

[siemens-vai.com](http://siemens-vai.com)

## Secondary metallurgy solutions

Technology, mechanical engineering, automation, and electrical engineering from a single source – top values in productivity, consumption, and availability

Answers for industry.

As the demand for quality and stainless steel is rising throughout the industry and as the value added by secondary metallurgy treated steel increases, the number of installed and contracted secondary metallurgy plants for the improvement of the steel quality is growing.

#### You expect:

- Efficient production and maximum productivity – through plant expertise
- Reliable delivery times, prompt commissioning, fast run-up – and reliable spare parts supply
- Flexible plant design – for the production of various steel qualities
- Low, demonstrably reachable consumption values – for alloying elements and energy
- Compliance with environmental regulations – including future requirements



# Your challenge: Rising demand for quality and stainless steel



## **Perfect teamwork for maximum efficiency**

It is vital that the entire plant should meet all required performance values, while at the same time delivering the planned steel quality in a safe, reproducible way. This requires basic expertise from your solution provider, as short charge cycle times, low consumption values, and reduced personnel costs are decisive factors for the performance and productivity of your secondary metallurgy.

## **Your customers require the best**

High availability, wide variety and the ability to adapt quickly to different requirements enable you to respond flexibly to new market requirements and the individual needs of your customers.

## **Long-lasting plant performance**

Siemens Metals Technologies can pass on its knowledge to your operating personnel and support your service experts at any time with necessary spare parts.

## **Environmental requirements are growing**

International agreements and national laws require a reduction of pollution, dust, and CO<sub>2</sub> emissions.

# Our solution: Secondary metallurgy for your steel plant

## **Coordinated layout – optimized process**

Our experience helps us precisely coordinate movement cycles in order to minimize secondary processing times and to use electrical and chemical energy more efficiently.

## **Automation with power – for productivity and quality**

All secondary metallurgy processes are controlled using an easily integrated automation solution. Continuous developed process models can optimize your production efficiency.

## **Complying with emission limits – including future standards**

As a complete plant supplier, we guarantee precise solutions in regards to environmental technology, looking to today's limit values and being prepared for tomorrow's requirements.

## **Ensured performance throughout the entire lifecycle**

Reliable production start-ups thanks to the transfer of know-how to the plant user. Ensuring our support through the entire product lifecycle, in spare part management, technical assistance, consultancy and modernization.



What does working with Siemens Metals Technologies stand for? It stands for 30 years of vacuum technology and 100 years of Siemens experience as partner to the metals industry – and an installed base of 180 secondary metallurgical plants. This unique combination of technology, mechanical and electrical engineering, and automation under the name of Siemens Metals Technologies is your guarantee that all your requirements will be met.



### Advantages of our secondary metallurgy solutions:

- Reliable fulfillment of the contractual conditions – through a reliable plant from an experienced partner
- Faster, more reliable run-up – using operator-friendly plants in combination with the process expertise of Siemens Metals Technologies
- Highest productivity, flexible process management, and maximum availability – using perfectly coordinated technology, automation, and process models
- Always at the forefront of technical developments, for example through COB lance, dry mechanical pump systems, optimized steam ejector pump and powerful automation solutions
- Fast amortization – thanks to minimized consumption figures, high availability, and assured productivity

# Vacuum tank degasser – VD

## Proven and reliable VD plants



80-t VD plant, Acc. Venete S.P.A., Camin, Italy

Good homogenization  
and high alloy yields

**Vacuum tank degassing is one of the oldest degassing techniques in use in the steel industry for improving steel quality.**

A teeming ladle is placed in a vacuum tank, which is connected to a vacuum pump system. The ladle is equipped with 1–3 porous plugs through which inert gas is injected into the melt to promote stirring. Metallurgical reactions such as degassing, deoxidation, decarburization, desulfurization, and alloying take place under vacuum conditions.

### The VD process

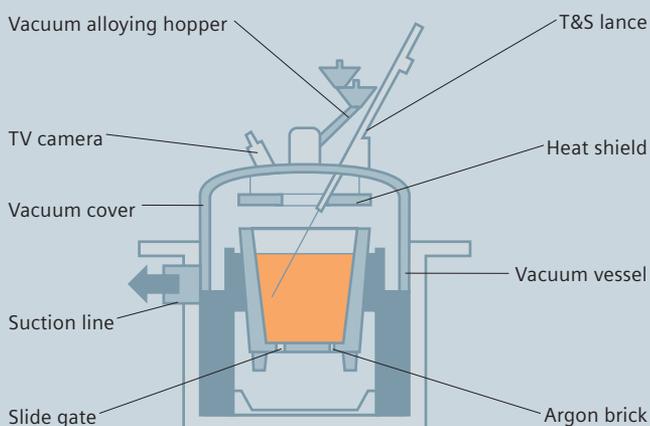
During vacuum treatment the carbon, oxygen, nitrogen, hydrogen, and sulfur contents are reduced in different process steps depending on the melt composition. A vacuum alloy hopper system allows for compositional adjustments. Good homogenization and high alloy yields are characteristic features of this process. Depending on the metallurgical reactions in the ladle, a freeboard of 600–1,200 mm is required. In order to increase productivity, the VD system can also be designed as (or extended to) a twin-vessel system.

### Features and benefits:

- Accelerated reactions under vacuum conditions
- Achieving low contents of carbon, oxygen, hydrogen, nitrogen, and sulfur
- Improved steel cleanliness, especially with respect to oxides and sulfides
- Low investment and operational costs

### Selected references:

Salzgitter AG, Salzgitter, Germany  
Azovstal, Mariupol, Ukraine  
Çolakoğlu Metalurji A.S., Gebze, Turkey  
Adhunik Metaliks Ltd., Rourkela, India  
SSAB, Mobile (Alabama), USA  
Usha Martin, Jamshedpur, India  
Uralstal, Novotroitsk, Russia  
Tyasa, Ixtaczoquitlán, Mexico



# Vacuum tank degasser – VD-OB/VOD

## VD-OB/VOD plants for maximum metallurgical flexibility



110-t VD/VOD plant, Wuyang ISCO, Wuyang, China



180-t VOD plant, Tisco, Taiyuan, China

The VOD system is a tank degassing unit which is additionally equipped with an oxygen blowing lance.

This additional oxygen supply can be used for the production of extra-low carbon stainless steel grade (forced decarburization) or for chemical heating of the melt in conjunction with aluminum/silicon additions (VD-OB process).

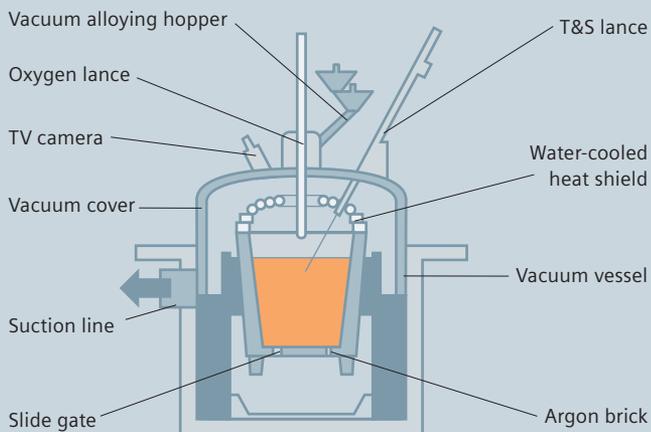
The vacuum pump is designed accordingly, having a higher capacity in order to cope with the increased offgas volume.

### Metallurgical benefits:

- Production of ULC grades (VD-OB process)
- Production of extra-low carbon stainless steel grades (VOD process)
- Operation possible with varying initial carbon contents
- Flexibility to use lower-cost HC alloying materials
- Low chromium oxidation losses in stainless steel production resulting from low partial pressure
- High rate of chromium recovery by slag metallurgy
- Chemical heating
- Low final content of dissolved gas
- Improved steel cleanliness (nonmetallic inclusions)
- Achievement of exact compositional values

### Selected references:

Lisco, Guangzhou, China  
Wuyang ISCO, Wuyang, China  
Gerdau Acos Finos Piratini, Porto Alegre, Brazil  
Acc. Venete S.P.A., Camin, Italy  
Azovstal, Mariupol, Ukraine  
AMK, Alchevsk, Ukraine  
Tangshan Stainless Steel, Tangshan, China  
Dalian Special Steel, Dalian, China  
Tisco, Taiyuan, China  
voestalpine Gießerei Linz, Linz, Austria



# RH plants

## The vacuum recirculation process



180-t RH plant, TISCO, Taiyuan, China



Ladle car and RH vessel

Fast  
decarburization

The RH (Ruhrstahl Heraeus) process is carried out in a refractory-lined vessel, equipped with two snorkels which are immersed in the steel bath.

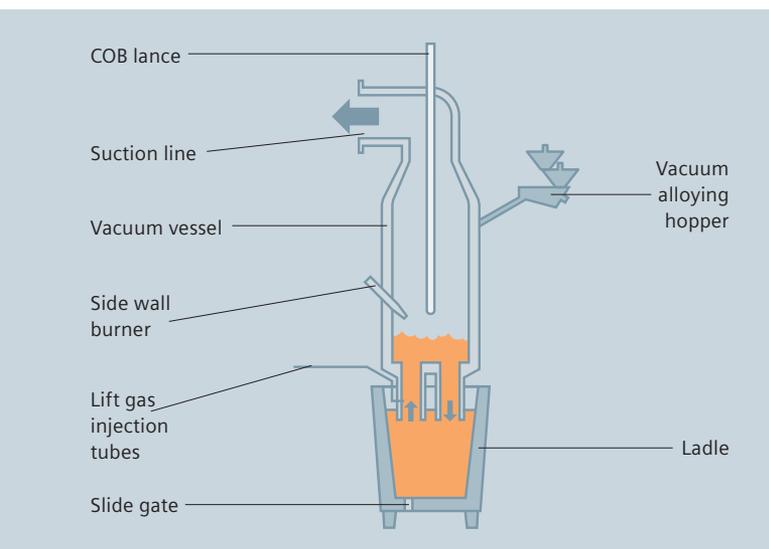
By reducing the system pressure, the melt rises into the vacuum vessel where decarburization, degassing, and other degassing reactions take place. The injection of lift gas into one of the snorkels initiates a circulation process. Thereby, the whole heat is treated quickly. Immersion of the snorkels is either carried out by lowering the vacuum vessel or by lifting the ladle. In order to minimize vessel exchange time a quick-change vessel system can be provided.

### Metallurgical benefits:

- Optimum decarburization to less than 15 ppm
- Operation also with varying initial carbon contents
- Flexibility to use lower-cost HC alloying materials
- Chemical heating of the melt possible
- Low final content of dissolved gas
- Improved overall steel cleanliness
- Achievement of exact compositional values
- Optimum decarburization control of the final range (15-25 ppm)

### Selected references:

voestalpine Stahl, Linz, Austria  
 ArcelorMittal Méditerranée, Fos-sur-Mer, France  
 Maanshan ISCO, Maanshan, China  
 Zhangjiagang Rong Sheng, Jinfeng Town, China  
 Companhia Siderúrgica Paulista (COSIPA), Cubatão, Brazil  
 ArcelorMittal Tubarão (CST), Tubarão, Brazil  
 Gerdau Açominas, São Paulo, Brazil  
 Zhangjiagang Rong Sheng (ZRS), Jinfeng Town, China  
 TISCO, Taiyuan, China  
 Companhia Siderúrgica do Atlântico, Sepetiba, Brazil  
 Nanjing Iron & Steel Co., Ltd., Nanjing, China  
 SAIL, Rourkela, India  
 Byelorussian Steelworks, Zhlobin, Belarus



# COB lance

## Perfectly controlled decarburization



150-t RH plant, SAIL, Rourkela, India



SIMETAL COB lance

**COB lance (Combined Oxygen Blowing) is provided at an RH plant for the injection of oxygen for forced decarburization, chemical heating, injection of gas and oxygen for vessel preheating, as well as for skull removal inside the RH vessel. Thus, a COB lance is crucial for the production of ultralow carbon steel grades.**

The newly developed spark ignition system makes the COB lance cheaper and much more reliable. Maintenance is easier as no flexible connections are required for the supply of media. The system is not affected by pressure

deviations or soiling of nozzles and is equipped with a UV cell for flame control during burning. In addition, the COB lance literally allows to keep an eye on the RH processes: With the integrated video camera, observation of the steel circulation and all events during treatment is possible.

### Features:

- Oxygen blowing for decarburization and chemical heating
- Heating temperature burner up to 1,400°C
- RH vessel heating up to 50°C/h
- Water cooled lance for long service life
- New spark ignition system instead of ignition by burner

### Main benefits:

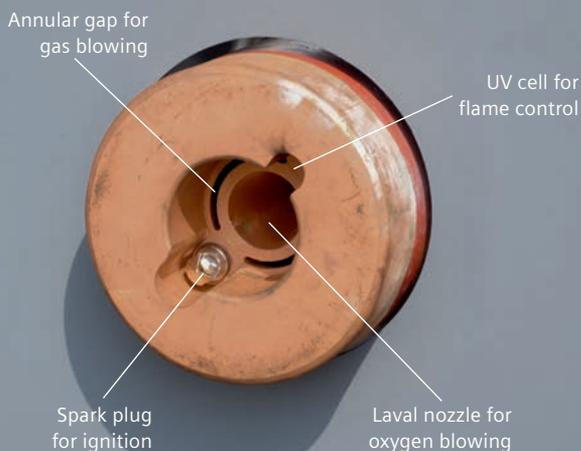
- Decarburizing heats with higher carbon levels
- Steel can be heated during RH treatment
- Quick skull removal using burner function
- Low investment and maintenance costs

### Selected references:

POSCO Gwangyang, South Korea:  
2 x COB for twin RH 280 t

POSCO Gwangyang, South Korea:  
1 x COB for RH 270 t

POSCO Pohang, South Korea:  
2 x COB for twin RH 345 t



# DETEM plants

## The clever way to economic metallurgy



12-t DETEM plant for stainless steelmaking Microsteel, Durban, South Africa



5-t DETEM vacuum degassing plant R.W. Carrs, Sheffield, United Kingdom

**The DETEM process represents the ideal solution for secondary metallurgical operations for small heat sizes ranging from 5 to 20 tons.**

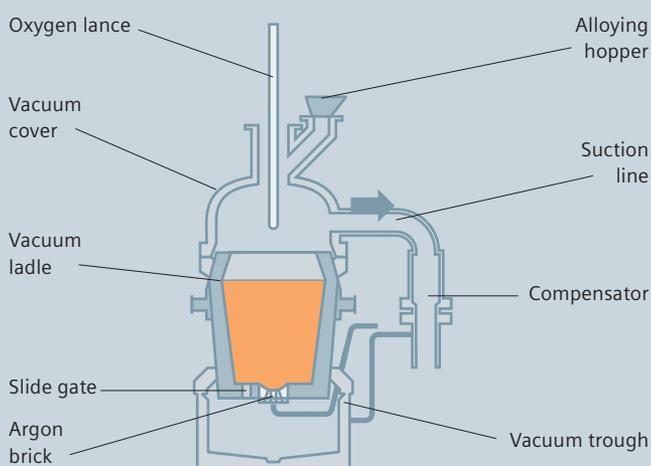
The process was the result of a joint research and development project between Siemens Metals Technologies and Dörrenberg Edelstahl. All process steps which are possible in VD and VOD plants can be economically carried out with the DETEM process, even the production of special and stainless steel grades. DETEM plants are in operation worldwide, particularly in micromills, forging shops, and foundries.

### Features and benefits:

- Use of only one DETEM ladle for furnace tapping, vacuum treatment, and casting
- Low temperature losses with the use of high-grade insulation materials and a specially designed ladle shape characterized by a small freeboard
- Unique vacuum sealing system between the ladle and vacuum cover, consisting of a highly temperature-resistant gasket ring
- Extremely low suction capacities required due to small system volume
- Therefore, low consumption of steam and cooling water
- Identical metallurgical benefits as with VD/VOD plants

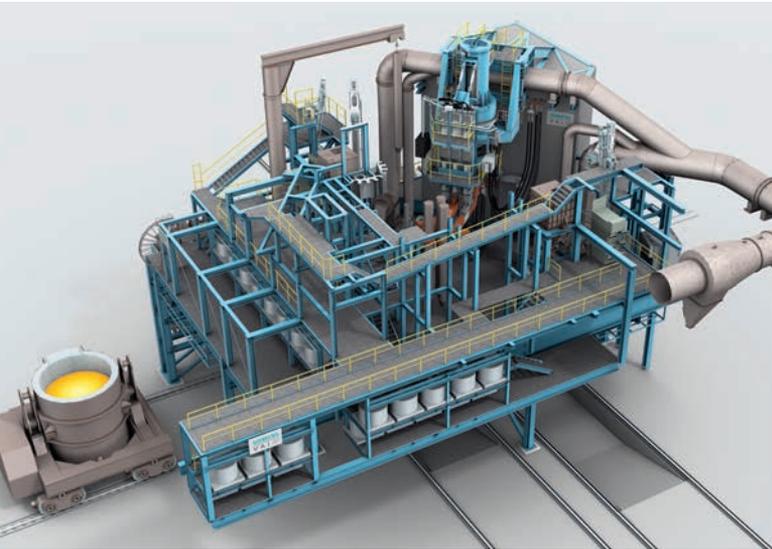
### Selected references:

Dörrenberg Edelstahl, Runderoth, Germany  
R.W. Carrs, Sheffield, United Kingdom  
Microsteel, Durban, South Africa  
Shougang Gitane, Shougang, China  
Breitenfeld Edelstahl AG, Mitterdorf, Austria  
Emirates Techno Casting (ETC), Dubai, UAE



# Ladle furnaces (LF)

## The quality link between melting and casting



300-t Twin LF, ArcelorMittal, Bremen, Germany



180-t Twin LF, Taiyuan, China

Installation of a ladle furnace between the melting and casting areas is vital to assure quality and productivity improvements in steelmaking.

Ladle furnace arrangements include single stations (with fixed/swiveling gantries or with ladle cars/turrets) and also twin stations (two roofs) with one swiveling electrode gantry.

### Design features

The compact design guarantees minimum space requirement while offering easy access to the roof and for electrode replacement. The main features comprise:

- Water-cooled roof without refractory lining in center area
- Automatic lance manipulators for temperature measuring, sampling, stirring, and powder injection
- Wire feeding for deoxidation and microalloying
- Automatic coupling system for stirring gas
- Inert gas stirring (porous plugs and/or lance)

### Layout arrangements:

- Single ladle furnace:  
Fixed or swiveling gantry  
Single or twin ladle cars or turret
- Twin ladle furnace:  
Swing-type gantry with two roofs  
Standing or suspended gantry  
Twin ladle cars or turrets

### Operational features and benefits:

- Operation with submerged "long arc" under synthetic slag
- Efficient energy input with high active power and efficient heat transfer
- "Stirring" by blowing inert gas into the steel to improve fast slag reactions and heat transfer
- Treatment times of less than 20 min (twin LF)
- Buffer function between melt shop and caster
- Decrease tapping temperature at the EAF/BOF
- Exact temperature adjustment for continuous casting
- Exact adjustment of the steel composition (metallurgical fine-tuning)
- Improved cleanliness of the steel
- For all steel qualities, including stainless steel
- Reduction in total costs
- Reduction in refractory consumption

### Selected references:

Single ladle furnace:  
MMK Magnitogorsk, Russia  
voestalpine Stahl, Linz, Austria

Twin ladle furnace:  
ArcelorMittal Carinox, Châtelet, Belgium  
Azovstal, Mariupol, Ukraine  
Salzgitter Flachstahl, Salzgitter, Germany  
ArcelorMittal, Bremen, Germany  
Maanshan Iron & Steel Co. Ltd, Maanshan, China

# Powder injection system for ladle furnaces

## Improving steel quality



Powder injection silos, Salzgitter, single ladle furnace

Modern high-tech steel requires precisely adjusted levels of residual elements. Traces of sulfur in particular are most detrimental and must be removed to the greatest extent possible. To both quickly and reliably achieve a low sulfur level, Siemens Metals Technologies has introduced a powder injection system in ladle furnace installations.

The main characteristics of this solution are reduced treatment times and more efficient chemical interactions between the elements. In addition, the consumption of slag-building materials and energy requirements are reduced – especially when an RH process follows the LF (ladle furnace) process and typical refining slag for top slag desulfurization of 10–12 kg/t is not required.

Desulfurization time is also reduced thanks to direct contact between the desulfurizing agents and the sulfur in

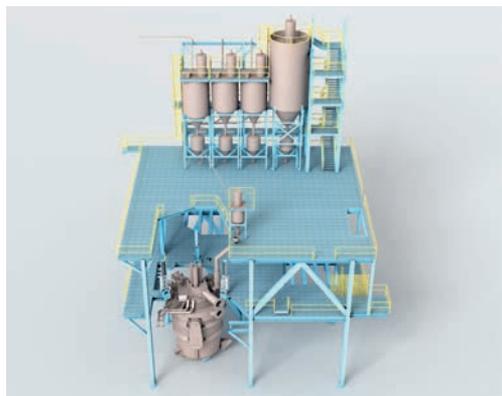
the steel – as compared with the interaction on the ladle top required by top slag desulfurization.

Although we have tested lime and calcium-silicon powder as the primary materials in our installation, a wide variety of desulfurizing materials can be used depending on local market availability.

The mechanical installation was also well-adapted for the LF layout, with a dedicated opening in the roof and even a combined emergency stirring and powder injection function.

### Selected references:

Salzgitter Flachstahl, Salzgitter, Germany  
Azovstal, Mariupol, Ukraine  
NLMK Novolipetsk Steel, Lipetsk, Russia



### Typical performance results for different steel grades:

	Group 1	Group 2
Start S value	100–80 ppm	50–40 ppm
End S value	< 20–16 ppm	< 10–8 ppm
deS rate	> 80%	< 80%
SiCa powder consumption	3.44 kg/t	3.13 kg/t

# Copper parts in LF and VD/VOD plants

## Highly efficient heat removal



LF roof on the Siemens Metals Technologies workshop ready for delivery



Roof's status after several months of operation

**Copper material offers highly efficient heat removal for parts subjected to heavy thermal loads. Working with this principle, a new copper roof for LFs was designed and installed at voestalpine Stahl, Linz.**

In addition to heat removal, the suppression of skull formation in the roof is another important factor to be considered. Skull formation is an undesirable occurrence during ladle furnace operation. Some steel plants must cope with intensive stirring conditions due to tight treatment times and very low sulfur demand; in this case, a reduced stirring flow is not acceptable. Our copper solution completely eliminates skull formation.

The same principle has been applied to the design of a new VOD roof for stainless steel production. Extremely

severe conditions with respect to heat load and skull formation are experienced in stainless production at VOD stations during the oxygen blowing phase.

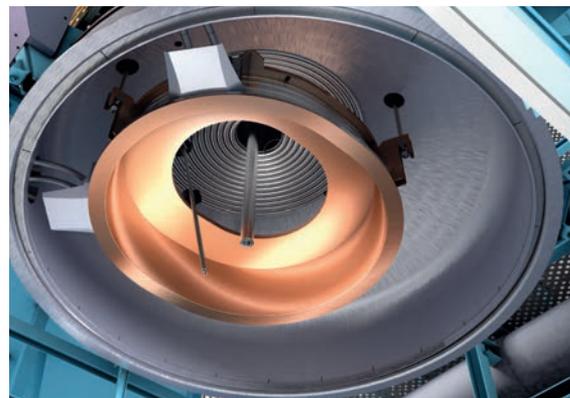
The copper roof was also adopted for the VD process with reduced ladle freeboard, where the risk of skull formation over the ladle is decreased; the copper roof has a flat surface design that minimizes skull formation.

### Selected references:

- voestalpine Stahl, Linz, Austria
- TISCO, Taiyuan, China
- Uralstahl, Novotroisk, Russia

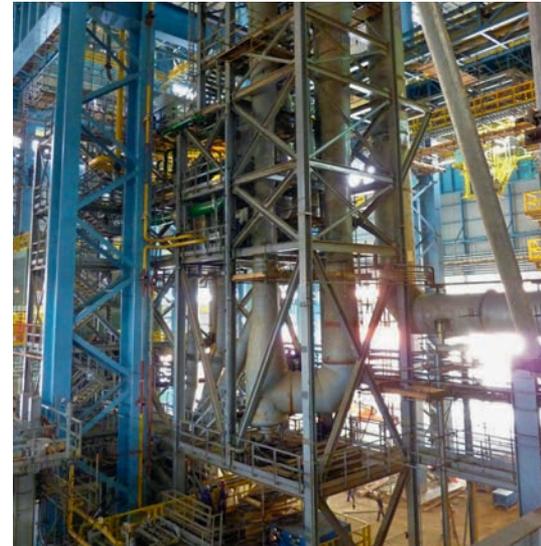


Schematic view of the copper roof, installed into the vacuum cover



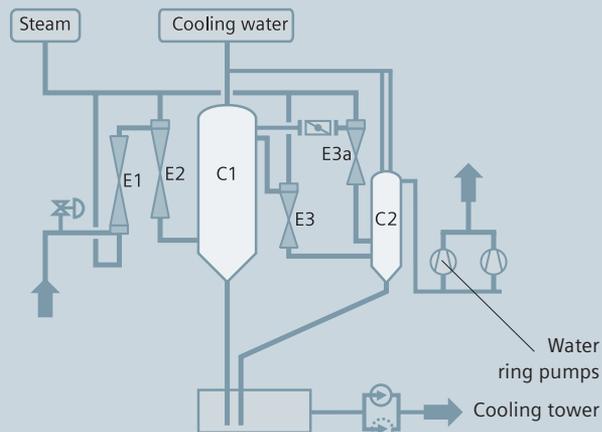
# Vacuum pump system and dust removal

The driving force behind every vacuum degassing plant

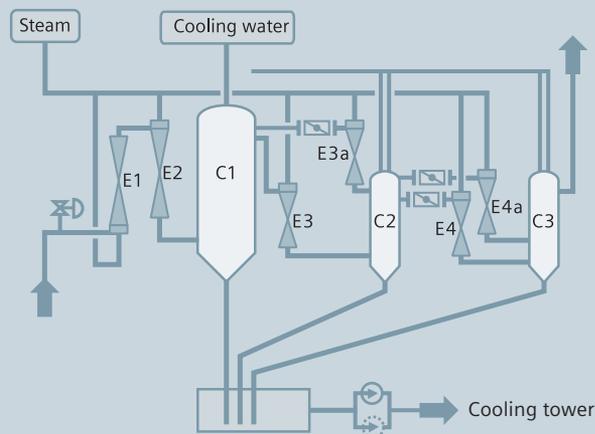


voestalpine Gießerei Linz, Linz, Austria

## Hybrid pump



## Full steam ejector pump



The vacuum pump systems necessary for vacuum degassing units are entirely designed and engineered by Siemens Metals Technologies process specialists. This ensures that the technical performance of each supplied pump system will meet the process and metallurgical requirements under all climatic conditions.

A typical pump system consists of an arrangement of steam ejectors with the necessary condensation stages, often in combination with water ring pumps. Siemens Metals Technologies offers the full range of pumping systems, including customized and cost-saving solutions for tailpipe and hot-well tank systems. Dry mechanical pumps are also part of our portfolio.

### An economic solution for dust removal

Significant dust quantities (up to 5 kg of dust per ton of treated steel) are generated during vacuum degassing processes, mainly with oxygen blowing. In order to avoid the high investment costs which could be necessary for a water treatment plant, including a sludge thickener and sludge disposal system, a specially designed bag filter unit is installed in the suction line prior to the vacuum pump. Virtually all of the generated dust is removed from the waste gas stream under vacuum conditions.

### Selected references:

POSCO Gwangyang, South Korea:

4-stage hybrid pump for twin RH plants from 270 to 345 t

TYASA, Ixtaczoquitlán, Mexico: Dry mechanical pump

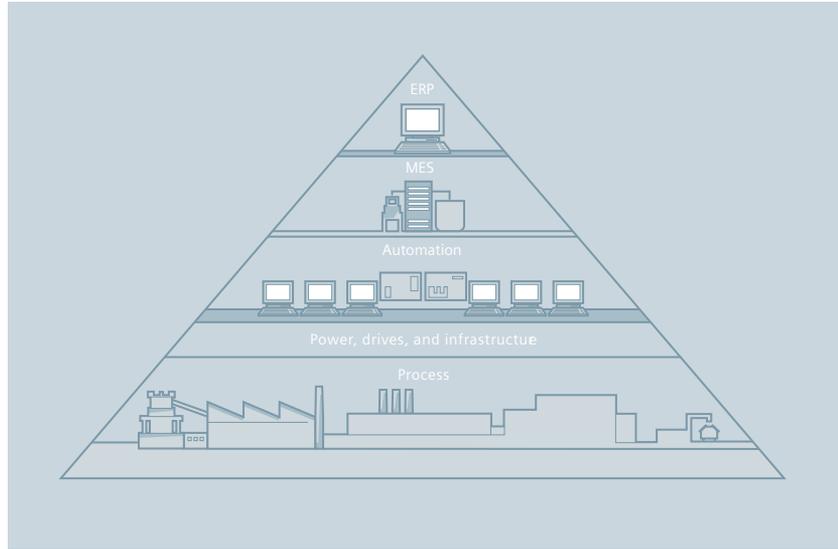
voestalpine Gießerei Linz, Austria: Dry mechanical pump

# Advanced automation solutions

## Enhancing the overall performance



Leading automation solutions based on standards such as SIMATIC S7 and SIMATIC IT on all plant levels ...



... from the field up to the management level

Siemens Metals Technologies stands for the combination of technological expertise and unique automation experience. Basic automation, process control, process models for various steel qualities, and master production planning on the MES (manufacturing execution system) level all come from one source – closely tuned into plant construction.

Our comprehensive automation solution for secondary metallurgy is based on an integrated, open concept – for all processes from ladle furnace to vacuum treatment units.

The modular design ensures that every unit of the automation system can be separately planned, started up, and repaired – without an interruption of the entire process.

### Main benefits:

- Stable production conditions, systematic quality improvement
- Higher productivity through optimized treatment
- Secure investment thanks to high flexibility for expansions
- Reduced downtimes, service and spare parts costs through preventive service concepts

### Vacuum model calculations:

- Cyclic calculation of remaining degassing time and carbon contents in steel bath
- Periodic recalculation (flexibly adjustable) of exact steel bath temperature and energy content
- Prediction of completion of heat based on actual operating parameters and target values

### Heat pacing:

- Calculation of required vacuum treatment time
- Recommendation of necessary operating procedures
- Exact coordination of secondary metallurgical operations
- Treatment progress information to continuous caster

### Operator guidance:

- User-friendly, instantaneous, graphical display of all important process data
- Recommendation of operating procedures for fulfilling all quality and production demands
- Analysis of previous heat histories and trends

### Metallurgical model:

- Final adjustment of steel bath chemical composition on a cost-optimized basis
- Continual recalculation of steel bath/slag chemistry
- Desulfurization, alloying, and deoxidation included

### Thermal supervision and control:

- Periodic recalculation of exact steel bath temperature
- Automatic temperature control for sequence casting

### Keeping an eye on resources, keeping planning under control

The automation solution also encompasses MES solutions that address questions such as, Is the resource available, in use, or being repaired? Is it configured properly for the planned processing step? What is its "history"?, etc.

# Our services

Best performance throughout the lifetime of your plant

Tailored solutions for the best steel quality and the highest plant efficiency and performance.



To be successful in the steel market today, a producer must continually improve steel quality as well as productivity and reduce conversion costs.

Continuous development in technology, equipment, and systems means that with relatively small investments, major improvements can be made in steel quality, plant performance, and production efficiency.

Siemens Metals Technologies offers a comprehensive range of tailor-made upgrading solutions for the harsh operating conditions of electric steelmaking. All components and systems supplied are designed for endurance, easy access and low maintenance, and offer superb value for the money.

## Features:

- Multidimensional problem solving capabilities for turnkey system supply
- Individual, customer-oriented solution approach
- Minimum interruption in ongoing plant operations
- Proven short solution implementation times within scheduled plant shutdowns
- Fast response and short delivery times
- “Rapid action” response teams in emergency situations
- Continual technology and service improvement through partner feedback

- Worldwide service network
- In-house workshop for highest-quality materials and workmanship
- Proven short return on investments

## Main benefits:

- Continuous improvement in plant performance
- Higher plant availability
- Technological solutions for boosting productivity
- Improved and consistent product quality
- Lower conversion costs
- Long-term relationships and partnerships

## Selected references:

Stahlwerke Bous, Bous, Germany  
ArcelorMittal, Schiffange, Luxembourg  
Gerdau Acos Finos Piratini, Porto Alegre, Brazil  
Hangzhou Iron & Steel, Hanggang, China  
Hadeed Saudi Iron and Steel Company, Al-Jubail, Saudi Arabia  
MMK – Magnitogorsk Iron and Steel Works, Magnitogorsk, Russia  
Çolakoglu Metalurji A.S., Gebze, Turkey

# Lifecycle management

## Partnership never ends

- Investigation/inspections & feasibility study
- Design
- Layout
- Construction
- Installation
- Commissioning

- Service contracts
- Spare parts and components
- Consulting and training
- Online and offline maintenance
- Maintenance contracting



- Migration packages
- Upgrading and modernization



### Siemens Metals Technologies lifecycle services

Plant operators have to face conflicting needs. On the one hand, the performance is measured on a quarterly basis to fit short term profitability expectations. On the other hand, the whole lifetime of a plant has to be taken into account. This gap makes it hard to come to right decisions.

With our comprehensive expertise and integrated approach of our lifecycle services, Siemens Metals Technologies provides solutions for both short-term and long-term benefits.

In the short term: Backed by our extensive experience with many reference plants, we guarantee fast, dependable production start-ups and short amortization periods.

In the long term: We provide competitive performance for plants at every phase of the lifecycle. Reliable technical support, efficient maintenance solutions, and permanent plant improvements are the basics to operate safe and cost-effective.

### Siemens Metals Technologies stands for a successful long-term relationship and partnership

Electric steelmaking: our soft-skill services		Electric steelmaking: our hardware supply services	
Investigation, inspections & feasibility study	Consulting & training	Spare parts & components	Upgrading & modernization
<ul style="list-style-type: none"> <li>• Evaluation and diagnosis                             <ul style="list-style-type: none"> <li>– equipment conditions</li> <li>– standard operation</li> <li>– plant performance</li> </ul> </li> <li>• Identification of problems                             <ul style="list-style-type: none"> <li>– on-site inspections</li> <li>– bottlenecks</li> <li>– operating practice</li> </ul> </li> <li>• Proposal of solutions to achieve                             <ul style="list-style-type: none"> <li>– new milestones</li> <li>– new targets</li> <li>– higher efficiency</li> <li>– new steel grades</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Fact finding missions</li> <li>• On-site support: “show-how”                             <ul style="list-style-type: none"> <li>– maintenance</li> <li>– operation</li> </ul> </li> <li>• Assistance during start-ups</li> <li>• Installation and commissioning services during:                             <ul style="list-style-type: none"> <li>– weekly maintenance shifts</li> <li>– yearly shutdown</li> <li>– provision of operational and maintenance training and technical assistance, including know-how and show-how services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Supply of spare parts                             <ul style="list-style-type: none"> <li>– components</li> <li>– equipment</li> <li>– systems</li> </ul> </li> <li>• Reengineering of components</li> <li>• Consignment stock services</li> <li>• Repair and remanufacturing</li> </ul>	<ul style="list-style-type: none"> <li>• For any secondary metallurgical equipment portion and type</li> <li>• Implementation of innovative technologies</li> <li>• Performance-enhanced solutions                             <ul style="list-style-type: none"> <li>– secondary metallurgical design improvement</li> <li>– latest vacuum and injection technologies</li> <li>– advanced process models</li> <li>– automation packages</li> </ul> </li> </ul>

### Services for steelmakers

Experience, competence, and expertise are available as soft skills in addition to hardware supplies and technological upgrades.

# Expertise from experience

Selected success stories with secondary metallurgy solutions



## One solution – two highlights

- Customer:** NLMK Novolipetsk Steel, Lipetsk, Russia
- Plant type:** 2 x 330-t ladle furnace; highlight: CaSi injection; slag stopper unit between BOF converter and ladle furnace; 2 x 160-t ladle furnace
- Our solution:** Installation of two 330-t LFs including alloy system, complete automation, and auxiliaries; complete metallurgical support
- The result:** Extension of product range (e.g., very low-sulfur content steel grades for gas pipes and marine pipes); decrease of BOF converter tapping temperature; increase of productivity



### Optimized logistics – boosting productivity

- Customer:** Zhangjiagang POSCO, Zhangjiagang, China  
**Plant type:** 2 x 180-t RH-COB lance  
**Our solution:** 2 single RH-COB, ladle lifting design – fast vessel exchange  
**The result:** Very high productivity increase through sophisticated logistic concept

### The first and largest

- Customer:** Maanshan ISCO, Maanshan, China  
**Plant type:** RH twin plant with COB lance and twin ladle furnace, 330 tons heat size  
**Our solution:** Implementation of the first and largest plant of this type (a twin plant with quick-change vessels)  
**The result:** Significantly higher productivity and plant availability than with single RH plants

### Twins

- Customer:** Salzgitter AG, Salzgitter, Germany  
**Plant type:** 2 x twin ladle furnace in line with three VD tanks and stand-alone ladle furnace  
**Our solution:** Installation of two twin ladle furnaces in combination with three VD units for degassing and decarburization  
**The result:** Increased productivity through arrangement of a ladle furnace and a VD unit each on one track



### Maximum production, low running costs

- Customer:** TISCO, Taiyuan, China  
**Plant type:** VOD plant, 180 tons heat size  
**Our solution:** Implementation of the largest twin VD plant worldwide  
**The result:** Optimum operating costs through the large charge size

### Process turnkey solution

- Customer:** Companhia Siderúrgica do Atlântico, Sepetiba, Brazil  
**Plant type:** RH plant with COB lance, hydraulic ladle lifting, three-vessel system  
**Our solution:** “Process turnkey” supply of a complete steelmaking plant with incoming desulfurized hot metal, hot metal treatment, liquid steel and secondary metallurgical treatment, and the necessary auxiliary facilities  
**The result:** Part of an integrated steel plant with the project owners ThyssenKrupp Stahl AG and Companhia Vale do Rio Doce

**Competence Center:**

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

**Headquarters:**

Siemens VAI  
Metals Technologies GmbH  
P.O. Box 4, Turmstr. 44  
4031 Linz, Austria  
Phone: +43 732 6592-0  
E-mail: [contact.metals@siemens.com](mailto:contact.metals@siemens.com)

[www.siemens-vai.com](http://www.siemens-vai.com)

Order No. E10001-M3-A3-V5-7600  
Dispo No.: 21661 K-No.: 28103 | Printed in Germany  
GB 120430 WS 09122.0 | © 09.2012, Siemens AG

All rights reserved. Subject to change without prior notice.  
SIMETAL is a trademark of Siemens AG.

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.