METAL REFINING UNITS

METINJECT

Metallurgical Injection Technology for Hot Metal and Steel

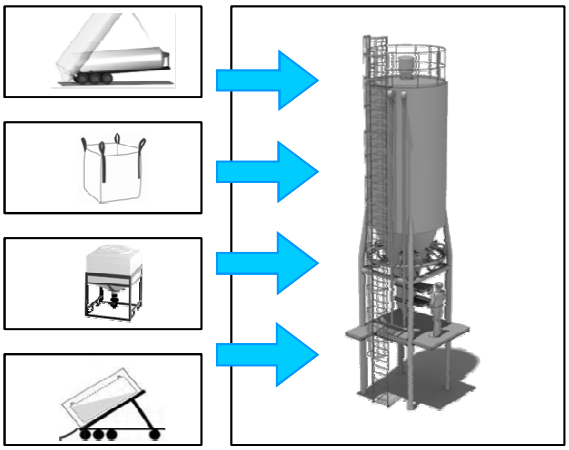
De-Si

De-P

De-S

Chemical Heating

KÜTTNER



STORAGE SILOS

Filling of storage silos by:

- Silo trucks
- Big bags, barrels
- Container bins
- Standard seafreight containers (ISO)

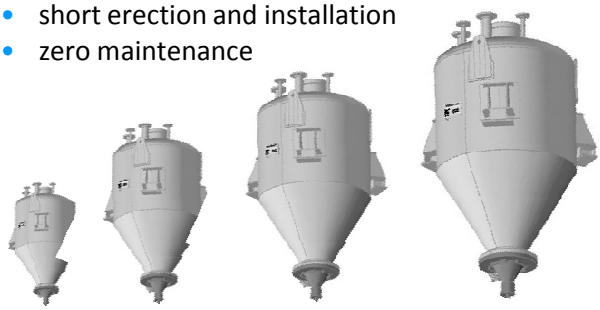
Reagents:

- Fluidized lime
- Calcium Carbide
- Granulated Magnesium
- Iron Oxides Fines
- Carbon powder
- etc.

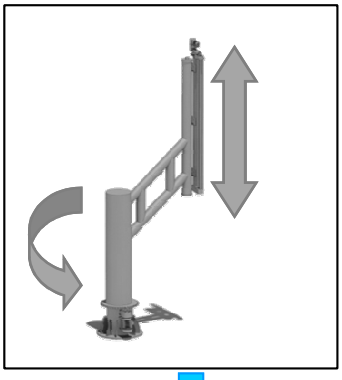
METINJECT - INJECTION DISPENSERS

Concept „plug and play“:

- modular, pre-assembled, tested, certified
- short erection and installation
- zero maintenance



1.0 m³ 2.5 m³ 4.0 m³ 8.0 m³

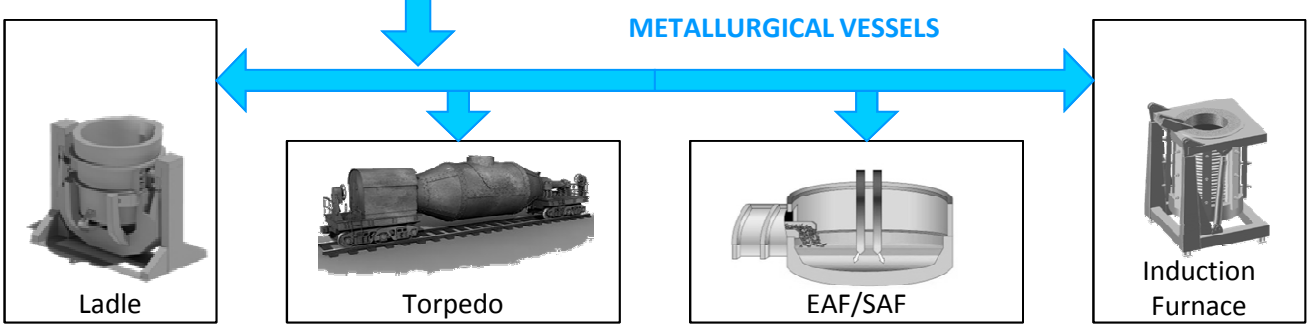


LANCE MANIPULATION

Standard solutions:

- 2-axis (up/down plus swivelling)
- up to 2 lances
- space saving design
- easy operation

METALLURGICAL VESSELS



METINJECT

Küttner's MetInject system has been designed for the following metallurgical treatments:

- De-Si (Desiliconization)
- De-S (Desulfurization)
- De-P (Dephosphorization)
- Recarburization
- Chemical heating

METALLURGICAL AND PROCESS GUARANTEES

Küttner guarantees process and metallurgical figures to ensure the economic success of the investment.

FINANCING CONCEPTS

Upon request Küttner offers financing concepts and business cases on zero investment bases, "price per ton of reagent" basis and others.

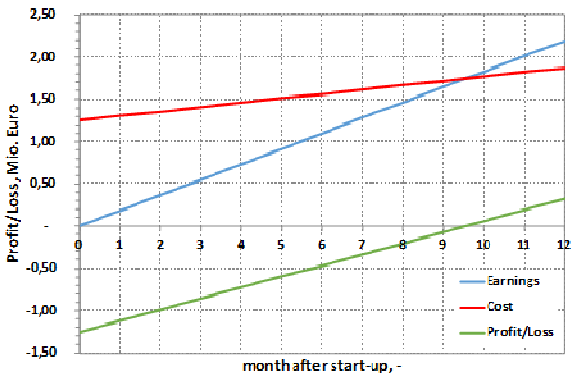
PROCESS OPTIMIZATION

In order to suggest the optimum process concept meeting customer's demands, Küttner offers preceding studies, engineering, and consultancy.

SHORT RETURN ON INVEST
EXAMPLE: HM DE-PHOSPHORIZATION

Dephosphorization of hot metal requires high stirring power which cannot be achieved with a simple addition of reagents to the bath surface thus deep injection is the preferred process to attain a final P content of ≤ 0.03 %.

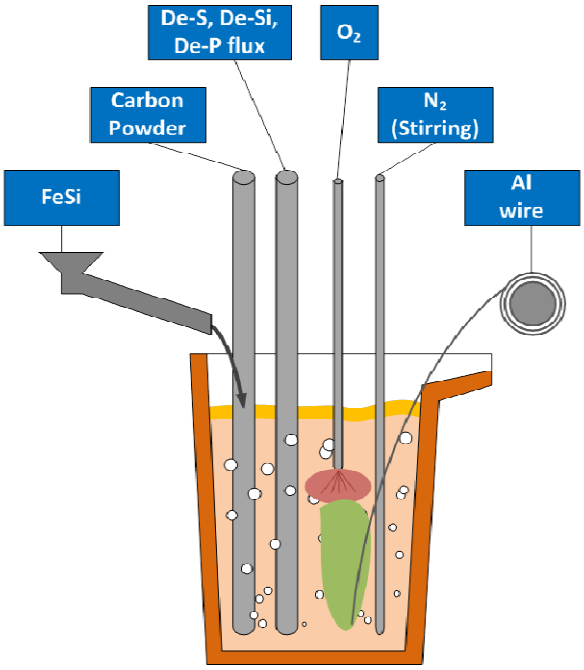
Due to the increase in value of the casted pig, the investment typically pays back in less than 1 year:



START SMALL AND EXTEND FLEXIBLY AS REQUIRED WITH ADDON PACKAGES

The following standard packages are available as addon packages:

- Unloading stations for big bags, silo trucks, ISO containers, container bins, etc.
- Screening machines
- Intermediate silos
- Transport dispenser
- Skimming machines
- Küttner's Metallurgical PC (MetPC)
- Temperature measurement and sampling systems
- Analyzers
- Generators of required process gases (pressurized air, nitrogen, oxygen, etc.)



Satisfying process demands with multi-refining

REFERENCES

Latest references for metallurgical injection stations are at:

- ISDEMIR Iron & Steel, Turkey
- TATA Iron & Steel, India
- ThyssenKrupp Steel, Germany
- TISCO Taigang, China
- TRONOX KZN Sands, South Africa
- SAIL IISCO, India

QUESTIONNAIRE METINJECT

If you have any metallurgical task, please contact us. Providing the following basic information would help us to suggest suitable solutions:

1. Company / plant name / location / contact

_____

2. Annual production of liquid metal

_____t/y ☐ Hot Metal ☐ Steel

3. Metal weight in ladle for treatment

_____ t

4. Number of aimed treatments?

_____ _ per day _____ _____ per year

5. Metallurgical task?

☐ Desulfurization ☐ Desiliconization
☐ Dephosphorization ☐ Recarburization
☐ Heating ☐ _____

6. Metal analysis before treatment (average)

C _____ % Si _____ %
Mn _____ % P _____ %
S _____ % Temp. _____ °C

7. Target S or P content after treatment

S < _____ % P < _____ %

8. Process limitations/constraints

Max. _____ min for injection
Max. _____ min for complete treatment
C > _____ % Temp. > _____ °C

9. Preferred reagents for injection?

☐ CaC_2 ☐ CaO
☐ Carbon ☐ Premixed fluxes
☐Mg ☐ _____

10. Freeboard in ladle/furnace

_____ mm to _____ mm

11. Any treatment steps after this required?

☐ FeSi addition ☐ Heating
☐ _____

12. Supply of reagents?

☐ ISO Container ☐ Big bags
☐ Silo trucks ☐ Flo bins
☐ Barrels ☐ _____

13. Vessel for injection?

☐ Ladle ☐ Induction furnace
☐ _____

14. Slag skimming facility available?

☐ yes ☐ no

15. Lance manipulator/carriage available?

☐ yes ☐ no

16. Dust collection and filter system available?

☐ yes ☐ no

17. Calculation/Reporting system required?

☐ yes ☐ no

18. Distance between injection equipment and treatment stand?

≈ _____ m

19. Reagent(s) storage available?

☐ Silo _____ m^3 ☐ no

20. Please send drawings of ladle/furnace and area of interest (if available).

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