



MULPIC®

PLATE COOLING TECHNOLOGY BAOSTEEL ZHANJIANG 4.3 M PLATE MILL, CHINA

Project start: March 2015
FAC completion: May 2017,

In March 2015, Primetals Technologies received an order to supply a new MULPIC® Plate Cooling System for the Baosteel (Zhanjiang) 4.3m Plate Mill in Southern China. Following the relocation of the Plate Mill from Shanghai Zhanjiang, Baosteel decided to replace their existing cooling machine with the market leading MULPIC® Technology, aiming at maximising and improving their Plate Production quality.

The scope of supply included two six metre long MULPIC® ACC&DQ Cooling banks and two six metre long MULPIC® ACC cooling banks, each bank with individually controlled headers.

MULPIC® TECHNOLOGY SOLUTION

MULPIC® technology provides a single 'in-line' Plate Cooling system with the capacity to achieve the cooling rates and temperature drops required for Accelerated Cooling (ACC) and Direct Quench (DQ) cooling for a wide range of plate thicknesses.

MAIN BENEFITS

- Using MULPIC® Technology, Baosteel Zhanjiang Heavy Plate Mill Plant can now successfully produce TMCP API and High Strength Structure Steel.
- The overall cooling accuracy has been dramatically improved, which enabled Baosteel to fulfill a 40.000t API (X70) steel export contract.
- In March of 2017, the 4.2m wide plate mill turned into profit for the first time since 2010 when the mill was first put into operation and the MULPIC® Technology has played a very big role for this.
- Robust design and ease of maintenance means reduced down time and a reduced requirement for frequent maintenance.
- 1 year post-FAC Support Service included as standard for all new MULPIC® installations.



Modular controlled cooling



MULPIC intermediate pipework

PLANT AND EQUIPMENT DATA

Baosteel MULPIC® Plate Cooling System

Machine Length	24 m (divided into 4 Cooling Banks)
No. of Headers per Cooling Bank	6 Top + 6 Bottom
Cooling Headers Width	4,300 mm
Cooled Plates Thickness Range	10 ~ 160 mm
Top Headers Height Adjustment	500 ~ 1,200 mm
Edge Masking Width Range	1,100 mm ~ 4,400 mm
Water Supply Pressure at TOP	DQ: 5.0 bar; ACC: 2.0 bar
Max. Flow DQ (Pump Fed):	6,130 m³/hr per Bank
ACC (Overhead Tank):	2,786.5 m³/hr per Bank

PERFORMANCE

- FCT Accuracy (N=100) SD: **9.88°C** (G.V.: 15.0°C).
- Cooling Rate Accuracy: **+/-2 °C/s** of target.
- Length Temperature Uniformity SD: **15.0°C**
- Width Temperature Uniformity SD: **10.0°C**

TECHNICAL FEATURES

- Highly dynamic, fast & accurate flow control
- Header design, individual flow control – flexibility
- Length temperature uniformity - better quality
- Width temperature uniformity – better quality
- Adaptive, model-based cooling control

OPERATING PRINCIPLES

The intermediate temperature and individual Sections cooling rates are controlled:

Four (4) cooling operation modes are available:

- **ACC** – All four (4) cooling banks with ACC flow.
- **Oscillation** – ACC flow, plate oscillated in the MULPIC®.
- **DQ Only** – DQ flow applied to Banks A and/or B.
- **DQACC** – DQ flow applied to Banks A and/or B, and ACC flow applied to Banks C and D.

Primetals Technologies Limited
A joint venture of Mitsubishi Heavy Industries and partners

Sheffield Business Park | Europa Link | Sheffield S9 1XU
primetals.com

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