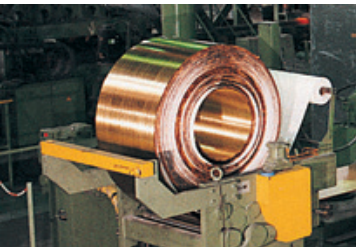
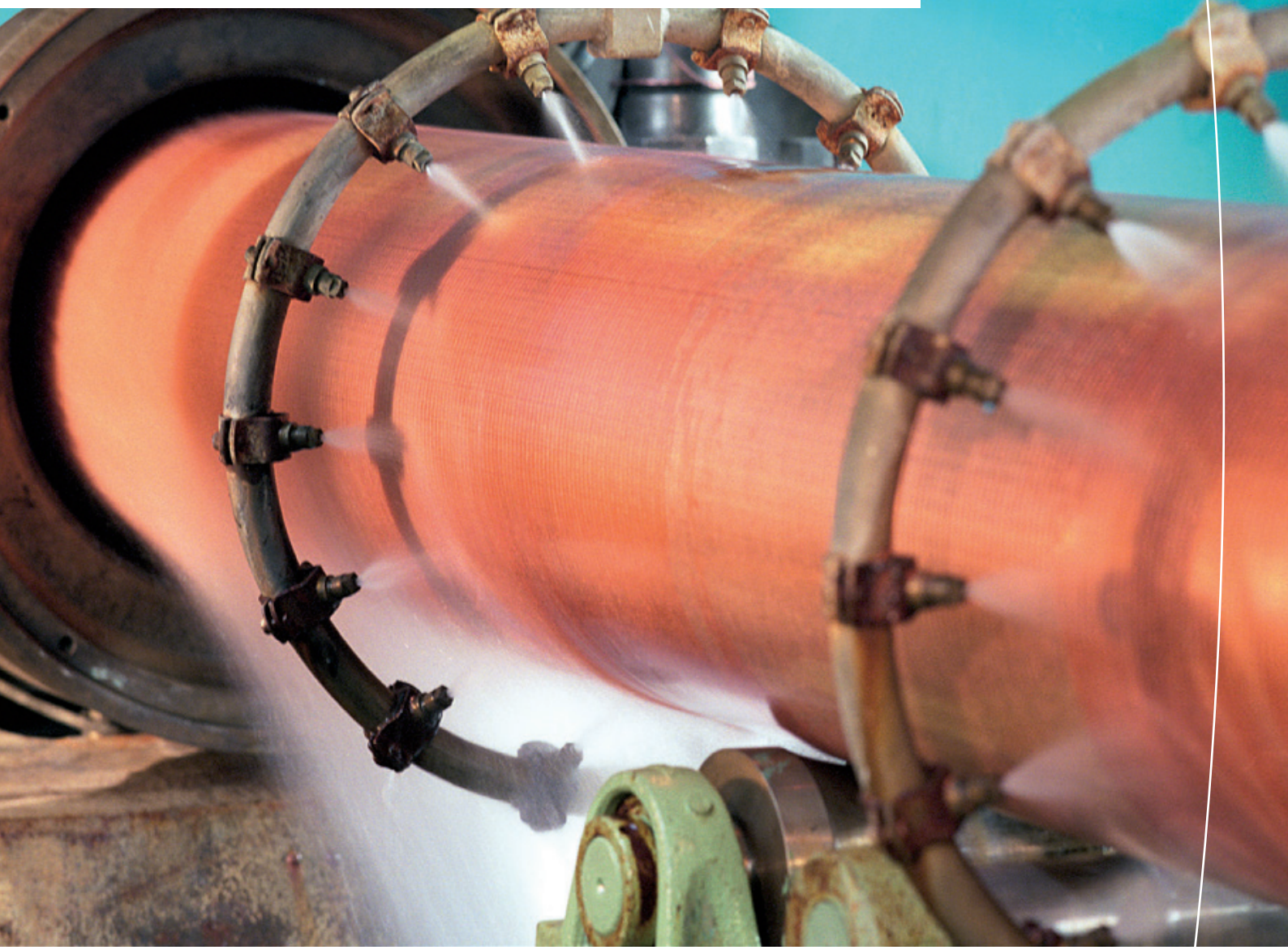
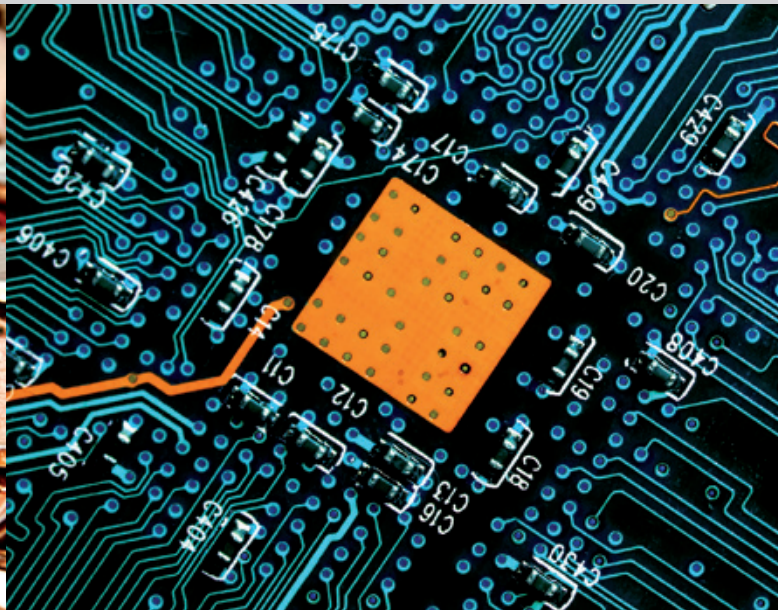
SMS group

Continuous casting plants for copper

Productivity and efficiency







Copper plants by SMS group

Whether it's strips, billets, bars or tubes: SMS group supplies cost-effective, flexible continuous casting plants for all types of copper and copper alloys. Over the past 50 years the company has refined its expertise in plant engineering for all conventional casting processes. During this time traditional companies such as Mannesmann, Krupp, Technica and finally Schumag and MRB have gradually become part of the business area, bringing their know-how and leading products with them. The copper activities at SMS group are now grouped within the Forging Plants business unit.

In demand worldwide: Technica continuous casting plants

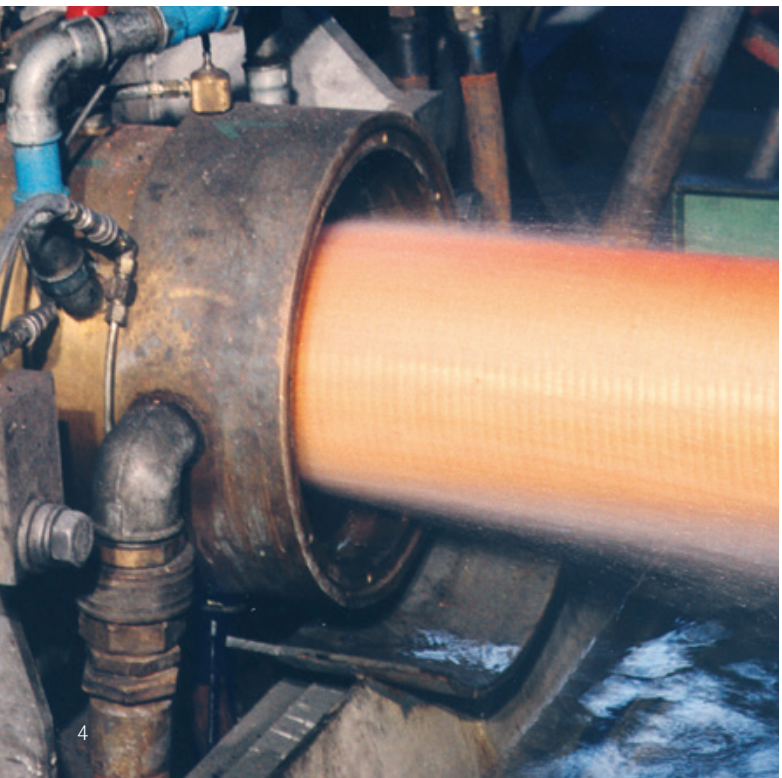
Since its founding in 1963, Technica has played a leading role in the further development of continuous casting technology for copper. Today the traditional SMS group brand, with over 500 continuous casting plants built worldwide, still ranks as a market and technology leader. Furthermore, SMS group is continuously improving its market position by maintaining a consistent customer focus and continually optimising its plants.

Referenzen

- Nippon Shindo, Japan, Horizontal 2-strand brass billet plant with pressure-controlled holding furnace and electromagnetic stirring coils for the best possible microstructure
- Diehl, Germany: State-of-the-art vertical 3-strand brass billet plant, individually tailored to the existing casting pit
- Wieland Copper Products, USA: directube® plant for the production of copper tubes for heat exchangers
- Luoyang Copper, China: Vertical continuous casting plant for copper slabs

Horizontal continuous casting plants

for extrusion billets



SMS group horizontal continuous casting plants for extrusion billets are suitable for billet diameters of between 60 and 400 mm and lengths of 400 mm and higher. They are used to cast a variety of copper alloys such as, for example, brass with and without lead, speciality brasses, copper-nickel and DHP copper.

Economically attractive alternative

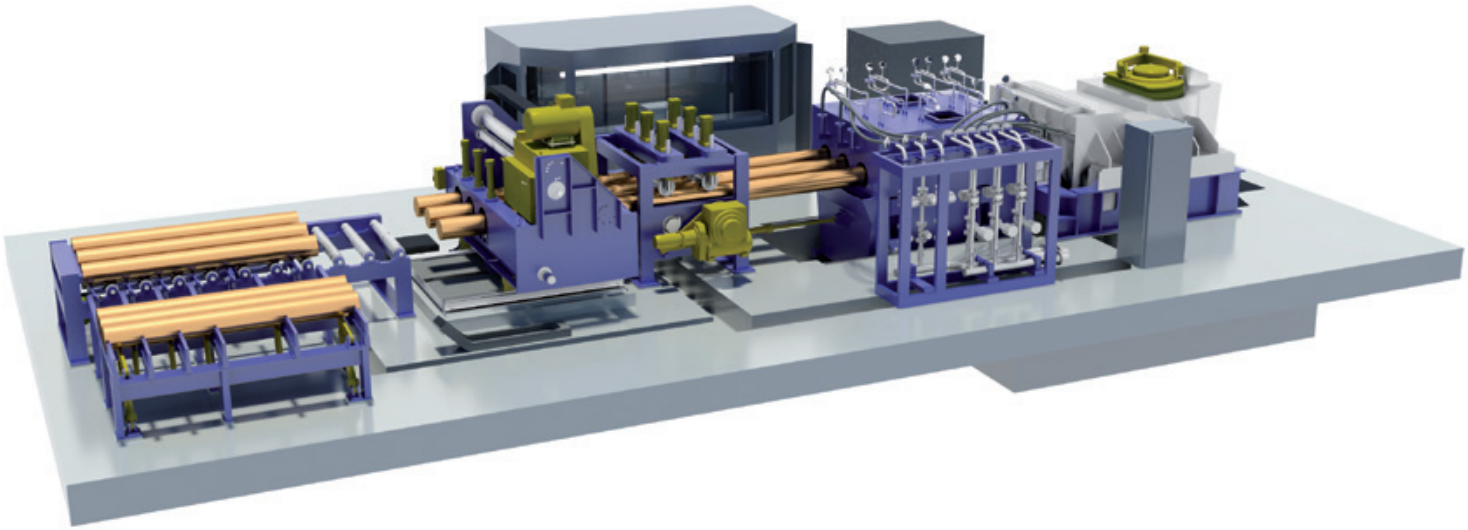
The plants offer an extremely high level of cost-effectiveness and product quality. Thanks to more favourable costs for the investment as a whole and the high level of automation with low manpower requirements, horizontal continuous casting plants are an economically attractive alternative to vertical continuous casting. SMS group experts provide plant owners with advice that is based on sound analyses and takes into account factors such as the product range, productivity and long-term goals when selecting the appropriate casting process. The SMS team is there for customers even after commissioning – for the lifetime of the plant.

High production flexibility

The high level of flexibility in terms of production capacity is another argument in favour of horizontal continuous casting plants. The casting machines can be equipped with up to four strands. As a result, an annual capacity of over 100,000 tpy can be achieved. They also offer the option of an electromagnetic stirrer. This allows speciality brasses with an extremely homogeneous microstructure to be produced.

Reproducible strand quality

A special feature of SMS group in connection with horizontal continuous casting plants is the pressurecontrolled multi-chamber holding furnace with stationary cooler, which ensures the products are of a consistently high quality.



Products and services

- Extrusion billet diameter: 60 – 400 mm
- Extrusion billet length: from 0.4 m
- Number of strands: 1 – 4
- Metals: Copper alloys, e.g. brass with or without lead, speciality brasses, copper-nickel, DHP copper etc.
- Method of operation: continuous
- Production capacity: up to 120,000 tpy (depending on alloy, diameter and number of strands)
- Operating personnel: 1 operator per shift

Horizontal continuous casting plants

for cold-rollable strip

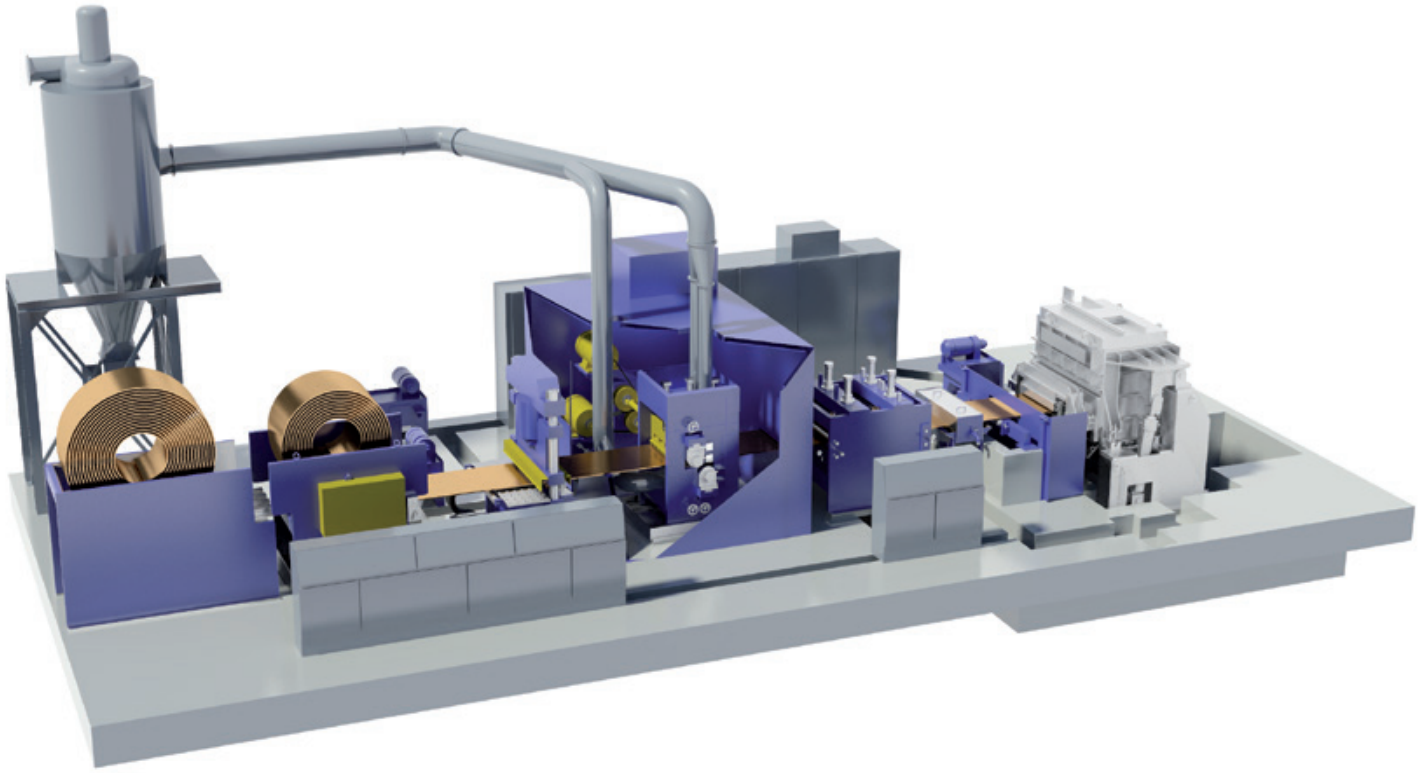
Together with the Technica brand, SMS group is the pioneer for wide strip continuous casting plants and has a wealth of experience with over 100 reference projects. These horizontal continuous casting plants can produce strips 10 to 20 mm thick and up to 1,050 mm wide. They can process bronze, brass, nickel-silver, copper-nickel, aluminium-tin and other alloys.

Quality that stands out

SMS group horizontal continuous casting plants for cold-rollable strip are a masterpiece of innovation and precision in mechanical engineering. This is reflected above all in the quality of the non-ferrous metal strips. Continuous optimisation of the mould technology has enabled the strip quality to be further improved and the service life of the graphite inserts to be extended. Many continuous casting plants are in operation worldwide, producing, for example, strips for coin blanks.

Products and services

- Strip width: max. 1,050 mm
- Strip thickness: 10 – 20 mm
- Number of strands: 1 – 4
- Metals: bronze, brass, nickel-silver, copper-nickel, aluminium-tin and others
- Method of operation: continuous
- Production capacity: up to 10,000 tpy (depending on alloy, cross-section and number of strands)
- Operating personnel: 1 operator per shift



Integrated solutions

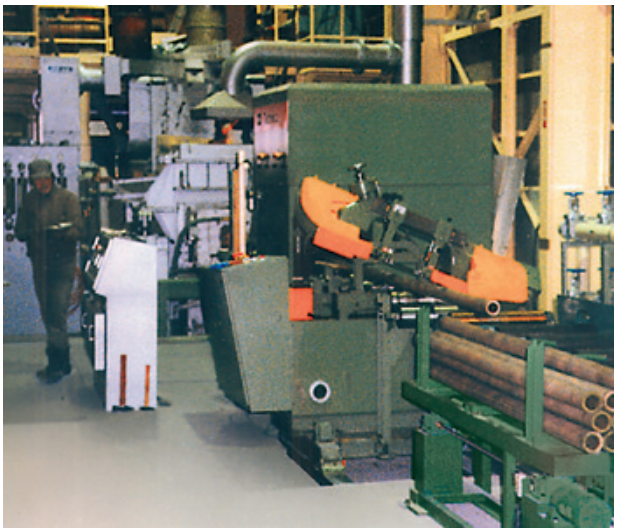
SMS group offers integrated plant solutions, where all components are perfectly tailored to one another. As a result, inline milling machines, shears, strip upcoilers and strip bending machines are also available with continuous casting machines. The result: maximum reliability and productivity. Continuous casting plants for cold-rollable strip require just one operator and produce up to 10,000 tpy strip.

Horizontal continuous casting plants

Flexible, cost-effective production of tubes and sections

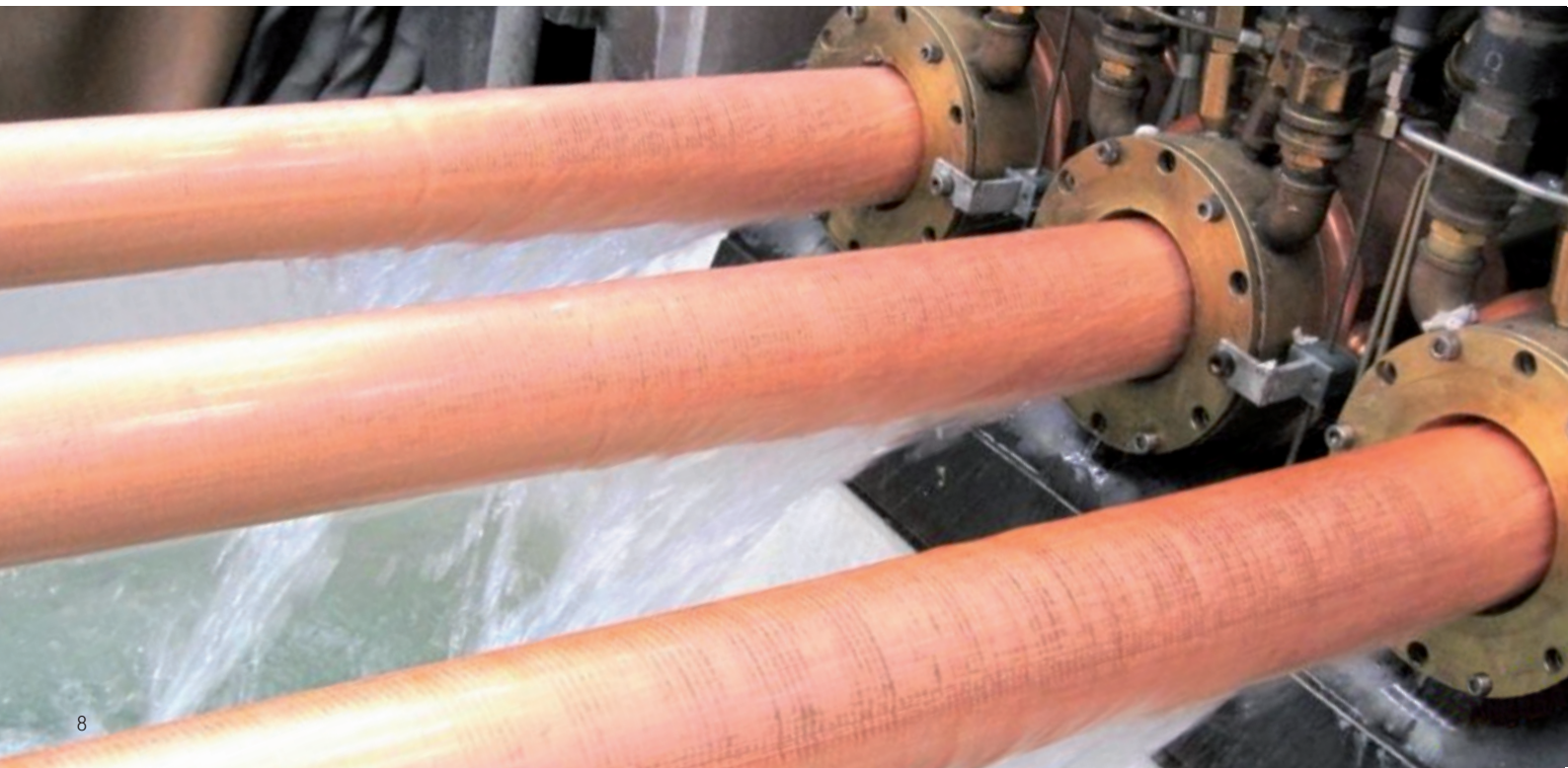
SMS group with the traditional names Technica, Schumag and MRB stands today for complete high-tech copper tube plants from the melt through to the finished tube.

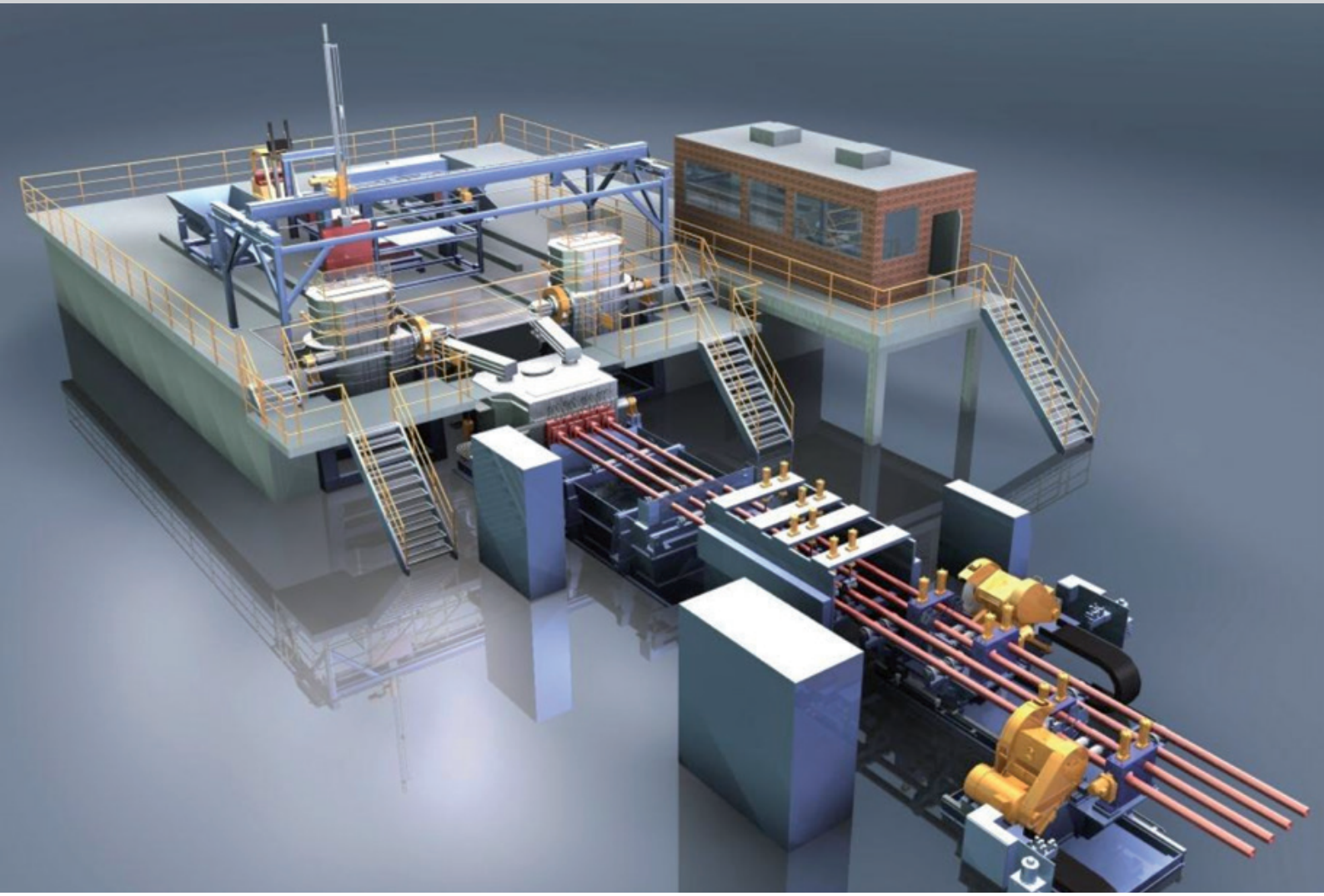
These continuous casting plants are able to handle tube diameters of up to 400 mm. They can achieve a production capacity of 35,000 tons per year. This type of plant is suitable for brass, copper, bronze, copper-nickel, nickel-silver and other precious metals. Metal foundries and semi-finished product manufacturers use horizontal continuous casting plants for special applications, where the cast products are subsequently processed by forging or machining. Various sections for special applications can also be produced on these plants.

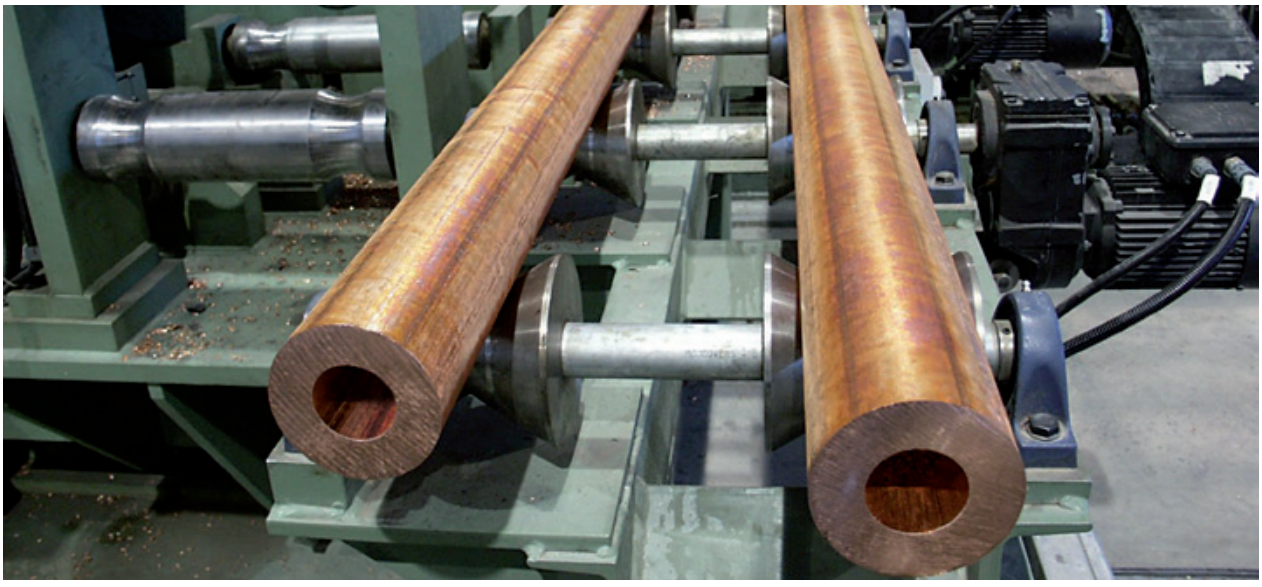


Products and services

- Bar and tube diameter: max. 400 mm
- Wire diameter: 16 – 25 mm
- Number of strands: up to max. 12 strands
- Metals: brass, bronze, nickel-silver, copper-nickel, precious metals, copper
- Method of operation: continuous
- Production capacity: up to 35,000 tpy
- Operating personnel: 1 operator per shift







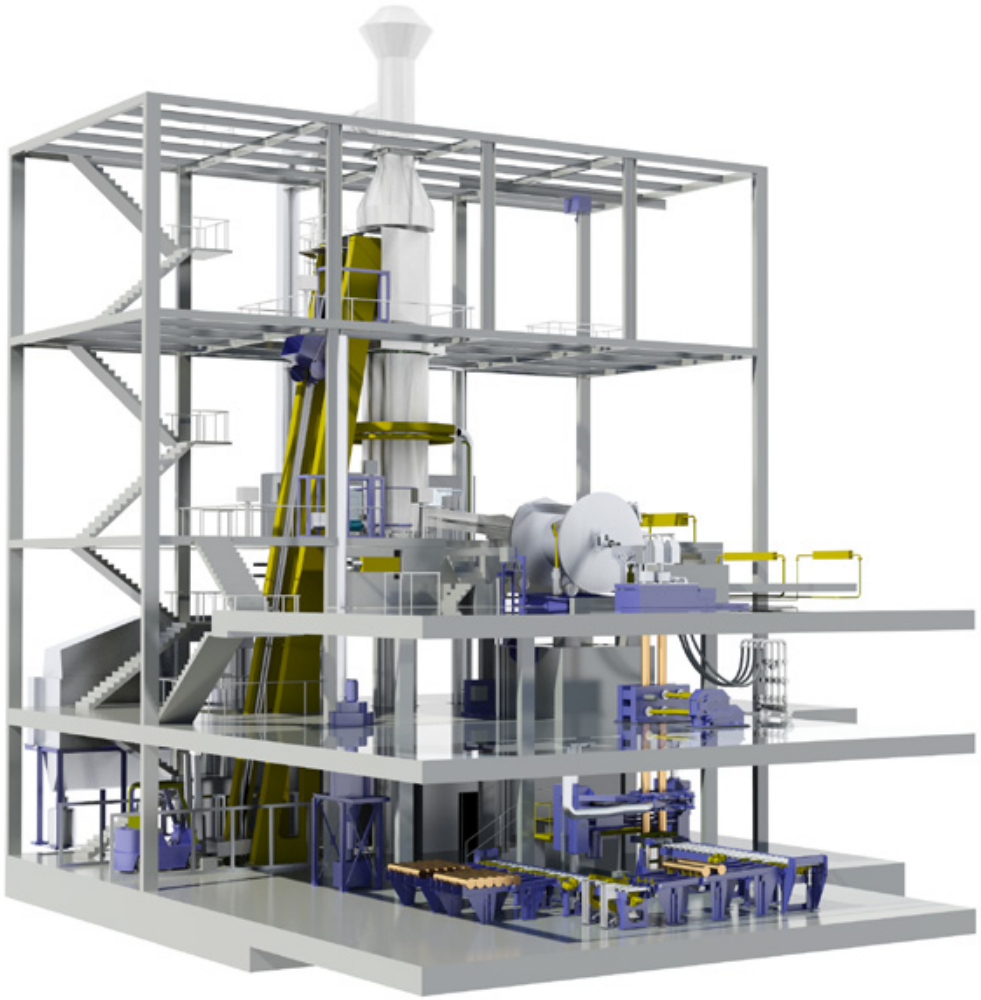
From the customer's viewpoint

"The new casting plant for brass extrusion billets is the first plant acquired in almost 40 years. The horizontal caster, which has been in service in our plant for 25 years, was developed by Krupp Technica, now SMS group. With the acquisition of this new plant, built in accordance with stateoftheart casting technology from SMS group, we now anticipate an increase of at least 10% in our productivity."

Yoshiharu Yagi, President CEO,
Nippon Shindo Co. Ltd.,Sakai, Osaka, Japan

Vertical continuous casting plants

High productivity – consistent quality



When it comes to producing slabs and extrusion billets in large volumes, vertical continuous casting plants from SMS group are the ideal solution. These plants achieve an annual capacity of 120,000 t copper or brass products. The product range comprises billets of between 80 and 450 mm in diameter, slabs with a maximum width of 1,300 mm and a maximum thickness of 300 mm. The plants are of particular interest to companies which demand the highest product quality at the greatest possible capacity levels.

Continuous production

Continuous casting means casting uninterrupted on one to four strands. The strands are cut to length by a flying saw and the cut sections are transferred by a tilting basket to a roller table for removal.

Products and services

- Formats:
  - Billets: 80 – 450 mm diameter
  - Slabs: up to max. 1,300 mm wide
  - Wire bars: 100 x 100 mm
- Number of strands: 1 – 4 (depending on the strand dimensions)
- Production capacity: up to 120,000 tpy
- Metals: copper and brass
- Method of operation: continuous
- Operating personnel: 2 operators per shift

This guarantees customers high productivity levels with low production costs. Whether it's slabs or extrusion billets made from copper or brass – SMS group technology delivers maximum, consistent product quality. Continuous further development of this type of plant means minimal maintenance is required. What's more, SMS group has continuously refined the plant's user-friendliness.

Know-how from a world market leader

Tried and tested and continuously improved over a period of more than 40 years, SMS group vertical continuous casting plants are known for their high cost efficiency and maximum reliability. A host of references confirm our leading position on the world market. SMS group offers customised solutions. For example, we install and integrate individual machines into existing plants.

Vertical semi-continuous casting plants

Flexible, cost-effective production

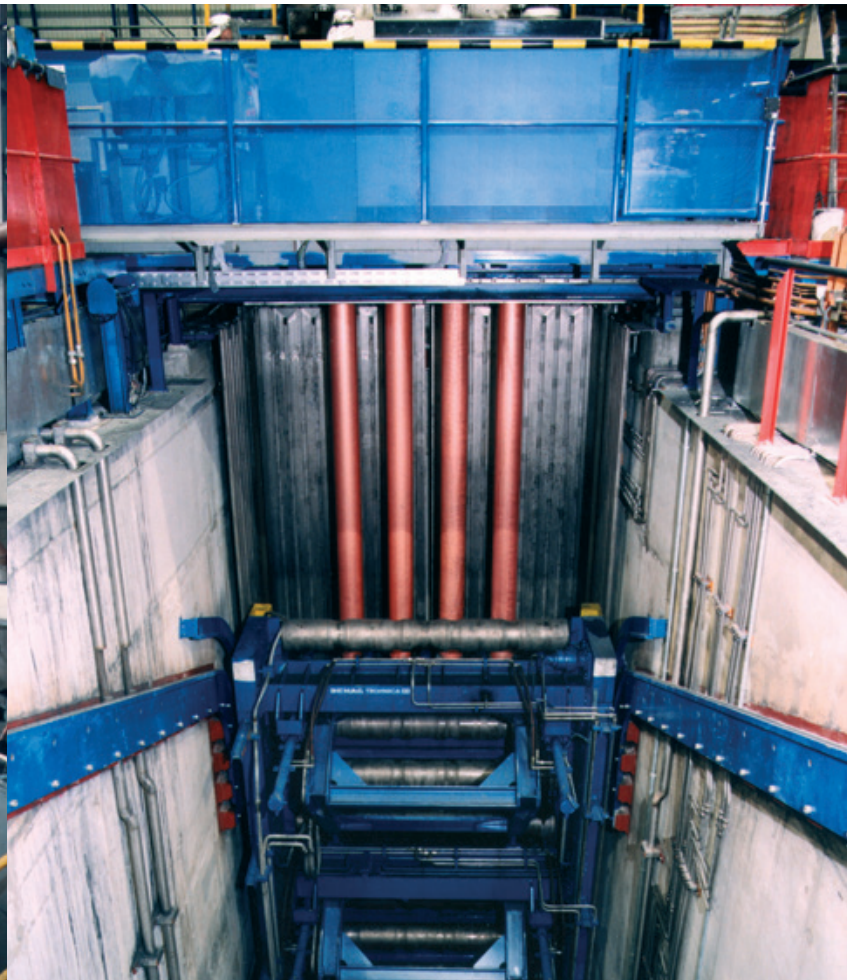
Vertical, semi-continuous casting plants represent a cost-effective alternative to vertical continuous casting plants, especially when the casting programme is frequently changed. With the semi-continuous method, casting is interrupted to allow the product to be removed from the casting pit. The process can then be started again.

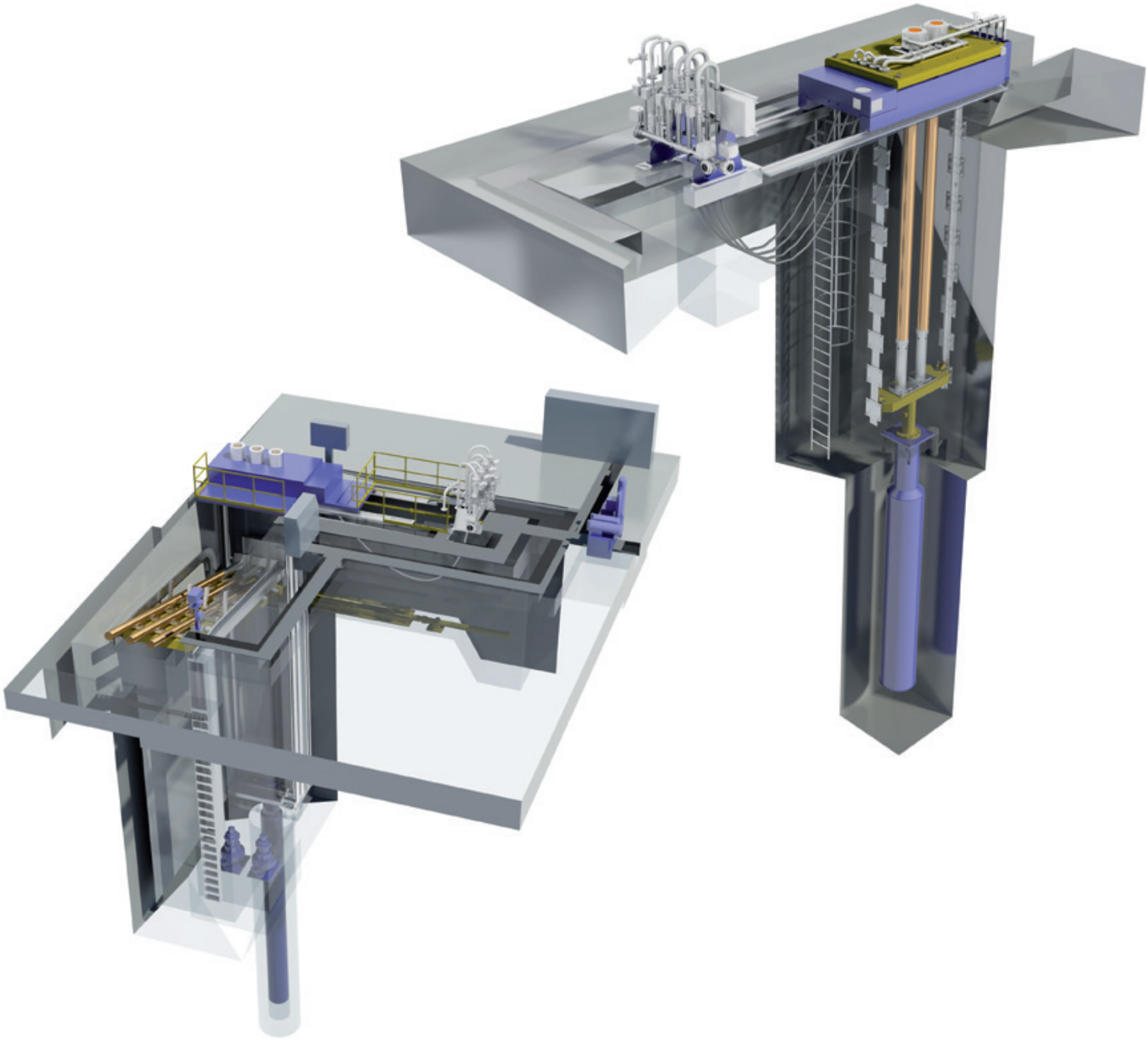
Flexible product range

SMS group supplies semi-continuous casting plants with up to six strands at an annual output of up to 120,000 t. The casting length can be between three and twelve metres, with slab widths of 1,300 mm and billet diameters of 80 to 450 mm possible. Special formats up to 1,300 mm in diameter can also be cast on SMS group vertical semi-continuous casting plants.

Two plant types

By offering two types of plant SMS group meets various customer requirements in terms of low investment costs and high automation levels. In the basic version, the strands are removed form the casting pit by crane. More convenient, however, is the casting plant with automatic discharge device. This system enables downtimes and therefore costs to be reduced.





Products and services

- Formats:
  - Billets: 80 – 450 mm diameter (special formats up to 1,300 mm in diameter)
  - Slabs: up to 1,300 mm wide
- Number of strands: 1 – 6 (depending on the strand dimensions)
- Casting length: 3 – 12 m
- Production capacity: up to 120,000 tpy
- Metals: copper and copper alloys
- Method of operation: semi-continuous
- Operating personnel: 1 – 2 operators per shift

Vertical continuous casting plants

for precision casting

SMS group has combined the benefi ts of horizontal and vertical casting in its precision casting plants. In this way the best of both worlds is achieved. These plants are of particular interest to companies which produce brass fittings for the plumbing industry and bronze bushings for the automotive industry.

The ideal combination

With vertical continuous casting the melt solidifies uniformly around the circumference. The result is a strand of uniform quality and good dimensional stability. With horizontal continuous casting furnace-specific cooling systems are used which allow small crosssections to be cast. The combination of the two systems enables products with small and medium dimensions to be manufactured which are particularly suitable for further processing on automatic lathes. This includes tubes (Ø 20 – 180 mm), bars (Ø 12 – 80 mm) and wire rods (Ø 12 – 25 mm).

Versatile in design

Our precision casting plants can be used for gun metal, bronze, brass, copper and other alloys. The production volume depends on the format and can be up to 2,500 tpy. Products with a maximum length of 4,000 mm can be produced on up to eight strands.

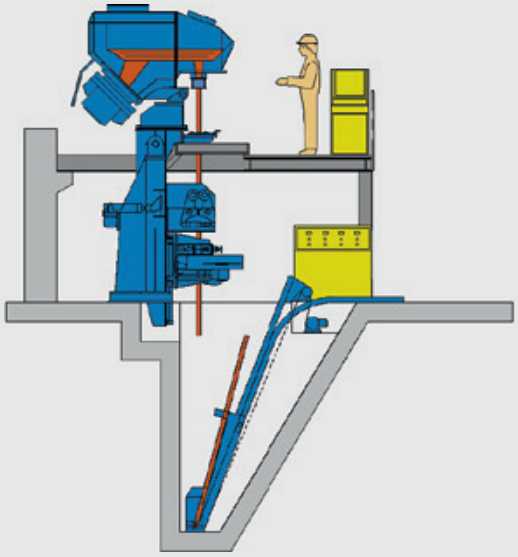
High availability

The plants can be pivoted to enable quick mould and cooler replacement.

Products and services

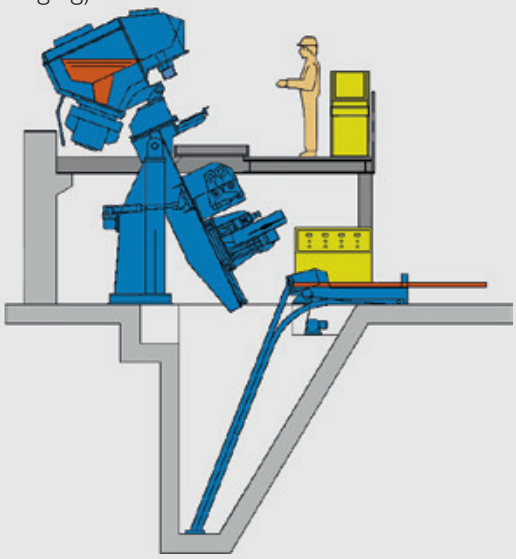
- Formats:
  - Tubes: 20 – 180 mm outside diameter
  - Bars: 12 – 80 mm diameter
  - Wire rods: 12 – 25 mm diameter
- Number of strands: 1 – 8 (depending on format)
- Strand length: up to 4,000 mm
- Production capacity: up to 2,500 tpy (depending on format)
- Metals: gun metal, bronze, brass, copper and others
- Method of operation: continuous
- Operating personnel: 1 operator per shift

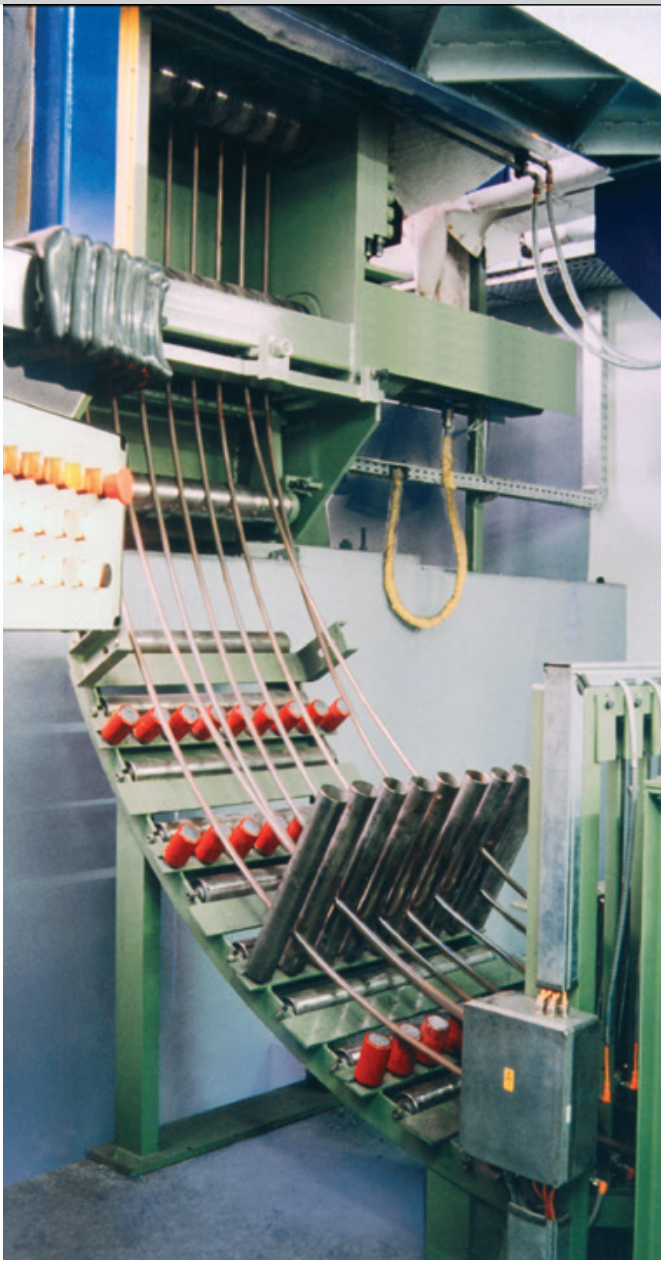
Casting position



Service postion

(Mould changing)





directube® for efficient seamless tube production

Less energy consumption, lower operating costs

In the past, seamless copper tubes were made from continuously cast billets. The principal stages in making a tube were shell extrusion, cold pilgering and drawing. However this process route was only economically viable if production capacities were high.

The innovation

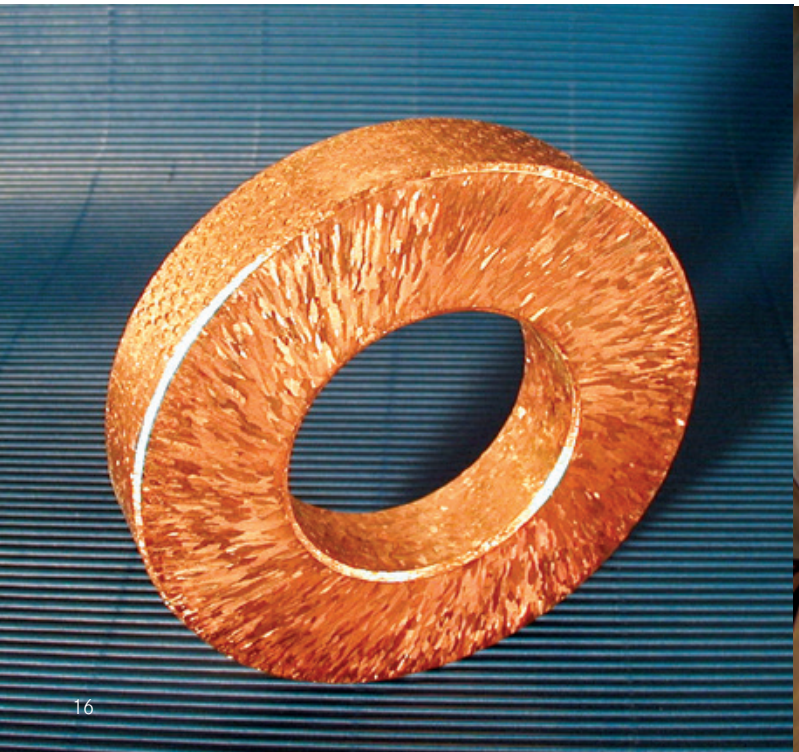
With its directube® system SMS group is able to offer an innovative process that is cost-effective even with small and medium production volumes. What is special about the system is that the “pressing” process stage is no longer required. The tube blanks are cast from copper cathodes on a horizontal continuous casting plant (with up to four casting strands) and then directly rolled to mother tubes in the planetary rolling mill. The mother tubes are then further processed on continuous straight-line drawing machines, bull blocks, finish-drawing machines and coilers.

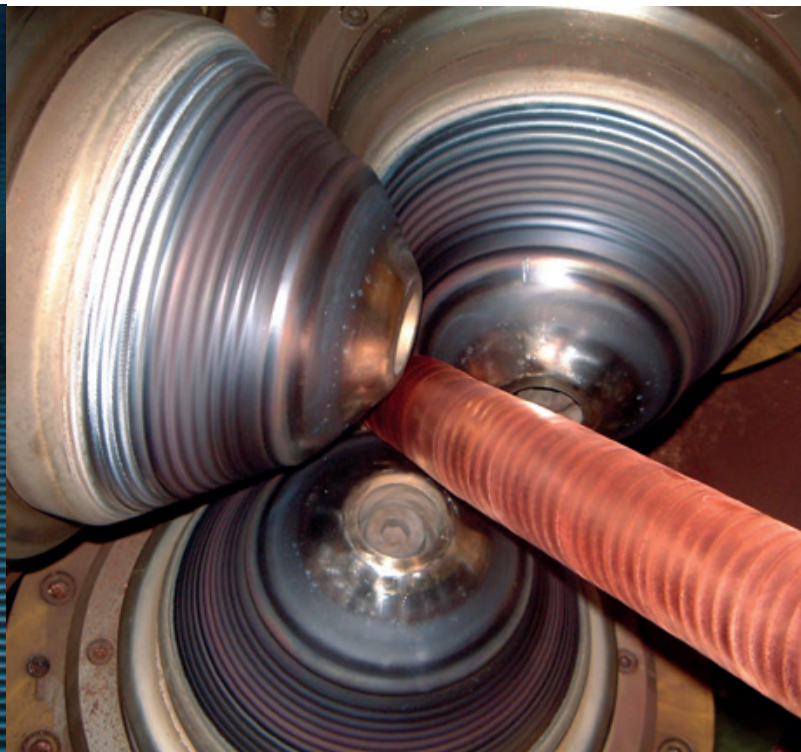
Achieve more with less

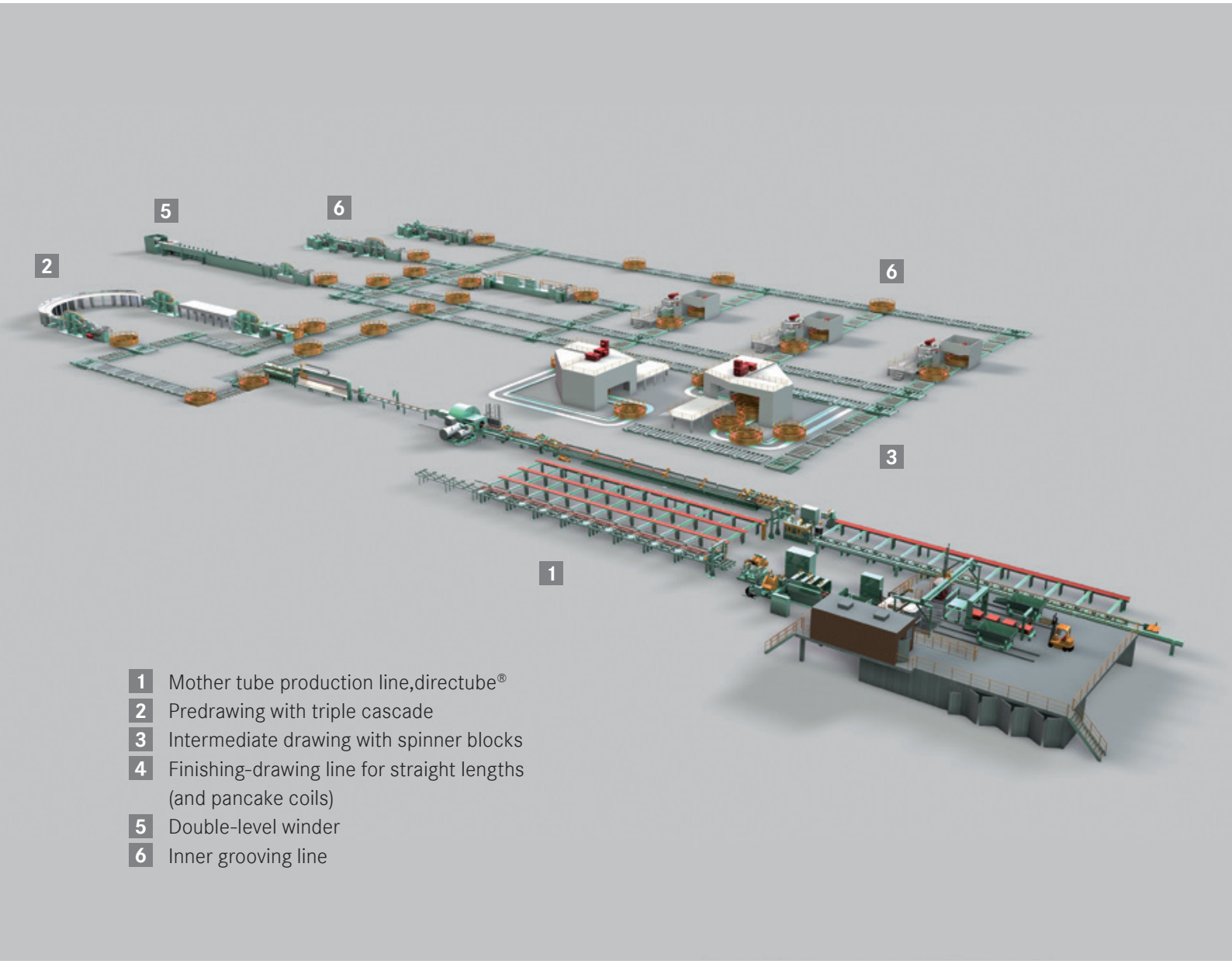
With the directube® process plant owners benefit from lower energy consumption and lower operating and investment costs. The tube blank produced during casting has a fine-grain structure uniformly distributed over the cross-section, as well as a clean surface free of oxidation, scale and defects. Thus less material is needed for the same length of tube. The rolling process can produce up to 1,300 metres per hour and runs continuously without any stops for loading.

Outstanding results

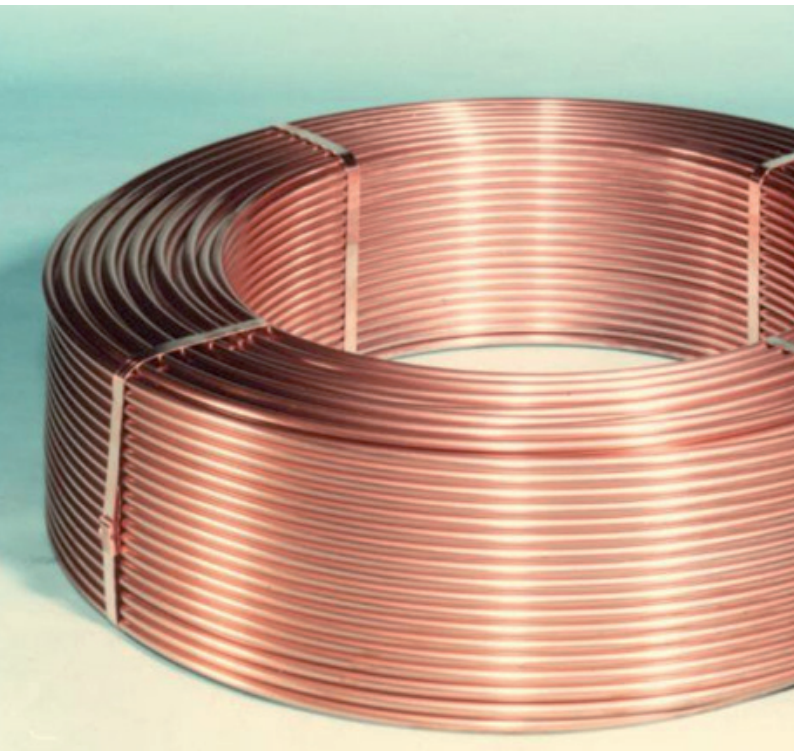
The directube® system is suitable for tube blanks with a diameter of between 90 and 150 millimetres. After rolling, the diameter of the mother tube is between 48 and 90 mm. An annual capacity of up to 35,000 tpy can be achieved with these plants. SMS group’s directube® system impresses customers with its excellent product concentricity and minimal material requirements.







1 Mother tube production line,directube®
2 Predrawing with triple cascade
3 Intermediate drawing with spinner blocks
4 Finishing-drawing line for straight lengths (and pancake coils)
5 Double-level winder
6 Inner grooving line



Products and services

Continuous caster:

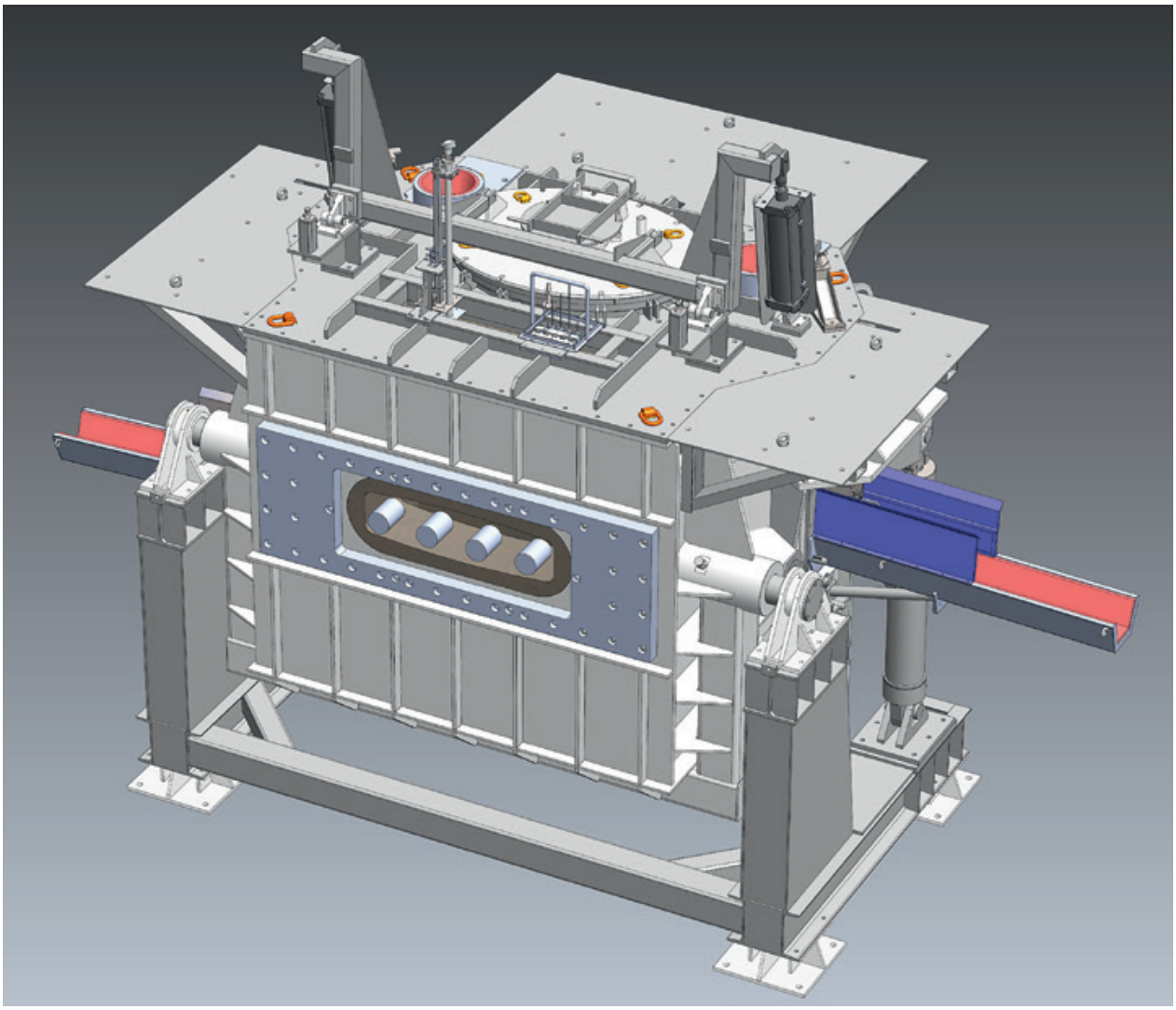
- Outside diameter: 90 – 150 mm
- Wall thickness: 25 mm
- Shell length: 10 – 20 m
- Number of strands: 1 – 4
- Metals: DHP copper
- Total capacity: up to 35,000 tpy

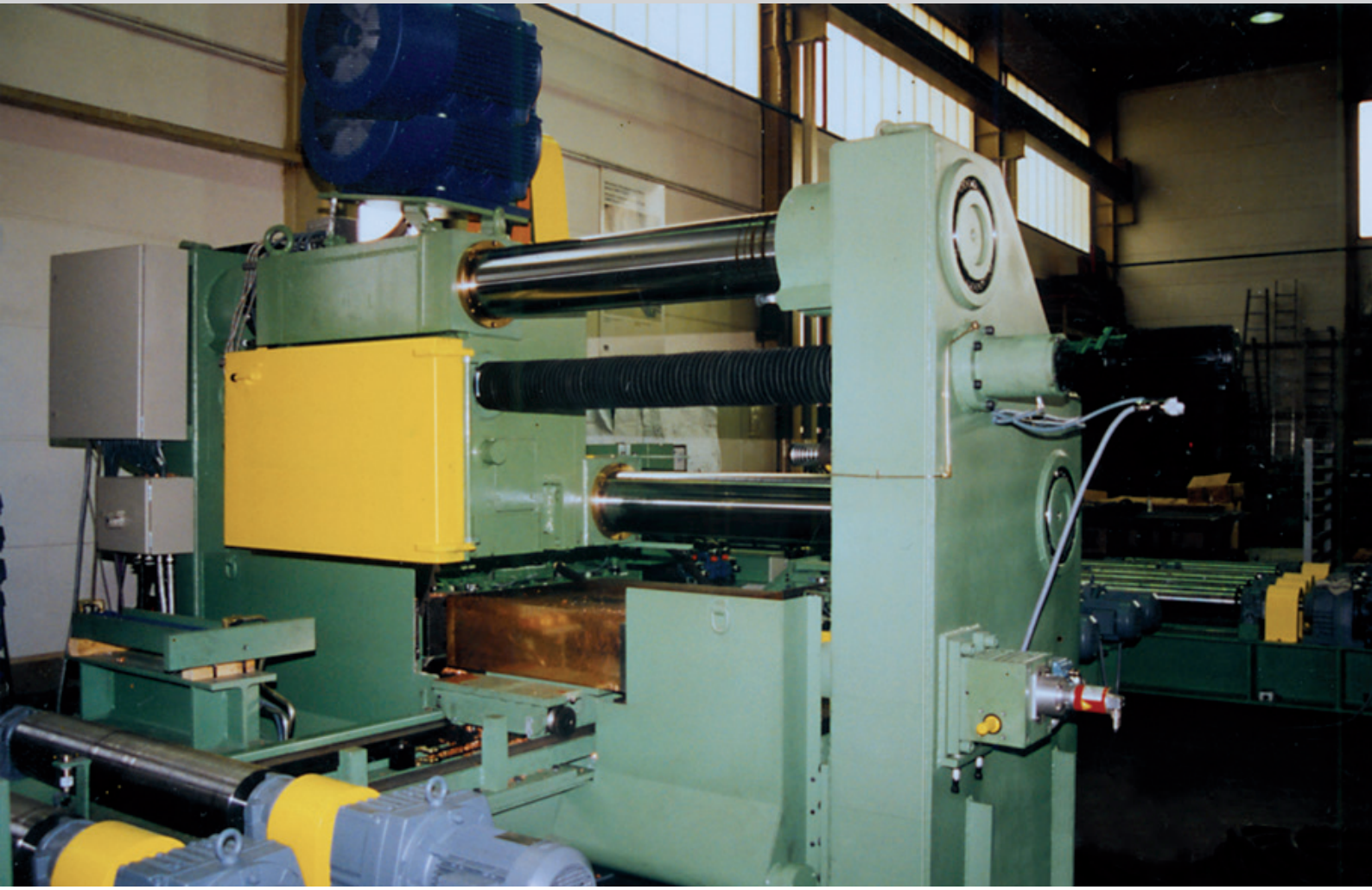
Special-purpose machines and ancillary equipment

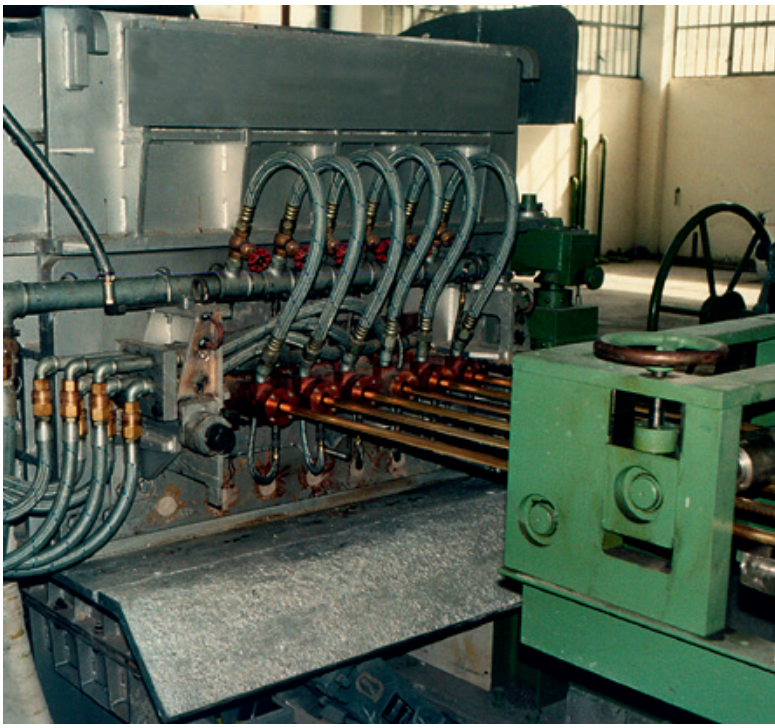
Individual solutions for every customer

In addition to continuous casting plants for copper and copper alloys, special-purpose machines for various applications complement the comprehensive product portfolio. Here, too, plant owners benefit from the wealth of process expertise we put into our plant technology, ensuring customers also receive excellent product quality.

Top quality with pressure controlled furnace
One particular option which SMS group uses here is the pressurised casting furnace. It comprises a casting-, a pressure and a refilling chamber which are connected to each other. As a result, the metallostatic pressure above the mould remains constant and any bath turbulence during refilling is avoided, regardless of the furnace filling level. Since the melt is protected from atmospheric conditions, the amount of slag formation is low. Such benefits mean maximum and, above all, uniform strand quality and improve the reli ability of the plant. There is also the option of a quick cooler change, since the metal bath can be lowered below the furnace window as a result of depressurisation.







Stationary saws

SMS group also supplies stationary saw systems tailored specifically to the needs of non-ferrous foundries. Highly automated systems are used for cutting billets to length for loading into extrusion presses and, in the case of semi-continuously cast products, removing the top and tail ends which are not to be processed. Special circular saws from SMS group are characterised by their robust design, low maintenance costs and user-friendliness.

Plants for wire rod

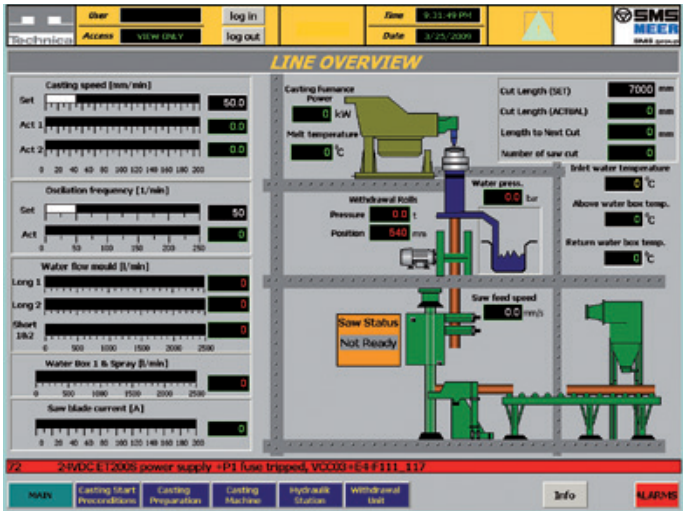
SMS group also offers machines for wire rod. With continuous casting plants for wire rod, the crosssectional range covered is 16 to 25 mm. These plants are characterised by low investment and operating costs.

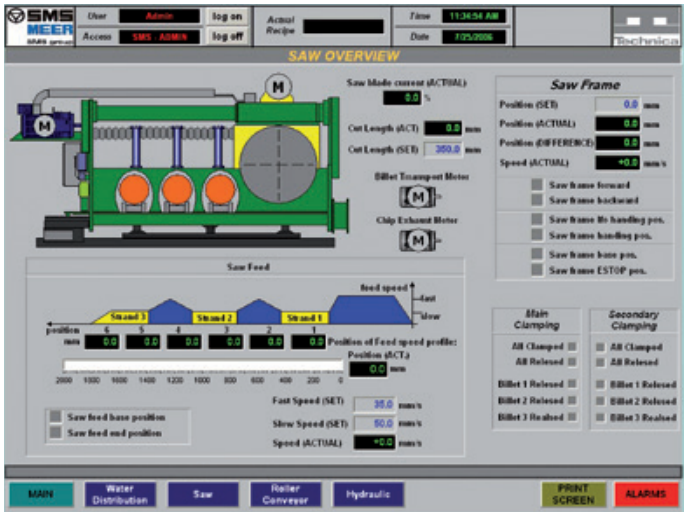
Control and drive technology

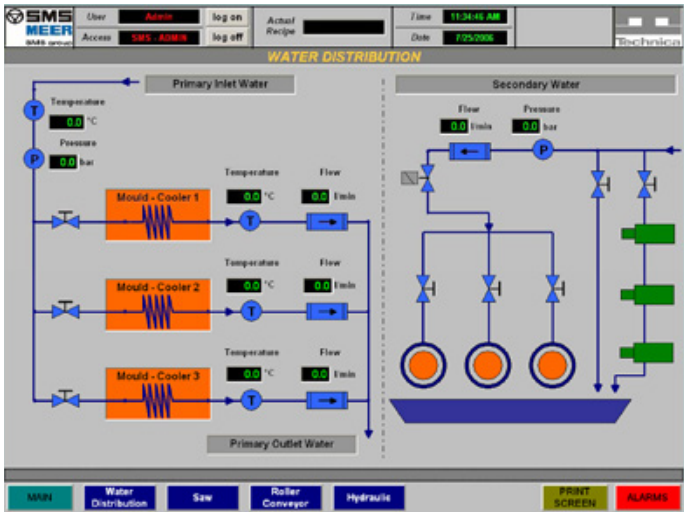
High precision

To control the continuous casting plants SMS group developed its own system known as Computocast®. This system enables the set production data to be reproduced with the highest precision. Remote maintenance and telediagnostic modules can also be integrated into the system. This ensures the rapid elimination of faults as well as a high level of system availability. The drive technology featuring threephase servo drives in real-time position control is state of the art.

What's more, SMS group continuous casting plants are equipped with a modern visual display system. Their high degree of user-friendliness is what makes them stand out.


LINE OVERVIEW
Saw Status
Not Ready
MAIN
Info
ALARMS


SAW OVERVIEW
Saw Frame
Saw Feed
Main Clamping
Secondary Clamping
MAIN
Water Distribution
Saw
Roller Conveyor
Hydraulic
PRINT SCREEN
ALARMS


WATER DISTRIBUTION
Primary Inlet Water
Secondary Water
Mould - Cooler 1
Mould - Cooler 2
Mould - Cooler 3
Primary Outlet Water
MAIN
Water Distribution
Saw
Roller Conveyor
Hydraulic
PRINT SCREEN
ALARMS

Research and development

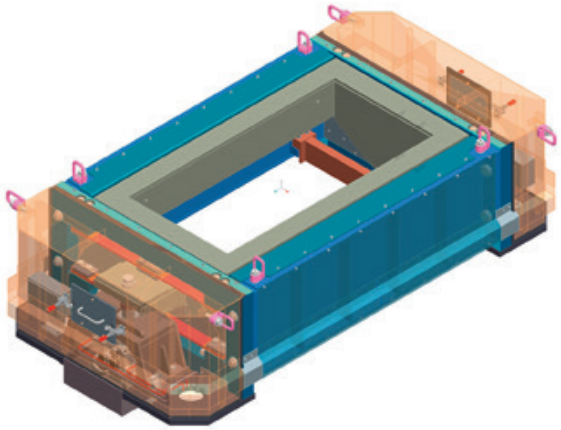
New technologies

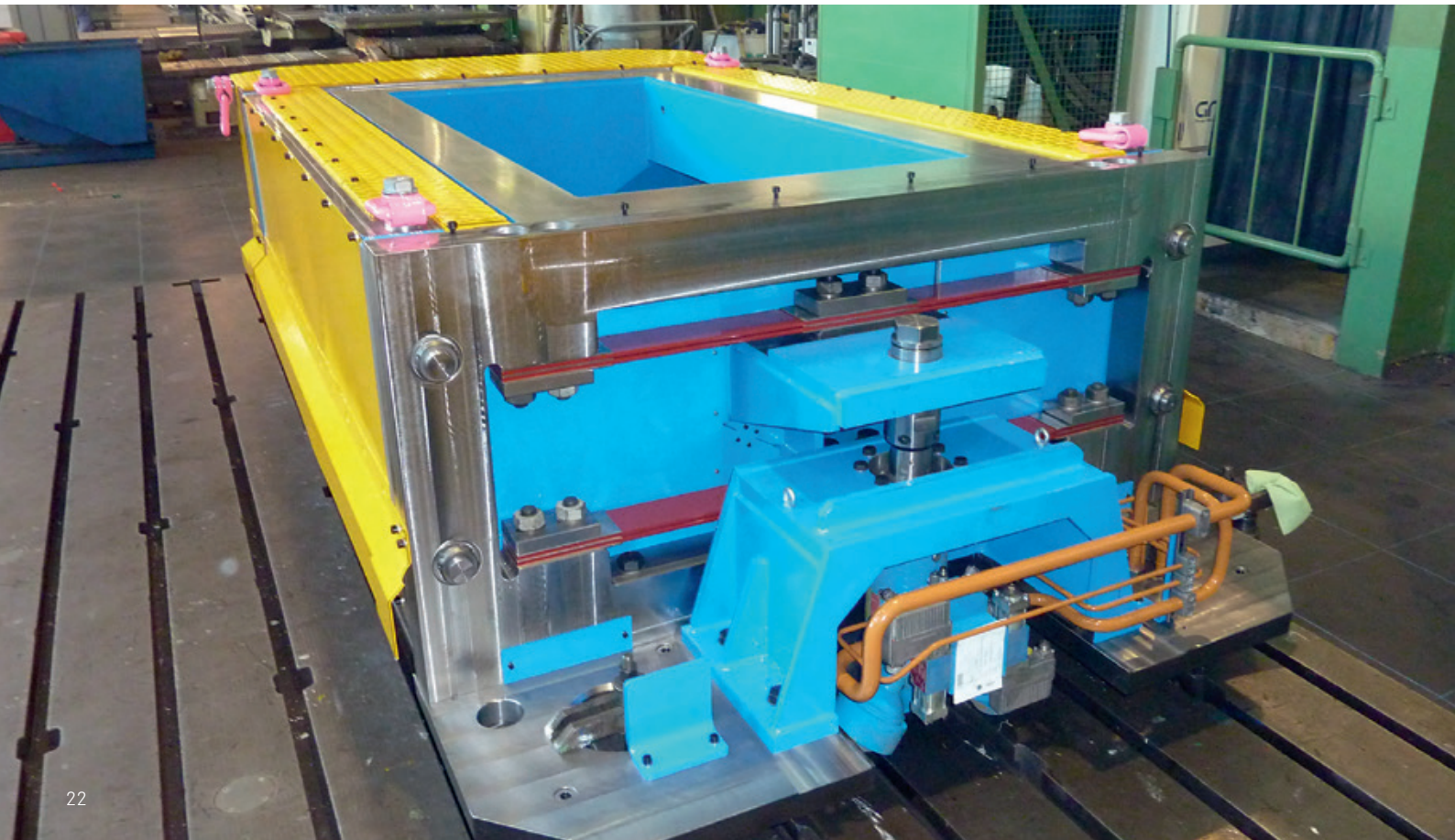
We work with customers, universities and other partners to text and explore new components and processes. Our focus here is on economic and environmental factors. Through constant innovation SMS group is able, with its casting plants, to meet growing demand for cost-effective processes and highquality products. For this we run development programs in the product units, while at the same time utilising the extensive resources available within the SMS group for cross-sector networking on research projects.

Resonance mould
Development of a leaf spring-guided, hydraulically powered resonance mould to optimise the vertical casting process.

Benefits:

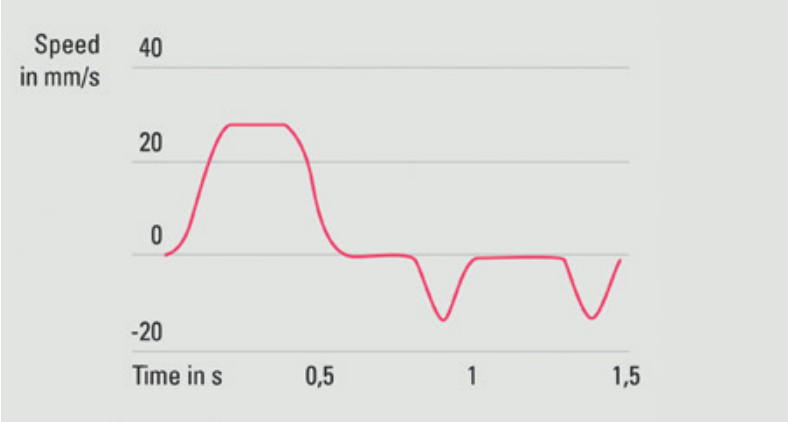
- Perfect oscillation accuracy ensures best product quality
- Less maintenance due to wear-free design
- Easy implementation into existing casters

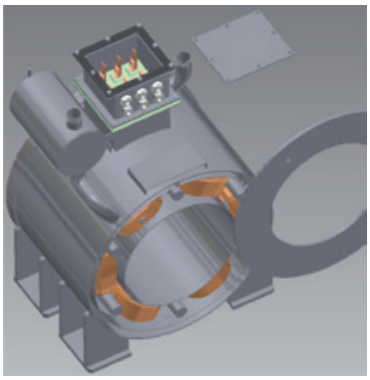


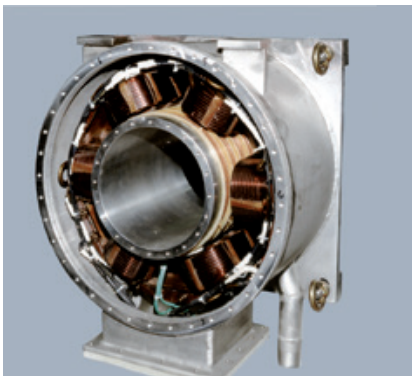


Softcast Drive Concept
SMS has consistently developed and refined its drive systems technology for horizontal continuous casters. Starting with the Computocast® and Softcast drive concepts, we have succeeded in reducing the maximum torques generated and so limiting the strain on the strand shell during the solidification process.

The new system gently changes the acceleration of the withdraw drive unit under controlled and adjustable conditions, thus avoiding peeks in the transitions between the individual drawing cycles. More stable casting results and improved surface quality can be achieved thanks to the new drive control system. What's more, the new drive unit also helps to increase the lifetime of the graphite molds.







Electromagnetic stirring coil
The use of electromagnetic stirring coils enables optimisation of the microstructure of horizontally-cast extrusion billets. In the case of high-alloy brass grades, this prevents possible segregation and the risk of core cracks. With electromagnetic stirring coils our customers are able to keep pace with continually rising market demands.

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