MULTIROLL MILL STANDS
for stainless-steel strip
STAINLESS STEEL, a multipurpose material

From ARCHITECTURE and HOUSEHOLD APPLIANCES to VEHICLE CONSTRUCTION

Stainless steel is a premium material for a wide range of applications. Whenever it comes to corrosion-resistance, aesthetics and durability, stainless steel is the first choice. Thanks to its unlimited recyclability, stainless steel is highly eco-friendly and helps protect our environment.

Architecture and façades
Aesthetic attraction and resistance to environmental impacts – stainless steel is building protection in perfection.

Chemicals and petrochemicals
Corrosion, acid and heat resistance along with reliable strength – stainless steel is perfectly suited for the processes in the chemical and petrochemical industry.

Medical instruments and food industry
Hygienic, clean and robust – stainless steel meets all requirements for applications in medicine and the food industry.

Household appliances
Ultrabright polish or brushed matt finish, simple elegance combined with excellent formability – stainless steel is a fascinating material which brightens up even daily routines like cooking, doing the laundry and washing the dishes.

Vehicle construction
High strength, low weight, energy-absorbing and resource-protecting – stainless steel has the ideal properties for automotive and vehicle construction.

Offshore technology and shipbuilding
Aggressive sea water, wind and weather – just the ideal environment for corrosion-resistant and robust duplex steels.
**INTRODUCTION**

Stainless steel, a multipurpose material

Top technology for top products

**SPLITBLOCK STANDS**

YUSCO

LISCO

ThyssenKrupp VDM

YUSCO

Outokumpu

POSCO

ThyssenKrupp Nirosta

**MONOBLOCK STANDS**

TPSS

ThyssenKrupp AST

TPSS

LISCO

TISCO

TPSS

SKS

ThyssenKrupp AST

**18-HIGH STANDS**

YUSCO
TOP TECHNOLOGY
for top products

EXPERTISE IN PLANT TECHNOLOGY FOR STAINLESS STEEL

SMS Siemag ranks among the leading suppliers of plant technology and equipment for the production of high-quality stainless-steel strip. We have already supplied more than 100 cold-rolling mills for stainless steel, silicon steels and carbon steel to customers around the globe. In addition, our product portfolio includes annealing and pickling lines for cold and hot strip, bright-annealing lines, skin-pass mills as well as preparation and finishing lines. And in recent years, we have continuously expanded our Electrics and Automation as well as Service Divisions so that SMS Siemag is able to offer its worldwide clientele the full range of plant technology and equipment for the production of high-quality stainless-steel products.

MONOBLOCK, SPLITBLOCK AND 18-HIGH COLD ROLLING MILLS

For the production of stainless-steel cold strip, SMS Siemag supplies powerful 20-high rolling mills which are designed as stand-alone stands operating in reversing mode. They come in two versions: the closed, robust MonoBlock design or the more flexible SplitBlock type. Both types of roll stands permit to achieve minimum thicknesses down to 0.1 mm at rolling speeds of up to 1,000 m/min and maximum thickness reductions of up to 90%. Another design are our 18-high stands with Z-high roll sets which are particularly suited for integration and use in continuous production facilities. Fully automated high-speed roll changing and highly dynamic control systems are a must for the implementation of a continuous production process. Several stands in tandem arrangement represent a high-performance plant concept for the economical production of premium-quality stainless-steel strip.

Moreover, the complete design or configuration of our Z-high roll setups allows to subsequently revamp existing four-high or six-high stands, thereby cutting investment costs as compared to new plants.

EXPLANATION OF TYPE DESIGNATION

Example: SB22-52"
SB = SplitBlock
22 = size identification code
52" = rollable width in inches
Overview of mills supplied.

**SPLITBLOCK STANDS**
- Yieh United Steel, SB22-52”, mill No. 2
- Lianzhong Stainless Steel, SB22-52”, mill No. 1
- ThyssenKrupp VDM, SB33-30”
- Yieh United Steel, SB22-52”, mill No. 1
- Outokumpu, SB21-64”
- Posco, SB21-52”
- ThyssenKrupp Nirosta, SB21-53”

**MONOBLOCK STANDS**
- TPSS Yuantong Stainless Steel Ware, MB22B-54”, mills No. 3 + 4
- ThyssenKrupp Acciai Speciali Terni, MB22B-54”, mill No. 7
- TPSS Yuantong Stainless Steel Ware, MB22B-54”, mill No. 2
- Lianzhong Stainless Steel, MB21BB-63”, mill No. 2
- Taiyuan Iron & Steel, MB22B-52”, mills No. 4 to 8
- TPSS Yuantong Stainless Steel Ware, MB22B-54”, mill No. 1
- Shanghai Krupp Stainless, MB22B-53”
- ThyssenKrupp Acciai Speciali Terni, MB21BB-62”, mill No. 6

**18-HIGH STANDS**
- Yieh United Steel, ZR613A-52”

Left: SplitBlock design. Right: MonoBlock design.
YIEH UNITED STEEL, Taiwan
Mill No. 2

SPLITBLOCK STANDS

Second 20-high mill from SMS Siemag

This size-22 SplitBlock stand is the second roll stand that SMS Siemag has built for Yieh United Steel Corporation (Yusco). The customer again decided in favor of this proven concept because of the good experience gained with the first facility.

Just like mill No. 1, this second cold rolling stand incorporates all the actuators or control elements needed for roll-gap setting and is thus able to process a whole range of different strip grades and qualities into precisely rolled finished products.

A thickness and flatness control system as well as a mathematical model developed by SMS Siemag preset all rolling parameters and control them fully automatically while rolling is underway.

There was no need to install an additional uncoiling station as the starting material can be introduced into the process directly at the reversing coilers.
20-HIGH MILL STAND
SplitBlock SB 22-52”

Commissioning 2007

Production data
Material stainless-steel strip
AISI 300 and 400 series
Strip width 800 to 1,300 mm
Strip thickness
  ingoing max. 6.0 mm
  outgoing 0.15 to 3.0 mm
Coil weight max. 28,000 kg

Technical data
Stand type SB 22-52”
Rolling speed max. 700 m/min
Rolling force max. 7,850 kN
Strip tension max. 500 kN
Capacity 80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A/D and F/G
- Shifting of first intermediate rolls by means of a push/pull system
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
Lianzhong Stainless Steel Corporation (Lisco), a subsidiary of Taiwan’s Yieh United Steel Corporation, is a production location set up on a greenfield site in southern China. For the new plant, SMS Siemag supplied one size-22 SplitBlock stand for a rolling width of 1,300 mm as well as one MonoBlock stand of size 21 for 1,600-mm-wide strip. Both stands were fabricated in minimum time and started up in 2006.

Manufactured in our Hilchenbach workshops, the 20-high SplitBlock stand was completely preassembled including entry- and exit-end equipment and the stand platform so that essential motions and the functions of the hydraulic system could be tested prior to final installation in the customer’s works. As a result, the original erection and commissioning schedule could be shortened by several weeks.

Various actuators or control elements for roll-gap setting make it possible for the cold-rolling stand to process a whole range of different strip grades and qualities. A thickness and flatness control system is also part of its equipment outfit. All rolling parameters are preset by a mathematical model from SMS Siemag and controlled fully automatically during the rolling process.
20-HIGH MILL STAND
SplitBlock SB 22-52”

Commissioning 2006

Production data
Material stainless-steel strip
AISI 300 and
400 series
Strip width 800 to 1,300 mm
Strip thickness
ingoing max. 6.0 mm
outgoing 0.15 to 3.0 mm
Coil weight max. 28,000 kg

Technical data
Stand type SB 22-52”
Rolling speed max. 700 m/min
Rolling force max. 7,850 kN
Strip tension max. 500 kN
Capacity 80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A/D and F/G
- Shifting of first intermediate rolls by means of a push/pull system
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems

Preassembly in our shops.

LISCO
To ThyssenKrupp VDM, Germany, SMS Siemag supplied a 20-high cold rolling mill for the safe and reliable production of foils, especially ultrathin foils down to a minimum final thickness of 20 µm.

The foils are made of high-strength special alloys which are employed, for instance, in automotive catalytic converters. SMS Siemag supplied the plant on turnkey basis including mechanical equipment, utility systems and electrics & automation.

Highly dynamic actuators and adequate control systems in the roll stand enable the production of ultrathin foils with thickness tolerances of minimum 1 µm. For this purpose, the mill is equipped with feed-forward and feed-backward mass-flow control systems for thickness control. And this cold rolling facility is the first ever to incorporate our novel SMS Siemag flatness measuring roll with closed roll surface.

The mill stand is fitted with all control elements required to produce strip with top flatness. This includes crown adjustment on backup shafts A and D, shifting of the first intermediate rolls and adjusting possibilities such as tilting and swiveling of the top roll set by means of the AGC system.
20-HIGH MILL STAND
SplitBlock SB33-30”

Commissioning 2002

Production data
Material stainless-steel strip
AISI 300 and
400 series,
special steels
Strip width 350 to 750 mm
Strip thickness
ingoing max. 1.0 mm
outgoing 0.02 mm
Coil weight max. 9,500 kg

Technical data
Stand type SB 33-30”
Rolling speed max. 600 m/min
Rolling force max. 2,100 kN
Strip tension max. 27 kN
Capacity 5,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A and D
- Shifting of first intermediate rolls by means of a push/pull system
- Additional uncoiling station with bridle roll set
- Plate-type filter system for cooling and ultrafine filtering of the rolling oil used
- Complete automation including thickness and flatness control systems from SMS Siemag
YIEH UNITED STEEL, Taiwan
Mill No. 1

SPLITBLOCK STANDS

First SplitBlock stand in size SB22

The 20-high mill stand at Yieh United Steel Corporation is the first size-22 SplitBlock stand ever built by SMS Siemag. Taiwan’s largest stainless-steel producer, Yieh United Steel Corporation (Yusco) uses this 20-high mill to roll strip in widths of 800 to 1,300 mm down to final thicknesses of minimum 0.15 mm.

Thanks to its large number of actuators or control elements for roll-gap setting, the roll stand is able to process a whole range of different strip grades and qualities. For the first time, the hydraulic roll-gap adjusting cylinders were arranged in the upper part of the stand to ensure ready access for maintenance jobs. All rolling parameters are preset by a mathematical model from SMS Siemag and controlled fully automatically during the rolling process. Control systems ensure exact final thicknesses and a perfectly flat strip.

The coils can be placed directly on the reversing coiler so that no separate uncoiling station with pinch roll leveler is needed.
20-HIGH MILL STAND
SplitBlock SB 22-52”

Commissioning 2001

Production data
Material stainless-steel strip
AISI 300 and 400 series
Strip width 800 to 1,300 mm
Strip thickness
  ingoing max. 6.0 mm
  outgoing 0.15 to 3.0 mm
Coil weight max. 28,000 kg

Technical data
Stand type SB 22-52”
Rolling speed max. 700 m/min
Rolling force max. 7,850 kN
Strip tension max. 500 kN
Capacity 80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A/D and F/G
- Shifting of first intermediate rolls by means of a push/pull system
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
OUTOKUMPU, Finland

SPLITBLOCK STANDS

20-high mill for wide stainless-steel strip

The largest SplitBlock stand ever built by SMS Siemag is in operation at Outokumpu (formerly Outokumpu Stainless Steel) in Tornio, Finland, and is the Tornio location’s third 20-high roll stand. Featuring a rolling force of 16,000 kN and a maximum strip tension of 600 kN, this powerful facility is able to process stainless-steel strip in widths up to 1,625 mm and ingoing thicknesses up to 8 mm. Coil handling is fully automated using self-controlled coil cars.

The backup shafts are secured in the stand block by means of a hydraulic saddle clamping device and need not be detached manually by the maintenance crew. Changing of the work rolls and the first intermediate rolls is done fully automatically by a robot system. The uncoiling station with leveler unit reduces idle times during coil changing.

A large number of actuators or control elements for roll-gap setting make sure that a whole range of different strip grades and qualities can be processed with top results. In addition to a thickness and flatness control system, the facility avails of a mathematical model for presetting the rolling parameters and fully automatic process control.
20-HIGH MILL STAND
SplitBlock SB 21-64”

Commissioning 1996

Production data
Material  stainless-steel strip
          AISI 300 and
          400 series
Strip width  800 to 1,625 mm
Strip thickness
          ingoing  max. 8.0 mm
          outgoing min. 0.3 mm
Coil weight  max. 28,000 kg

Technical data
Stand type  SB 21-64”
Rolling speed  max. 800 m/min
Rolling force  max. 16,000 kN
Strip tension  max. 600 kN
Capacity  150,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A to D
- Shifting of first intermediate rolls by means of a push/pull system
- Fully automated roll-changing robot
- Additional uncoiling station with pinch roll leveler for coil preparation
- SUPAMIC® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
20-high mill for large coils

This 20-high rolling mill is geared to process stainless-steel strip coming in coils with a maximum weight of 35 t and diameters of up to 2,400 mm. Strip with an ingoing thickness of maximum 5 mm is rolled down to a minimum final thickness of 0.1 mm. Thanks to varied actuators or control elements for roll-gap setting, a whole range of different strip grades and qualities can be processed with top results.

The work rolls and the first intermediate rolls of this mill are changed fully automatically, while changing of the second intermediate rolls and the backup shafts is accomplished in semiautomatic mode. The backup shafts in the stand block are fastened by means of a hydraulic saddle clamping device and need not be unclamped manually by the maintenance crew. An automated transport system supplies the paper winders with fresh paper coils which are kept on stock in a store beside the roll stand. To boost productivity, the mill is equipped with an uncoiling station and a leveler unit for shorter nonproductive times during coil changing. The sequences for coil loading and strip threading are automated.

A thickness and flatness control system is also part of the mill’s equipment outfit. All rolling parameters are preset through a mathematical model and controlled fully automatically during the rolling process.
20-HIGH MILL STAND
SplitBlock SB 21-52”

Commissioning 1995

Production data
Material  stainless-steel strip
          AISI 300 and
          400 series
Strip width  600 to 1,300 mm
Strip thickness
  ingoing  max. 5.0 (5.5) mm
  outgoing min. 0.1 to 2.0 mm
Coil weight  max. 35,000 kg

Technical data
Stand type  SB 21-52”
Rolling speed  max. 800 m/min
Rolling force  max. 12,000 kN
Strip tension  max. 500 kN
Capacity  120,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A to D
- Shifting of first intermediate rolls by means of a push/pull system
- Fully automated roll-changing robot
- Additional uncoiling station with pinch roll leveler for coil preparation
- SUPAMIC® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
ThyssenKrupp NIROSTA, Germany

**SPLITBLOCK STANDS**

20-high mill for maximum rolling speeds

Stainless-steel strip with ingoing thicknesses of maximum 8 mm can be processed on this 20-high stand, the fourth at the Krefeld location. For highest output and performance, the facility can be operated at a maximum rolling speed of 1,000 m/min. Equipped with a large variety of actuators or control elements for roll-gap setting, the stand is able to process a whole range of different strip grades or qualities.

The work rolls and the first intermediate rolls of this mill are changed fully automatically, while changing of the second intermediate rolls and the backup shafts takes place in semiautomatic mode. A hydraulic saddle clamping device serves to secure the backup shafts in the stand block so that any manual unclamping by the maintenance crew is unnecessary. The uncoiling station with walking-beam coil conveyor and leveler unit reduces the idle times during coil changing, thereby increasing the mill’s productivity. The sequences for coil loading and strip threading are automated.

Easy maintenance and ready access are ensured thanks to central arrangement of all hydraulic controls on a platform behind the stand. The process control system comprises: X-ray thickness measuring system, thickness control system, flatness measuring roll and control system as well as a mathematical model for presetting and control of all rolling parameters.
20-HIGH MILL STAND
SplitBlock SB 21-53”

Commissioning 1995

Production data
Material stainless-steel strip
AISI 300 and
400 series
Strip width 500 to 1,350 mm
Strip thickness
ingoing max. 8.0 mm
outgoing 0.2 to 3.0 mm
Coil weight max. 32,000 kg

Technical data
Stand type SB 21-53”
Rolling speed max. 1,000 m/min
Rolling force max. 12,000 kN
Strip tension max. 500 kN
Capacity 120,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts A to D
- Shifting of first intermediate rolls by means of a push/pull system
- Fully automated roll-changing robot
- Additional uncoiling station with pinch roll leveler for coil preparation
- SUPAMIC® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
Inspired by the successful development of stainless-steel production at its Tianjin location, the customer decided to take another expansion step into the profitable stainless-steel market. To ensure quick and smooth implementation of this project, TPSS chose SMS Siemag to supply two new 20-high rolling mills. The goal is to double the existing plant’s cold-rolling capacity to 400,000 t.

Just like mills No. 1 and 2, the new cold rolling facilities will be of the proven MonoBlock design and equipped with cutting-edge technology and equipment from SMS Siemag. The product spectrum will comprise stainless-steel strip with a maximum width of 1,350 mm and ingoing thicknesses of up to 6 mm which will be rolled down to a final thickness of minimum 0.15 mm.

On both sides, the roll stands are equipped with high-tension reversing coilers and the entry and exit facilities required for the economical production of stainless-steel strip. There was no need to invest into an additional uncoiling station because the coils to be rolled can be loaded directly on the reversing coilers. In addition to a highly dynamic thickness and flatness control system, both mills come with a mathematical model for presetting all process parameters and fully automatic control of the rolling process.

To use the resources employed as economically as possible and protect the environment, both mills will be equipped with a modern SUPAFINE® filtration system for efficient cleaning and cooling of the rolling oil used.
Here again, our customer can draw on the proven equipment, vast experience and special know-how of SMS Siemag in the field of ultrafine filtration of rolling oil.

20-HIGH MILL STANDS
MonoBlock MB 22B-54”

Commissioning 2009

Production data

Material stainless-steel strip
AISI 300 and 400 series
Strip width 800 to 1,350 mm
Strip thickness
  ingoing max. 6.0 mm
  outgoing min. 0.15 mm
Coil weight max. 30,000 kg

Technical data

Type of stands
No. 3 to 4 MB 22B-54”
Rolling speed max. 800 m/min
Rolling force max. 7,850 kN
Strip tension max. 500 kN
Capacity 80,000 tpy

Technical features

- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C and F/G
- Shifting of first intermediate rolls by means of a push/pull system
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
ThyssenKrupp ACCIAI
SPECIALI TERNI, Italy, Mill No. 7

MONOBLOCK STANDS

Seventh 20-high mill

Using proven plant technology and equipment made by SMS Siemag – that’s how the Terni, Italy, location will carry on its success story. The new cold rolling mill incorporates leading-edge stand technique and is already the seventh MonoBlock which the customer ordered from SMS Siemag for its Terni operations.

Acciai Speciali Terni is Italy’s largest stainless-steel producer and belongs to the ThyssenKrupp Stainless group, a European producer of high-quality stainless-steel strip for the globally rising demand.

Featuring the proven, compact MonoBlock design, the mill processes pickled stainless-steel strip of the AISI 400 (ferritic) and AISI 300 (austenitic) grades in widths of up to 1,370 mm and ingoing thicknesses of maximum 6.3 mm.

Design, procurement, manufacture and shop assembly were completed in just 12 months. The MonoBlock was transported to Italy in assembled state including baseframe and gearunit, installed in record time and put into operation several weeks ahead of the contracted deadline.

The mill consists of two reversing coilers, one uncoiling station with leveler unit and a mobile crop shear to minimize the nonproductive times during coil changing. Fully automated control systems for precise strip thickness and optimal flatness ensure cold-rolled finished products of supreme quality. All rolling parameters are preset automatically by a mathematical model.

SMS Siemag’s supply package included the design, manufacture, erection and commissioning of the mechanical equipment including ancillaries such as hydraulic, rolling-oil, fire-extinguishing and fume exhaust systems.
20-HIGH MILL STAND
MonoBlock MB 22 B - 54”

Commissioning 2006

Production data
Material stainless-steel strip
AISI 300 and 400 series
Strip width 650 to 1,370 mm
Strip thickness
  ingoing max. 6.3 mm
  outgoing min. 0.2 mm
Coil weight max. 30,000 kg

Technical data
Stand type MB 22 B - 54”
Rolling speed max. 800 m/min
Rolling force max. 7,850 kN
Strip tension max. 500 kN
Capacity 80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C (prepared for backup shafts F/G)
- Shifting of first intermediate rolls by means of a push/pull system
- Additional uncoiling station with pinch roll leveler for coil preparation
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
Second 20-high mill

In 2005, TPSS Yuantong Stainless Steel Ware Corporation had branched out into the stainless-steel market, and just one year later ordered and commissioned a further 20-high cold-rolling stand from SMS Siemag. Representing the next step in TPSS’s ambitious expansion program, this mill No. 2 boosted production by another 80,000 tpy of stainless-steel strip with top quality.

Identical in design with stand No. 1, the mill stand No. 2 serves to process pickled stainless-steel strip with a maximum width of 1,350 mm and ingoing thicknesses of up to 6 mm.

The “Zero-Crown” MonoBlock stands out for its high stiffness and is completed by entry- and exit-side high-tension reversing coilers as well as the necessary entry and exit equipment.

Mill productivity is increased by an additional uncoiling station with pinch roll leveler allowing all preparatory work for the next coil to be done while rolling is underway.

Closest thickness tolerances and optimal flatness are ensured by adequate control systems. The mathematical model fully automatically controls all the parameters needed for reliable and precise rolling.
20-HIGH MILL STAND
MonoBlock MB 22 B - 54”

Commissioning 2006

Production data
Material  stainless-steel strip
AISI 300 and 400 series
Strip width  800 to 1,350 mm
Strip thickness
  ingoing  max. 6.0 mm
  outgoing  min. 0.3 mm
Coil weight  max. 30,000 kg

Technical data
Stand type  MB 22 B - 54”
Rolling speed  max. 800 m/min
Rolling force  max. 7,850 kN
Strip tension  max. 500 kN
Capacity  80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C and F/G
- Shifting of first intermediate rolls by means of a push/pull system
- Additional uncoiling station with pinch roll leveler for coil preparation
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
LIANZHONG STAINLESS STEEL, China
Mill No. 2

MONOBLOCK STANDS

Second 20-high mill for wide stainless-steel strip

Lianzhong Stainless Steel Corporation (Lisco), a subsidiary of Taiwan’s Yieh United Steel Corporation, operates a production facility set up on a greenfield site in southern China. Just like for its home location in Taiwan, the customer decided to employ SMS Siemag’s proven 20-high stand technology and equipment at its new production operations in China.

In addition to the size-22 SplitBlock stand, SMS Siemag installed a second coldrolling mill in MonoBlock design in Lisco’s plant. This MonoBlock stand serves to process stainless-steel strip with a maximum width of 1,600 mm and ingoing thicknesses of up to 6 mm into high-quality cold strip.

The large-width stand block is of “Zero-Crown” design and features excellent stiffness at minimum mill spring under rolling load. For easier and less maintenance, the backup shafts are secured in the stand block by means of a hydraulic saddle clamping device.

Fully automated thickness and flatness control systems ensure precisely rolled cold strip with closest tolerances. The mathematical model from SMS Siemag automatically presets all rolling parameters which are controlled online during the rolling process.
20-HIGH MILL STAND  
MonoBlock MB 21 BB - 63”

Commissioning 2006

Production data

Material  stainless-steel strip  
AISI 300 and 400 series

Strip width  600 to 1,600 mm

Strip thickness
ingoi ng  max. 6.0 mm  
outgoing  min. 0.3 mm

Coil weight  max. 30,000 kg

Technical Data

Stand type  MB 21 BB - 63”
Rolling speed  max. 700 m/min
Rolling force  max. 14,000 kN
Strip tension  max. 600 kN
Capacity  150,000 tpy

Technical features

- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C (prepared for backup shafts A and D)
- Shifting of first intermediate rolls by means of a push/pull system
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
Five 20-high mills for stainless-steel strip

Taiyuan Iron & Steel Co. Ltd. (Tisco), China’s leading stainless-steel producer, ordered a total of five 20-high mills from SMS Siemag, representing the largest single order for 20-high roll stands ever awarded to any supplier. All of the stands could be put on stream ahead of the contracted deadline. In addition to these five 20-high mills, SMS Siemag, in 2005, supplied Tisco with an inline skin-pass mill for its hot-strip annealing and pickling line.

The MonoBlock cold-rolling facilities are designed to process very high coil weights of up to 35 t with a maximum coil diameter of 2,400 mm.

All of the 20-high stands are provided with high-tension reversing coilers on both sides as well as the necessary entry and exit equipment. The first mill additionally incorporates an uncoiling station for efficient and smooth processing of hot strip coils with maximum strip thicknesses.

To ensure closest tolerances, each of the cold-rolling stands features a thickness and flatness control system. A mathematical model presets all rolling parameters which are controlled fully automatically during the rolling process.
### 20-HIGH MILL STAND
**MonoBlock MB 22B-52”**

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<th>Commissioning</th>
<th>2005</th>
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**Production data**

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<th>Material</th>
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<td>Strip width</td>
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<tr>
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<tr>
<td>outgoing</td>
<td>min. 0.3 mm</td>
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<tr>
<td>Coil weight</td>
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**Technical data**

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<th>MB 22 B-52”</th>
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<td>Rolling speed</td>
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<td>Rolling force</td>
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<tr>
<td>Strip tension</td>
<td>max. 500 kN</td>
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<tr>
<td>Capacity</td>
<td>80,000 tpy</td>
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**Technical features**

- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C (prepared for backup shafts F/G)
- Shifting of first intermediate rolls by means of a push/pull system
- One stand with additional uncoiling station including pinch roll leveler for coil preparation
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
TPSS YUANTONG STAINLESS STEEL WARE, China, Mill No. 1

MONOBLOCK STANDS

First 20-high mill for a "newcomer"

TPSS Yuantong Stainless Steel Ware Corporation, a new player on the Chinese stainless-steel market, is based in the Tianjin Economic Development Area, a high-tech industrial park our customer chose for its top-notch production facilities. Among others, the park also accommodates an Airbus assembly plant.

For moving into the production of high-quality stainless-steel strip, TPSS decided to employ a 20-high cold-rolling mill which serves to process pickled stainless-steel strip with a maximum width of 1,350 mm and ingoing thicknesses of up to 6 mm into first-class cold strip. Proven plant technology and equipment as well as easy operation smoothed the way for production to succeed at this new location in China.

The heart of the mill is an MB22 MonoBlock stand which is completed by two high-tension reversing coilers and an uncoiling station to reduce idle times.

All rolling parameters are set by a mathematical model and controlled fully automatically during rolling.

TPSS Tianjin Pipe Corporation Ltd. ranks among China’s largest pipe makers and has been cooperating closely with the companies of SMS metallurgy for years. So it came as no surprise that the customer chose SMS Siemag to expand its product portfolio.
20-HIGH MILL STAND
MonoBlock MB 22 B - 54”

Commissioning  2005

Production data
Material         stainless-steel strip
                 AISI 300 and
                 400 series
Strip width      800 to 1,350 mm
Strip thickness  
ingoing  max. 6.0 mm
               outgoing min. 0.3 mm
Coil weight     max. 30,000 kg

Technical data
Stand type       MB 22 B - 54”
Rolling speed    max. 800 m/min
Rolling force    max. 7,850 kN
Strip tension    max. 500 kN
Capacity         80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C and F/G
- Shifting of first intermediate rolls by means of a push/pull system
- Additional uncoiling station with pinch roll leveler for coil preparation
- SUPAFINE® filtration system for cooling and ultrafine filtering of the rolling oil used
- Mathematical model
- Thickness and flatness control systems
Since 2001, Shanghai Krupp Stainless Co. Ltd. (SKS) has been producing high-quality stainless-steel strip of austenitic and ferritic grades on a 20-high cold rolling mill made by SMS Siemag. SKS is a joint venture between ThyssenKrupp Stainless and Baosteel for stainless-steel production in China.

Just like at its German operations in Krefeld, Benrath and Dillenburg, ThyssenKrupp decided to equip the Shanghai plant with SMS Siemag’s proven 20-high stand technology and equipment.

The new mill in MonoBlock design enables the processing of pickled stainless-steel strip with a maximum width of 1,340 mm and an ingoing thickness of up to 5 mm.

To boost mill capacity, the cold-rolling stand incorporates an additional uncoiling station to reduce nonproductive times during coil changing.

The thickness and flatness control system is part of the stand automation and ensures exact strip dimensions with closest tolerances. All rolling parameters are preset and controlled fully automatically during rolling by means of a mathematical model from SMS Siemag.
20-HIGH MILL STAND
MonoBlock MB 22B-53”

Commissioning 2001

Production data
Material  stainless-steel strip
AISI 300 and
400 series
Strip width 800 to 1,340 mm
Strip thickness
  ingoing max. 5.0 mm
  outgoing min. 0.2 mm
Coil weight max. 27,000 kg

Technical data
Stand type  MB 22 B-53”
Rolling speed  max. 800 m/min
Rolling force  max. 7,850 kN
Strip tension  max. 500 kN
Capacity 80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C
  (prepared for backup shafts F/G)
- Shifting of first intermediate rolls by
  means of a push/pull system
- Additional uncoiling station with pinch roll
  leveler for coil preparation
- SUPAFINE® filtration system for cooling
  and ultrafine filtering of the rolling oil
  used
- Mathematical model
- Thickness and flatness control systems
ThyssenKrupp ACCIAI SPECIALI TERNI, Italy, Mill No. 6

**MONOBLOCK STANDS**

Large 20-high mill for wide stainless-steel strip

In order to be able to roll also wide strip at its Terni location, the customer once again decided in favor of technology and equipment made by SMS Siemag.

The 20-high mill in the proven, compact MonoBlock design processes stainless-steel strip in widths of up to 1,575 mm and ingoing thicknesses of max. 5 mm.

The stand block in "Zero-Crown" design features maximum rigidity at minimum mill spring under rolling load.

It is the sixth 20-high cold-rolling mill that SMS Siemag has built for this customer.

For easier replacement, the backup shafts are secured in the stand block by means of a hydraulic saddle clamping device. The mill is provided with a fully automatic thickness and flatness control system. All rolling parameters are preset by a mathematical model and controlled online during operation.

In this mill, the coils to be rolled are introduced into the process directly at the reversing coiler so that no extra money had to be spent on an uncoiling station.
20-HIGH MILL STAND
MonoBlock MB 21 BB - 62"

Commissioning  2000

Production data
Material          stainless-steel strip
AISI 300 and
400 series
Strip width       900 to 1,575 mm
Strip thickness
  ingoing         max. 5.0 mm
  outgoing        min. 0.2 mm
Coil weight      max. 33,500 kg

Technical data
Stand type       MB 21 BB - 62"
Rolling speed    max. 800 m/min
Rolling force    max. 16,000 kN
Strip tension    max. 590 kN
Capacity         150,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- Crown adjustment for backup shafts B/C
  (prepared for backup shafts A and D)
- Shifting of first intermediate rolls by
  means of a push/pull system
- SUPAFINE® filtration system for cooling
  and ultrafine filtering of the rolling oil
  used
- Mathematical model
- Thickness and flatness control systems
YIEH UNITED STEEL, Taiwan

18-HIGH STANDS

18-high stand for stainless-steel strip

In addition to its two 20-high stands from SMS Siemag, Yieh United Steel Corporation contracted us to supply an 18-high cold-rolling mill. This roll stand represents an innovative type of rolling facility which SMS Siemag has added to its portfolio of modern stand equipment and technology.

A special feature of the 18-high concept are the slim work rolls with a diameter of 120 mm. Horizontal support by means of adjustable supporting roller bridges ensures that the work rolls are laterally stabilized during the rolling process.

The mill stand also incorporates an HS shifting system for the work rolls as well as an axial shifting and bending system for the intermediate rolls. All actuators or control elements for roll-gap setting allow to process a whole range of different hot-strip grades into high-quality cold-rolled products. Thanks to a fully automated thickness control system, the stainless-steel strip produced features precise dimensions. All rolling parameters are preset by an electronic database system for many different rolling programs and pass schedule strategies.

Mills of this type can be operated in reversing mode and as inline stands for rolling scale-affected hot strip or conventional cold strip. In integrated rolling, annealing and pickling lines, 18-high roll stands in tandem arrangement form the technological unit for thickness reduction.
18-HIGH MILL STAND
ZR613 A - 52”

Commissioning: 2007

Production data
Material: stainless-steel hot strip
AISI 300 and 400 series
Strip width: 800 to 1,300 mm
Strip thickness:
ingoing: max. 6.5 mm
outgoing: 1.5 mm
Coil weight: max. 28,000 kg

Technical data
Stand type: ZR 613 A - 52”
Rolling speed: max. 500/min
Rolling force: max. 20,000 kN
Strip tension: max. 600 kN
Capacity: 80,000 tpy

Technical features
- Servohydraulic roll-gap control (AGC)
- HS shifting for the work rolls
- Intermediate-roll shifting system
- Intermediate-roll bending system
- Emulsion system for cooling and filtering the coolant-lubricant used
- Electronic database system for presetting all rolling parameters
- Thickness control systems
"The information provided in this brochure contains a general description of the performance characteristics of the products concerned. The actual products may not always have these characteristics as described and, in particular, these may change as a result of further developments of the products. The provision of this information is not intended to have and will not have legal effect. An obligation to deliver products having particular characteristics shall only exist if expressly agreed in the terms of the contract."