



Refined and Granulated Ferroalloys - Materials for the Steel Industry.

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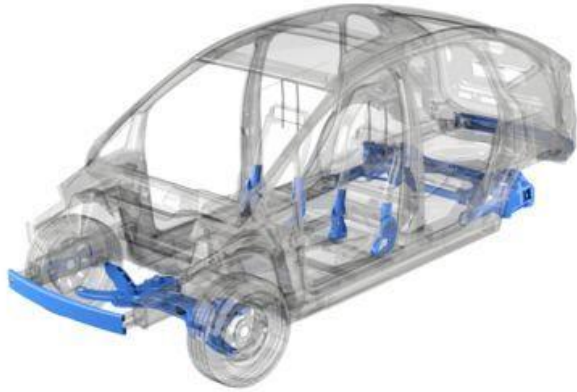




Challenges in Steel Making.

- ↘ Cost reductions
- ↗ Fierce competition
- ↗ New steel grades
- ↗ Higher levels of quality
- ↘ Cut order size & lead time
- ↗ Environmental awareness
- ↘ Shortage of investments - old processes

HSLA 1.5-2.2% Mn



TRIP 2.2% Mn



TWIP 20% Mn



Increased Mn Consumption.

→ Mn required in most steel, typically 1-1.5% Mn

↗ Annual world steel growth 4-5%

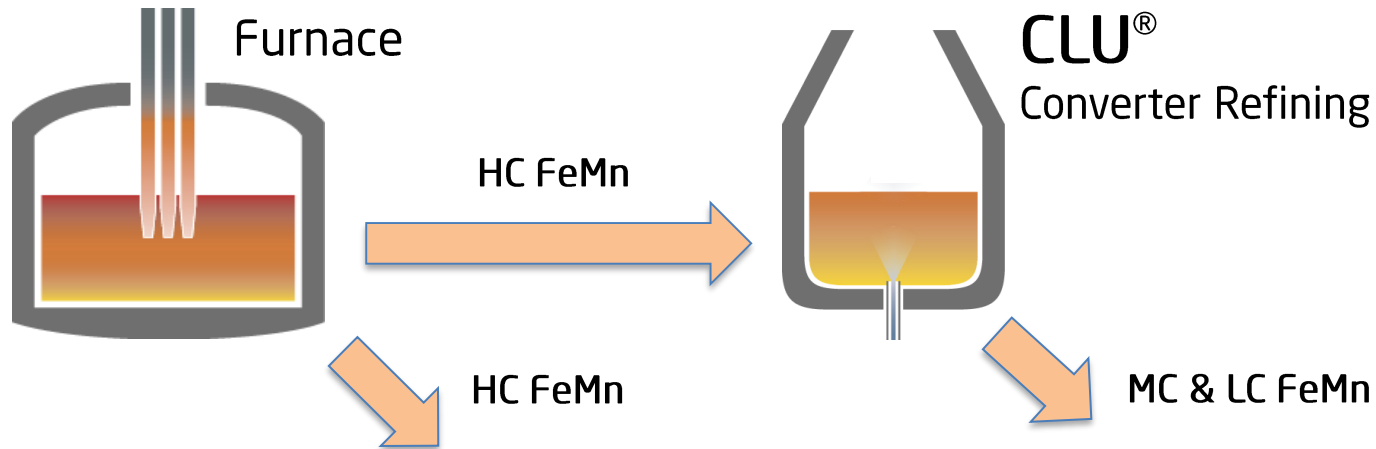
↗ Mn added since only 10-20% Mn can be recycled

↗ More Mn in new advanced steel for better weight/strength ratio
↳ Due to environment, energy, carbon footprint and cost

↗ Restricted C & Si in Hi-Strength steel requires MC/LC FeMn/EMM

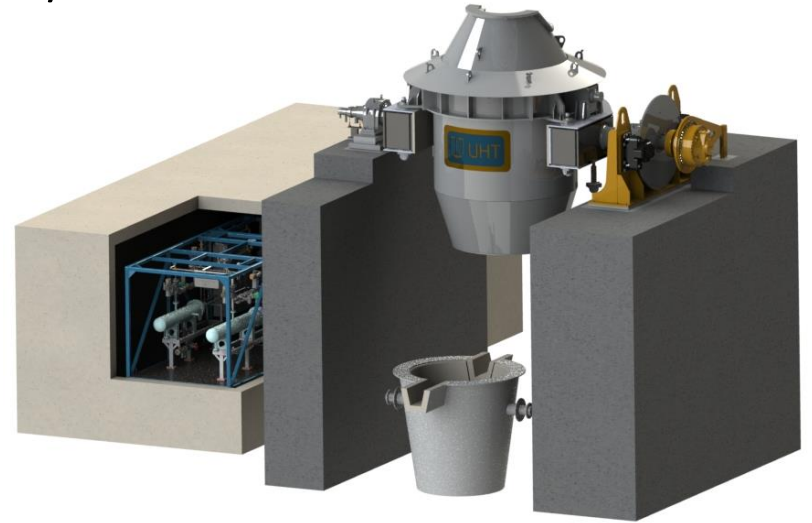
↗ MC/LC FeMn to replace EMM

CLU[®] refined FeMn Products.



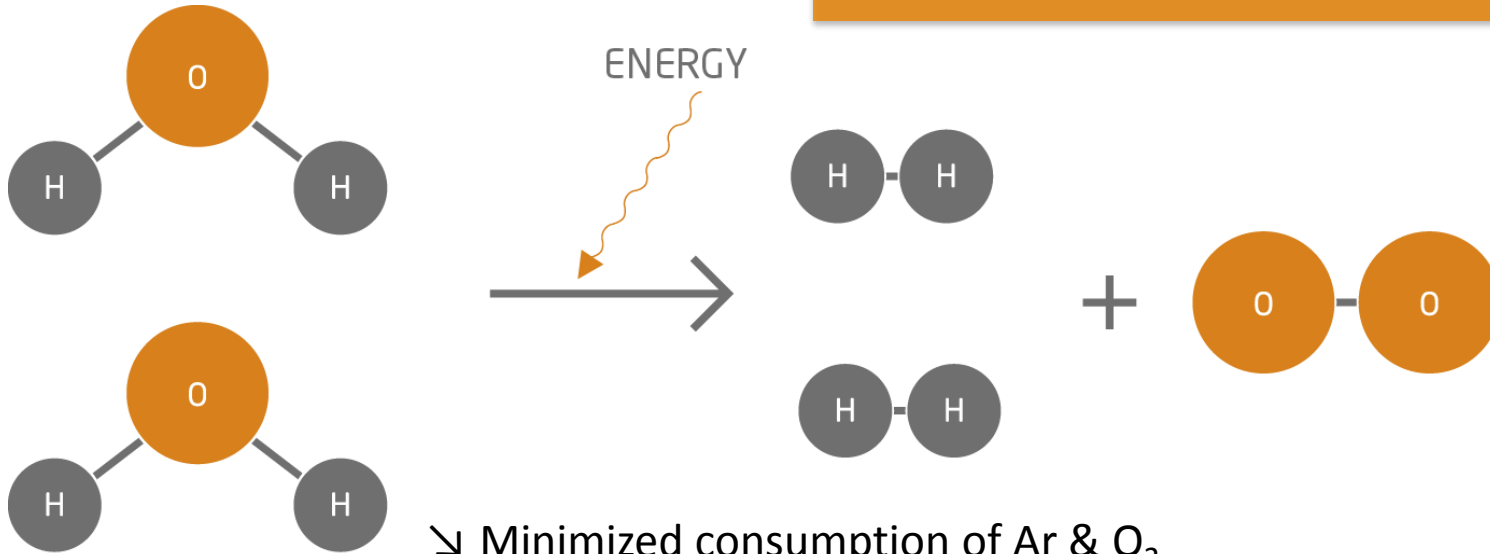
CLU[®] Converter Refining.

- Produce low Carbon ferroalloy grades; MC/LC/ULC
 - Oxygen removes C & Si, also Ti & Al
 - Reduce Sulphur
 - Create Nitrided products
- Stable & Predictable Output Analysis
 - Real-time process control
 - Handle new grades, situations, raw mtrl, etc
- Superheated steam as extra process gas
- Use of ore and Recycling of fines/sculls
 - Ferroalloy oxides can also be sold or recycled
- CLU[®] – Creusot-Loire & UDDEHOLM



CLU[®] Converter Refining.

- Superheated Steam as Extra Process Gas.



- ↳ Minimized consumption of Ar & O₂
- ↗ Higher metal yield by temperature control
- ↳ Less wear on expensive refractory

CLU[®] Converter Refining.

Level 1/PLC and Level 2;
Real-time process control UTCAS[®]

Sampling
platform

Vessel

Tuyeres

Charging Hopper &
Material Handlings System, MHS

Water-cooled off-gas hood &
Fume Treatment Plant, FTP

Top-lance

Hydraulic Converter Drive, HCD

Gas Mixing Station, GMS
with Superheated steam



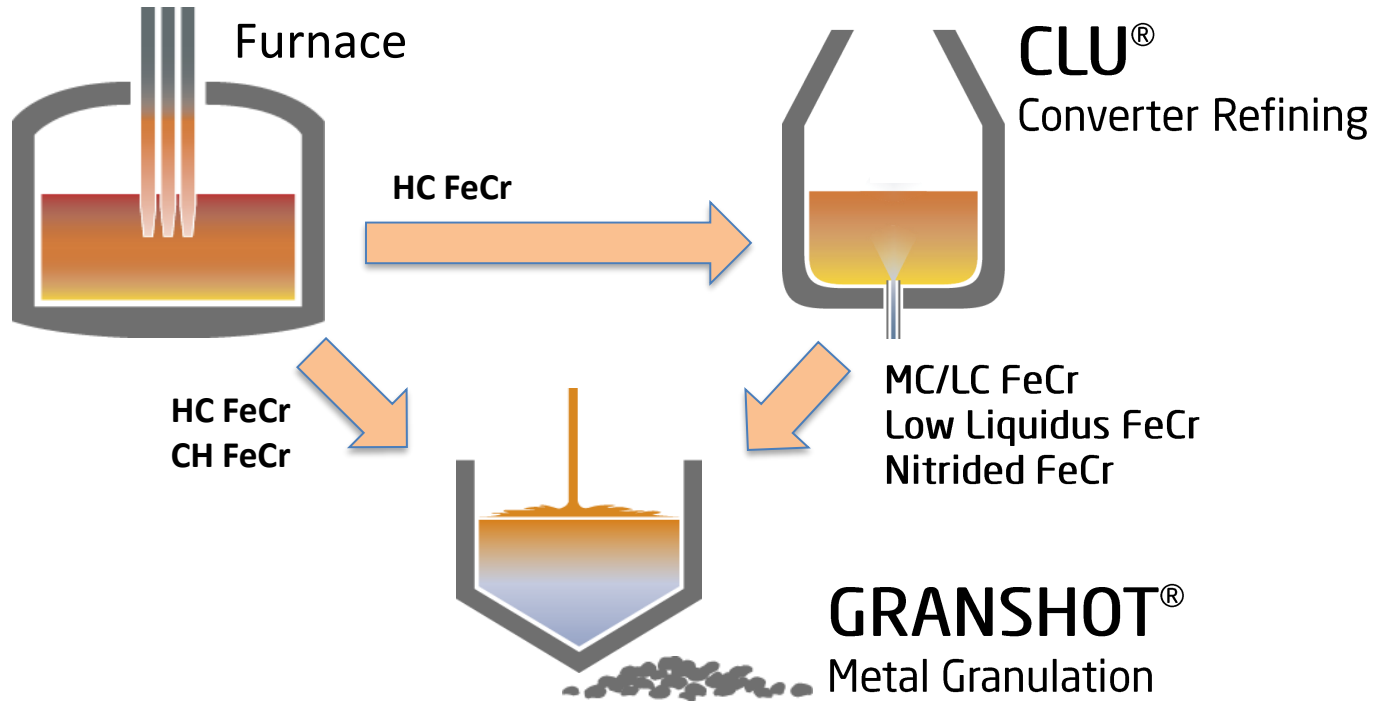


Increased Cr Consumption.

- Annual stainless steel growth 5%
- Increasing appetite for stainless steel
- MC/LC FeCr to reach production targets
- Specific grades for products/production

CLU[®] refined FeCr Products.

Solidification by GRANSHOT metal granulation



Refined Ferroalloys in Steel Making.

- Demand to make better/cleaner/advanced steel
- Specific FeCr/Mn analysis secures EAF & AOD output
- Demand of MC/LC FeMn for high strength steel
- LC FeMn can substitute Electrolytic Mn [EMM]
- Low Liquidus FeCr melts easier with less energy



25 tonnes CLU[®]
MENGFA, MC FeMn, China.



11 tonnes CLU[®] & GRANSHOT[®]

MC FeCr/Mn, Russia.





27 tonnes CLU[®]

TRANSALLOYS, MC FeMn South Africa.





12 tonnes CLU[®]
HIRA S&P, MC FeMn, India.





13 tonnes CLU[®]
AFARAK Mogale, MC FeCr, SA.





GRANSHOT®
Metal solidification in water

Granules for Modern Steel Making.

- 3-50 mm size
 - FeNi 99% >4mm
 - HC FeCr 99% >4mm
- Minimum of fines and dust
- Close to 100% metallic yield
- Easy handling, packaging, transport
- Easy use, automated and fast melting in furnace

LC FeCr



HC FeCr



FeNi





Casted, crushed, sieved
FeCr with fines & dust.



Granulated FeCr
- Minimum of fines or dust.



Casted, crushed, sieved



Granulated



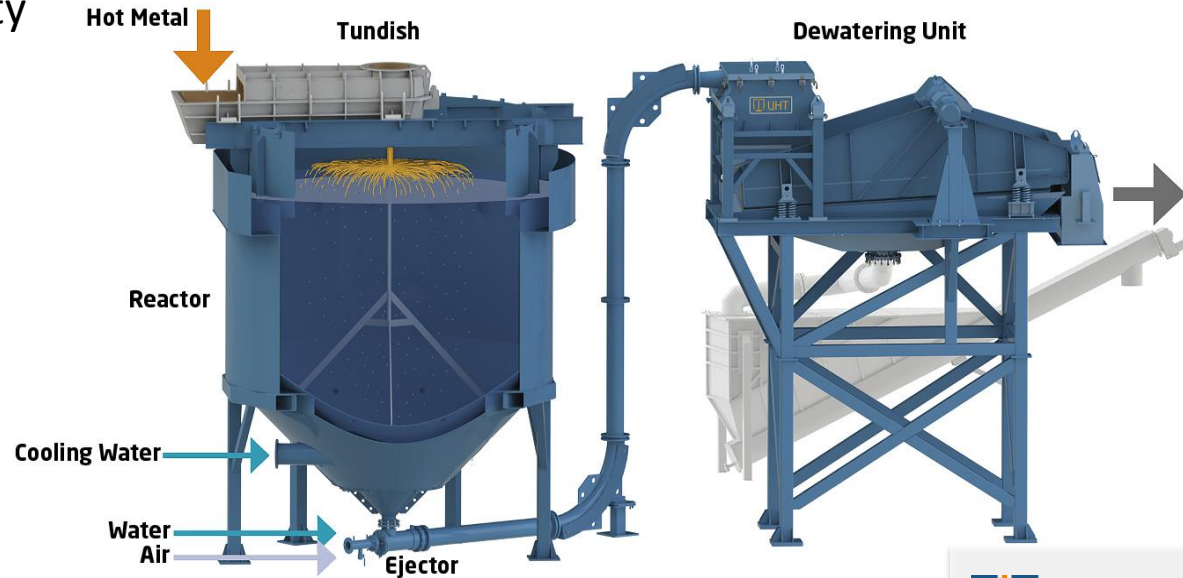
Granulated FeCr. Minimum of fines & dust

	Crushed	Granuled
Fines during Production	(5-20%)	1%
Fines before Tumbling Test	0,4%	1%
Fines after Tumbling Test	6%	1,3%
Fines from Tumbling Test	5,6%	0.3%
Diffuse Losses	1.4%	0.4%
Total	7%	0.7%

Fines <4 mm

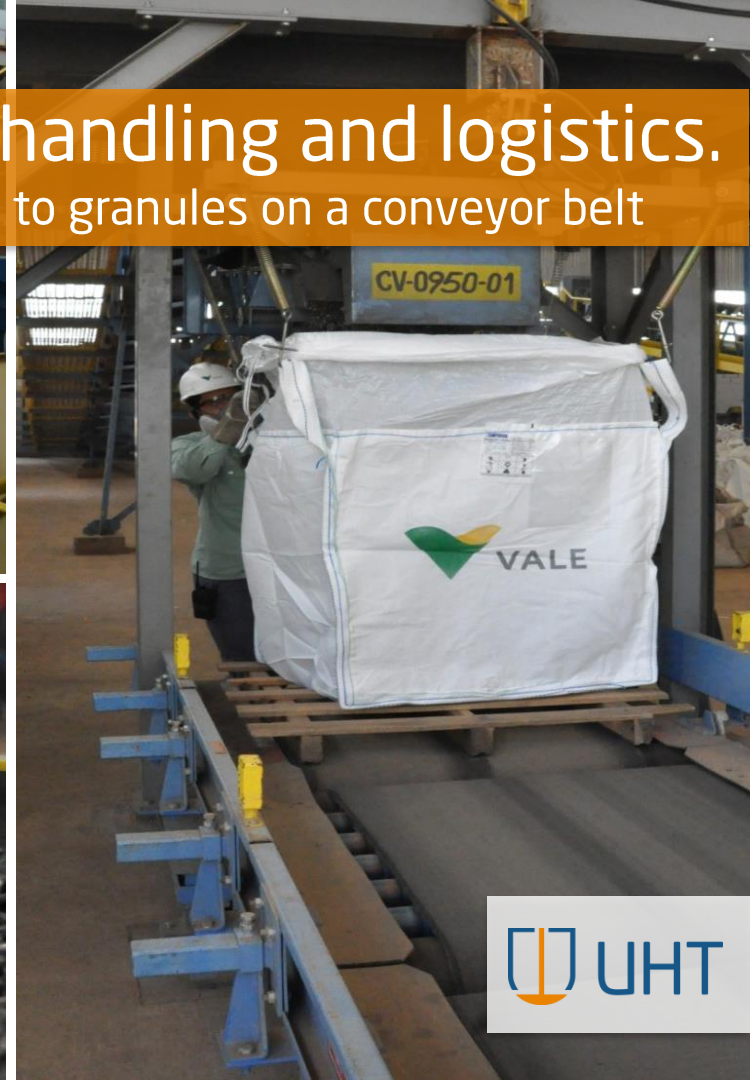
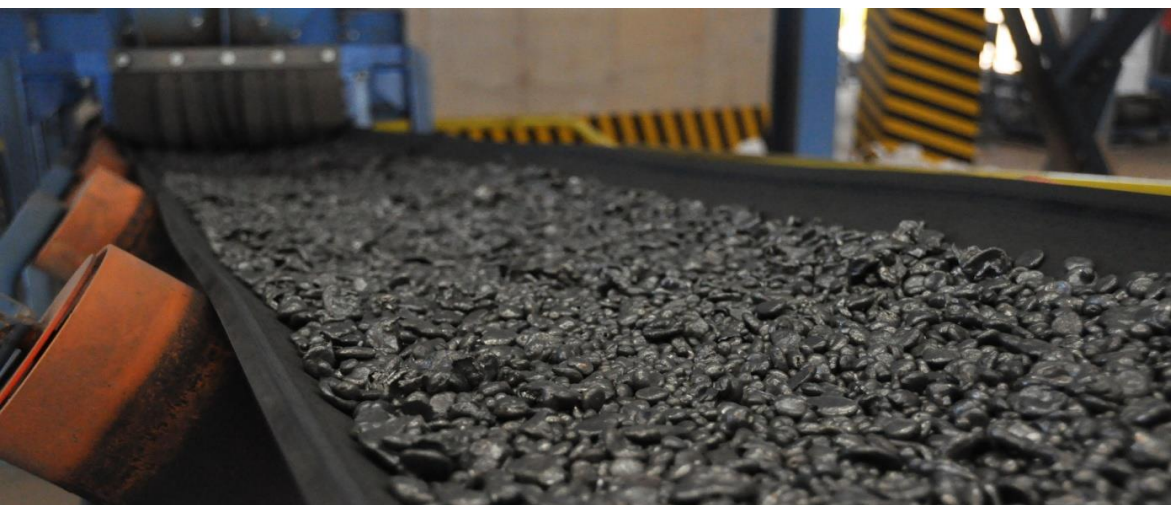
GRANSHOT® Metal Granulation.

- Up to 300 tonnes/hour capacity
- Rapid processing, 30 seconds
- High yield, close to 100%
- 98% process availability
- 50 references world wide
 - Ni, FeNi, FeCr, FeSi, SiMn
 - Pig iron, steel, stainless steel
 - Base metals, recycled metals
 - FeCo, FeMo, Copper, Lead



Granules for easy handling and logistics.

- 30 seconds from hot metal to granules on a conveyor belt



GRANSHOT® for FeCr.

AFARAK Mogale, South Africa



A large industrial ladle is shown pouring molten metal into a mold in a steel mill. The scene is filled with bright orange and yellow light from the molten metal, with sparks falling from the ladle. The background shows various industrial structures, including pipes, walkways, and large machinery.

Granulated Ferroalloys in Steel Making.

- Granulated metal is well defined, clean and no dust
- Easy to transport and for automated handling
- Minimized losses and rapid melting



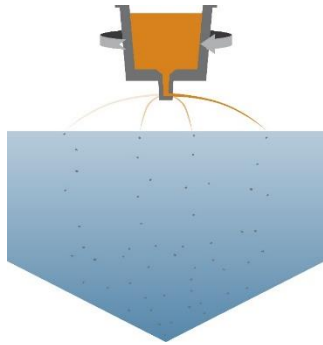
New GRANSHOT® solution.
Rotating Tundish for larger granules



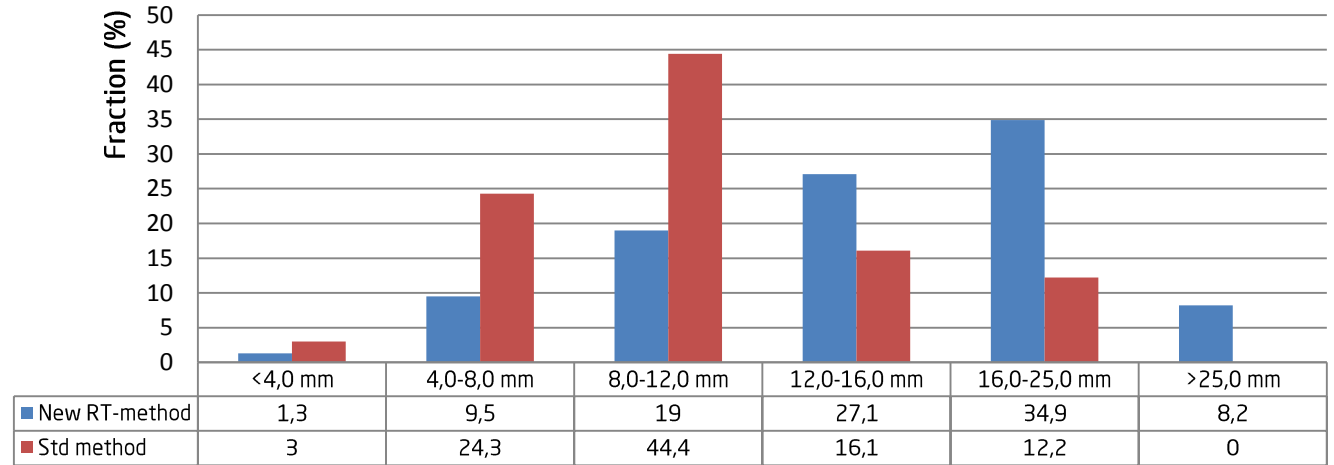
New GRANSHOT[®] solution.

Rotating Tundish for larger granules

Rotating Tundish, RT



Spray Head



HC FeCr: Cr65-68%, C 5.5%, Si 0.5-2%



Granulated Pig Iron, GPI.

ESSAR, TATA, JSPL, 2xJSW



The Future of Steel Making....



Now Available !

Enquiries : ibmd@tatasteel.com





Sales 7 M€uro
23 employees
Metallurgy
Engineering
ISO9001/14001



In-house workshop
GRANSHOT pilot plant

UHT Uvån Hagfors Teknologi AB
Kista & Hagfors, Sweden.



A photograph of an industrial setting, likely a steel mill. In the center, a worker in a dark blue uniform with the UHT logo on the back and a blue hard hat stands with their back to the camera, holding a white clipboard. To the right, another worker in a full silver heat-reflective protective suit and a white hard hat is seen from the side. The background is filled with industrial machinery, including a large glowing furnace or ladle, and yellow safety railings. The lighting is warm and industrial, with a strong orange glow from the heat source. A yellow sign with the number 'B0-0920-04' is visible on the left. The overall scene conveys a sense of active industrial work.

Growing with
our customers.

Independent & family owned company
In-house experience of stainless, tool & special steels
Focus on AOD/CLU® & GRANSHOT®
Complete offer to customers
Active worldwide





GRANSHOT® Pilot Plant.
Test your metal at our facility

 UHT

 UHT

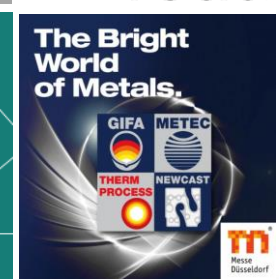
Conferences & Fairs

2018

- INFACON XV, 25-28 Feb, South Africa
- IMnl, June, Kuala Lumpur
- IIMA, 17-19 September, Stockholm
- IFAPA, 5-7 September, India
- MB Ferroalloy, 11-13 November, Lisbon

2019

- AISTECH, 6-9 May, Pittsburgh,
- GIFA/METEC, 25-29 June, Dusseldorf





Refined & Granulated Ferroalloys.

- Go from Bulk/Commodity to Products Supply
- Support development of new steel grades
- Boost steel making operations; cost ,quality, capacity
- Solve customer problem in BOF, EAF, AOD, IF etc