ANDRITZ Metals

Ansteel Tiantie continuous annealing line

Tianjin, China

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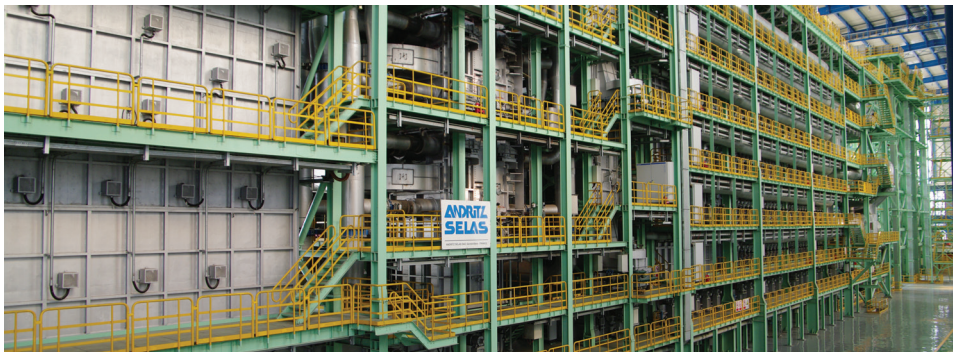


The Ansteel Tiantie continuous annealing line (CAL) in Tianjin (China) went into operation on August 28th, 2010. The furnace was designed, supplied, erected and commissioned by ANDRITZ Selas. This is the second furnace from ANDRITZ Selas installed at the premises of Ansteel Tiantie in Tianjin.

Broad product range

On this new line, Ansteel Tiantie produces a wide range of steel sheet products used for household appliances and, above all, in the automobile industry. The cold rolling process involves a substantial degree of forming so that the microstructure of the steel is hardened. The annealing process allows the material to recrystallize and regain the forming and deep-drawing properties required for further industrial applications.

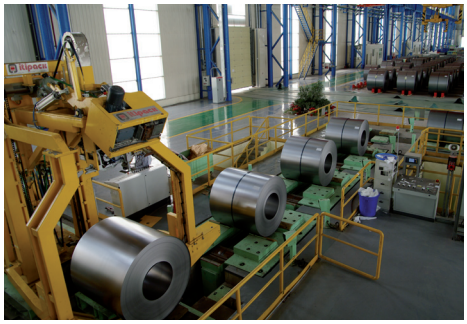
Radiant tube burners

Drive-side furnace rolls

Furnace heating sections

The strip enters the All Radiant Tube furnace (ART) through a double seal roll device separating the protective gas atmosphere inside the furnace from the surrounding atmosphere. The strip is heated two stages. The first heating zone consists of an efficient convection heating by hot HN_X gas which is blown onto the strip. This HN_X gas is heated by the hot waste gases from the radiant tube furnace section. Further heat recovery from the waste gas is achieved by heating hot water for the cleaning section of the line prior to the furnace.

In a second stage, the strip is heated to its by gas-fired, W-shaped radiant tubes. These are equipped with high-efficiency



Line exit

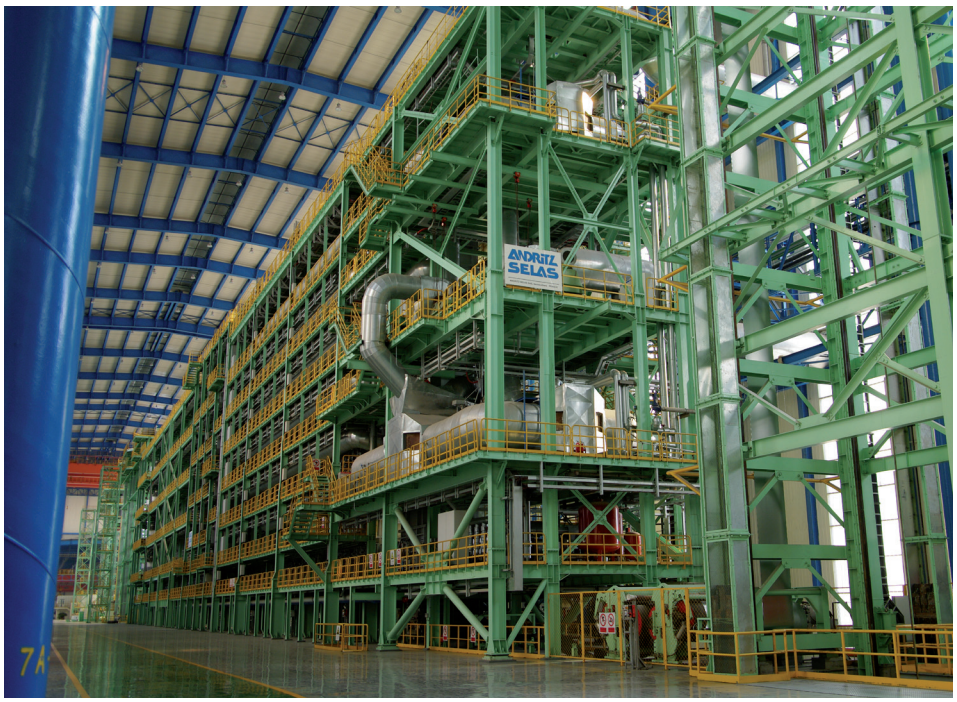
Air distribution

recuperative low NO_X burners. These burners are operated in on/off mode, ensuring optimized combustion, very low NO_Xemissions in the waste gas, and smooth furnace operation.

Cooling and exit sections of the furnace

The strip is cooled in several stages, allowing great flexibility in operation of the various cooling cycles, essential to achieve the different mechanical properties of the material grades. After the soaking zone in a single-pass Slow Jet Cooling zone (SJC), individual cooler units blow air containing HN_X onto the strip. These units recirculate the heatet HN_X back through heat exchangers again to the blowing nozzles facing the strip. This zone is also equipped with electrical heating elements in case a cooling cycle is required with minimal, slow cooling. The heart of the CAL is the Differential Rapid Jet Cooling (DRJC), where the strip is cooled rapidly with high-speed jets of cooled

HN_x gas. The cooling rate is more than 100° C/sec and ensures that the mechanical properties required for the AHSS are achieved. The cross-strip temperature is controlled and adjusted very accurately and allows homogeneous cooling all along the strip width. The coolers have been designed to give maximum flexibility and full control of operations to the steelmaker. Each cooler is fully instrumented and controlled independently. The distance between the blowing nozzles of each cooler and the strip can be controlled during operation and allows further adjustment. Various modes of cooling are available and permit exact setting of the strip cooling rate. This process is used to ensure that the mechanical properties are obtained and allows production of the latest generation of extra-high and ultra-high strength steels.



Furnace from entry side

Compact design

The DJRC has been designed to have the same height as the furnace. This very compact design provided major savings for the customer in terms of building and crane cost, at the same time ensuring the cooling requirement and strip stability for the complete production range.

Main control room

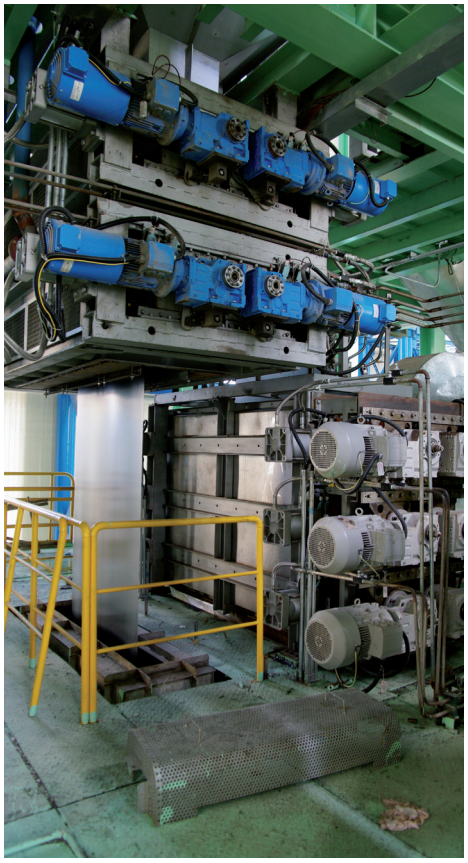
Control and operation

The furnace control system has been developed entirely by ANDRITZ AUTOMATION and is characterized by all best available practices for process control. The HMI features allow the operator very convenient operation of the line and provide all the information needed to identify equipment failures or unusual process behaviour and react with suitable measures. Based on data provided by the mathematical model developed by ANDRITZ AUTOMATION, heating power is adjusted directly to minimize the transition time between all stages and to optimize operation and output. Additionally, it ensures that the line is operated in the same way whatever shift is on duty. Quality parameters are stabilized — essential for any user of the final product — and throughput is increased.

Record time

The close, constructive and successful cooperation between ANSTEEL TIANTIE and the ANDRITZ METALS enabled both parties to achieve an outstanding project timeline. The line went into commercial operation only 25 months after contract signature. The guaranteed performance parameters were achieved rapidly and the final acceptances certificate for the complete line was signed in April 2011. One of the key factors for this success was the erection start well ahead of schedule and a very smooth commissioning period.

The excellent cooperation between the companies has again been the key to this success, which was previously proven in construction of a pickling line with an acid regeneration plant and a continuous galvanizing line (CGL) furnace – all at the same site.



Double seal unit

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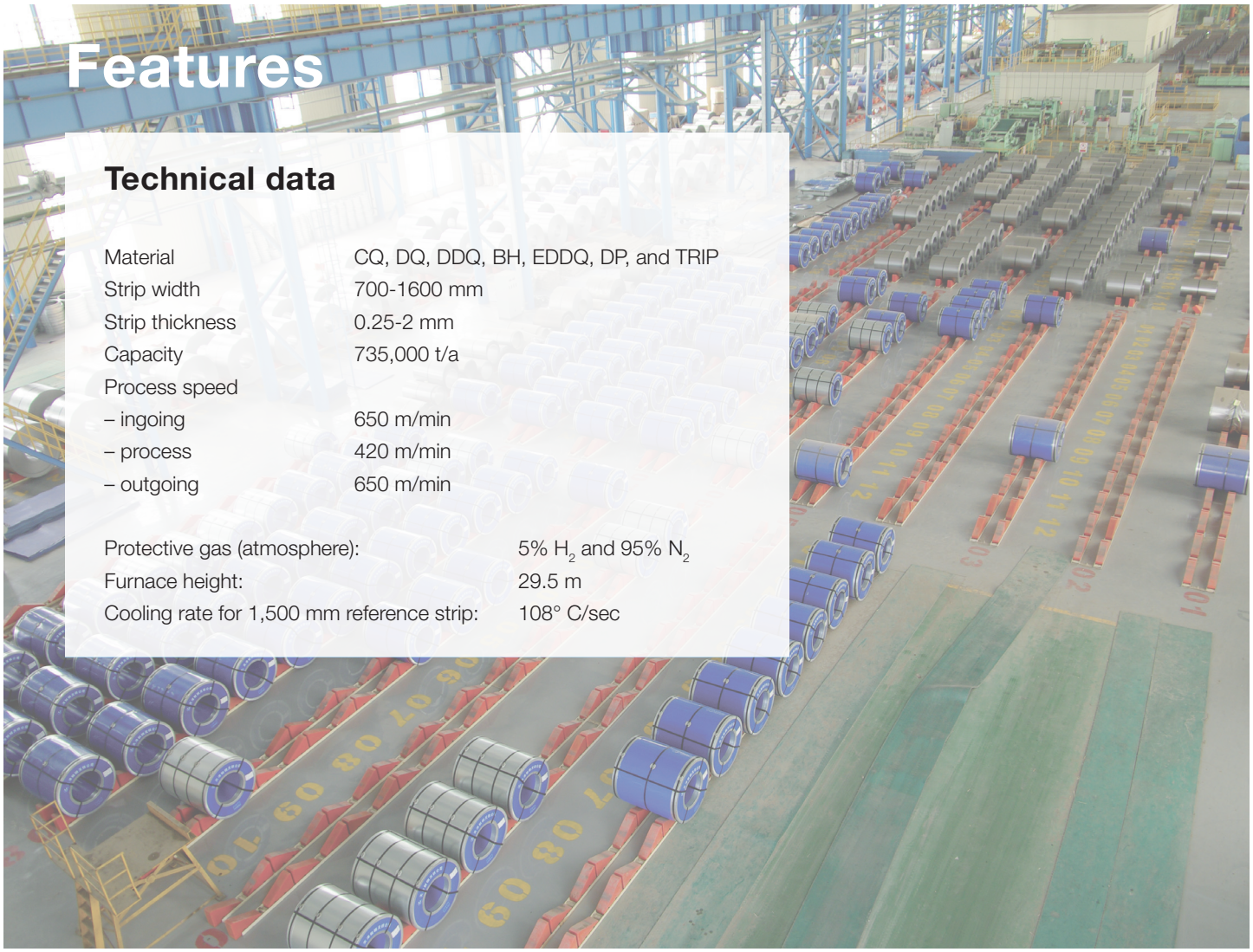

Features

Technical data

Material	CQ, DQ, DDQ, BH, EDDQ, DP, and TRIP
Strip width	700-1600 mm
Strip thickness	0.25-2 mm
Capacity	735,000 t/a
Process speed	
– ingoing	650 m/min
– process	420 m/min
– outgoing	650 m/min
Protective gas (atmosphere):	5% H_2 and 95% N_2
Furnace height:	29.5 m
Cooling rate for 1,500 mm reference strip:	108° C/sec

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