Capable of firing a wide variety of fuels:
  - ↳ Lignite, Peat, Sludge - High Moisture (up to 60%)
  - ↳ Indian Coal, Washery Rejects, Char - High Ash (up to 76%)
  - ↳ Lignite, Petcoke - High Sulphur (up to 8.2%)
  - ↳ Petcoke, Washery Rejects, Char - Low Volatiles (up to 1%)
  - ↳ Coals from Indonesia / South Africa / Colombia - Low Ash (up to 4%)
  - ↳ Char, Middlings, Washery Rejects - Low Heating Value Fuels
- Proven for firing Fibrous Biomass fuels such as Julia Flora, Wood Chips, Saw Dust, Rice Husk, Cotton Stalk.
- Capable of firing Oil and Gas.



Coal



Petcoke



Washery Rejects



Saw Dust



Wood Chips



Peat



Lignite



Kiln Char mixed with Coal



Julia Flora



Paper Sludge



Rice Husk



Cotton Stalk

## Environment Friendly

- Low NOx emission due to staged combustion and controlled combustion temperature.
- Low SOx emission due to uniform combustor temperature and effective limestone utilisation.
- Low CO emission due to efficient carbon burn out.
- Efficient ash coolers make ash disposal easier.
- Lower unburnt carbon in fly ash allows for industrial use facilitating environment clearances.
- Reduced particulate emission due to increased fuel and sorbent residence time in dense lower combustion zone.

## High Efficiency

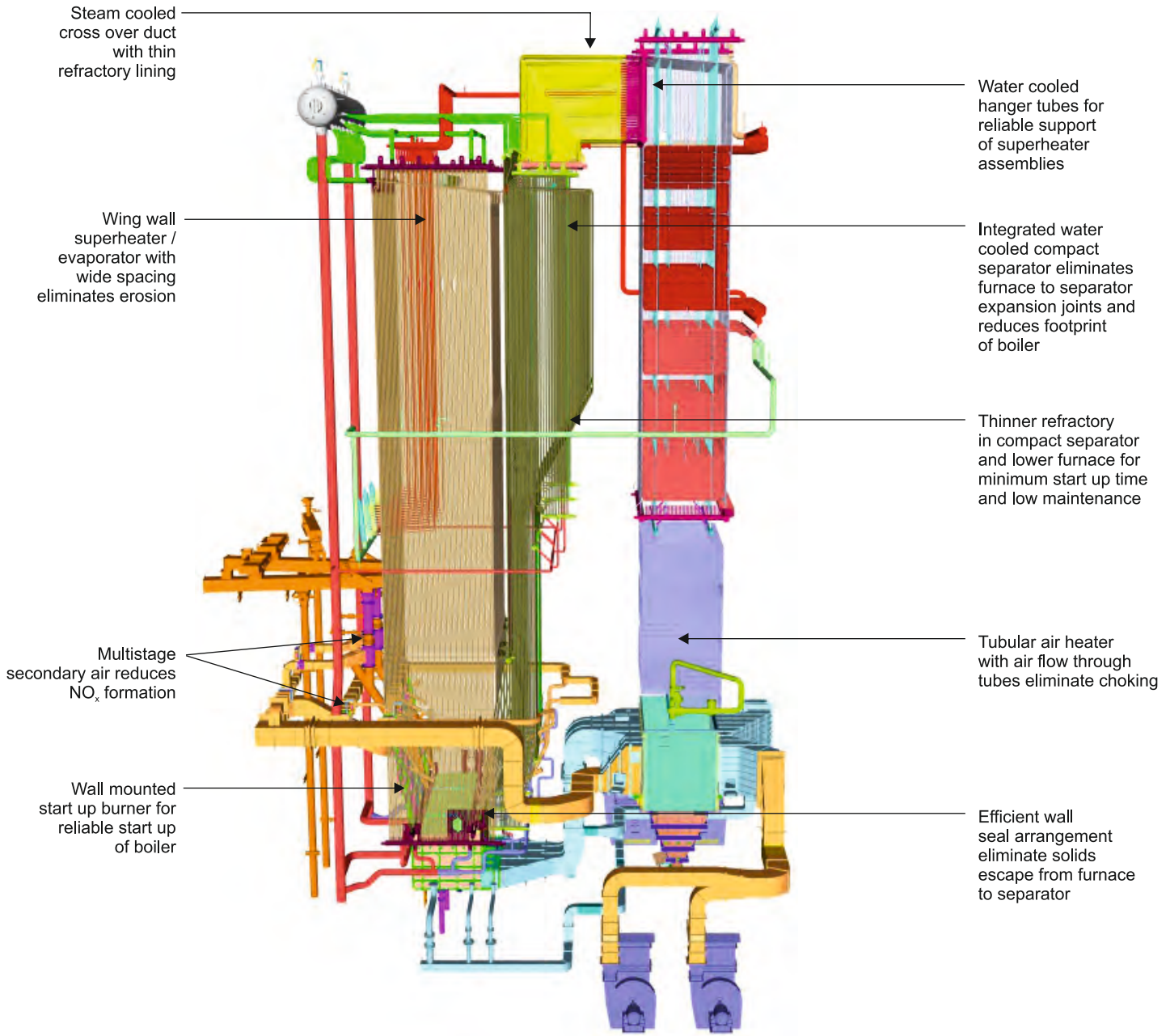
- Patented Compact Separator design.
- 99.9% collection efficiency for particle size > 65 microns.
- Solids re-circulation up to 100 times.
- Special design of air nozzles for uniform air distribution and efficient combustion.
- Tall furnace, high residence time, and uniform furnace temperature.
- Ash classification and cooling using efficient ash coolers.

## High Reliability and Availability

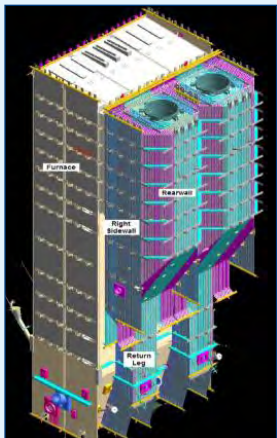
- Minimum refractory.
- No expansion joint between furnace & compact separator.
- Water cooled cross-over duct and convection cage.
- Most heating surfaces located in the second pass after the Compact Separator, thereby minimising pressure part erosion.
- Advanced 'kick out' design (patented) at lower furnace to prevent erosion.
- Elimination of maintenance prone mechanical seals in solid separator return leg.
- Simple and efficient front wall fuel feeding.
- Elimination of back firing using high pressure air bustle in fuel chute.
- Elimination of unplanned refractory downtime due to cooled compact separator and advanced refractory system with dense stud pattern.

## Global Experience of Project Execution

- Experienced in executing CFBC Boiler projects globally including **Latin America, Turkey, Morocco, Indonesia, Jordan, and Vietnam.**
- Repeat CFBC Boiler Orders from Corporate Houses - **DCM Shriram, Nirma, Welspun, Aditya Birla, Bhushan, Bijao Electric, Gallant Group, Dalmia Cement.**
- Supplied CFBC Boilers in Refineries and Petrochemical Plants - **HPCL-Mittal Energy and IOCL.**
- Latest software tools used for engineering - **Tekla for Structural Modeling, Nowa for Circulation Checks, 3D Modeling, and CFD Analysis** etc.
- On-site visits by Isgec domain specialists at various stages of installation for critical checks.
- Special attention paid to furnace alignments and refractory work during construction.



## Compact Separator



Sumitomo SHI FW patented high efficiency steam / water cooled compact separator design is the most proven in the industry.

A thin layer of refractory provides necessary erosion protection, permitting rapid start up with minimum start up fuel.

## Ash Cooler



- CFB Boilers are provided with fully air cooled bottom ash (bed ash) coolers.
- Utilizes part of combustion air to cool down the bed ash.
- Does not require any DM water or service water to cool the bed ash and thereby minimises operating cost.
- Prevents any hot drain of bottom ash from CFB furnace.
- Fixed stationery type without rotary parts.
- Design lowers the maintenance cost and also easier to operate.

## A Few Recent References

Customer / Site	TPH	kg/sq.cm.g	Deg.C	Fuel
Tata Steel BSL Ltd. (Orissa) India	2 x 425	105	545	Washery Rejects I / II, combination of Kiln Char with Washery Rejects I / II
Nirma Ltd. (Gujarat) India	410 (Reheat type)	145	545	Imported Coal, Petcoke, Kutch Lignite, Bhavnagar Lignite
Welspun Ltd. (Gujarat) India	350	105	542	Indian Coal, Lignite, Indonesian Coal, Petcoke
HPCL Mittal Energy Ltd. (Punjab) India	2 x 300	110	510	100% Petcoke, Imported Coal, Indian Coal, 50% Refinery Fuel Gas (RFG) or Cycle Oil (LCO)
Shriram Alkali & Chemicals (Gujarat) India (DCM Shriram Group)	300	105	540	Indonesian Coal South African Coal, Petcoke
Bhubaneswar Power Pvt. Ltd. (Orissa) India (Tata Group)	2 x 275	95	540	Indian Coal, Washery Rejects and combination of Indian Coal and Washery Rejects
Kutch Chemicals Ltd. (Gujarat) India	267	110	540	Coal
Modern Karton Co. Ltd., Turkey (Eren Energi Group)	240	17	235	Coal
Modern Cement and Mining Company, Jordan	150	110	540	Coal / Petcoke
Bijao Electric Company SA de CV, Honduras	3 x 142	110	540	Petcoke, Coal



2 x 300 TPH CFBC Boilers  
at HPCL Mittal Energy Ltd. (Punjab) India  
(100% Petcoke Fired Boiler in Refinery - 1st in India)



### Vashp Kutir (House of Steam)

An integral part of our in-house learning process, this innovative & one-of-a-kind lab helps us study on-ground operational issues so as to add to our knowledge base and help improve our technology and execution on an on-going basis

- Display of a wide variety of fuels that Isgec Boilers are capable of firing
- 3D & 2D Boiler Models representing the wide variety of technologies that Isgec offers
- Wide range of Components and Boiler Parts from different stages of operation
- Various kind of tube failure samples
- Boiler RPMS (Remote Performance Monitoring System)
- Houses 100s of case studies and is a bank of experience of more than 5 decades



### Simulator for Training (Internal & External)

- On Operations ⇨ Improved Knowledge Level
- On O&M ⇨ Improved Availability of Boilers
- Simulation of Control Loops and Interlocks ⇨ Improved Engineering Validation
- Simulation of Emergencies ⇨ Improved Handling of Operations
- Refining Critical Parameters ⇨ Improved efficiency Operations

#### Simulator Services available by:

HMEL • Nirma • DSCL • BCML • Triveni • Simbhaoli

## Isgec Offerings

### STEAM GENERATORS

- Pulverised Coal Fired (PC)
- Circulating Fluidised Bed Combustion (CFBC)
- Atmospheric Fluidised Bed Combustion (AFBC)
- Travelling / Pulsating / Pinhole / Dumping Grate
- Oil & Gas Fired
- Heat Recovery Steam Generators
- Waste to Energy
- Waste Heat Recovery
- Slop / Spent Wash / Vinasse Fired

### AUXILIARY EQUIPMENT \*

- Air Pollution Controller (ESP)
- Deaerator / Fans
- Valves
- Electricals & Instrumentations
- Burner
- Bed Ash Coolers
- DCS
- Feeders
- Pumps

### STEAM GENERATOR SERVICES

- Site Construction & Commissioning
- Retrofitting and Modernisation
- Replacement / Upgradation of Parts
- Troubleshooting & Services
- Residual Life Assessment (RLA) Studies
- Training
- Spares
- Operation & Maintenance

### EPC PROJECTS

- Independent Power Plants
- Cogeneration Plants
- Sugar Plants
- Material Handling
- Water Treatment Plants
- Distilleries

\* Only available with the Boiler

**Feed Cycle Equipment (HP Heater, LP Heater & Condenser)  
Process Equipment • Presses • Castings • Material Handling • Contract Manufacturing**



**ISGEC HEAVY  
ENGINEERING LTD.**

A-4, Sector 24, Noida - 201 301 India  
Tel.: +91-98102 56166, 98105 13340  
Email: boilersales@isgec.co.in, exports@isgec.co.in

**www.isgec.com**