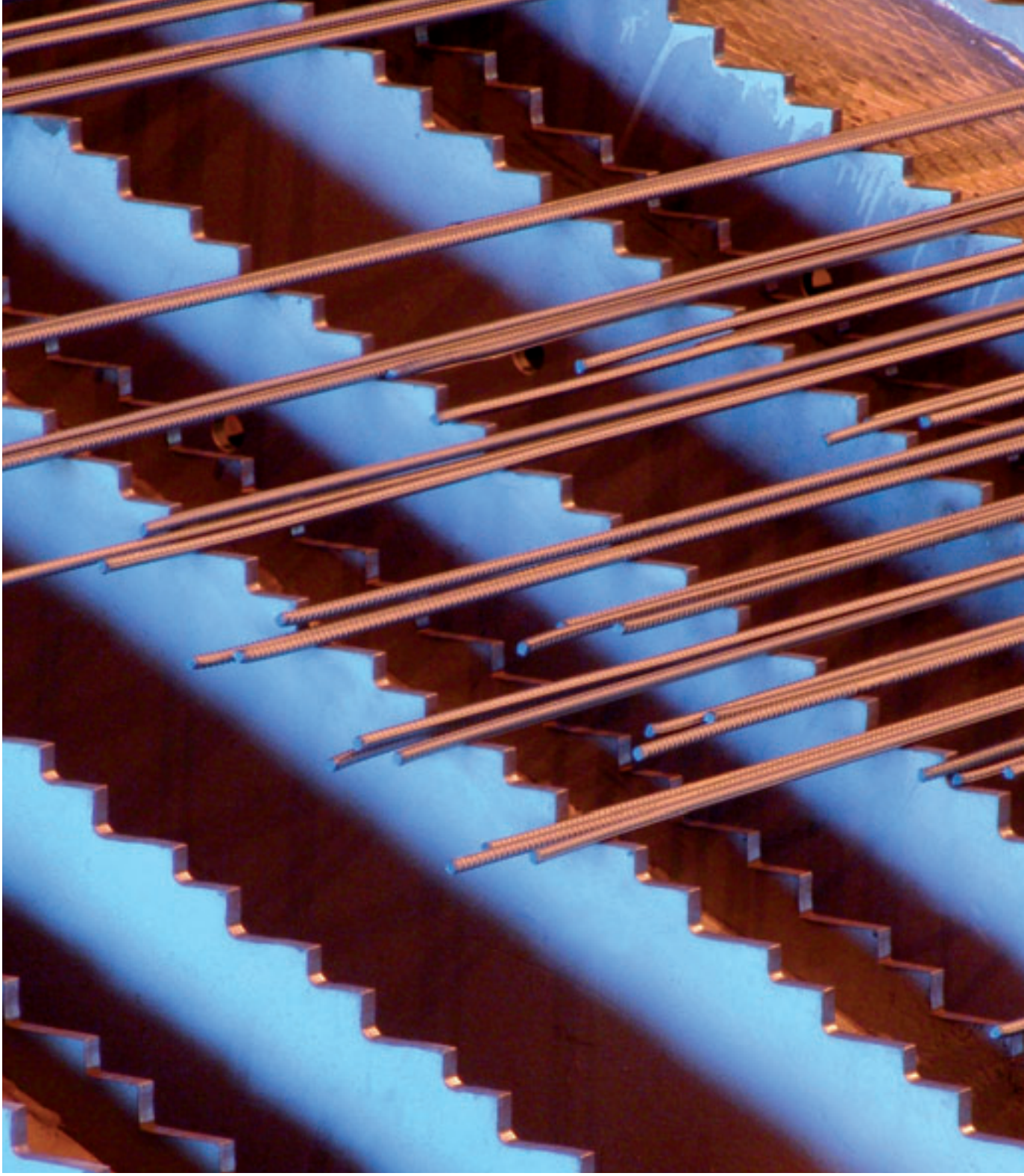


Competence in MiniMills

Technology, mechanical engineering, automation and electrical engineering from a single source – for maximum overall plant performance

SIEMENS VAI

Metals Technologies

Can a MiniMill produce steel in just two hours? From scrap to the finished product?

It can…

- With mechanical and electrical equipment, engineering, automation and process technology all from a single source – from the world's leading supplier.
- With a total solution in which all elements are completely coordinated to the last detail to work smoothly together, both technically as well as logistically. We call this "connecting all processes."

More than the sum of its parts: Optimized project implementation and an efficient plant from a single source.

Two factors are always vital to the performance and productivity of your MiniMill: the quality and configuration of the individual equipment units, and overall plant performance. What's needed is an overall layout that optimally accommodates all complex technical, metallurgical and logistical relationships, thereby generating time, cost, and productivity advantages that are difficult to achieve through partial solutions.

Siemens VAI is your partner for supplying technology for **all process steps** from a single source and integrating them into a flawlessly operating plant. Whether you define "mini-mill" as a partial system or as a total plant from the furnace to the mill train, we provide all the expertise and all the components.

Everything we do is based on the combined expertise and leading technology of Siemens VAI, the **No. 1 electrical engineering and automation specialist** for the metals industry, and VAI, the leading **technology and process experts as well as plant builders**. Since our merger in 2005 we have systematically been using this expertise – already proven in many prior joint projects – as a single supplier.

The all-inclusive approach of Siemens VAI not only benefits your plant through cost and productivity advantages in ongoing operations. It also ensures **dependable project implementation** without the risk of interface problems, as well as an on-time start of operations – and consequently a **predictable payback of the financial investment**. What's more, Siemens VAI can also play a very helpful role in advance with the financing of your project.

Good reasons for working with Siemens VAI

- Optimized project implementation – by a reliable partner, even for large projects
- Simpler financing – due to assured on-time completion, fast ramp-up and flexible sourcing
- High plant quality – thanks to the market and technology leadership of Siemens VAI and to time-tested partnerships with selected suppliers
- Totally systems-engineered plant from a single source – through in-house expertise for the integration of layout, electrical and mechanical engineering as well as metallurgy
- Time- and cost-optimized processes – through plant-wide coordination of all component parts: equipment units, infrastructure, auxiliary processes, logistics, and much more (Balance of Plant)
- Dependable services with long-term optimization concepts even after commissioning
- Extensive training packages

The products – proven worldwide and seamlessly integrated

Secondary metallurgy

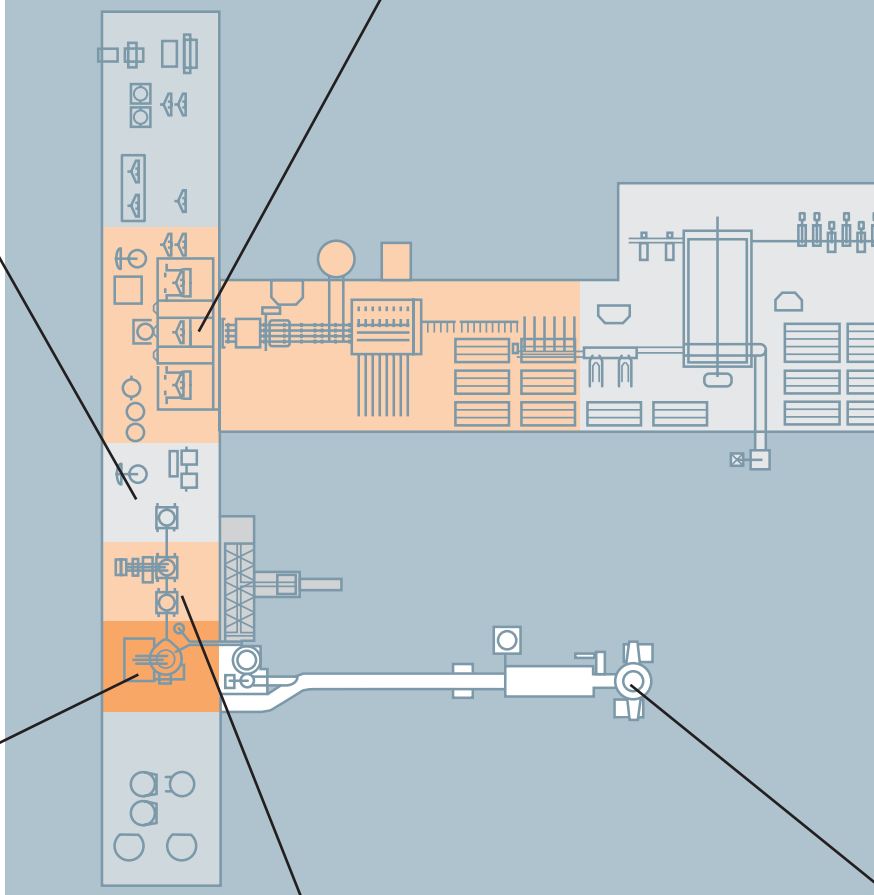
State-of-the-art secondary metallurgy plays a vital role in today's steel production. Siemens VAI supplies **the entire range**, from ladle metallurgy with optimized methods of adding alloying agents to all widely accepted vacuum technologies, and presently has an installed base of **more than 170 secondary metallurgy plants** with capacities of up to 350 metric tons. Also for secondary metallurgy the former VAI FUCHS know-how is utilized.

Electric arc furnaces: SIMETAL^{CIS} EAF

Until 2005, electric arc furnaces from Siemens VAI were known as **VAI FUCHS** furnaces. These arc furnaces have been setting standards for 35 years in both design and innovation, for example with the introduction of water-cooled components, current-conducting electrode arms, and the shaft furnace with integrated preheating of scrap metal. The latest generation – SIMETAL^{CIS} Ultimate – supports even **higher energy input rates** but with **lower energy consumption** and a reduction in tap-to-tap times by up to 30 minutes.

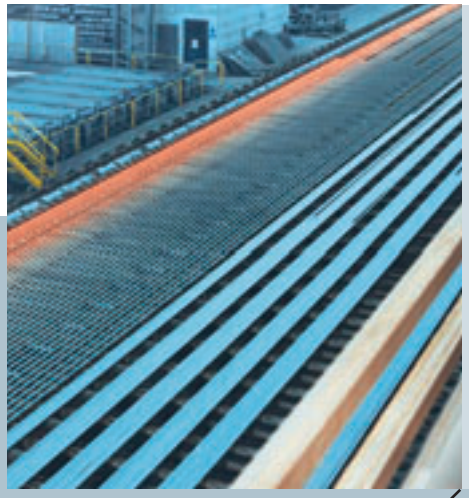
Continuous billet casting

The speed, throughput and flexibility of a MiniMill are in large measure determined by the continuous casting billet line. Modular continuous casting systems from Siemens VAI enable steelmakers to **meet production requirements precisely** in every detail, and to readily implement future changes.



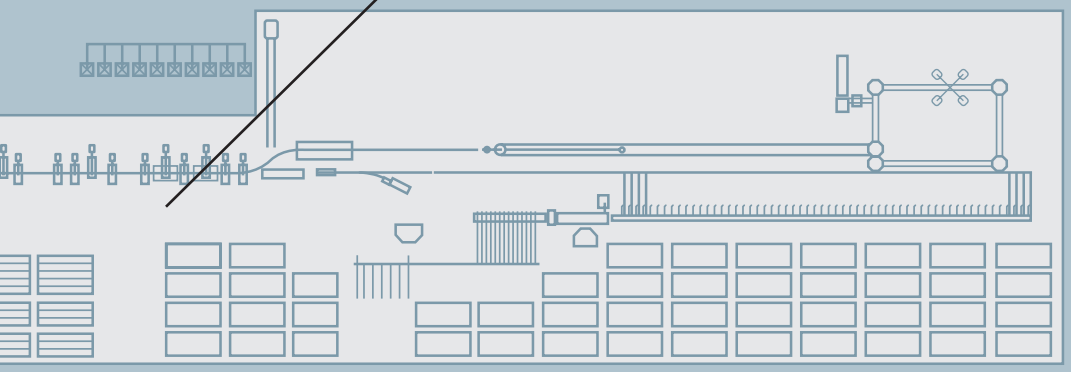
Ladle furnaces

The installation of a ladle furnace allows steelmakers to precisely adjust steel temperatures and composition. This substantially improves the quality of steel as well as the productivity of casting plants. An installed base of **more than 130 ladle furnaces** from 30 to 350 tons worldwide highlights the market leadership of Siemens VAI – formerly **VAI FUCHS** – in this segment too.



Rolling mills

Siemens VAI MiniMills lend themselves to configurations that allow **immediate processing of billets** while they're still hot. Less energy is required to produce high-quality half-finished goods immediately after the billets have been cast. Here Siemens VAI applies over 120 years of experience in this technology accumulated by Pomini, a tradition-rich Italian firm, and also utilizes the internationally proven technologies of Ashlow and GFM, among others.

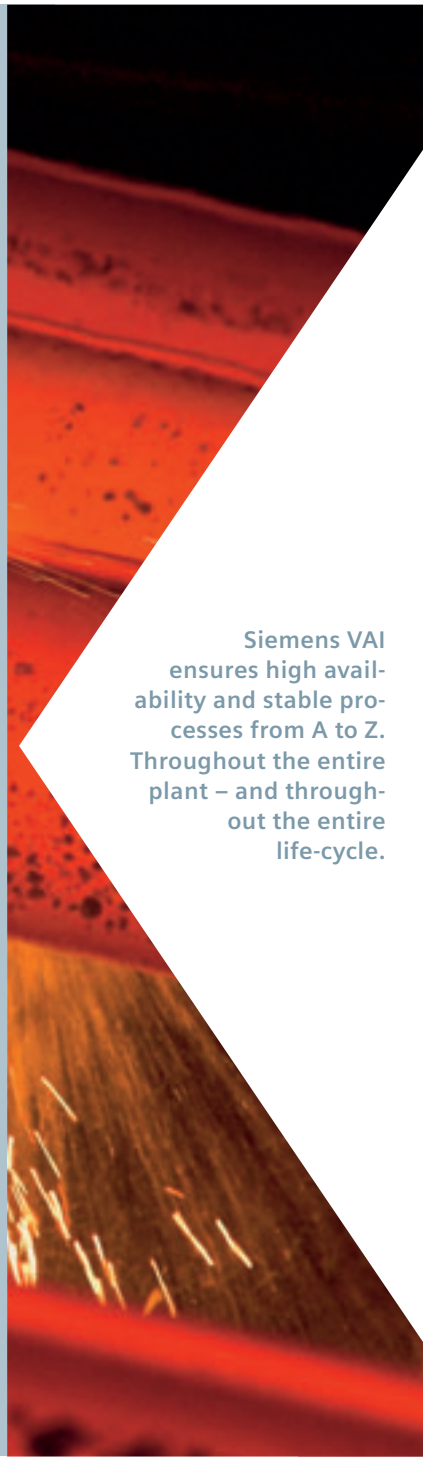


Dust-collecting systems

The latest systems and filter technologies of Siemens VAI ensure that emission levels **always remain within the green zone** – and will continue to do so even when emission standards are further tightened in the future. Here again, solutions are contributed by the expertise of VAI Pomini, including DECOS filter technology.

Siemens VAI for your MiniMill: experience backed by numbers

- More than 250 installed electric arc furnaces and ladle furnaces worldwide
- More than 100 installed or upgraded dedusting systems
- More than 1,300 installed and upgraded billet caster strands
- More than 400 installed or upgraded rolling mills



Siemens VAI ensures high availability and stable processes from A to Z. Throughout the entire plant – and throughout the entire life-cycle.

From melting to rolling

Siemens VAI stands ready to support you with extraordinary technological expertise in MiniMills, based on over 200 years of accumulated experience. Our customers can rely on industry-leading products spanning the entire range of partial processes. Performance-critical components are manufactured at our workshops in-house. And a complete range of available services is your assurance of competitive performance throughout the entire life-cycle of your plant.

With a thriving steel market, electric steel plants have established themselves as the most effective alternative to the converter steel plant. And the name "mini-mill", which originally denoted smaller, locally focused capacities, has now long been synonymous with high performance, economy and flexibility. Nevertheless, this technology is still far from reaching its limits. This brochure shows how you can fully exploit the potential benefits of the MiniMill with a total solution from Siemens VAI.

Across all processes: Mechanical and electrical engineering, automation, expertise

Automation

With SIMATIC, Siemens has been setting the de-facto standard in automation technology for about 20 years. No other system is so widely used in the metals industry. The concept of Totally Integrated Automation supports a homogeneous automation landscape that's also a safe long-term investment, from the factory floor to the management level.

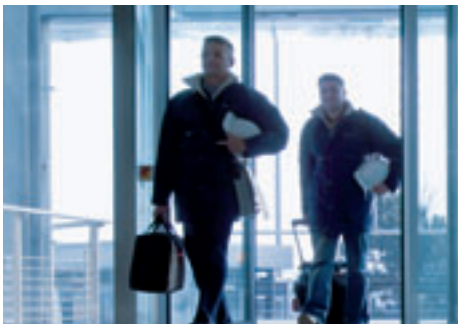
Drives and energy supply

A majority of all rolling mills rely on Siemens drives. These are known for top-notch performance and for being precisely controllable – characteristics that are becoming indispensable with new materials and increased productivity requirements.

Siemens also supplies the entire energy supply system required for a stable, uninterrupted production process. Flicker compensation can be an especially critical factor in the implementation of new electric steel plants. The combined expertise of Siemens and VAI ensures that main pollution levels remain within regulatory limits.

Life-cycle services

High availability calls for a well-designed service concept, up to and including around-the-clock monitoring of the plant at Siemens headquarters. Clearly defined processes, uniform manuals, assured parts availability and a globally available team of specialists ensure minimized shutdown times and high performance throughout the life-cycle of the plant.



Total engineering

Accurate planning that addresses everything from energy supply and raw materials logistics to throughput targets is a prerequisite for a successful start of your plant. We provide all the up-front necessities to make sure your project gets off to a safe start, including technical consulting, financing, as well as simulation of all processes.

Connecting all processes: Perfect balance = maximum productivity

For a flawless interaction of all processes a concept of interconnecting different plant areas is nededed. Its purpose is to achieve perfect coordination of production, storage and shutdown cycles, end-to-end planning of materials logistics, and maintenance designed to minimize shutdown times. We meet these objectives as your general contractor.

Your benefit from crucial technical and business advantages

Dependable project implementation – simple financing

Our widely respected planning and implementation expertise assures investors that they won't be confronted by unexpected budgetary deficits. Essential elements of our service are:

- **Accelerated approval processes** – for example through a dependable emissions calculation that encompasses the entire process with all equipment units.
- **On-schedule and on-budget completion** – thanks to decades of experience in project management and the use of the most advanced simulation tools.
- **Highest acceptance levels by government agencies and creditors** – based on a solid record of successfully completed projects.
- **Financial soundness** – as a global company, Siemens also offers rock-solid financial assurance that the project will be successfully implemented.
- **Excellent export credit prospects** – thanks to our supply chain components in Austria, Italy and Germany, Siemens VAI customers have access to all large European Export Credit Agencies (ECAs) and can benefit from optimized financing packages.

Seamless plant layout – low operating costs

Our expertise also stands for taking steps from the very start to ensure low, predictable operating and consumption costs, for example through:

- **Reduced replace parts requirements** – as a direct consequence of a homogeneous plant design with standardized components. This not only saves floor space but also ties up less capital.
- **Reduced energy costs** – through optimized utilization of thermal, electrical and fossil energy. Examples are hot charge lines where the hot billets are immediately processed in the rolling mill.
- **Agility in coping with fluctuating raw materials prices** – thanks to the mechanical and electrical engineering design of the plant to flexibly accommodate the use of different raw materials.
- **Optimizing the levels of energy consumption** – thanks to robust components, the plant can be flexibly ramped up or down during periods of higher or lower energy demand.

Stable processes – high product quality

When we implement the entire production line, we are also responsible for stable processes and high steel quality. We ensure:

- **High availability** – this is supported by wear-optimized construction throughout, and by seamless integration of all steps in the process.
- **Simple-to-manage processes** – optimized paths and clearly defined interfaces help minimize the complexity among partial processes. Thanks to a uniform operating and maintenance philosophy, your personnel can be familiarized quickly and effectively with the entire plant.
- **Systematic quality** – as both the planners and the builders of the entire plant, we're in complete control of all technical and logistical factors that affect the quality of the final product.
- **Fit for future requirements** – the individual equipment units and the entire plant are designed flexibly to minimize the modifications required to accommodate the production of new kinds and grades of steel.

Our integration services for your MiniMill: consulting, planning, and implementation from a single source – for dependable implementation and perfectly synchronized production.

Are you planning to invest in an electric steel plant? We'll ensure the right balance. With seamless expertise in products, systems, integration, and services.

We'll be happy to advise you.

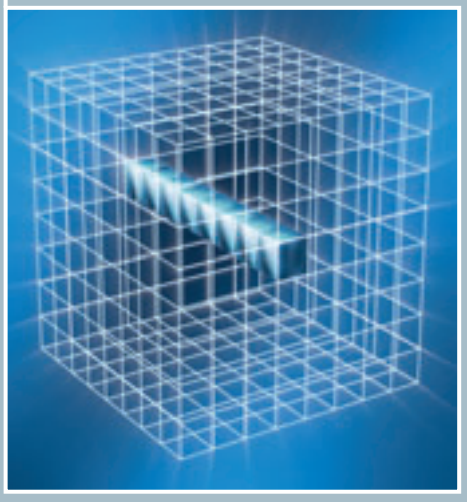
Selected references

- Suez Steel, Suez, Egypt
- Revda – Maxi Group, Revda, Russia
- Stahlwerk Thüringen, Unterwellenborn, Germany
- MMK – Magnitogorsk Iron and Steel Works, Magnitogorsk, Russia

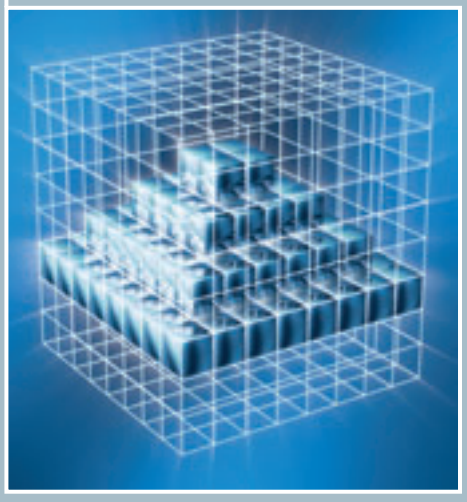
Completely Integrated Solutions with Siemens VAI

Integrated offerings for higher plant performance

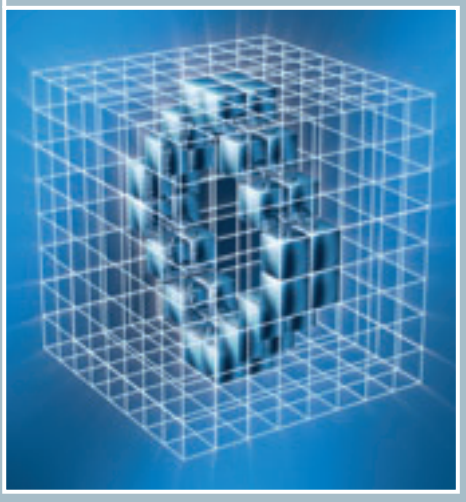
Higher availability
Measurable process improvement



Greater productivity
Integrated information technology



Reduced life-cycle costs
Maximum protection of your investment



Optimized processes

We lay the foundation for optimized processes with proven, leading products worldwide, including mechanical and technological engineering for metal production, rolling and strip processing as well as process control engineering, drive engineering and power supply. Integrated online and offline process models reflect decades of practical experience and help to ensure reliable, reproducible quality.

Our process engineering expertise fuses these products into complete plant solutions that also accommodate the upstream and downstream processes. These solutions are the basis for optimal resource use, minimized waiting times and reduced maintenance and spare parts costs, as well as wide flexibility with respect to raw materials and the resulting products.

Efficient production control

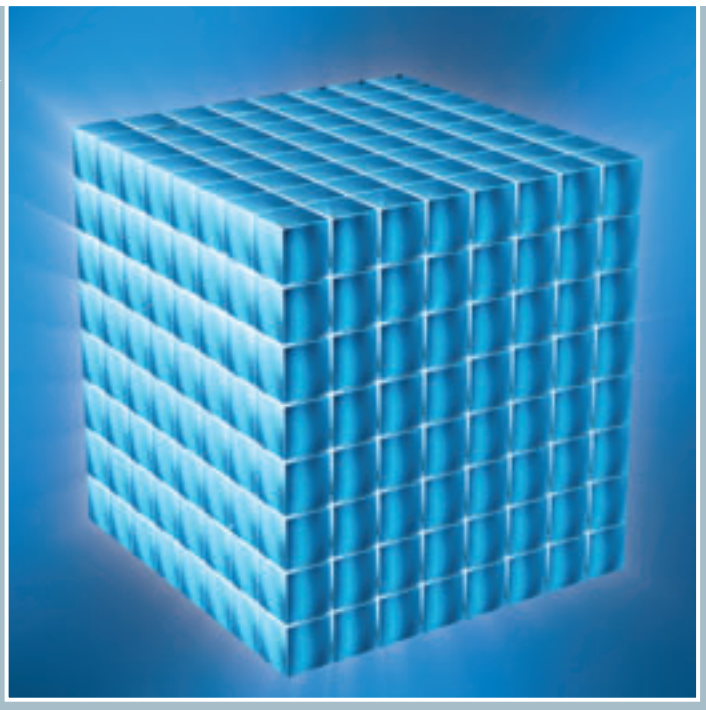
A further factor for competitive production is the quality of information processing. Production data must be consolidated and compared with planning data to ensure optimal production flow.

As a leading supplier for the metals industry Siemens VAI offers integrated information technology across all automation levels – from the sensor to the Enterprise Resource Planning system. Patented solutions, such as for smelting reduction plants, electric arc furnaces, hot strip mills, profile rolling or processing lines, enable systematic quality assurance, efficient logistics, flexible production planning and scheduling, end-to-end tracking and tracing from raw materials to the end product and back, and much more.

Maximized life-cycle returns

Services from Siemens VAI help to ensure high profitability for your plant throughout the entire life-cycle. Reliable project implementation by our specialists sets the course for quick start-up and repayment of funds as scheduled.

During the operating phase, preventive maintenance, standardized components and component design that meets the requirements of steel plants help keep maintenance costs low. A reliable spare parts supply – with in-house workshops for key components – ensures high availability. And modernization at the right time guarantees a high level of competitiveness and compliance with environmental regulations in the future.



Perfect integration of every aspect

Completely Integrated Solutions offer a comprehensive range of products and services, tailored and refined to the specific requirements of your plant. The key to this approach is the close interlinking of plant construction, process engineering, electrical and automation engineering, sensors and actuators, as well as information technology and life-cycle services, seamlessly integrated by Siemens VAI.

Completely Integrated Solutions from Siemens VAI – your benefits from an integrated concept:

- High process quality, lower energy costs and increased throughput – by taking all process steps into account
- Reproducible high product quality and efficient use of charging materials – thanks to integrated process models
- High enterprise quality, low life-cycle costs and unique investment protection – through flexible production based on metal-specific MES systems, intelligent plant design and integrated planning.

For further information contact:

Siemens VAI
Metals Technologies GmbH
Reithallenstr. 1
77731 Willstätt-Legelshurst, Germany
Phone: +49 (0) 7852 4100
Fax: +49 (0) 7852 41141
E-mail: minimill.metals@siemens.com

Headquarters:
Siemens VAI
Metals Technologies GmbH
P.O. Box 4, Turmstr. 44,
A 4031 Linz, Austria
E-mail: contact.metals@siemens.com

The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

Order No.: E10001-M1-A2-V2-7600
Printed in Germany
Dispo No.: 21661 K-No.: 28105
GB C-MTIS5207M09 WS 05071.5
Subject to change without prior notice

www.siemens-vai.com