

Thermal processing Technology

The Next Generation



Presented by
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SANKEN INSERTEC EUROPE S.A.



SANKEN GLOBAL NETWORK



Technology Evolution

Advanced Side-well Melting

Inline Molten Metal Treatment

Molten Metal Delivery and Dosing

High Accuracy Dosing Pump

Decoating Systems

Basketless Eco T6 system

Ancillary equipment

Global Strategic Products

Mission:

To meet various customer's requirements and needs by utilizing of standard parts and common modules.

Objective :

GSP achieves overwhelming competitiveness in the world market with standardized modular design having flexibility to meet customer's requirements

Equipment : Melting and Holding Furnaces

Hot Metal Transfer Launder

Roller Hearth Aluminum Heat Treatment

Reheating Furnace etc



GSP MELTOWER Modular Concept

Tower Module

Melting
Chamber
Door Module

Holding Chamber

Melting Chamber

Door Module

Core technology Tilting MELTOWER® Furnace

Generic features

- Continuous operation
- Bulk Melting
- Provides quality metal on demand at the correct temperature uniformity and compositional homogeneity.
- Separately controlled Melting and Holding chambers
- Free standing compact layout
- Wide range melting capacity , from 500 to 5000 kg/h
- High melting efficiency
- Improved metal recovery



Core technology Static MELTOWER®



Innovative Dual Charging Systems

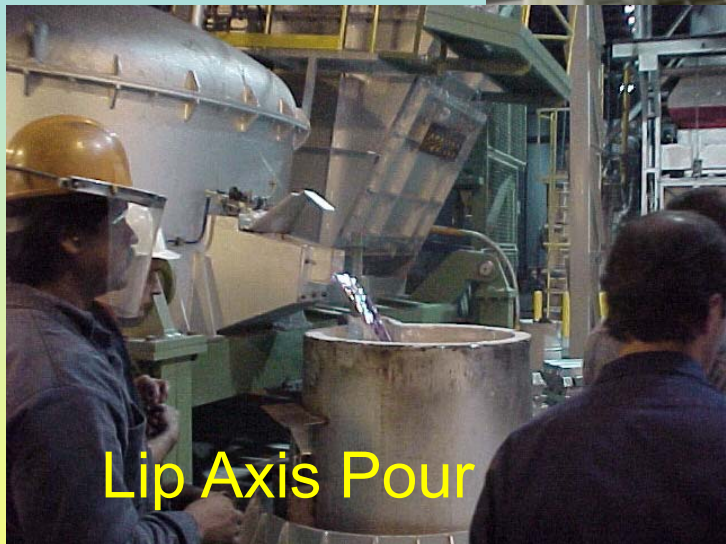


Two tier ingot storage and inclined scrap conveyor systems

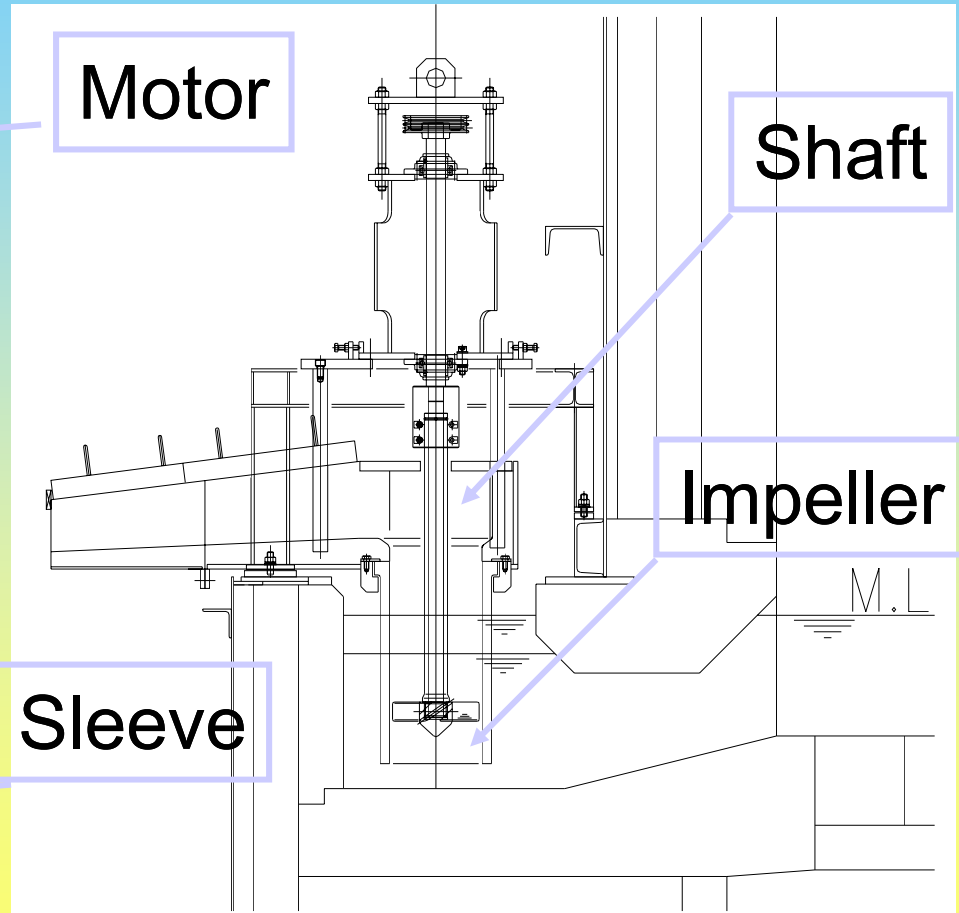
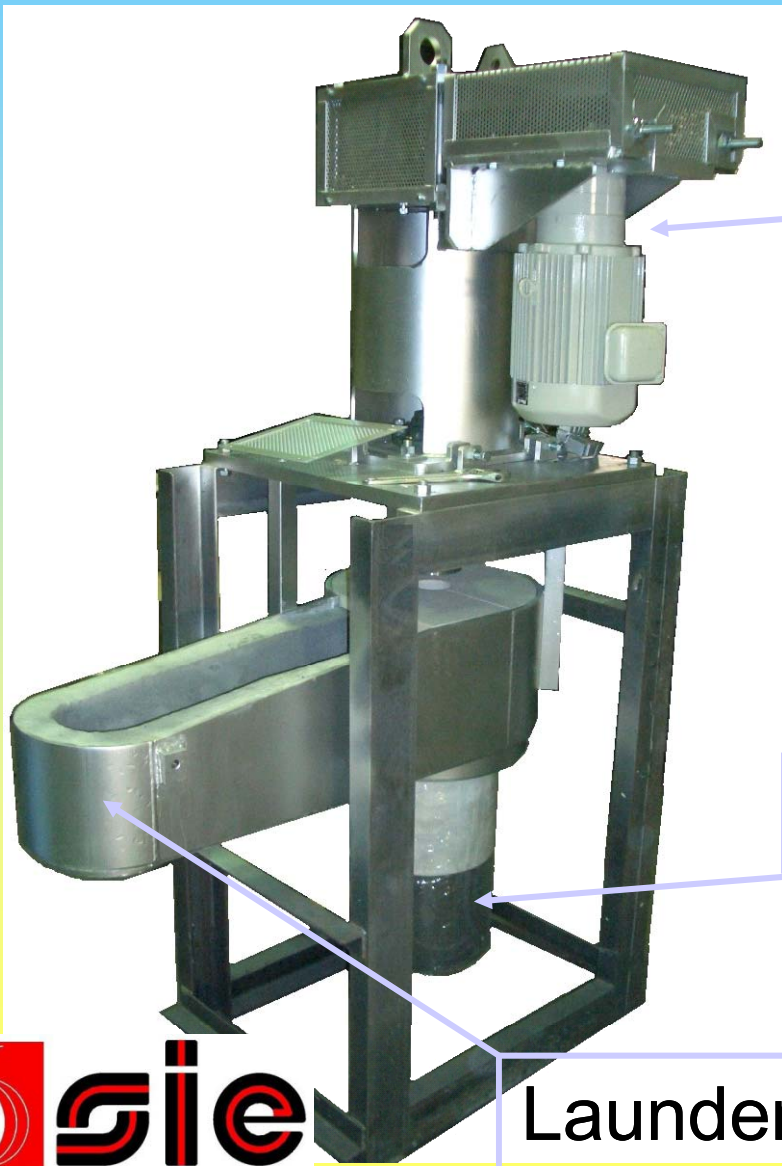
Combination MELTOWER®



SANKEN Tapping Systems



Features of KAWAGOWA



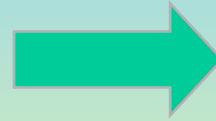
Performance of KAMAGOWA

1. Tap Out Rate



500 kg/min

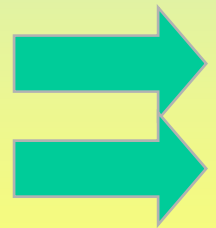
2. Tap Out Head



360 mm

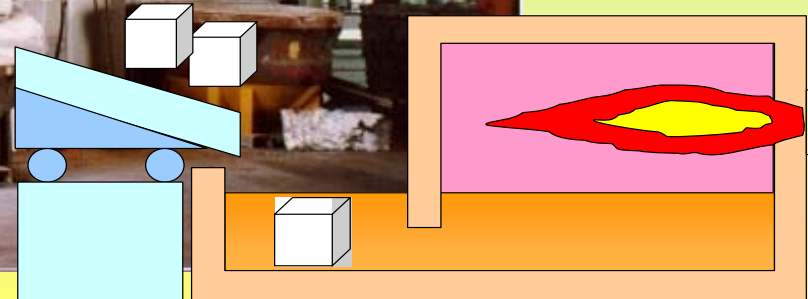
3. Life of Consumable Parts

Graphite Impeller
Ceramic Shaft



Avg. 5,500 ton
No failure
(as of June 2007)

Advanced Side Well Melting

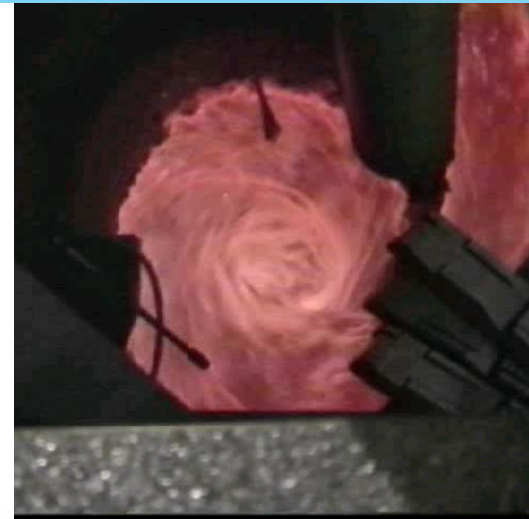
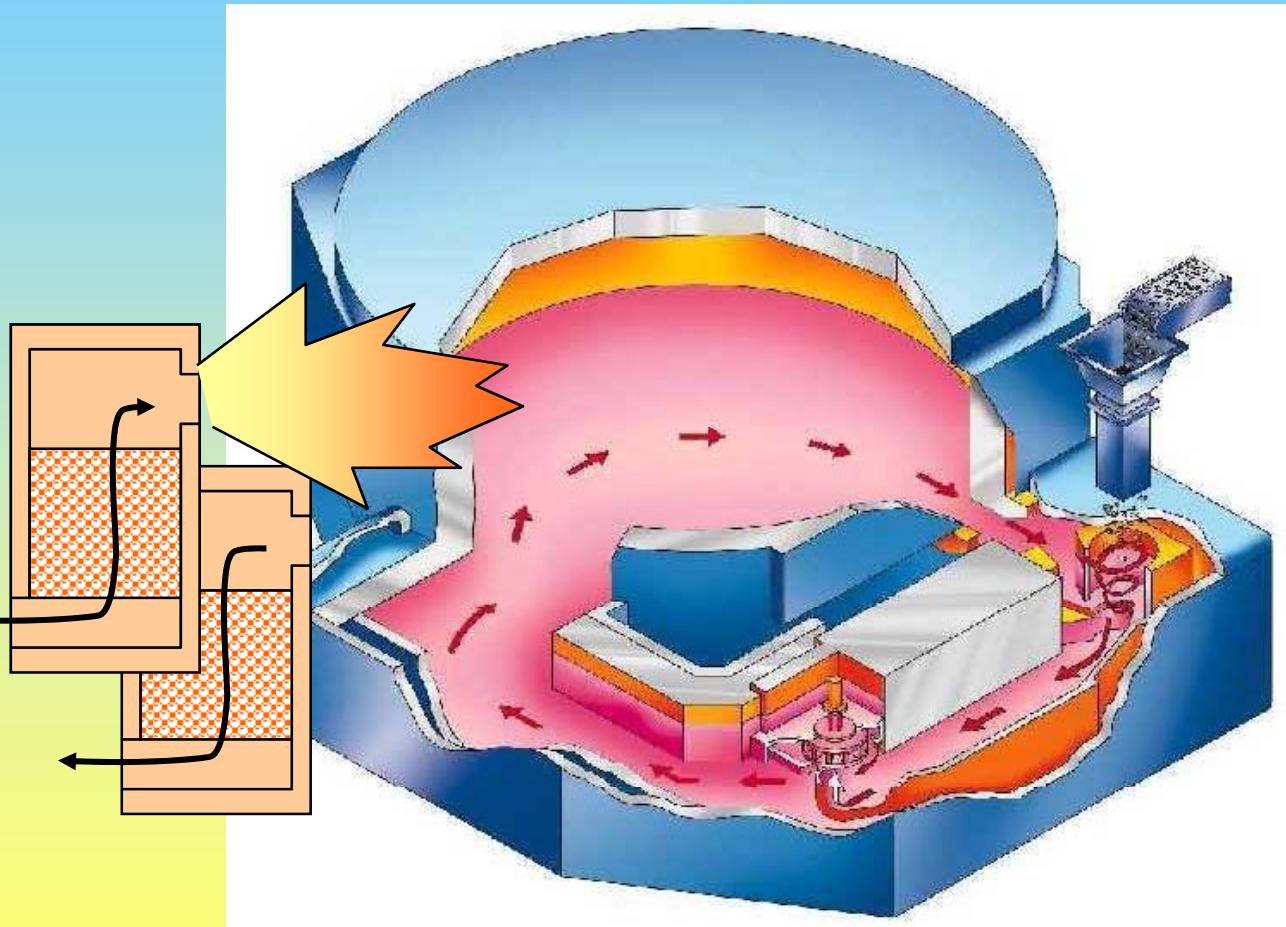


Advanced side well melting

Features

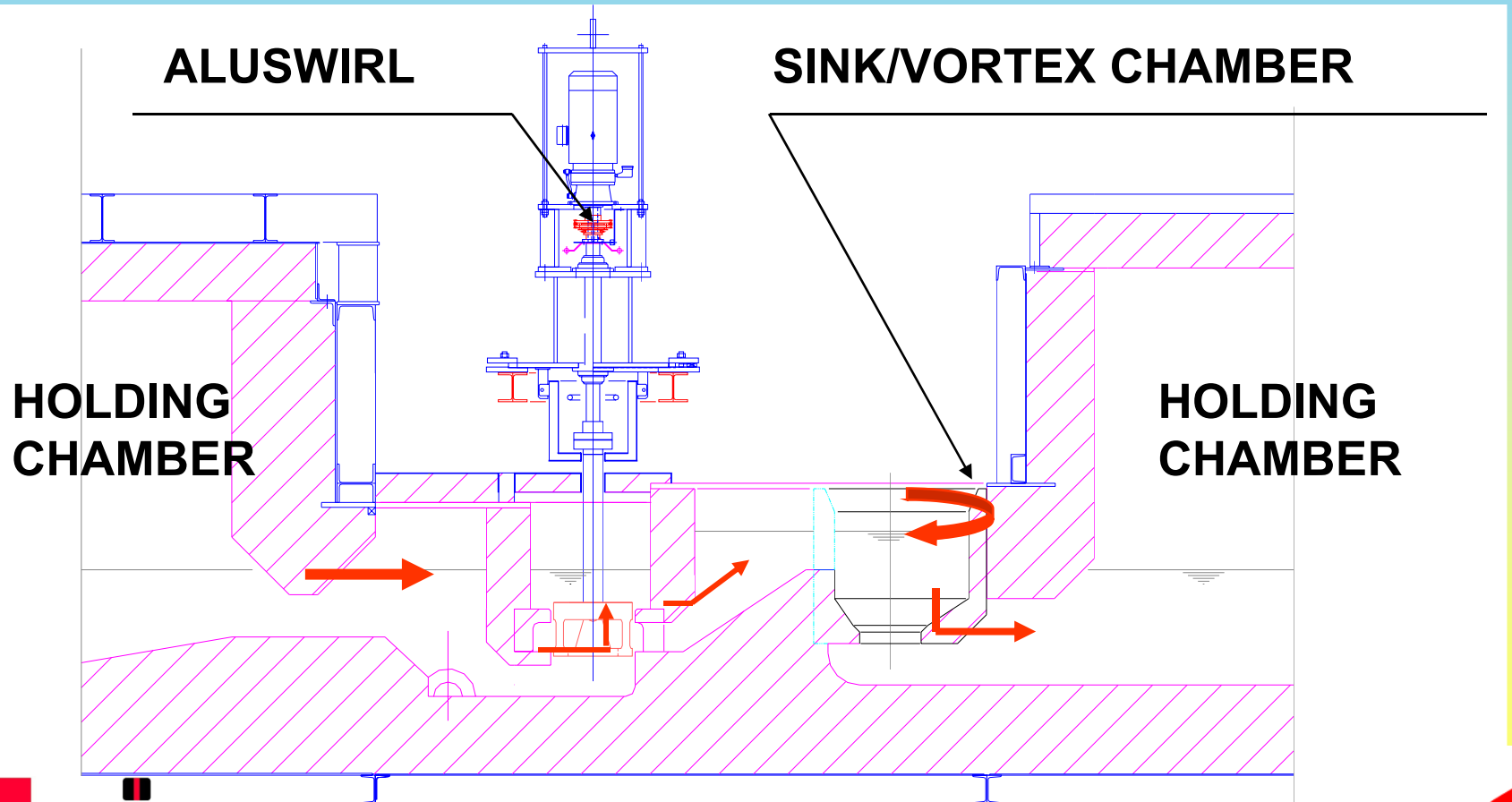
- Multi-port regenerative burner system
- Forced convection
- Applied Aluswirl Sink Vortex
- Magnetohydrodynamic Option
- Continuous operation (Tapping&Charging)
- Indirect heating

Lateral Stirring and sink vortex



Aluswirl Principle of Operation

High Circulation Rate



Aluswirl Pump

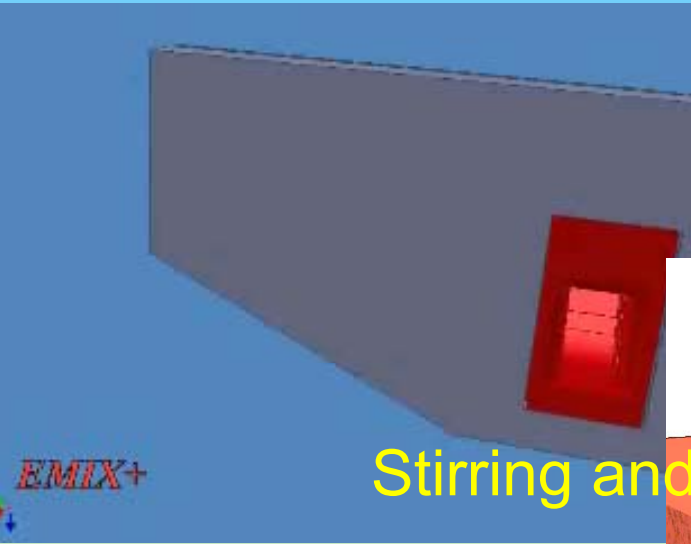


- Low Energy Consumption
- Improved Wear Rates
- Proven Reliability
- Ease of Maintenance

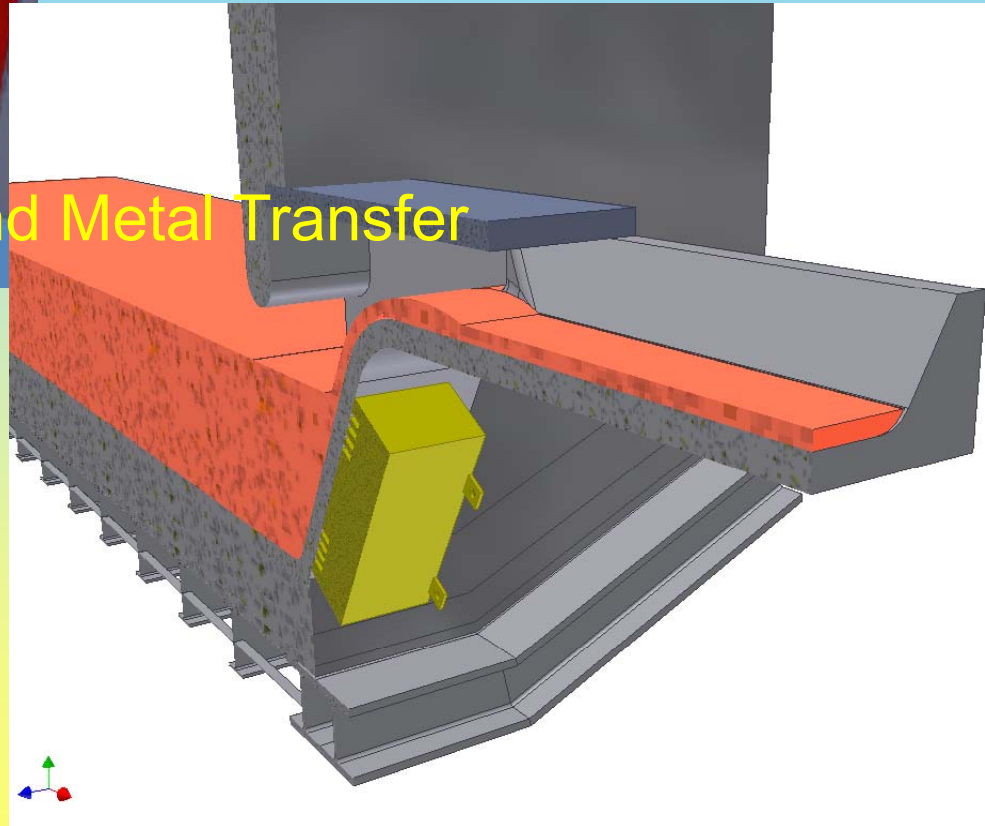
SERVICE LIFE

- **SHAFT: 6 to 12 months**
- **IMPELLER: 4-5 months**

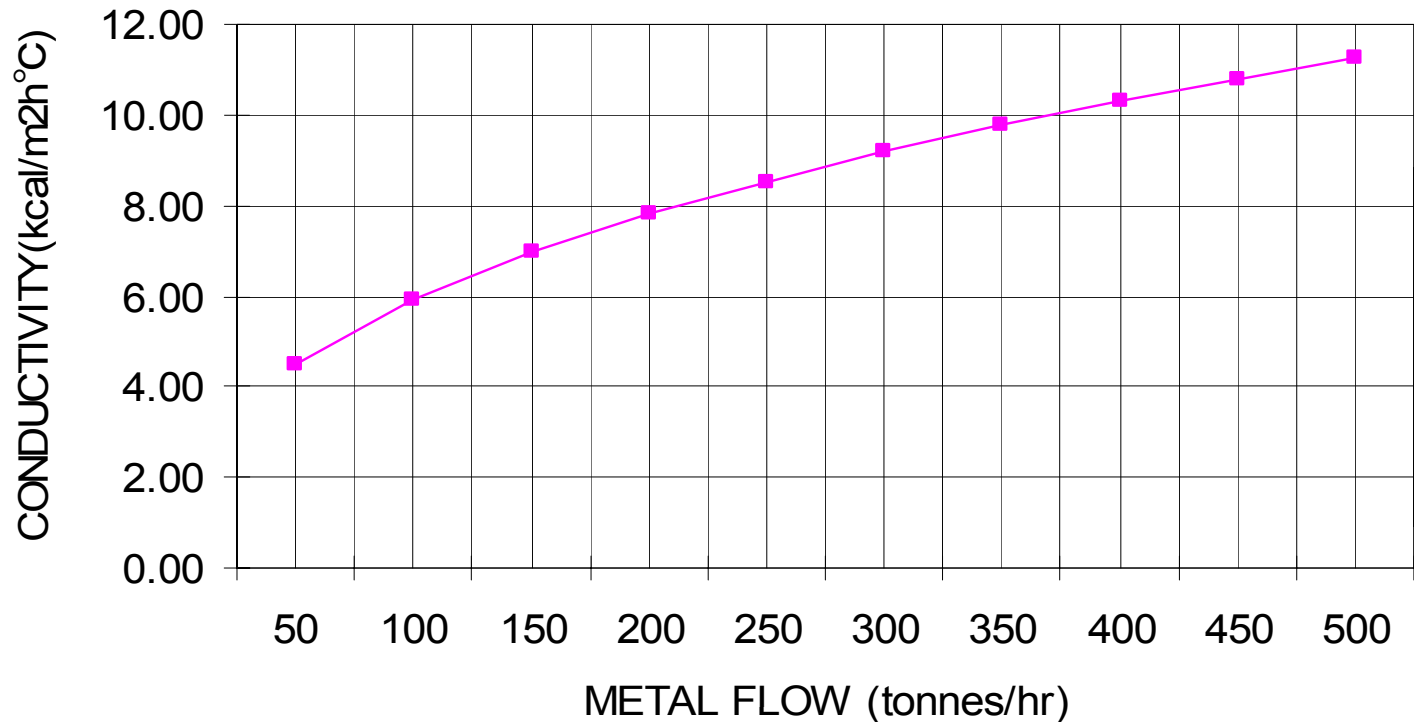
Multifunctional Stirrer



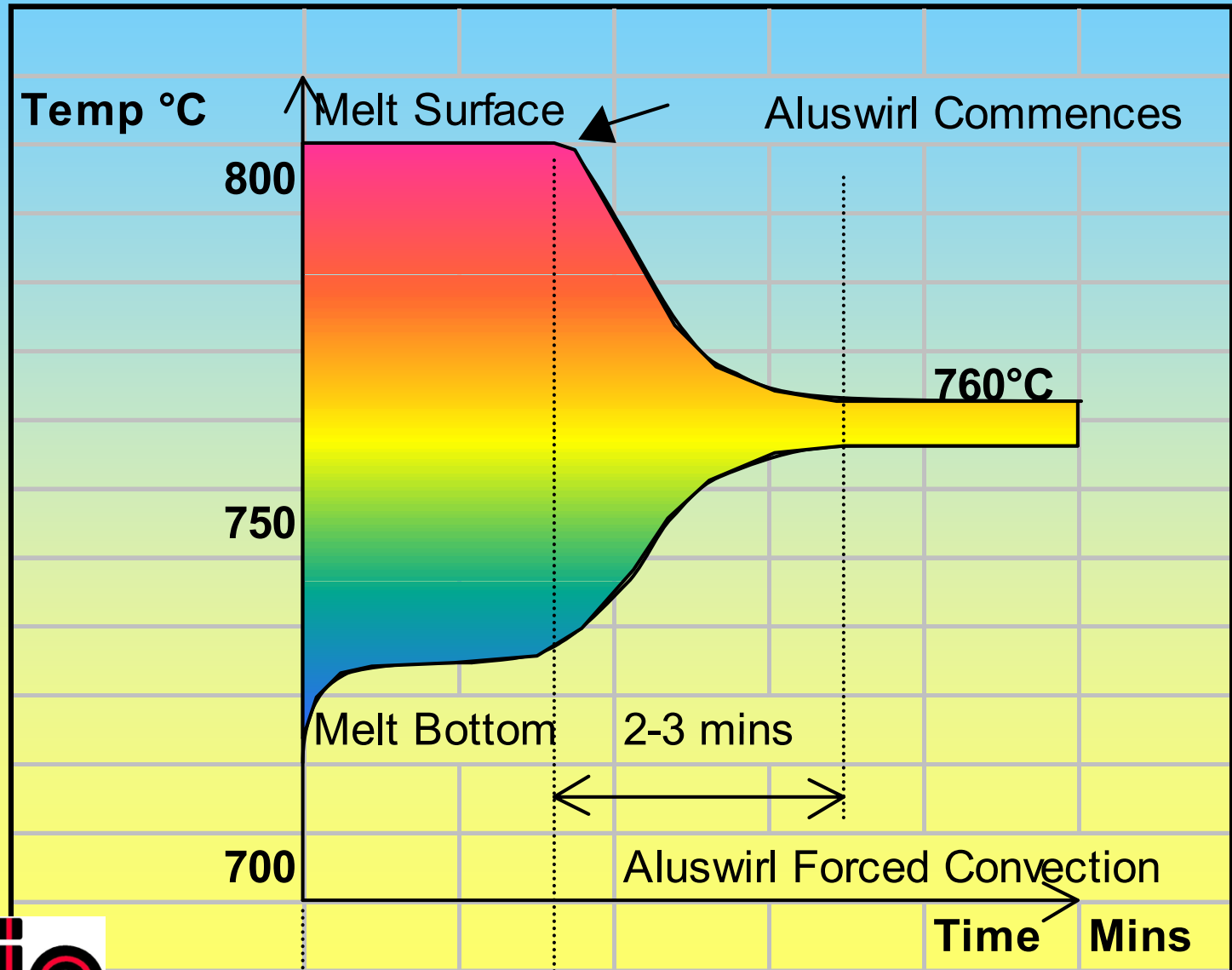
Stirring and Metal Transfer



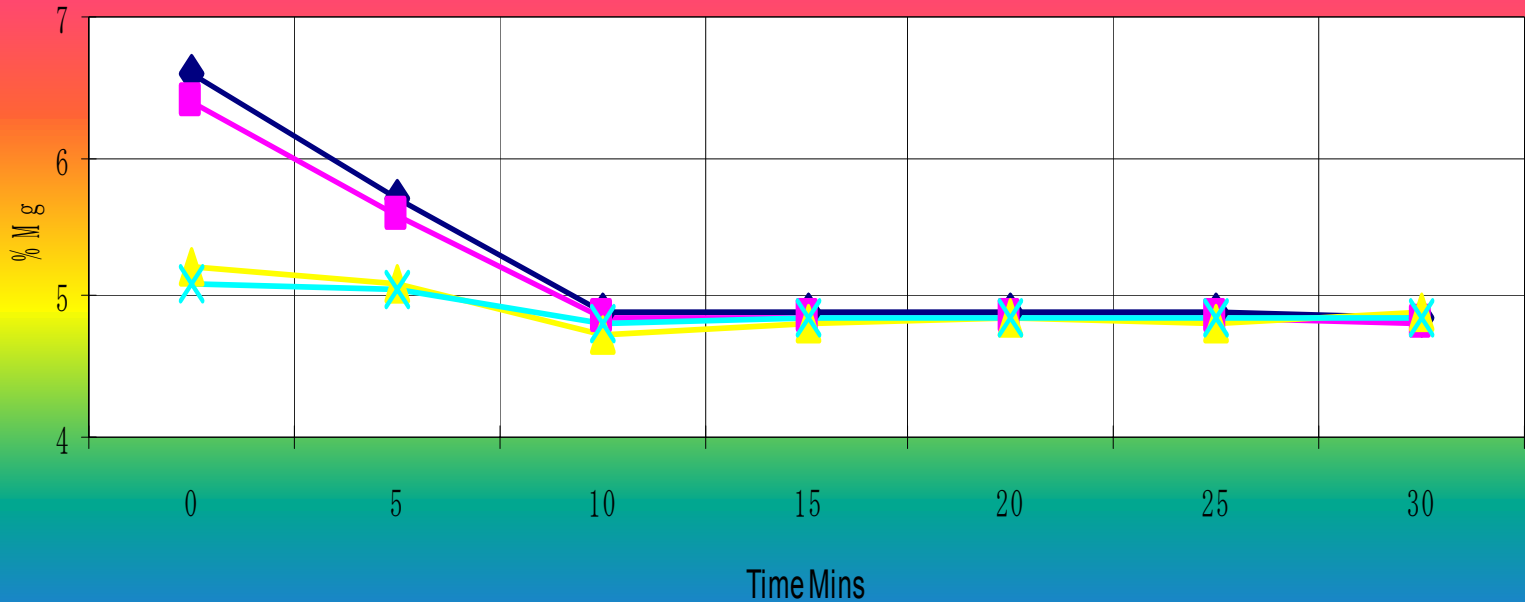
Correlation between metal flow and conductivity



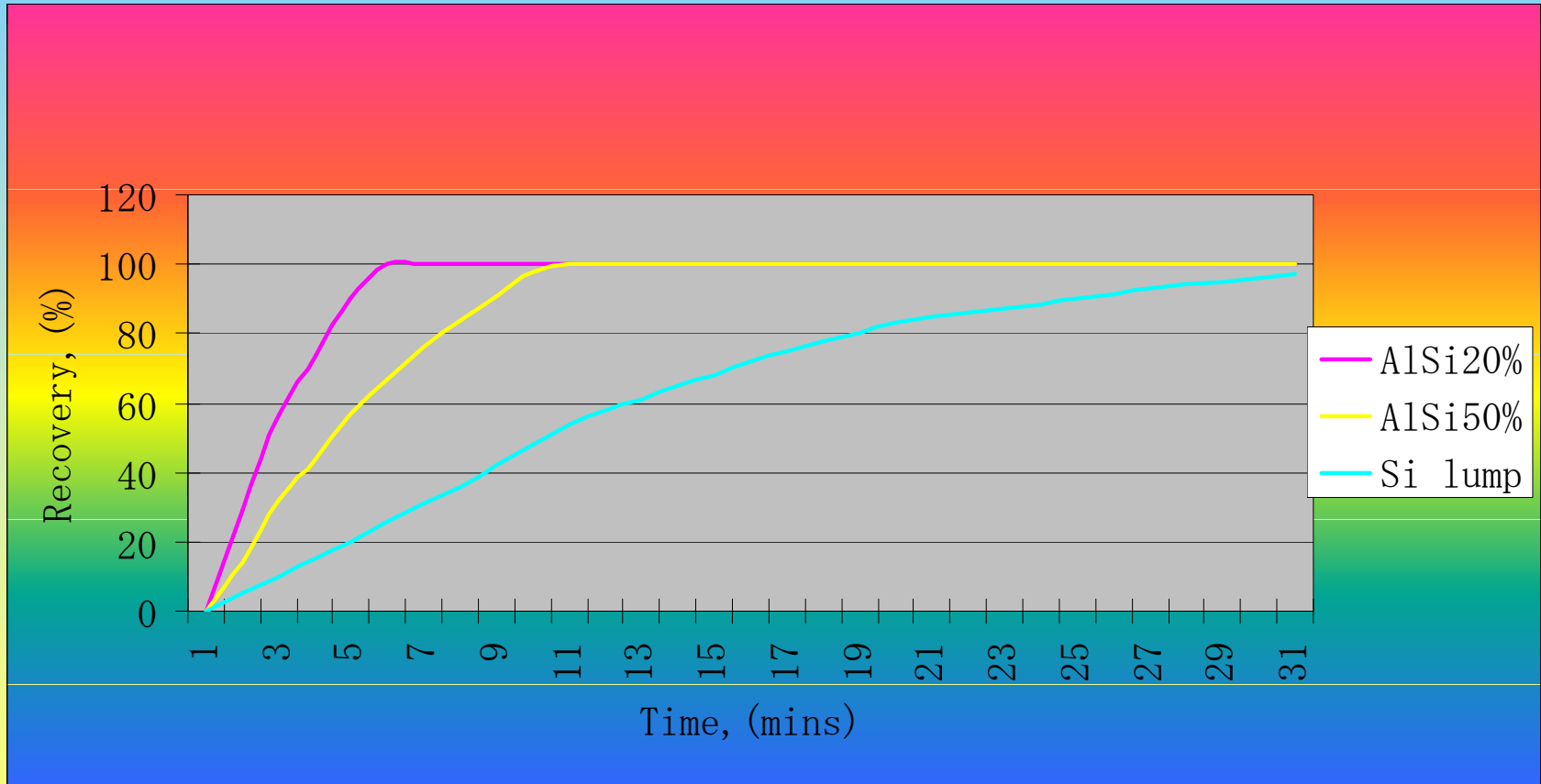
Temperature Uniformity



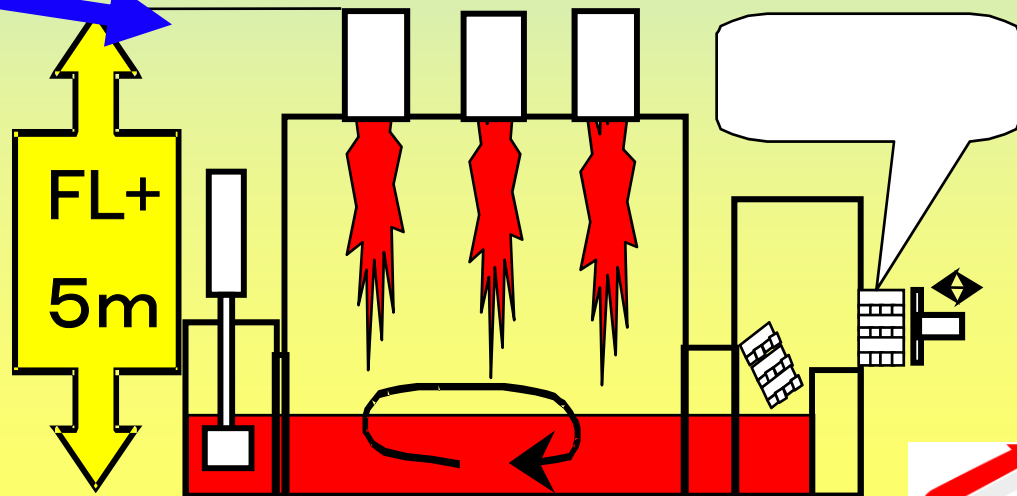
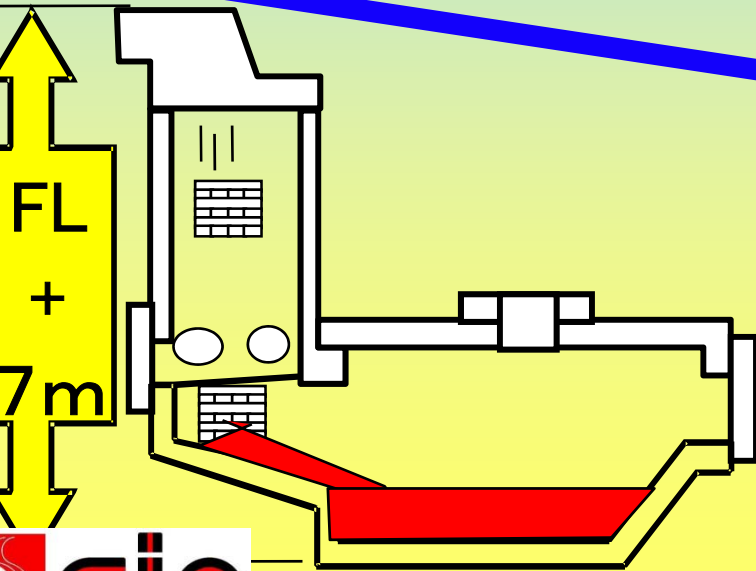
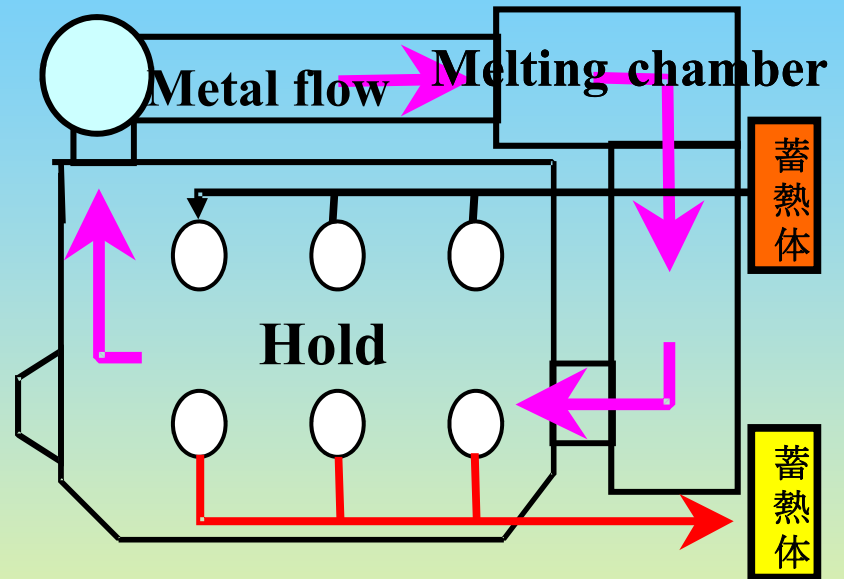
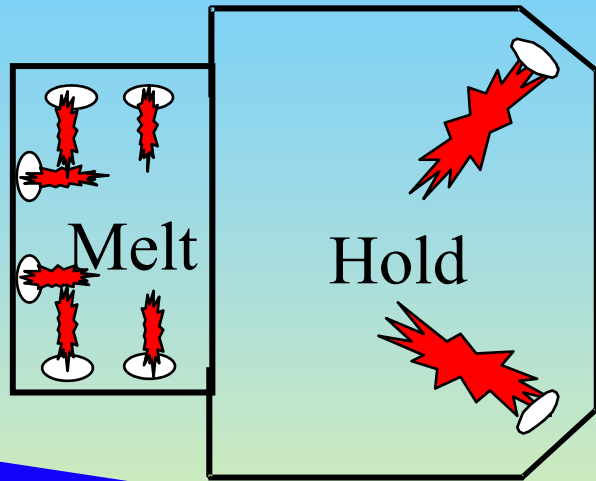
Compositional Homogeneity



Comparison of the Metal Dissolution Rates between Elemental Silicon and Master Alloys



Meltower vs Side Well Melting

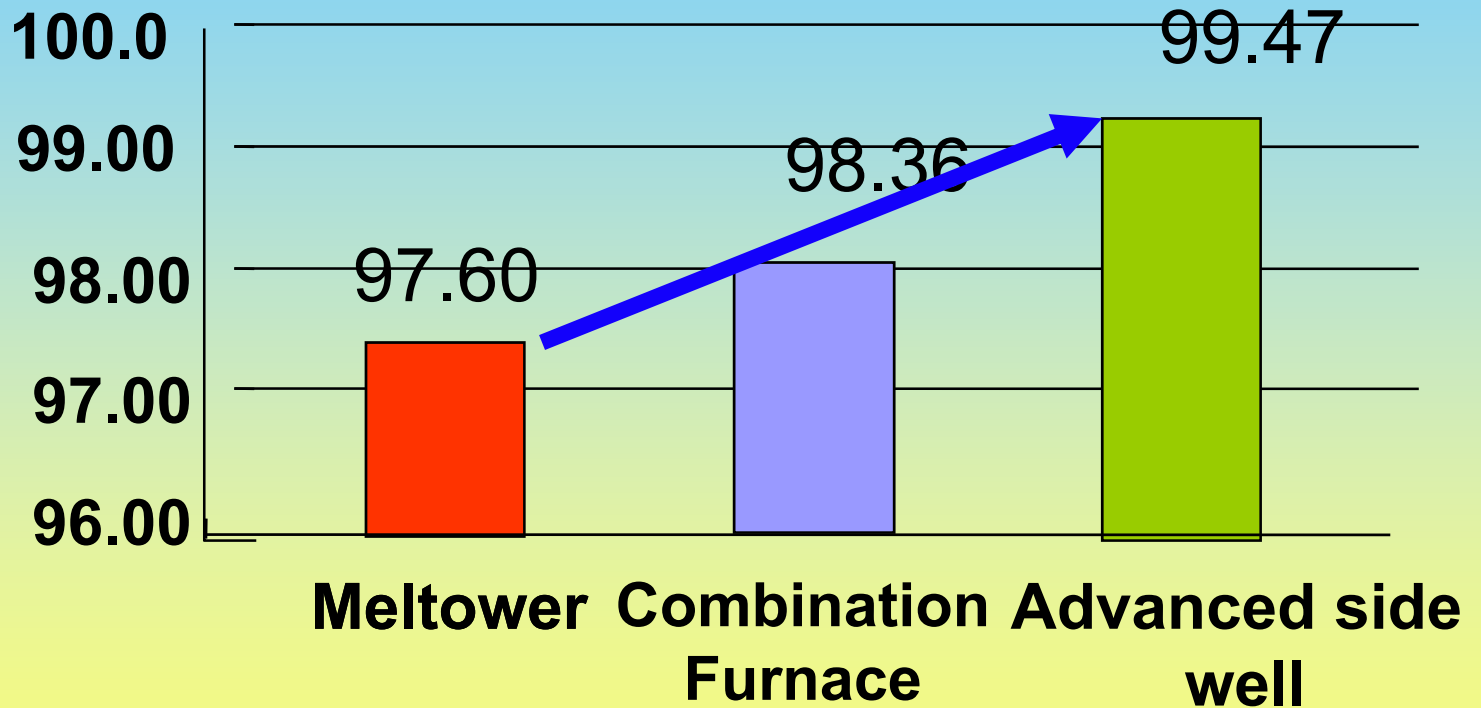


MELTING TIME COMPARISONS FOR MAJOR MATERIAL TYPES

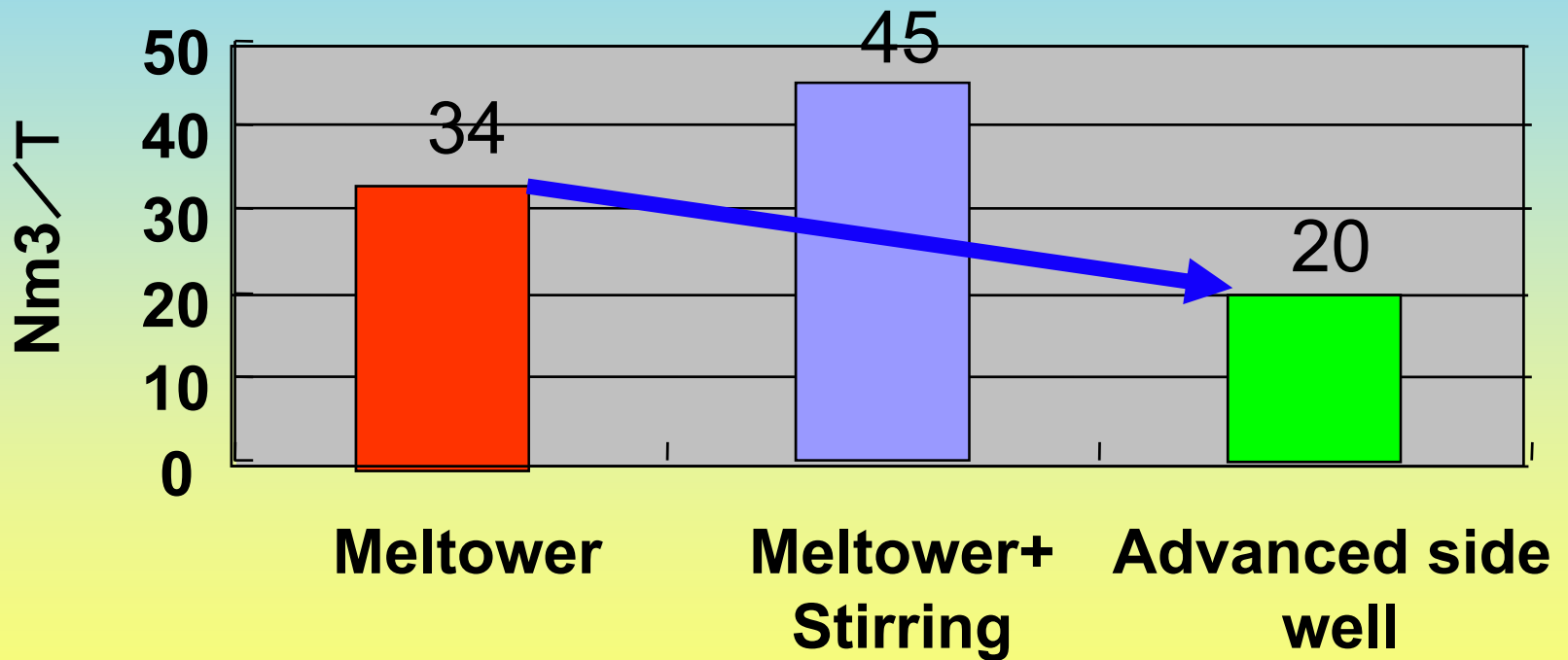
Light Gauge Submergence

Material type	Density	Melting time
Machining Chips	0,4 – 0,5 ton/m3	2 sec
Irony AL	3.0kgs/pc	15 sec
Wheel	7-15kg/pc	45 sec
Ingot	500kg/bundle	220secs

Metal Recovery



Fuel Economy



Advanced side well melting

Key Benefits

- Improved metal recovery
- Flexibility to process light gauge materials
- Accelerated melting rate (25%)
- Excellent compositional homogeneity
- Close temperature uniformity
- Low environmental impact (30% NOX reduction)

Conventional Methodology for Molten Metal Treatment and Delivery

Disadvantages

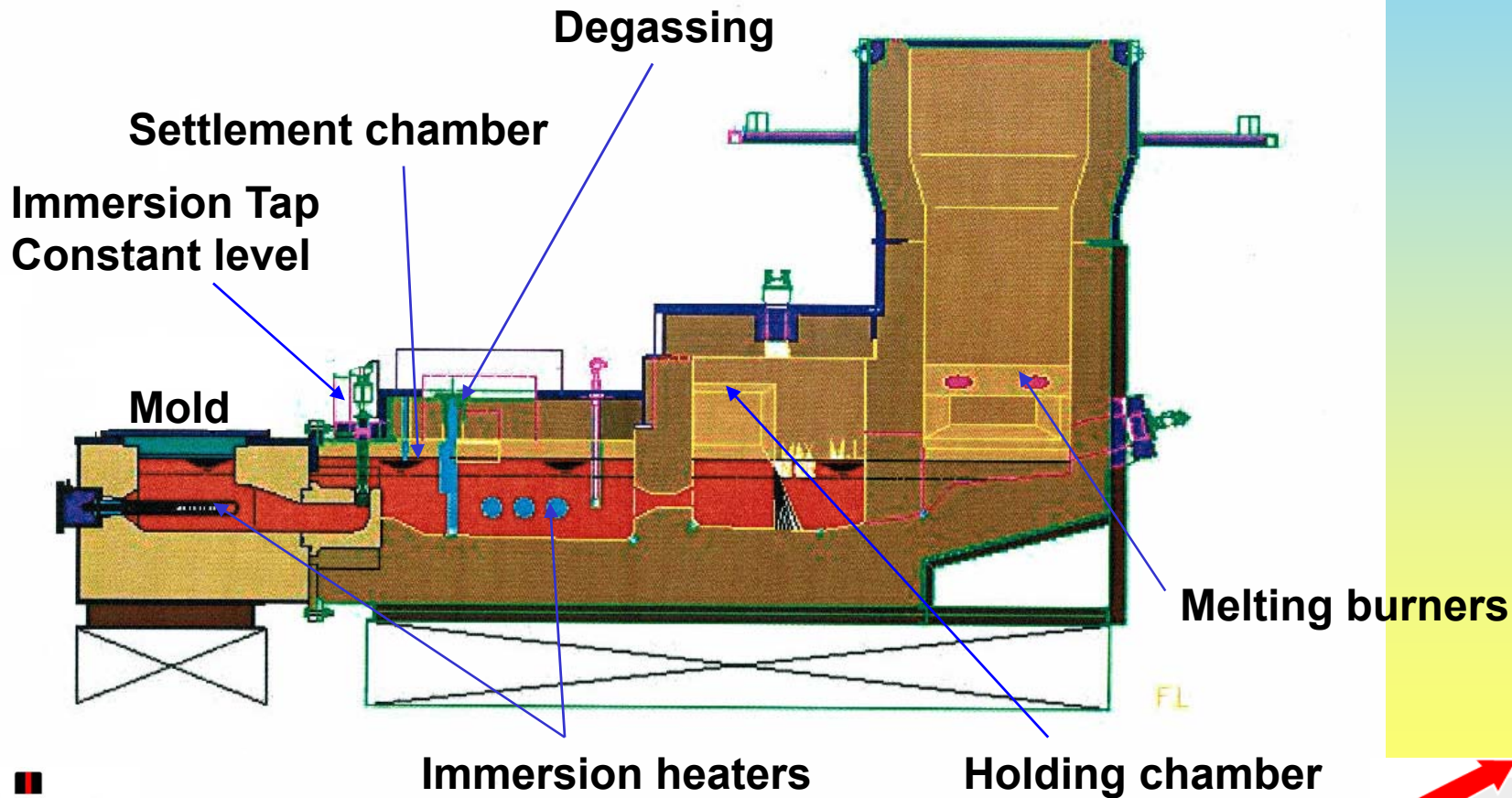
- Inconsistent Metal Quality
- Temperature Losses
- Unsafe Molten Metal Handling
- Hot Working Environment

Synergy for Implementing Inline Molten metal treatment and Delivery Technology

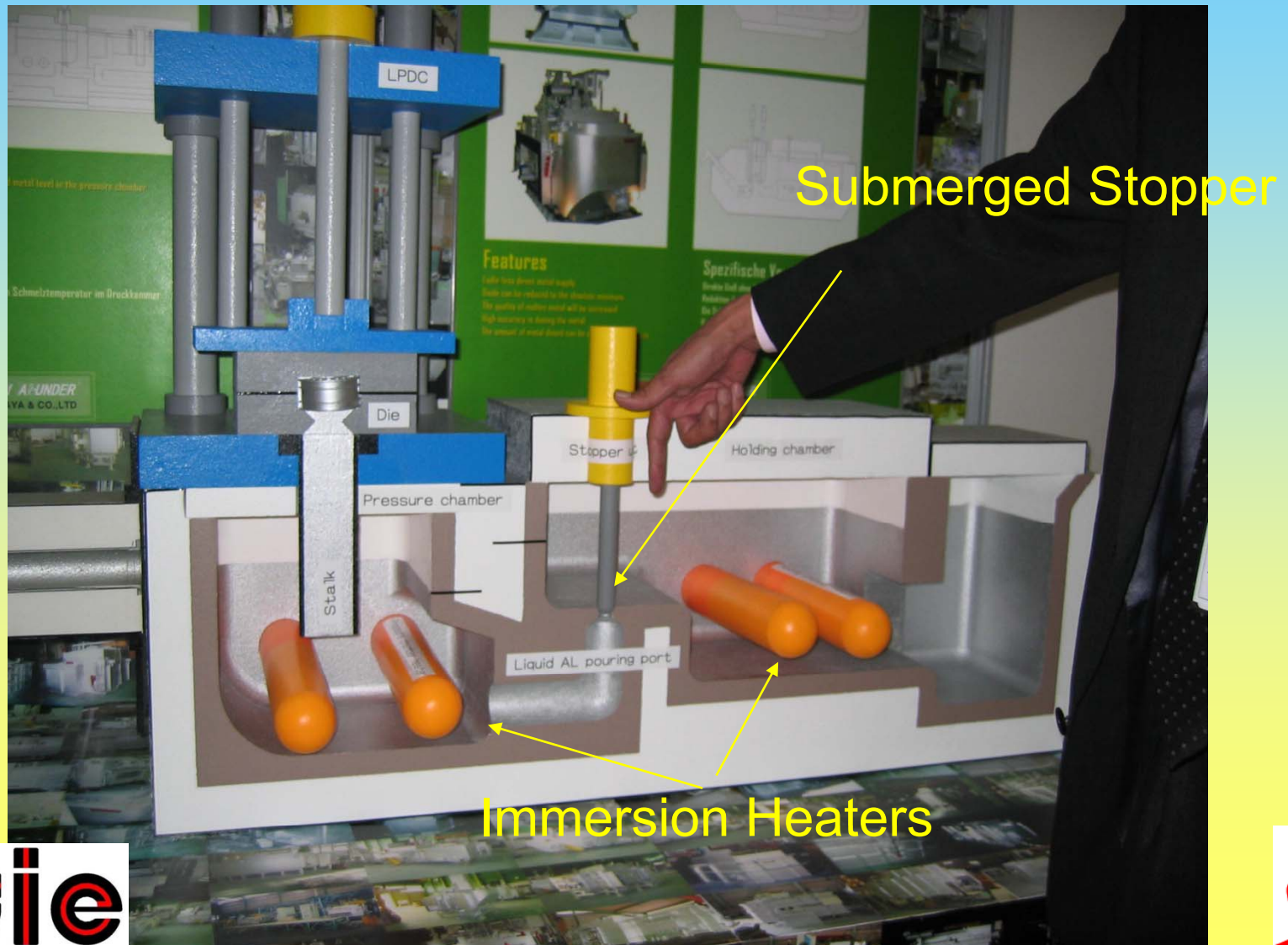
Key Benefits

- Clean Quality Metal for structurally high Integrity components
- Energy Savings
- Safe Molten Metal Transfer
- High Productivity
- Fully automated process management
- Reduce fixed costs

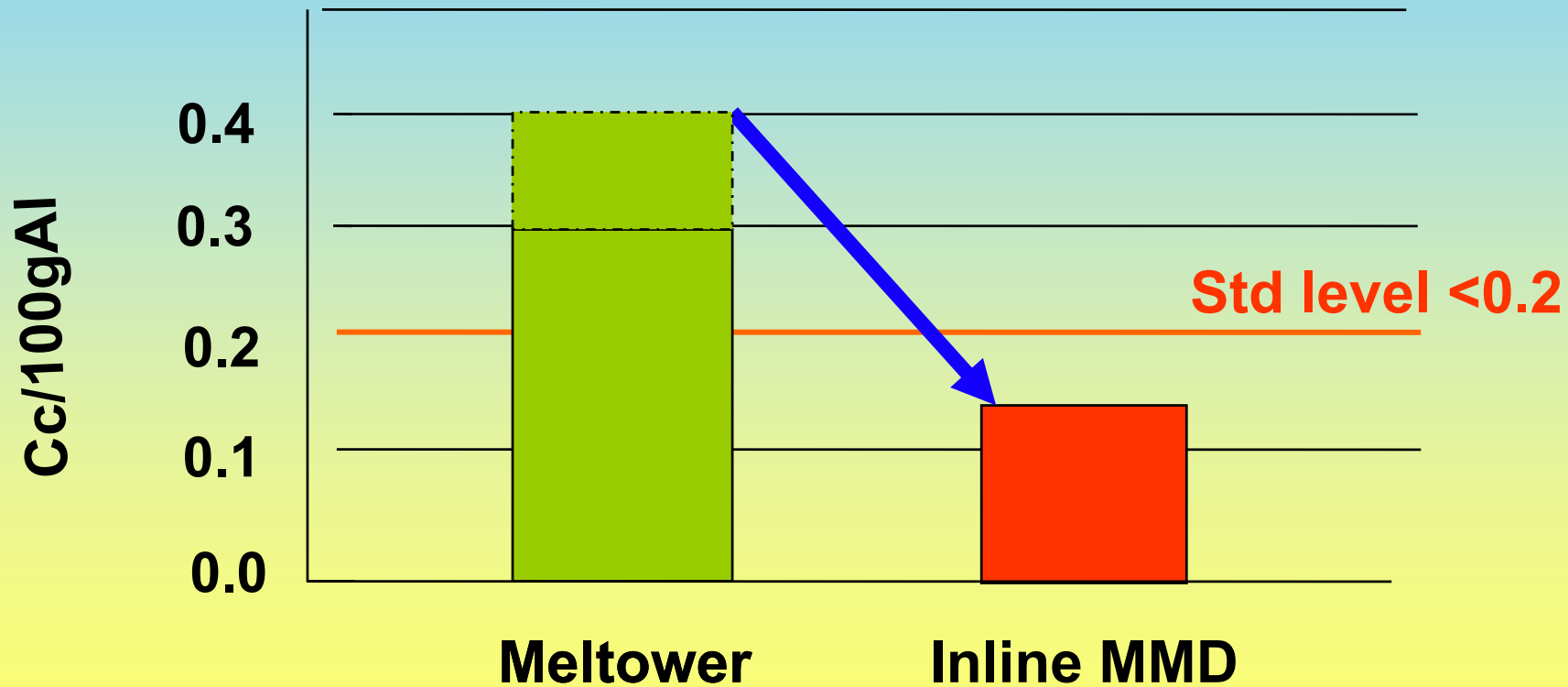
Inline Metal Treatment and Delivery System



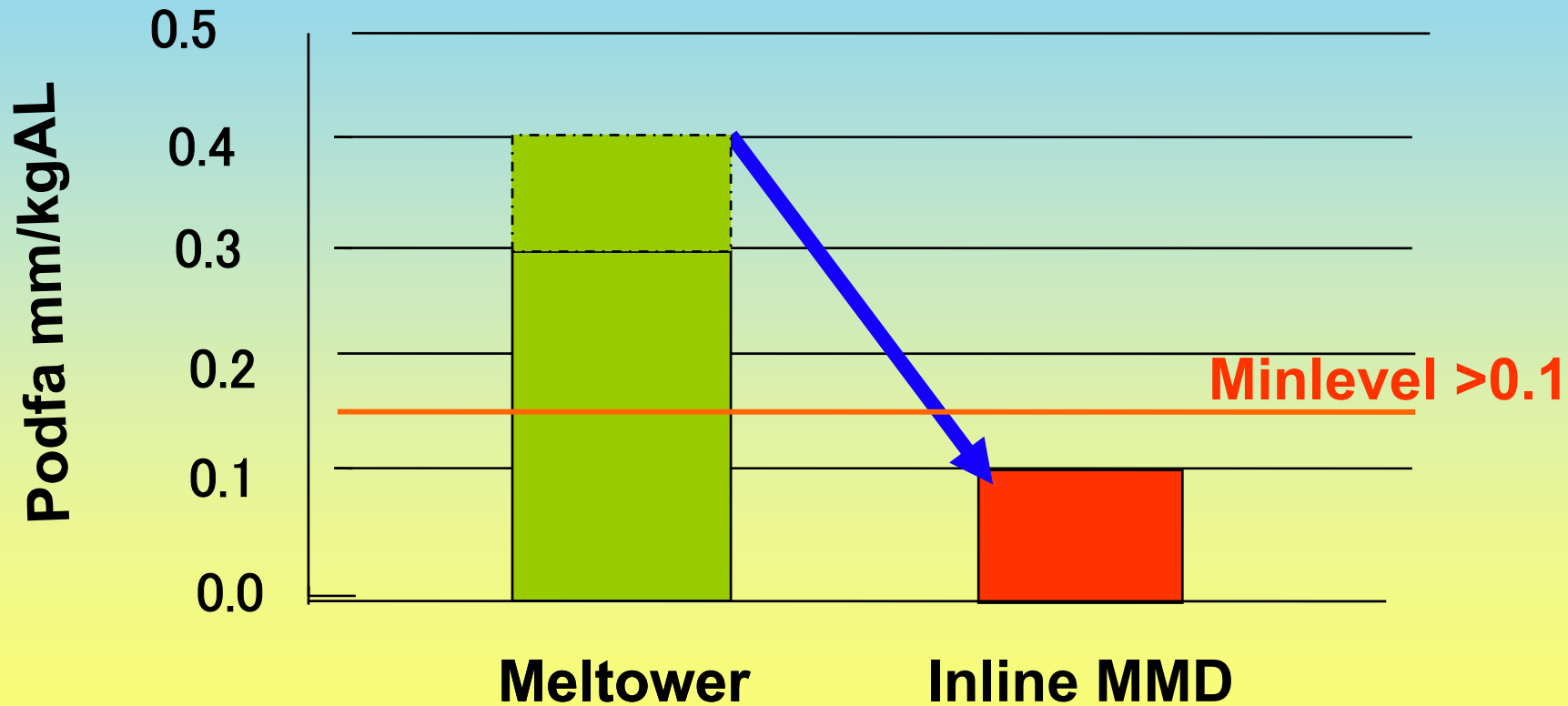
Low Pressure Cell Holding Furnace



Hydrogen Gas Solubility



Inclusion Concentration



Comparisons

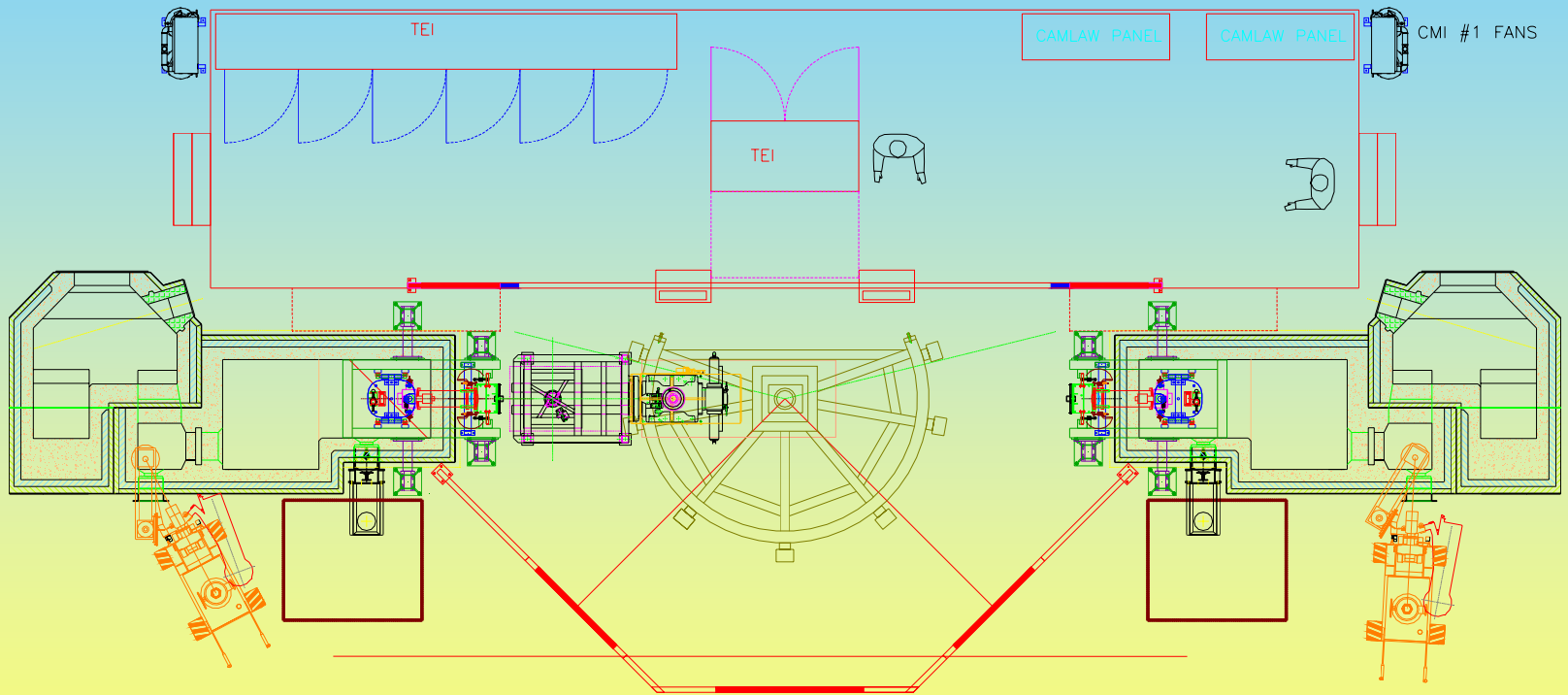
Equipment	Units	Fully automated dosing system	Conventional methodology
MeltingFuel consumption	%	40	100
Metal level	mm	± 5	
Temperature uniformity	$^{\circ}\text{C}$	± 3	± 15
Dosing accuracy	%	± 3	± 3
Cycle	sec/ shot	25	50
Productivity		200	100
Defect ratio by inclusion	%	0.03	1

Case reference for a 250kgs/hour system



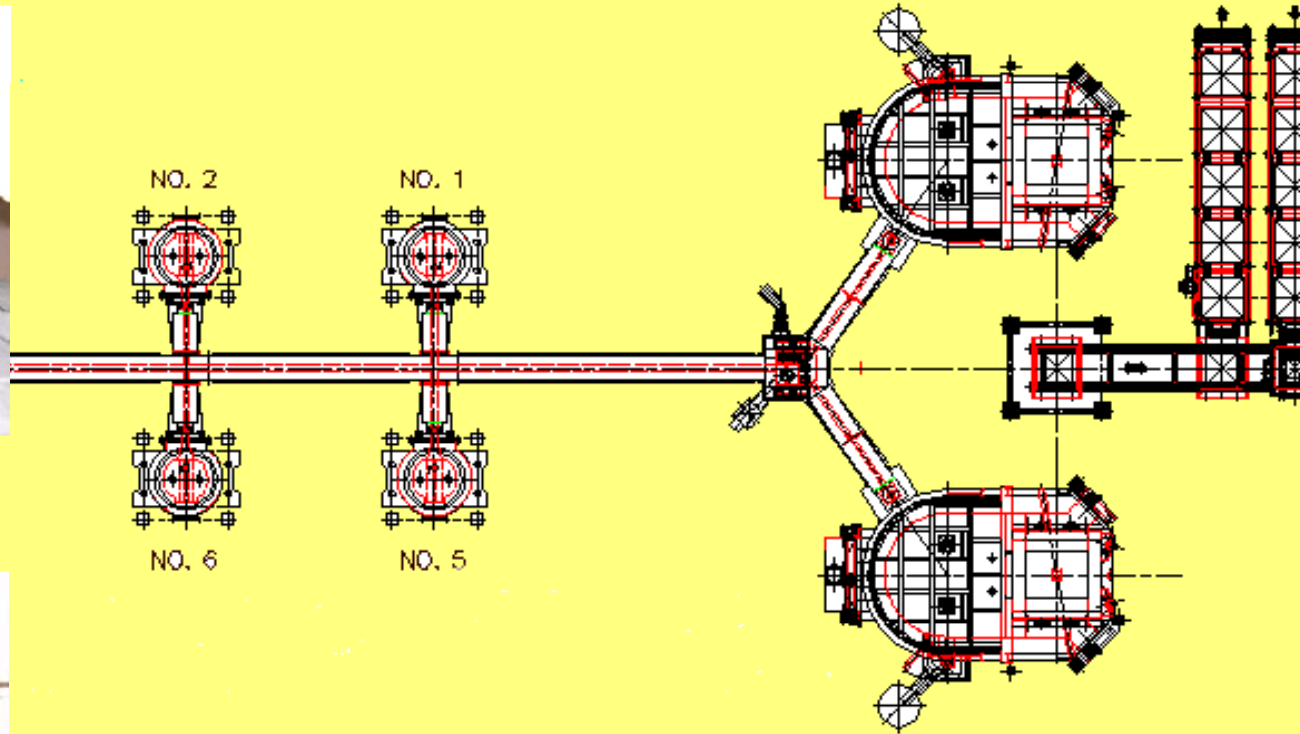
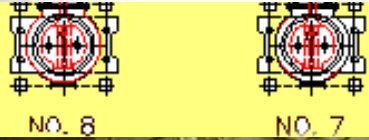
Case reference for a 250kgs/hour installation

Cylinder Block Manufacture



Benchmarked Metal quality

Inline MMD combined with Alumap innovation for LP Casting Cell



**Melting treating and distribution to 8 casting cells
in continuous operation**

INLINE MMD Delivery Systems

Metal Quality

SANKEN
HERTFUL THERMAL TECHNOLOGY

商外事業グループ	KIA 向け LPD ライン 溶湯分析	May.18, 2005	
		承認	作成
		高橋	

溶湯分析位置・・・SAMPLING POINT A B C D

A ガス後の SAMPLING 及び 介在物の SAMPLING
B ガス量の SAMPLING 及び 介在物の SAMPLING
C ガス量の SAMPLING
D ガス量の SAMPLING

分析の SAMPLE は合計 6 ケとなります。(大 2 ケ 小 4 ケ)

精錬室

Melting Furnace

SAMPLING する MOLD を別途送付します。
SAMPLING は別紙 MOLD PH1 及び PH2 を使用してください。

214n/2 1/2 KIA_molten metal analysis_TKH.doc

三建産業株式会社 報告書

件名 ADC合金の分析

依頼日:平成17年6月14日

試料履歴: 不明

結果:

1. ガス量分析

表-1 ガス量分析結果

	全ガス量	備
A	0.35	
A	0.31	
B	0.29	
B	0.28	
C	0.38	
C	0.28	
D	0.44	
D	0.32	

報告書

日本軽金属株式会社

写真 1 介在物顕微鏡

1000μm

1000μm

500μm

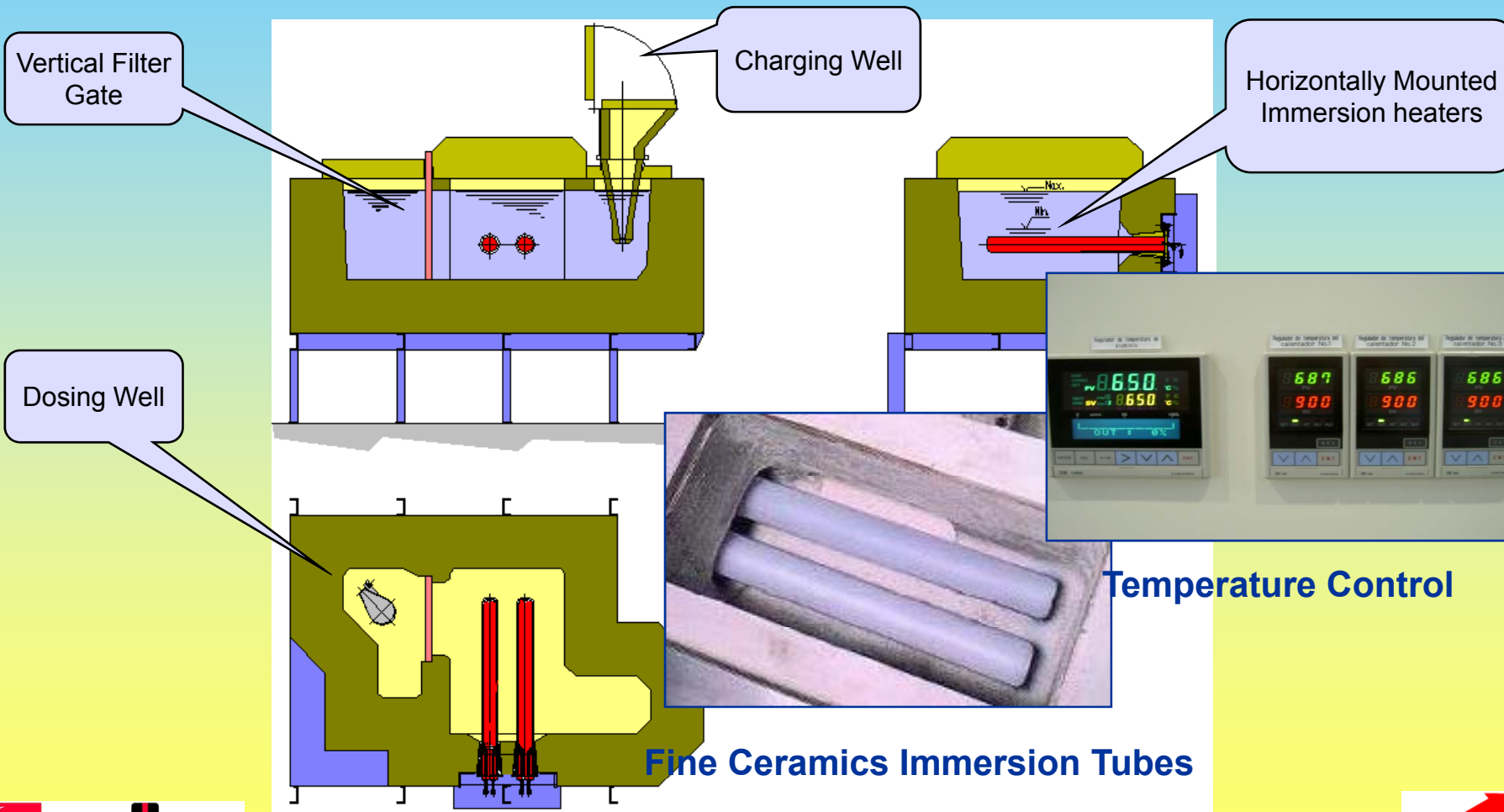
500μm

試料	A
	PH7

試料	B
	PH8

Advanced Immersion Type Holding Technology

Key Design Features of the IMAE Holding furnace



Holding capacity 1000-3000kgs

Dosing capacity 400-1400kgs

Advanced IMAE Holding Furnace



2800Kgs Holding capacity
AISIN CZ

Delaquering Systems

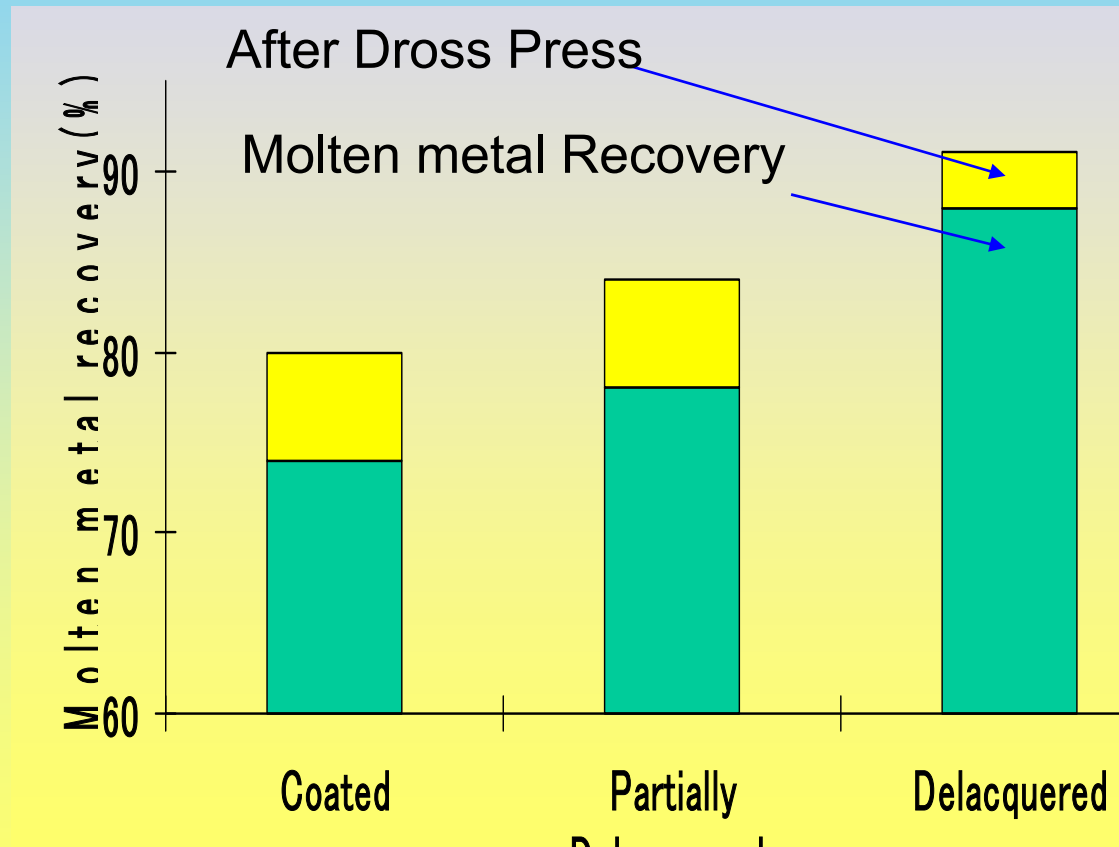


IDEX 3 tonnes/hr

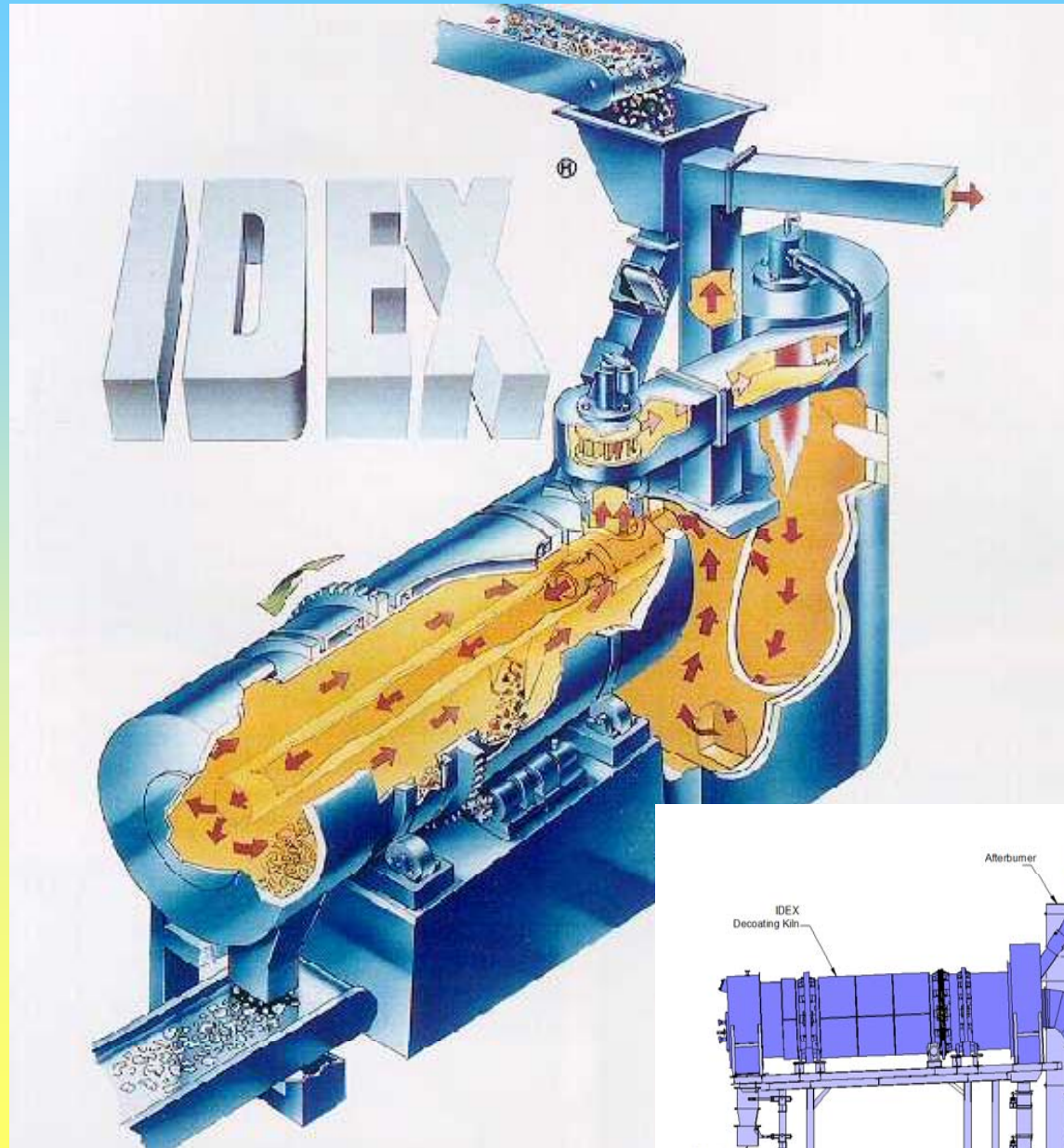


ECO-KILN 100-300kgs/hr

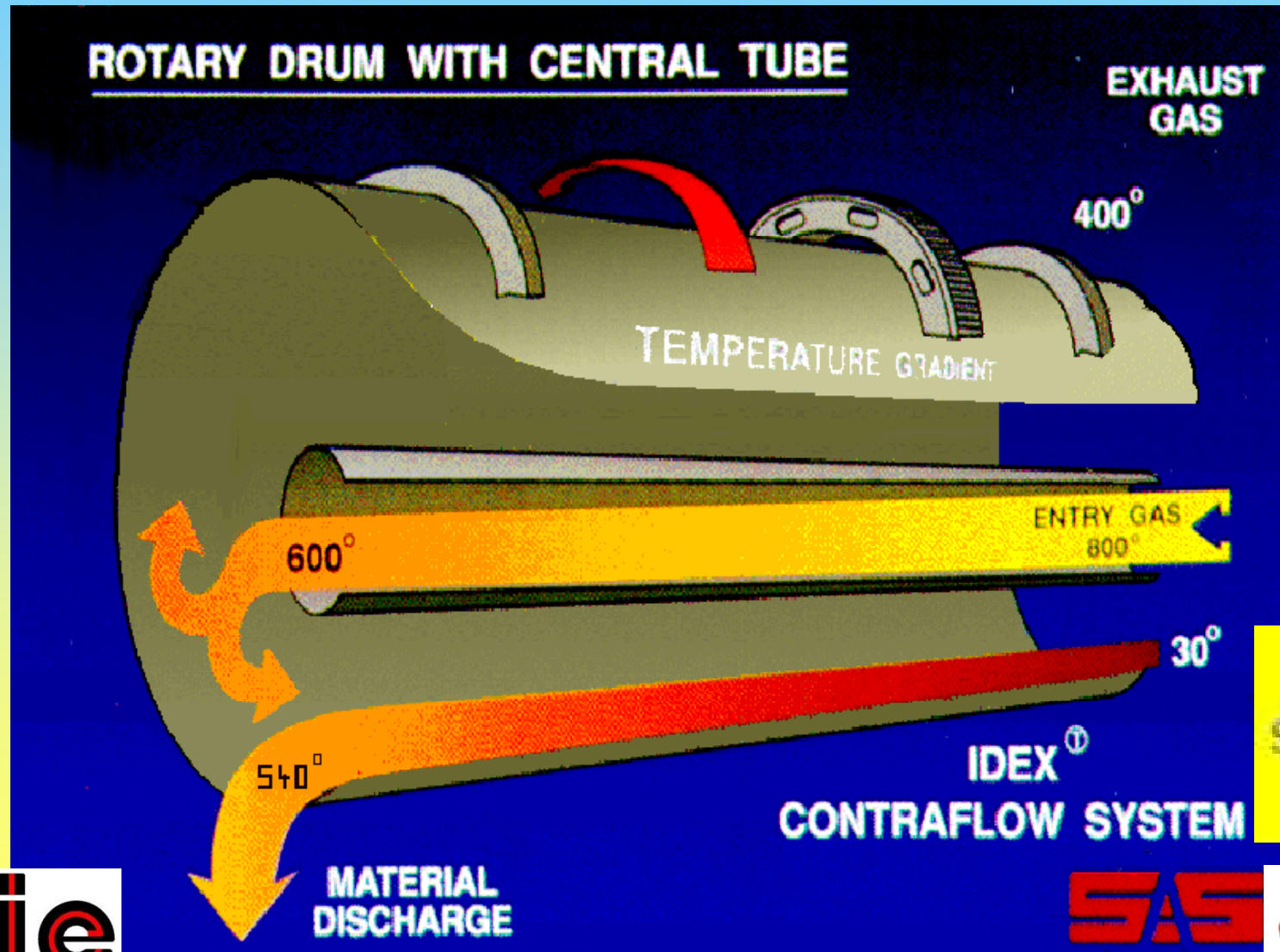
The impact of decoating on molten metal recovery



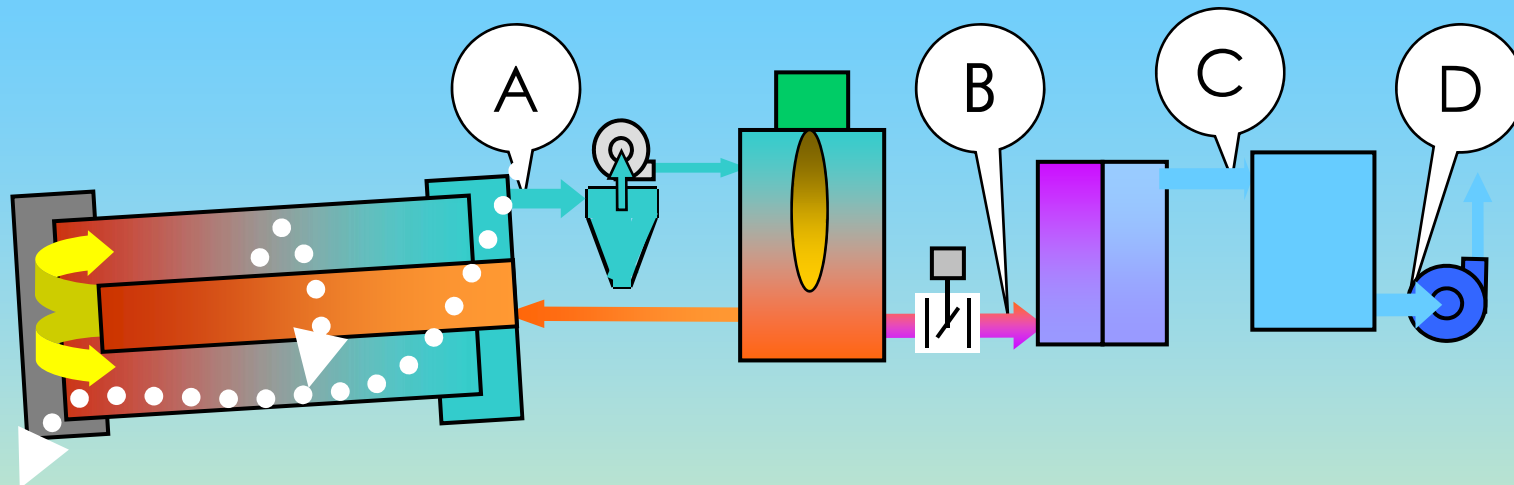
Idex Kiln



Idex-Principle of Operation



IDEX Emmissions



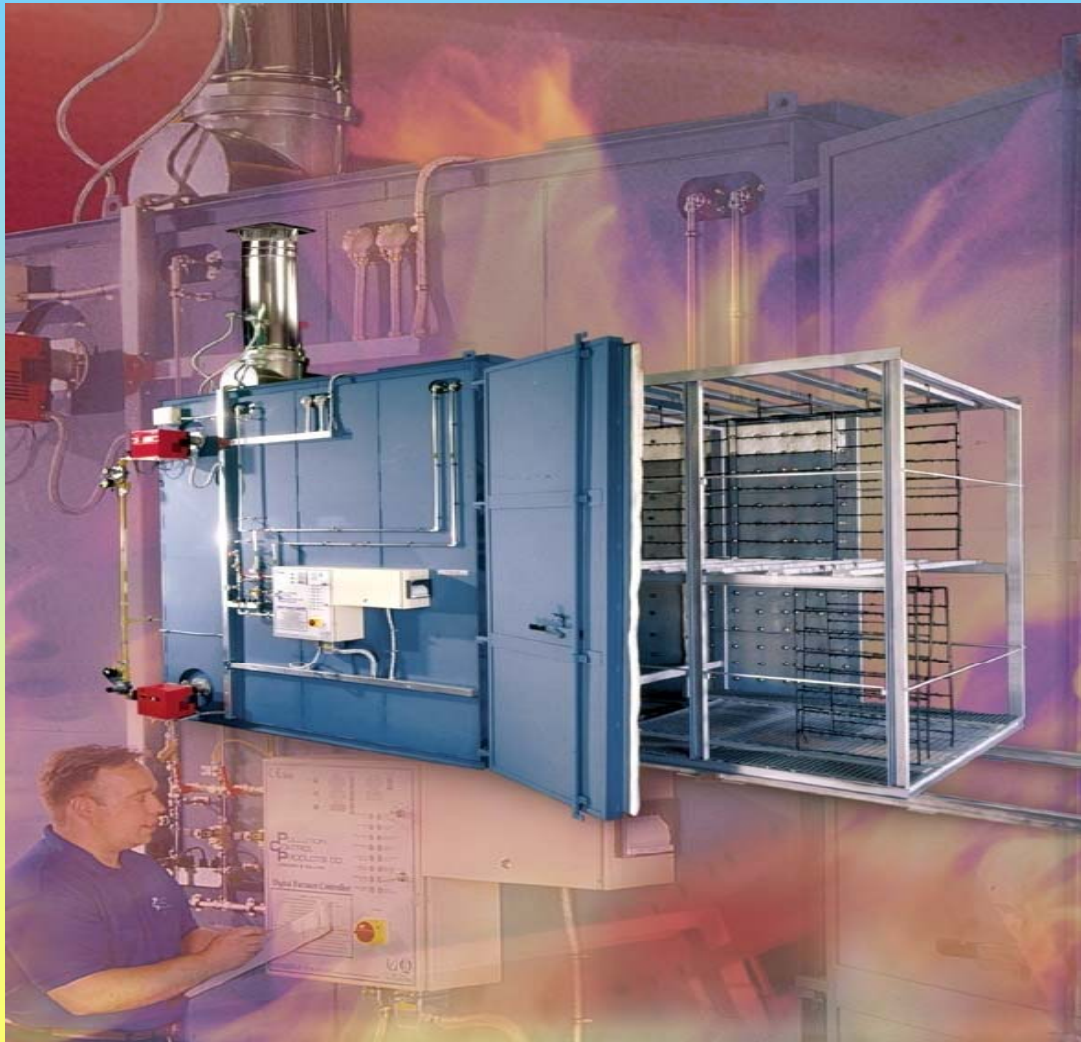
	A	B	C	D	Remarks
Dioxine ng-TEQ/Nm ³	4.4	0.092	0.22	0.066 (*)	12% based on O ₂
Dust particles mg/Nm ³	1.88	0.0269	0.0541	0.0005 (0.2)	11% based on O ₂
HClCondens mg/Nm ³	84.8	270	238	237	11% based on O ₂
NO _x ppm	-	-	-	21.5	11% based on O ₂
SO _x ppm	-	-	-	10.5	11% based on O ₂

IDEX Kiln

Key Benefits

- Maximises recovery of scrap materials
- Improved specific energy consumption
- Can be used with existing furnaces/Bag Filter systems
- Reduces dross formation in melting furnace
- Allows wide range of scraps to be recycled
- Quick pay back on capital investment

Controlled Pyrolysis



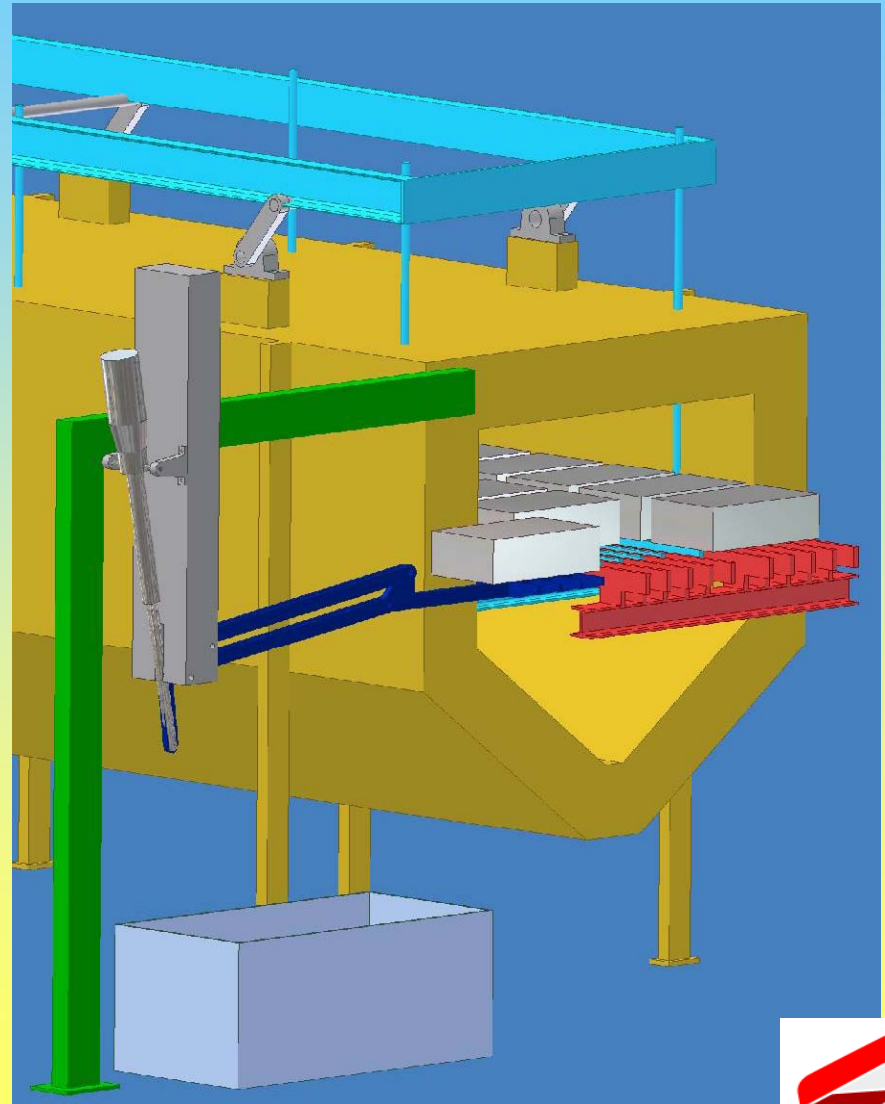
T6 Heat Treatment



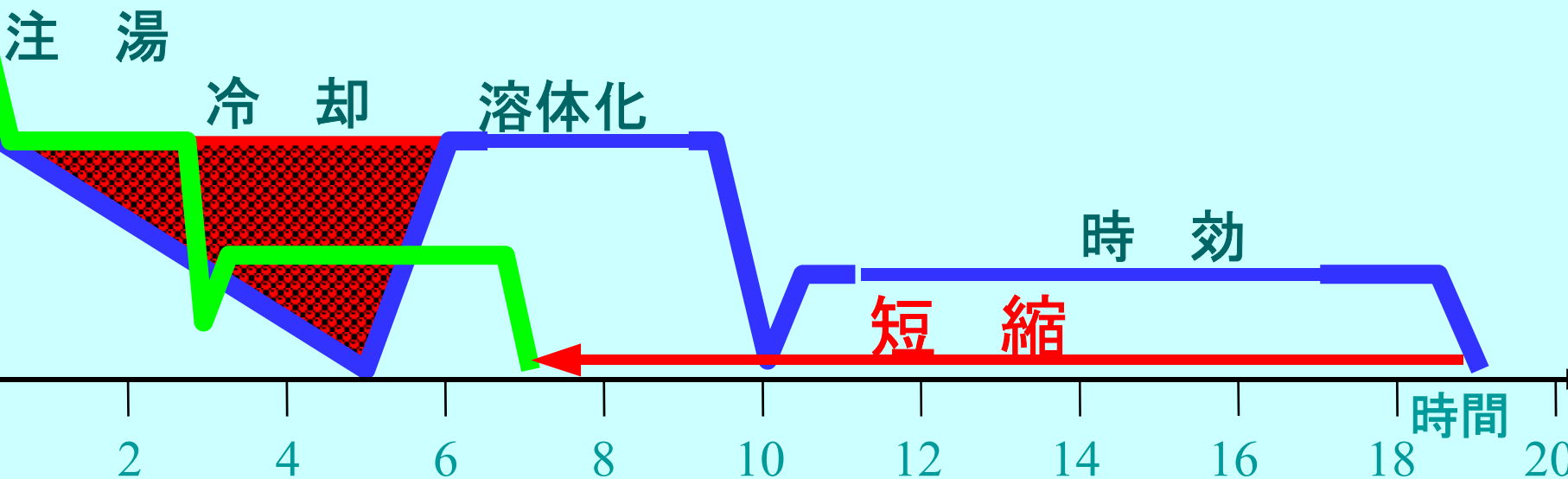
High efficiency ECO T6 system

Features

- Basket less T6
- Indirect air heating
- Hot charging
- Compact layout 100m²
- 20% reduction in SEC



High efficiency ECO T6 system

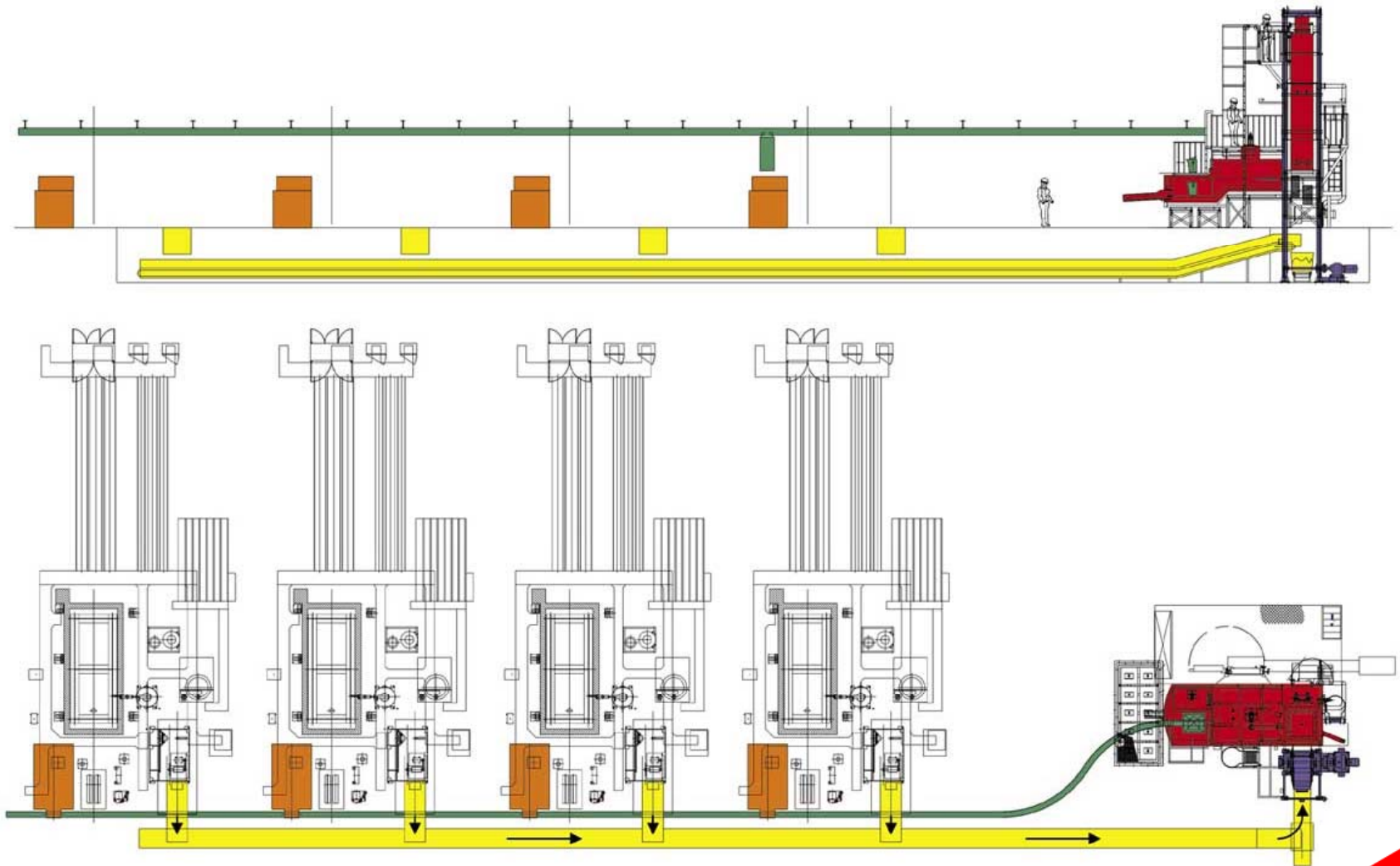


Comparison of Cycle time

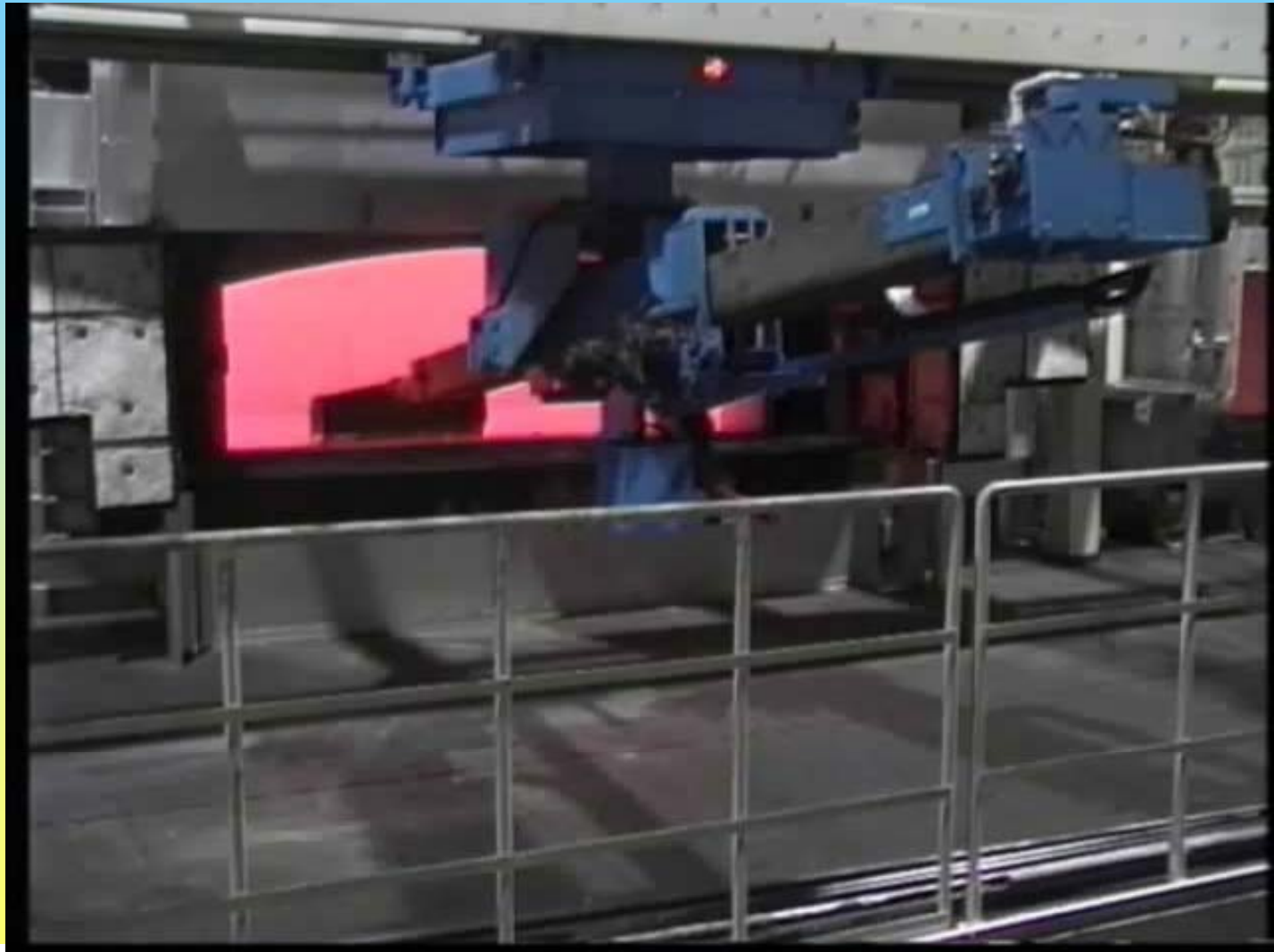
Fully Automated Molten Metal Transfer System



Typical HP diecasting Layout



Fully Automated Drossing Device



NEXTAGE SANKEN



Thank you for your attention