

Advanced technologies for a new 20-roll mill stand

ThyssenKrupp Nirosta GmbH in Krefeld, Germany



Advanced drive and automation technology

ABB has provided a complete solution based on latest technologies, for the stainless-steel mill of ThyssenKrupp Nirosta in Krefeld, Germany.

Within the scope of the project, ABB was responsible for project management, engineering, erection and commissioning.

The ABB scope of supply included the complete electrical equipment and automation:

- Complete process control, incl. technological controls and adaptive preset models
- Production management system
- Main and auxiliary drive systems using the latest AC technologies
- Instrumentation and power supply

16 months to first coil

Together with their consortium partner Sundwig GmbH, which was responsible for the mechanical layout and supply of the plant, ABB succeeded in starting the plant ahead of the deadline agreed upon in the contract due to a smooth project execution.

Following a construction time of only 16 months, the plant was ready for commissioning in early 2004.

The required quality characteristics were achieved after only a few coils and 3-shift production was introduced at the beginning of March 2004.

Due to the short commissioning time, the rolling mill has already exceeded the planned production of cold rolled strip more than 14,000 t.

With their new plant at Krefeld, ThyssenKrupp Nirosta now runs five cold rolling mills – the electrical equipment for mill no.4 had already been delivered by ABB in 1994.



ThyssenKrupp Nirosta GmbH

Krefeld-based ThyssenKrupp Nirosta GmbH is one of the largest manufacturers of flat-rolled stainless-steel products in the world.

The new 20-roll stand produces 110,000 t per year of cold rolled strip with a width of up to 1350 mm and a thickness between 0.2 to 2.5 mm, at a rolling speed of max. 800 m/min. It processes coils weighing up to 30 t.

ABB sets standards in the automation of stainless-steel mill stands

For this cold rolling mill, ABB applies the complete 800xA automation concept with advanced technologies ranging from auto-adaptive preset models for pre-setting the rolling mill, technological controls for achieving the quality parameters, right up to production management drive and process control technology.

These ABB solutions for cold rolling mills are applied to all types of mills and processing lines for high-grade steel, mild steel and for non-ferrous metals.

New process controller

For this solution the fast and highly communicative controller has been applied, which was designed for the special requirements of cold rolling mills and processing lines.

The modular and flexible controller is used in rolling mills for simple control tasks as well as for highly sophisticated technological controls, covering the complete plant control functions by using only one type of controller:

- Mill drive control
- Pilot and coordination control
- Technological control
- Plant control for entry, exit and mill section
- Control for media supplies

Technological controls and mathematical preset models

The solution package for the 20-high roll stand consists of technological controls for thickness control and an adaptive preset model to determine the setpoints of the rolling mill.

The use of mathematical models for the preset calculation permits accurate specification of the setpoints for the rolling mill on the basis of the current process conditions and the properties of the incoming material. The calculations are based on models, which take into account the varying physical conditions during reduction, so that the highest level of accuracy is achieved for the setpoint generation of the rolling mill.

Feedback of the measured values during operation adapts the model to the short-term (process changes) or long-term changes (changes in the material types).

The integration of the technological concept into ABB's well proven and robust system permits in particular the relationships between strip thickness, tension, rolling speed and flatness to be taken into consideration for achieving high quality parameters for the strip

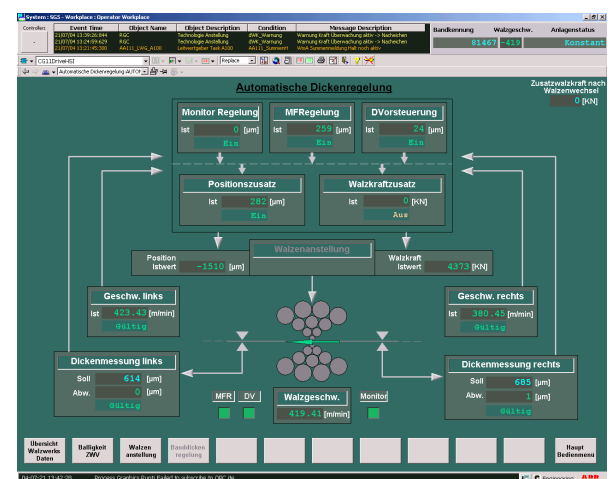




ABB Scope of performance

For ThyssenKrupp Nirosta in Krefeld, ABB has designed and delivered the following equipment and was responsible for project management, engineering, training, erection and commissioning:

Power system

- AC motors and IGCT medium voltage inverters ACS6000 with Direct Torque Control DTC and common busbar for all main drives
- AC drives ACS600 and MCCs for auxiliary drives
- Medium voltage switchgear system SF6, LV distribution, UPS system

Automation system

Total integration of automation functions in ABB 800xA control system based on Operate^{IT} and Control^{IT}.

- Drive control
- Pilot control
- Technological control
- Plant controls for entry, exit and mill section
- Control for media supplies
- Uniform Human-System-Interface via process operator stations
- Main operator desks and local operator panels

Technological controls

- Thickness control
- Direct tension control
- Coil eccentricity compensation
- Flatness control (crown adjustment, skewing, axial shifting, roll gap position)

Process control computer

- Process data management
- Order planning and management
- Material tracking
- Roll management
- Model for pass schedule calculation
- Setpoint generation management
- Adaptive rolling model

Instrumentation

- X-ray thickness measuring devices
- Laser based velocity measuring instruments
- Tensiometer devices
- Remote I/O units via Fieldbus

Data of the AC main drives

Uncoiler/tension reel	4000 kW each 340 / 1320 rpm
Mill stand	4168 kW 360 / 1100 rpm



ABB Automation GmbH

Metals

Kallstadter Str. 1

68309 Mannheim

GERMANY

Phone: +49 (0)621 381 7159

Fax: +49 (0)621 381 8055

www.abb.com/metals