Define the future
Automatic Ladle Gas Coupling System
1. Automatic Ladle Gas Coupling System

- General description
- What are the most important aspects?
- Typical arrangement
- RMC-Unit
- Media Control Panel MCP
- Funnel
- Degree of tolerances
- Conclusion
2 Automatic Ladle Gas Coupling System

Without ALGCS

Flow control

Harmful area
3. Automatic Ladle Gas Coupling System

With ALGCS

Flow control → Media control panel → Automatic remote media coupling

Harmful area
The Automatic Ladle Gas Coupling System is used in the following areas of the steel mills:

- Ladle treatment and deslaging station
- Ladle transfer car
- Ladle turret
- Vacuum tank
- etc.

Fig. 1: Example of ALGCS-application
What are the most important aspects?

• “Mill-worthy” - eliminates operator fatigue, enhancing consistency and repeatability
  - reliable in harmful environment, efficient gas use

• Safety – provides safety for operators, he is not staying anymore in harmful area
• Performance – improved performance for steelmaking costumers

• Time – provides rapid connection to minimize the gas purging interruption and enables operators to perform other duties

• Self protection – predetermined breaking point protects the machinery. Quick exchange of the “break-away” part

• Self positioning – large coupling tolerance

• Protected position – system is protected from harmful environment

• Repetition – repeatable process
Typical Arrangement

- ALGCS-unit mounted on the ladle car
- One (1) funnel at each ladle
- Media control panel (MCP) can be installed flexibly, either direct at the ALGCS or several meters far away from the ALGCS (where possible)

Fig. 2: Example of standard RMC-arrangement

Fig. 3: Example of standard funnel-arrangement
Automatic Ladle Gas Coupling System

Automatic Ladle Gas Coupling Unit

- Housing
- Gas nozzle
- Connecting rod with predetermined breaking point
- Pneumatic drive system (cylinder, stroke 500mm)
- Protection shield (optional)

Fig. 4: Example of ALGCS Unit
Automatic Ladle Gas Coupling System

Media Control Panel MCP

- No electrical components necessary
- Ambient temperature inside -20°C (-4°F) to 70°C (158°F)
- Media pressure
  min. 10bar (145psi)/ max. 24bar (348psi)

Fig. 5: Example of media control panel

Fig. 6: Example, installation of MCP at ALGCS
Funnel

- Funnel mounted at the ladle
- No wear parts

Fig. 7: Example of funnel

Fig. 8: Example of funnel position
10 Automatic Ladle Gas Coupling System

- Spherical tolerance ±75mm (±2.95")
  at max. stroke

- Connecting angle deviation max. 4°
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Technologies

VENTUS®: VD/VOD Processes based on mechanical vacuum pumps
VENTUS® PRO: Process Control Model for VD/VOD Processes
VENTUS® ARC: VENTUS combined with Ladle Heating Furnace

Standard & Customized Automation Equipment

- Automatic media control and connections to ladles and ladle transfer cars
- Automatic temperature measuring and sampling systems including probe handling and processing
- Automatic alloying systems for wire, powder and pellets
- Material storage, transportation, conveying and handling systems
- Customer specified process automation

We provide customized solutions for a reliable, safe, efficient, cost and energy saving production on a high level of quality.
Use our Knowledge for your Evolution, Define the Future
Define the Future
Secondary Metallurgy
Steel Industry Equipment
Consulting & Research
Development & Special Process Plant
Secondary Metallurgy

MTUS Technology is an experienced turn-key supplier of complete Vacuum Steel degassing systems utilizing hybrid pumping technologies. The Vacuum Degassing process, an essential step in the secondary metallurgy of steel, allows for a more precise removal of certain gaseous elements to successfully attain even the most complicated steel grades. We are capable of designing and delivering an extensive range of installation starting from a 5t liquid steel ladle capacity up to 250t. Our standard degassing plant, offers a technically, economically, and ecologically well engineered alternative to traditional Steam Jet ejectors.

MTUs Technology specializes in several Vacuum degassing processes:
VD•VOD•VAD•VAR•VCD•VMD•VOI•VIT•RH

Advantages of Hybrid Mechanical Pumps

- Significant Saving in Running Costs: decreased energy consumptions; up to 20 times
- Better Performance: Ultimate Vacuum pressure of 0.1 mbar
- Decreased Environmental Impacts : no water effluent, clean exhaust gas
- Higher Hydrogen Elimination
- Easier Maintenance
- Computer controlled: Level 1 Software, Level 2 Automation
- Fast Turn On/Off service
Steel Industry Equipment

Automatic Ladle Gas Coupling Systems
Safe reliable solution for the manual coupling process

Wire Feeding Machine
Unique multiple modular system for all wire types.

Robotemp
Measuring and Sampling robot for tough work at the Electric arc furnace

Measuring and Sample Lance Manipulators
The temperature and sample lance manipulator

Gas Lance Manipulators

Automatic Probe Changing System

Slide Gate Manipulators

Universal Lance Manipulator

Oscillating Flap Door

Furnace Peripheral Equipment

Ladle Treatment Stations

Oxygen & Carbon Injection Systems
(water cooled or consumable)

Process Gas Analyser (PGA)
Consulting & Research

At MTUS, our priority is to satisfy our customers’ needs and our focus is on the improvement of your competitive position which we deliver through our extensive practical experience in the development and designing of structures, equipment and complete machines.

We support our customers with innovative consulting,
- Development of new procedures, processes and products
- Technology and know-how transfer
- Economical solutions in line with market requirements
- Practice related transfer of customer expectations based on interdisciplinary engineering
- Customized design
- Realization of ideas to the point of sale
- Revamping

Our dedication to innovative solutions enables us to continuously develop new procedures and processes,
- Metallurgical installations, machines and equipment
- Strip casting technology
- Installations in the field of high temperature
- Cold and warm forming technologies
- Measuring technologies for special machines and applications
- Custom-tailored machines
- Atomization of processes

Development & Special Process Plants

- Concepts
- R&D
- Planning
- System Design
- Market Research
- New Processes
- FE Analysis & Optimization
- Protection Against Noise & Fumes
- Process Automation
Steel degassing is an essential process in secondary steel-making. Its value is in its rapid and effective removal of dissolved contaminant gases from primary steel (principally hydrogen and carbon monoxide) and the reduction in dissolved carbon levels, resulting in higher quality, higher value steel product with more widespread applicability. The two main processes are vacuum degassing (VD) and vacuum oxygen decarburisation (VOD).