PRIMETALS TECHNOLOGIES

BLAST FURNACE NO.3 & NO.4

JSW STEEL LIMITED, TORANAGALLU, INDIA

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Blow-in of No.3 blast furnace took place on 18th February 2009 and No.4 blast furnace on 18th July 2011

PROJECT HIGHLIGHTS

- Modern working practices
- Low fuel consumption
- Exceeding required environmental controls
- Furnace design based on highly successful designs
- Flat casthouse floor
- Stoves waste heat recovery system
- High rate coal injection system
- Full condensation slag granulation system

THE CHALLENGE

Having commenced ironmaking operation at Toranagallu based on small blast furnace and COREX® technology, JSW wanted to install the first 4,000 m^3 blast furnaces in India which would significantly enhance the ironmaking capacity at Toranagallu.

OUR SOLUTION

Primetals Technologies solution was to use their highly successful blast furnace designs developed for Posco Gwangyang but to improve the technology to current state-of-the-art and to design the furnace to be able to operate at high productivity even with high-gangue raw materials.

Primetals Technologies provided the design, equipment supply, and erection/commissioning supervision of two furnaces. The blast furnaces were designed for a minimum production of 7,800 tHM/day based on an inner volume of 4,019 m^3. The furnace profile and cooling system allowed operation with a variety of ferrous burden qualities, with a pulverized coal injection potential up to 200 kg/tHM. Construction commenced in 2007, and Primetals Technologies worked closely with a number of contractors to bring the project to a successful conclusion.

Blast furnace No.3 was successfully blown-in on the 18th February 2009 and blast furnace No.4 on 18th July 2011. The furnaces incorporate Primetals Technologies level 2 automation systems and the furnaces have regularly exceeded their nameplate production by over 15%.

SCOPE OF DELIVERY

- Basic design of the process equipment
- Detail engineering of proprietary-supplied equipment for the furnace
- Basic engineering of the infrastructure – supporting local contractors to complete the project within a tight budget
- Construction and commissioning supervision
- Performance guarantees for key production and operating parameters

JSW Steel Limited, Toranagallu, Blast Furnace No.4

NEW BLAST FURNACE

- Furnace profile based on Primetals Technologies worldwide success with copper staves
- Carbon hearth with deep sump and ceramic pad for long life
- PCI system for 200 kg/tHM

HOT BLAST STOVE SYSTEM

- 3 Internal combustion chamber stoves providing 1250 °C hot blast to minimize coke consumption, incorporating waste heat recovery to minimize enrichment fuel costs

PROCESS GAS CLEANING SYSTEM

- Tangential single-entry cyclone to maximize dry dust recycle
- Triple-cone wet scrubber

STOCKHOUSE

- Twin-stockhouse with two gathering conveyors for various burdens containing a wide range of sinter, lump ore and/or pellets, plus use of centre coke
- Belt conveyor feeding a parallel hopper top

CASTHOUSE

- 4 taphole flat-floor casthouse for optimum ease of operation, incorporating Primetals Technologies taphole equipment

SCREW-DEWATERING SLAG GRANULATION SYSTEM

- Heavy duty screw-dewatering copes with slag surges with condensation system
- Quality granulated slag generating high value product for the cement industry

AUTOMATION

- Primetals Technologies level 1 and level 2 systems

FURNACE DESIGN PARAMETERS

Average production	7,800 t/d
Peak production	10,000 t/d
Furnace hearth diameter	13.2 m
Furnace working volume	3,445 m^3
Furnace inner volume	4,019 m^3
Top gas operating pressure	2.50 bar g
Blast pressure at furnace	4.10 bar g
Normal productivity on inner volume	1.94 tHM/d/m^2
Normal productivity per hearth area	57.0 tHM/d/m^2
Number of tuyeres	36 off
Number of tapholes	4 off

Primetals Technologies
A joint venture of Mitsubishi Heavy Industries and partners

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