



**KALIKA STEEL, JALNA,
MAHARASHTRA, INDIA**

ONE MORE FEATHER IN PRIMETALS
TECHNOLOGIES' CAP

INTRODUCTION

In August 2013, Kalika Steel Alloys Pvt. Ltd., a steel product manufacturing organization awarded a contract to Primetals Technologies (then Siemens VAI Metals Technologies) for the supply of a 250,000 tons/yr Rebar Mill at its integrated steel complex located in Jalna, in the Indian state of Maharashtra.

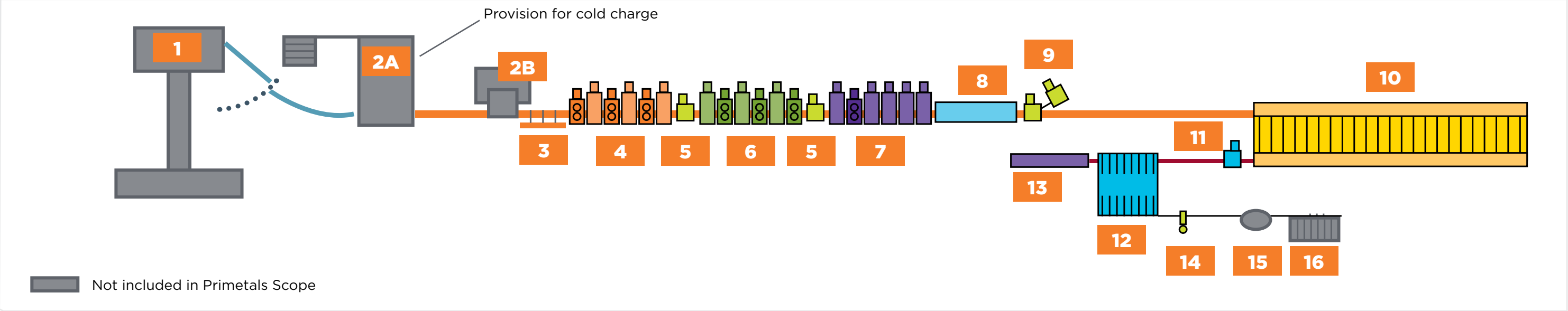
The scope encompassed the complete design, engineering, manufacturing supply of the facility, including electrics & automation, supervision of erection & commissioning, and demonstration of performance guarantees of the mill equipment. The project was completed in eighteen (18) months. The start-up of the mill (first rolled billet) was in March 2015 and Primetals Technologies completed the Performance Tests in July 2015.



Kalika Steel Alloys Pvt. Ltd.,
Jalna, India



MILL LAYOUT AND EQUIPMENT DISPOSITION



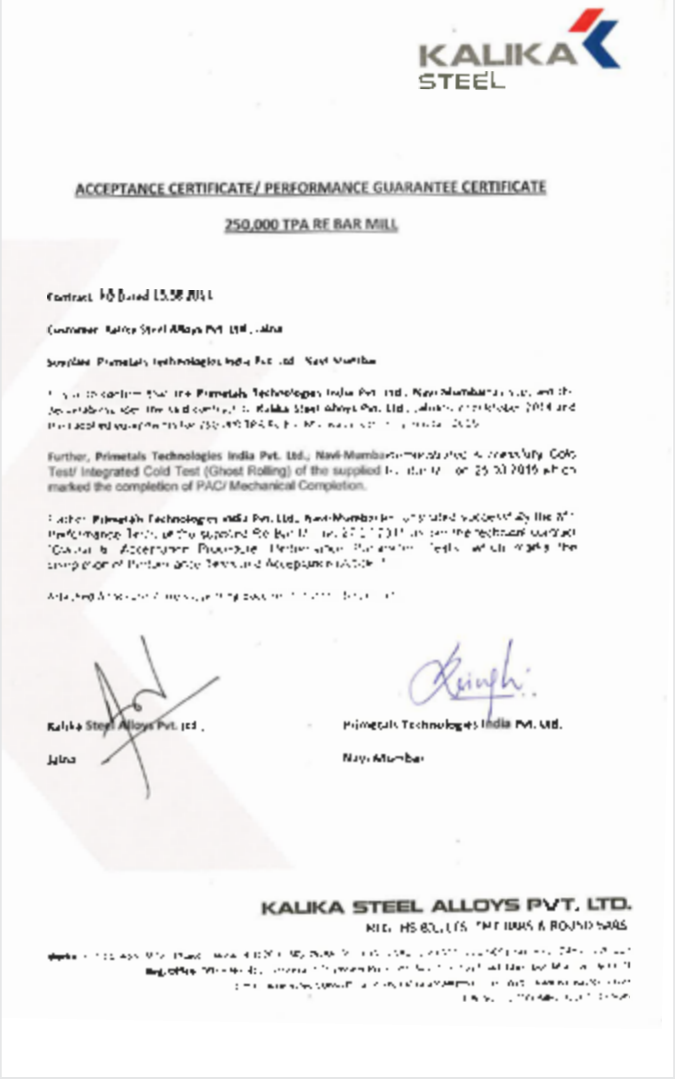
- 1 Continuous Caster
- 2A Reheating Furnace
- 2B Induction heater
- 3 Billet discard device
- 4 Roughing train
- 5 Flying shears
- 6 Intermediate train
- 7 Finishing train
- 8 In-line thermal treatment
- 9 Dividing & Crop shear
- 10 Cooling bed
- 11 Cold shear
- 12 Chain transfer
- 13 Short tail recovery
- 14 Bar Counting & Sub bundling
- 15 Binding Machine
- 16 Dispatching station

The plant includes state-of-the-art technologies and boasts a compact design and layout. The mill produces rebars in straight length. There is space provision for a Wire Rod line in the future. The approximate area required for the plant is 315 m X 46 m excluding balance-of-plant facilities. This includes the disposition of upstream facilities such as the induction furnace and the casters.

- One of the key features of the plant is that it is designed for 100% hot billet charging where billets coming from the caster pass through an induction heating furnace to maintain the temperature required for rolling. The main advantages of hot charging are:
- High efficiency of process with reduced OPEX.
 - Increase of the metallic yield due to reduced scale formation and losses.
 - Reduction in CAPEX as the mill can operate without a conventional billet reheating furnace.
 - Smaller area requirement as the billet storage area can be eliminated.
 - As Kalika contemplates also the possibility of cold billet charging operation, a pusher-type billet reheating furnace with billet storage area is provided.



Photo of Mr. Hiroshi Okuno - CEO, PTIN (2nd from right) with Mr. Anil Goyal - Director, KSA (3rd from right)



PG test certificate

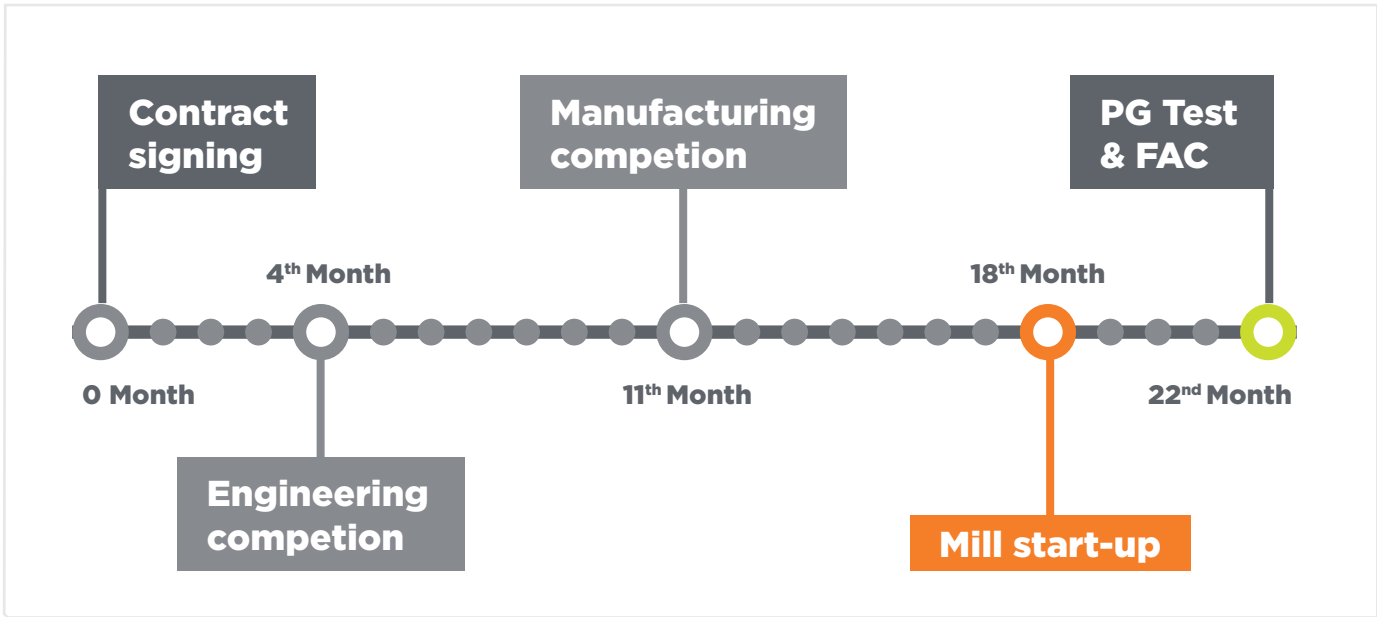
PLANT DATA

UPSTREAM FACILITIES

Induction Furnace	One (1) 30 t One (1) 25 t
Billet Caster	6/11 m x 3 strand 130 sq. mm; 110 sq. mm billet

MILL PARAMETERS

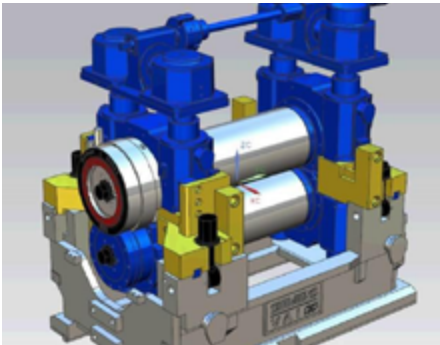
Plant capacity	250,000 tpy
Input material	130 X 130 X 9,000 mm; 1,194 kg
Reheating furnace capacity (for cold charging)	20 t/h, pusher-type
Induction heater installed power	3,600 kW
Charging scheme	100% hot charging of billets with cold charging provision
Steel grade	Low carbon steel (IS 1786-2008, Grade Fe500)
Finished Product	Rebar Ø 8 - Ø 40 mm, length: 9 - 15 m
Finished product bundle size	2 t - 3 t master bundle with 100 kg sub-bundle
Max. rolling speed	13 m/s for 8 and 10 mm
No. of slits	8 mm - 3 Slit; 10 & 12 mm - 2 Slit; 16 - 40 mm - Single strand
Max. production rate	50 t/h
No. of mill stands	18
Net rolling hours	5,000 hrs
Yield	96%



Project schedule



SALIENT FEATURES



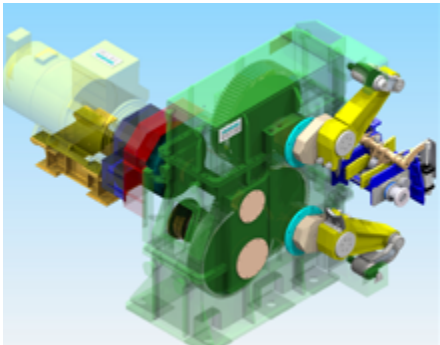
MILL STANDS

- (Qty 18) Red-Ring stands in H-V configuration (before slitting) and H-H configuration (after slitting)
- Mill stand sizes :
 - RR 455 (Stand 1 – 6)
 - RR 445 (Stand 7 -12)
 - RR 436 (Stand 13-18)
- Fixed rolling line
- Main features of Red-Ring stands :
 - Reduced stress path for better tolerance
 - High strength and rigidity
 - Horizontal and vertical cartridge are completely interchangeable
 - Symmetrical roll adjustment by screwdown mechanism



QUENCHING SYSTEM

- Located after the mill, specially designed “Venturi pipes” provides thermal treatment to rebars to attain the desired metallurgical properties.
- The process obviates the addition of costly materials e.g. Mo, Cr, V therefore significantly reducing the manufacturing cost to achieve the required yield strength and weldability
- Different sizes of cooling elements are provided for different sizes of bars
- Water flow rate : 360 m³/h
- Water pressure : 24 bar



HOT DIVIDING SHEAR

- Divides the bars in multiple of commercial length
- Convertible flying type : For low speed (below 5.5 m/s), the shear can perform in crank mode and for high speed it can perform in rotary mode
- Minimum shearing temperature: 600 deg °C
- Nominal shearing force: 40 tons
- Cutting accuracy: + 60 mm

SALIENT FEATURES



COOLING BED

- Size : 54 m x 8 m
- Bars are braked by tilting aprons during their upward stroke. The aprons are electrically driven and their weight is pneumatically balanced
- Magnetic aprons have been provided to compensate the lower friction coefficient of hot bars and reduce the cycle time
- Rake type : movable rakes advance the bars. They are operated by cams driven by variable speed motors.
- Aligning rollers are provided in the final notched segment of rakes for head alignment of bars
- Notch pitch : 80 mm



COLD SHEAR

- It cuts the bars to commercial length
- Nominal shearing force : 360 tons
- Blade width : 1,000 mm
- The bottom blade is fixed. The top blade is movable and operated by electrical motors with pneumatic clutch and brake
- The shear is equipped with a bar holding device, and with a bar head aligning device for cut optimization
- A system for the collection and removal of crops is also provided



GAUGE BEAM

- Located after cold shear for commercial length setting
- The stopper is mounted on a carriage which slides along a gauge beam. The car is driven by an electric motor with rack-pinion transmission while the stopper is actuated by a pneumatic cylinder
- Max. cutting length : 15 m
- Min. cutting length : 9 m

SALIENT FEATURES



BUNDLE FORMING STATION AND SHORT BAR COLLECTION SYSTEM

- The bar cut is optimized so that the number of bars saleable at the best market price is maximized
- The short bars remaining from the last cut layer are brought to a short-bar roller table from where are collected in a cradle, where bundles are manually tied.
- These short bars can be sold in local market
- Maximum short bar length : 11.5 m
- Minimum short bar length : 3.0 m



BAR COUNTER

- Located in the bar bundling area, it automatically and accurately counts the bar before bundle is formed
- The photocell detects the bar heads and a wheel counts the bars. The bars head-ends are separated by a faster moving chain transfer which facilitates the precise counting
- After determined numbers of bar are counted, the counted bar layers are separated from uncounted layers by pneumatically operated separating fingers
- Counting speed : 8 bars/sec max



BINDING MACHINE

- A wire tying machine is used for tying the master bundles
- A set of sub-bundling machines are provided for making sub-bundles of 100 kg before the master bundle is formed
- The equipment is hydraulically operated
- Bundle dimension :
Ø 150 mm (min.)
Ø 400 mm (max.)
- Bundle weight : 2 t – 3 t
- Bundle length: 9 m – 12 m
- No. of ties : 6 for 9 m bundles
: 9 for 12 m bundles
- Binding cycle: 8 sec.
- Product temperature (max.): 150 °C

ELECTRICS & AUTOMATION



COMPACT SPEED MASTER (CSM)

- CSM is a cost effective solution for mills and provides the following features:
- An open solution, easily handled by Simatic S7 and WinCC
- CPU 319, the fastest CPU in the Simatic S7-300 family
- Standard hardware and software integration according to plug-and-play principles
- Modular design for easy integration with downstream packages (rod/bar outlets)
- Shorter commissioning times



TECHNOLOGICAL FEATURES OF CSM

- Automatic minimum tension control
- Storage of pass schedules
- Speed setting either manually or via pass schedules
- Cascade speed control
- Interstand tension control
- Impact speed drop compensation
- Loop position regulation and cascade control
- Shear head and tail cut control
- Shear automatic cobble cutting
- Fault protection
- Compact operator desk with full HD HMI station
- Drive interfaces/sensor interfaces (Sinamics DCM for stand and shears/Sinamics S120 for auxiliaries)
- Total installed power for mill equipment: 7990 kW

Primetals Technologies Austria GmbH

A joint venture of Mitsubishi Heavy Industries and partners

Turmstrasse 44
4031 Linz
Austria

primetals.com

Brochure No.: T06-O-N493-L4-R-V2-EN

Printed in Austria

© 2020 Primetals Technologies Ltd. All rights reserved

The information (including, e.g., figures and numbers) provided in this document contains merely general descriptions or characteristics of performance based on estimates and assumptions which have not been verified.

It is no representation, does not constitute and/or evidence a contract or an offer to enter into a contract to any extent and is not binding upon the parties. Any obligation to provide and/or demonstrate respective characteristics shall only exist if expressly agreed in the terms of the contract.

These estimates and assumptions have to be analyzed on a case-to-case basis and might change as a result of further product development.

Primetals Technologies excludes any liability whatsoever under or in connection with any provided information, estimates and assumptions. The provided information, estimates and assumptions shall be without prejudice to any possible future offer and/or contract.

Any use of information provided by Primetals Technologies to the recipient shall be subject to applicable confidentiality obligations and for the own convenience of and of the sole risk of the recipient.

Primetals is a trademark of Primetals Technologies Ltd.