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Energy Efficiency For Melting And Holding Operation In Aluminum Foundries

Author: Dipl.-Ing. Klaus Malpohl

Representation
METEK Mühendislik
Dr. M. Cahit ENSAR
www.metekltd.com

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Specifications (in extracts) for melting and holding furnaces in foundries

- material to be charged (of Al foundries)
- operational conditions (for AL foundries)

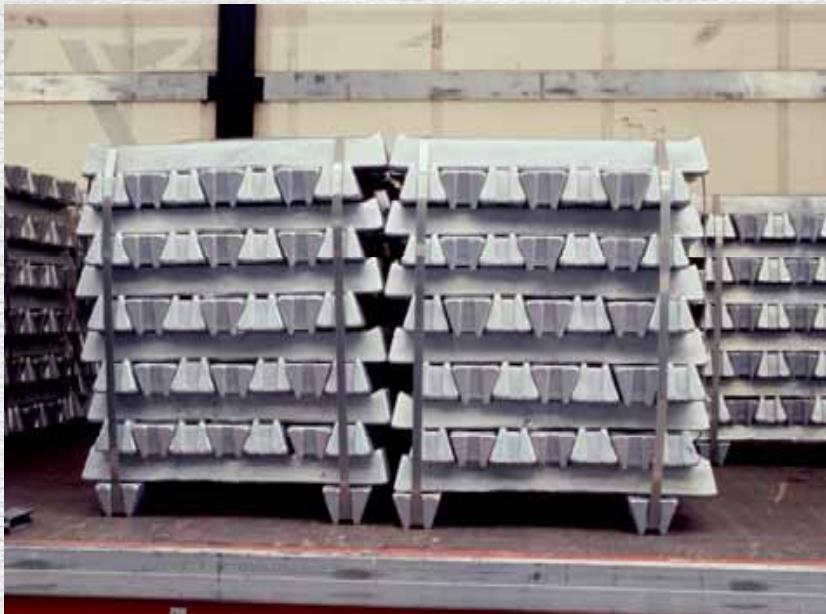


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Charging material (1 of 2)

production of cast parts
in
gravity, sand or die casting process

50% ingots + 50% returns





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Charging material (2 of 2)

production of cast parts
in
gravity, sand or die casting process

50% liquid metal + 50% returns





Requirements to melting operations

- **continuous metal supply**
 - metal take-out according to the customer's demand
 - constant metal take-out temperature (+/- 5°C)
 - high metal quality (density index < 8%)
- **high metal yield**
 - metal yield (> 99%)
 - (rule of thumb: 1% metal loss / 1 t/h melting capacity / 6.000 h/a / 2.000 €/t / results in a loss of 120.000,-- €/a.)
- **easy handling**
 - automated furnace control
 - charging
 - metal take-out
 - cleaning
- **low energy consumption**
 - for melting operation (< 600 kWh/t)
 - for holding operation (< 1 - 2 kWh/h x t)
 - (rule of thumb: 1 t/h melting capacity / 600 kWh/t / 6.000 h/a / 4,44 ct/kWh / energy = 160.000,-- €/a.)



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STRIKOMELTER[®] with ETAmox[®] system

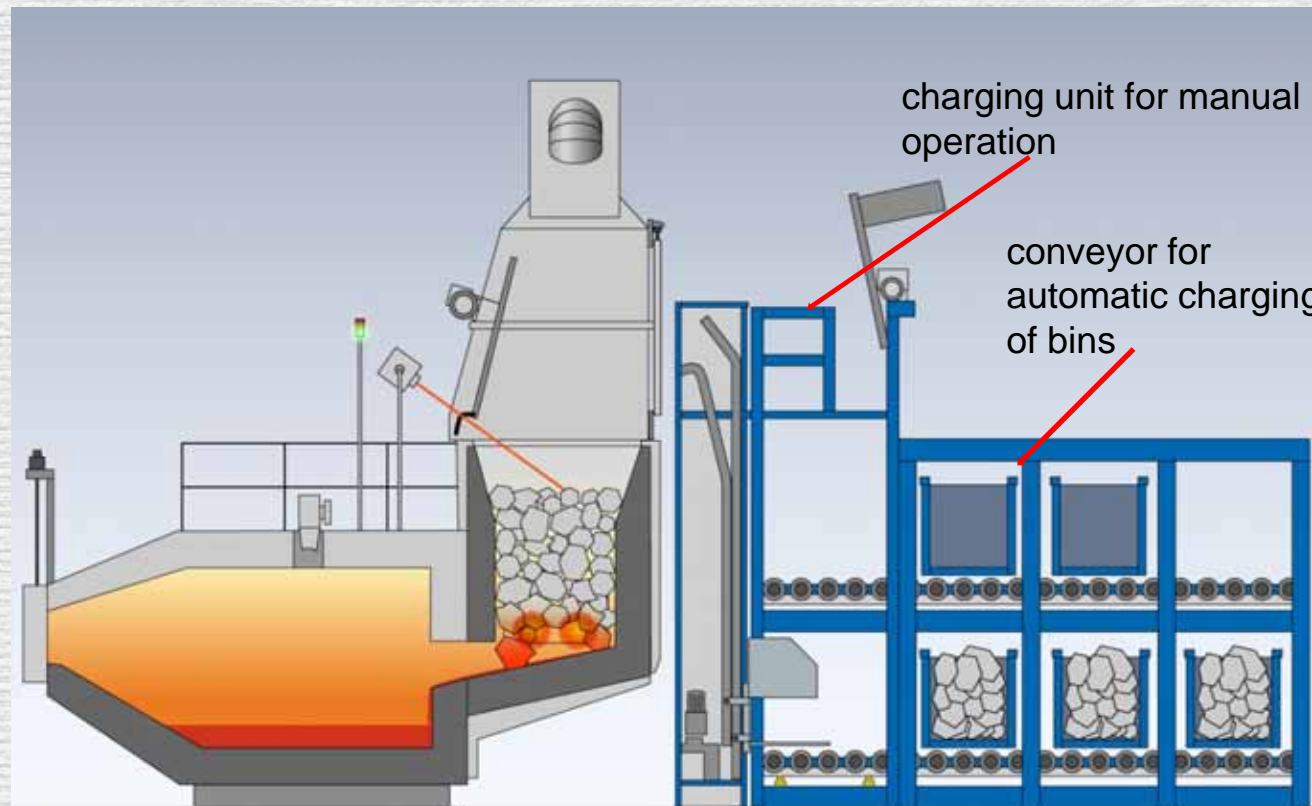


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STRIKOMELTER[®] / Charging system





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charging unit for manual operation



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STRIKOMELTER® / Charging system

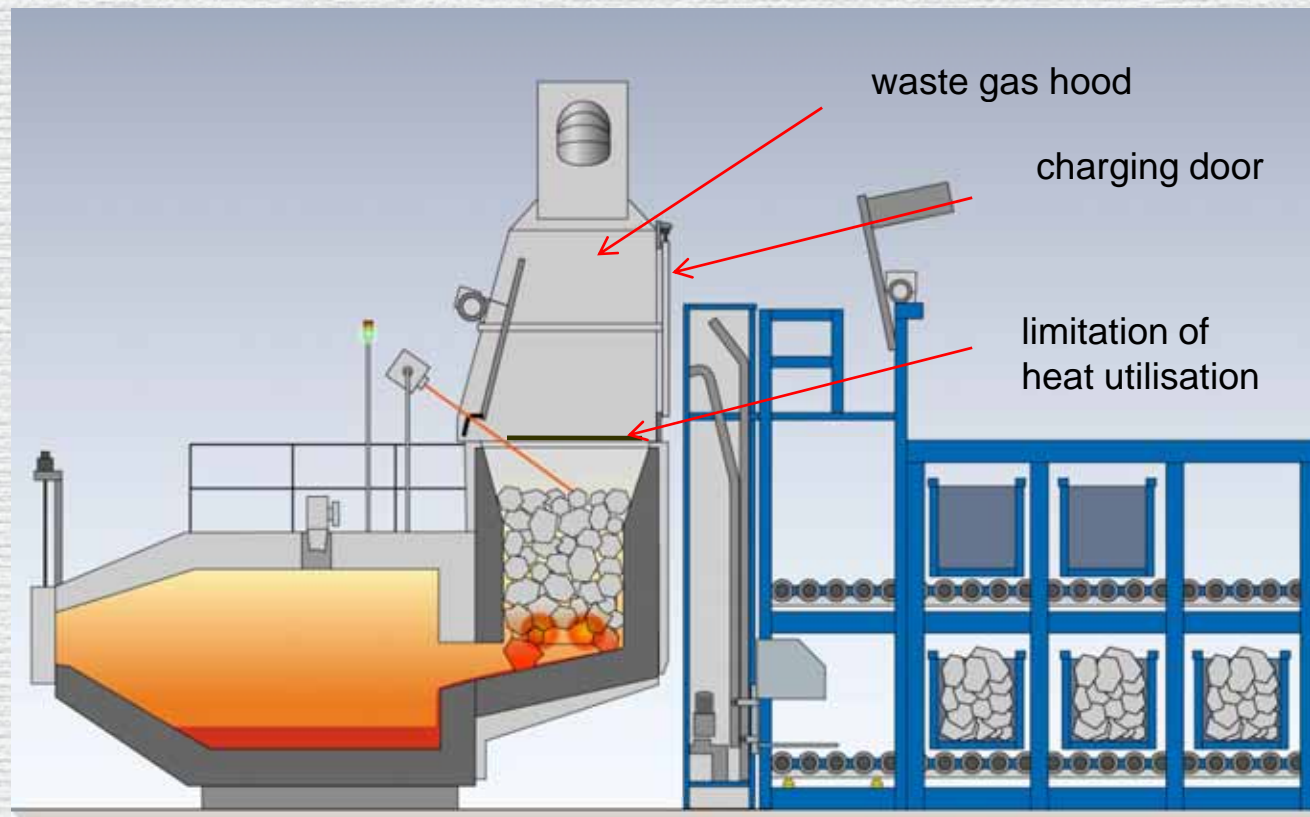


conveyor for automatic
charging of bins



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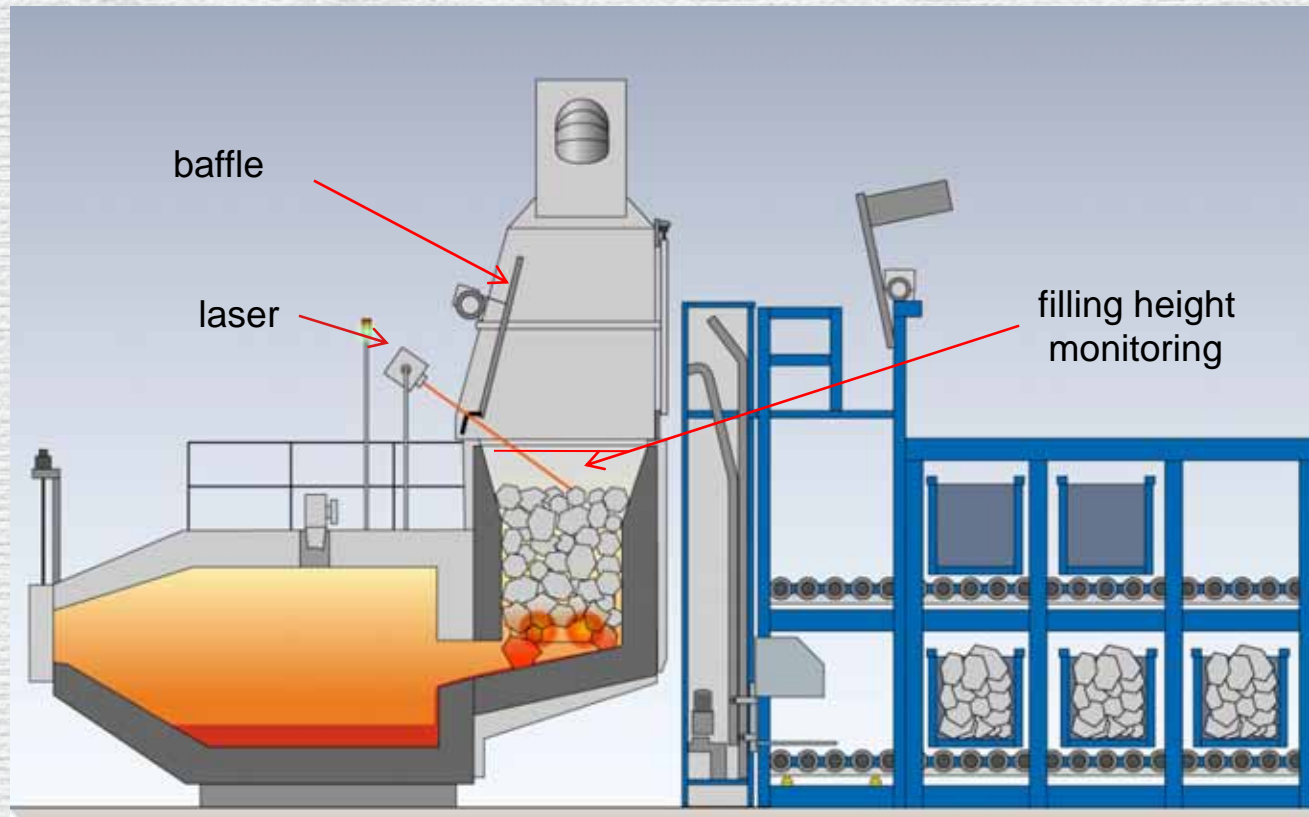
STRIKOMELTER[®] / Waste gas hood





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STRIKOMELTER[®] / Laser scanner





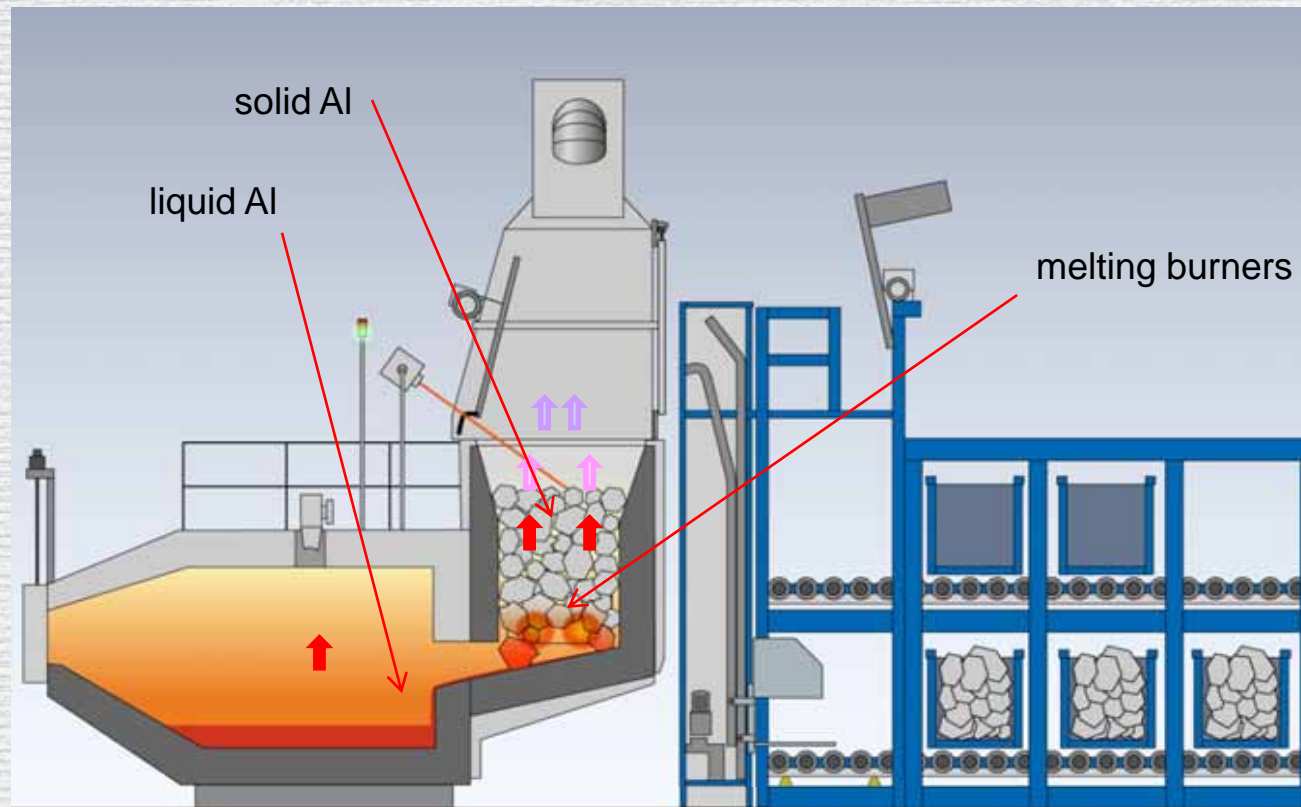
Example „shaft scanner“ for reduction of energy consumption

- increase in efficiency of the STRIKOMELTER®
decrease of energy consumption by 10 %
 - decrease of gas consumption by 60 kWh/t
 - melting capacity: (1 t/h at 6,000 h/a) 6.000 t/a
gas price (average of 2009) 4,44 ct/kWh
- **energy savings: 16.000 €/a**



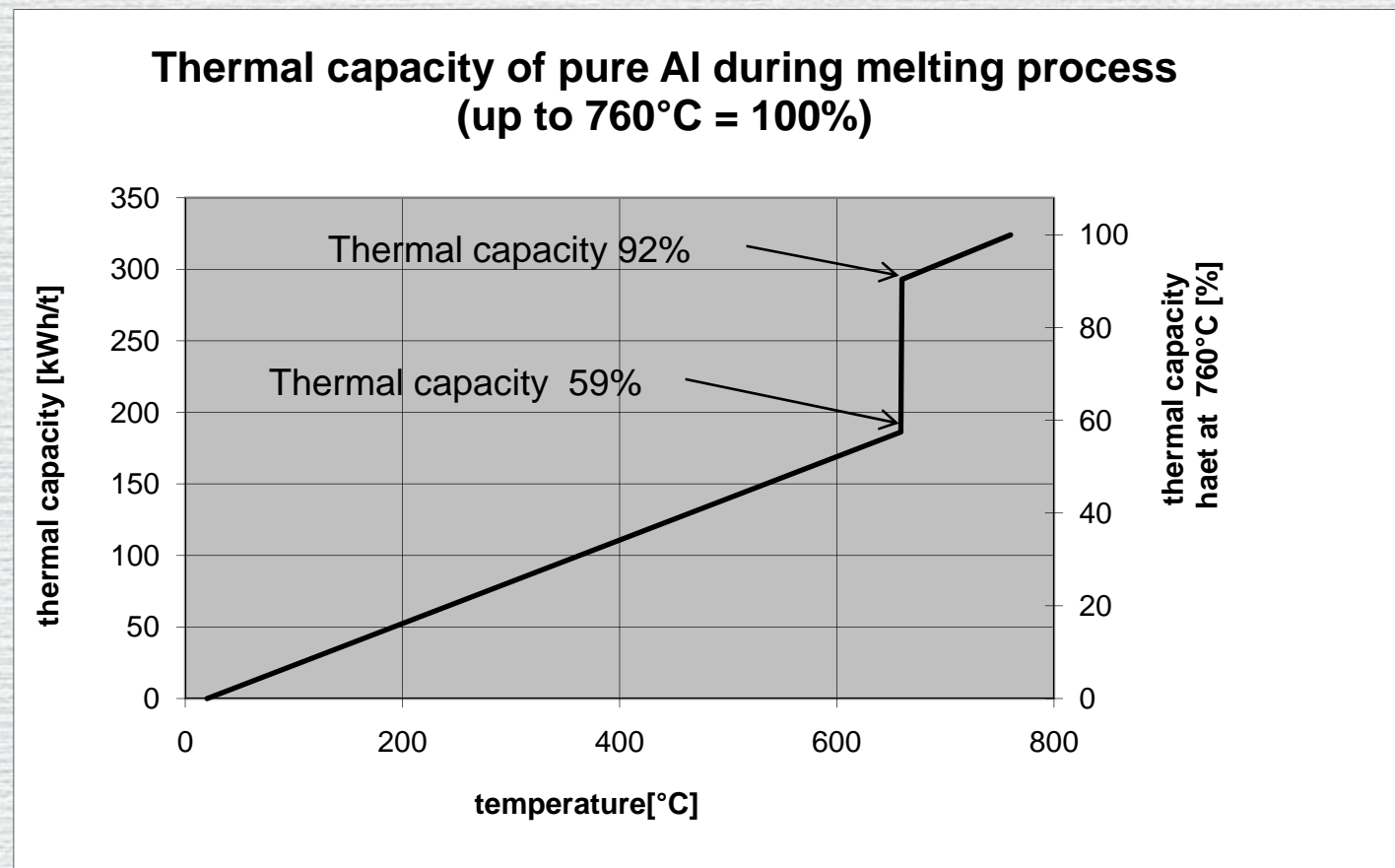
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STRIKOMELTER[®] / Melting burners





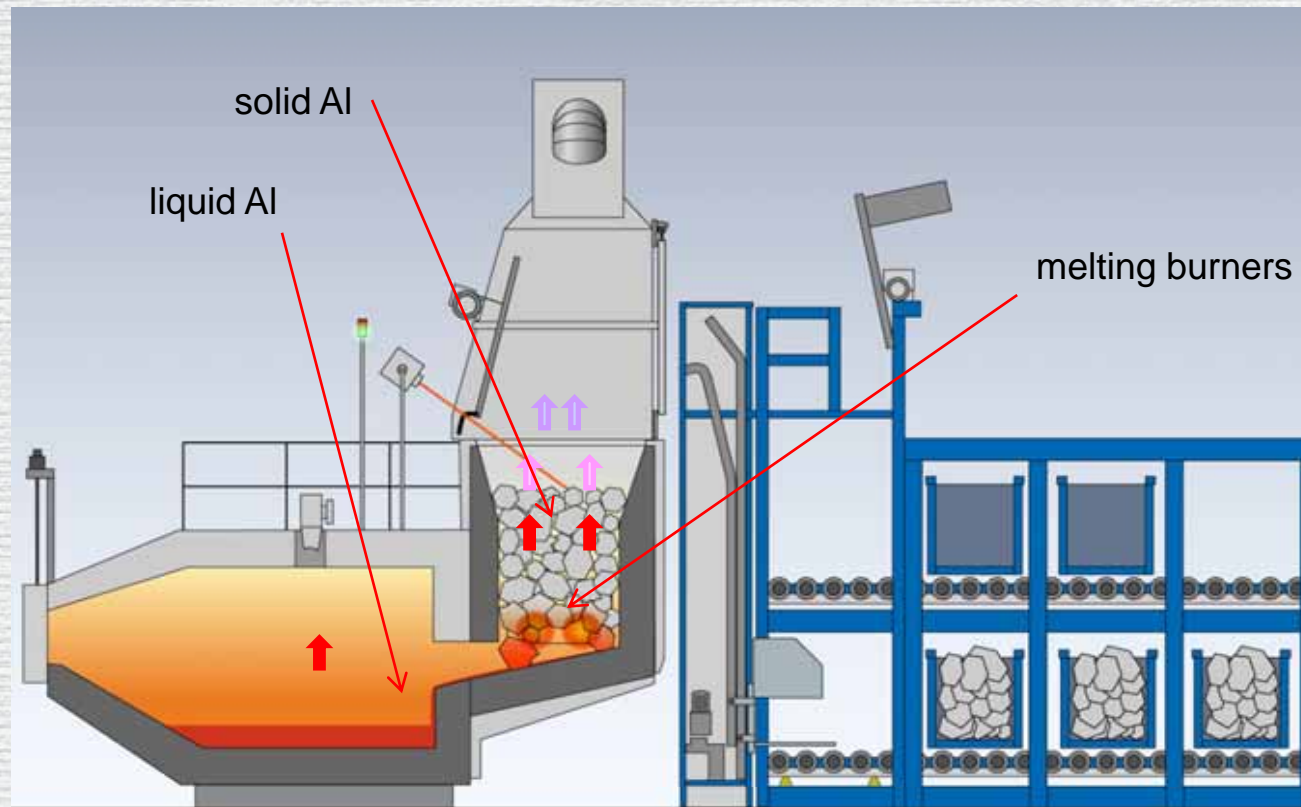
Thermal capacity of pure Al





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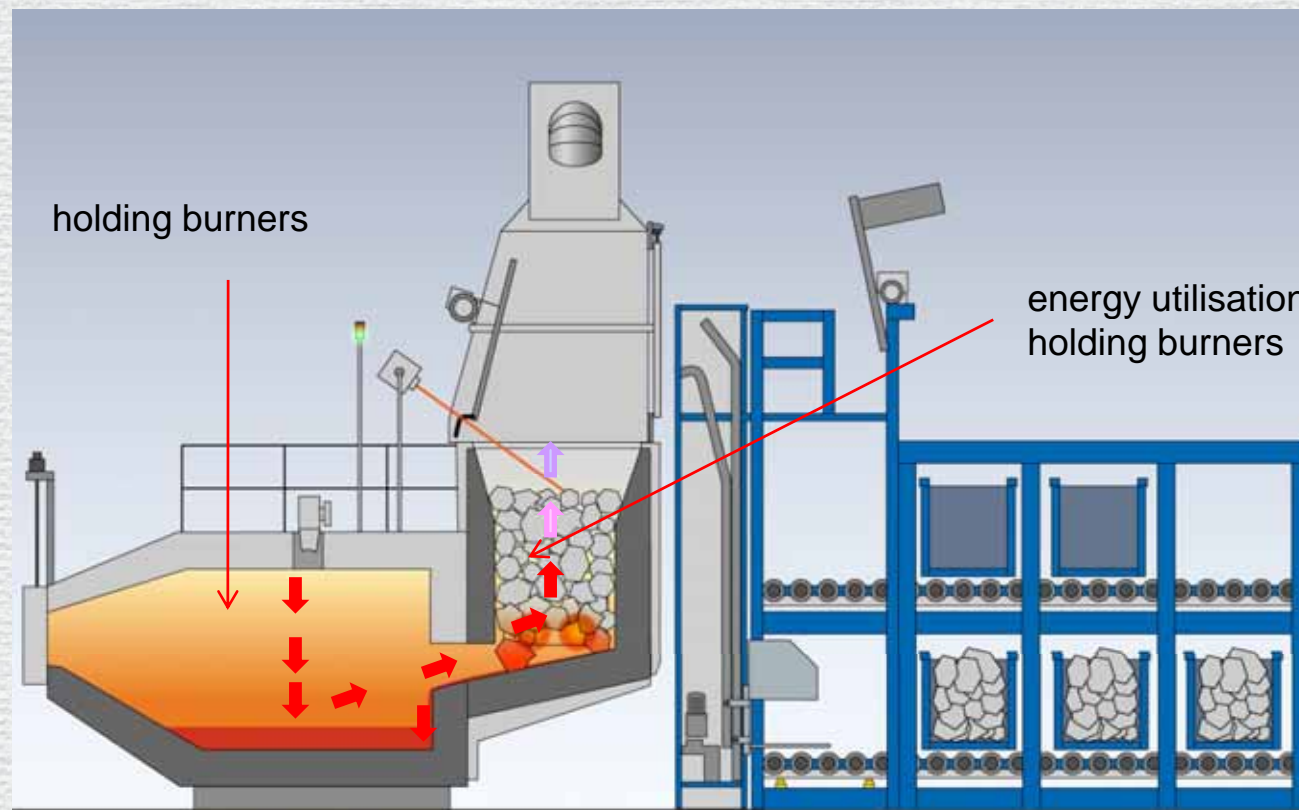
STRIKOMELTER[®] / Melting burners





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STRIKOMELTER® / Holding area





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STRIKOMELTER[®] : Principle / summary

- shaft charging: no energy loss when charging
- pre-heating zone – ETAmox[®]-shaft, drying and pre-heating of the charging material, integrated waste heat utilisation
- melting area – fast melting at the material front
- holding chamber – overheating to a constant metal tap-out temperature
- utilisation of flue gas from the holding area



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How can I control energy consumption?

- training of operators, workers, smelters
- checking the SOP (standard operating procedures)
- documentation / shift monitoring
- data recording integrated in the furnace unit
- regular furnace inspection and maintenance
- replacement of old furnaces



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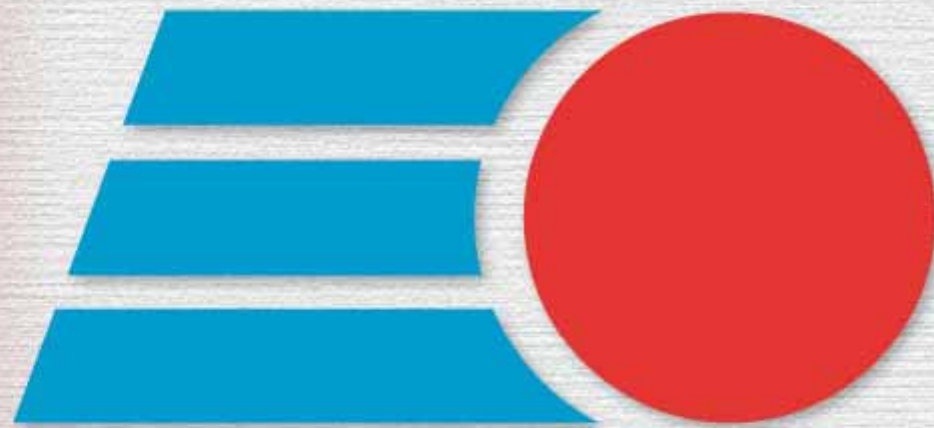
Thank you for your attention



STRIKOMELTER[®] with ETAm[®]

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**Melt yield in a
STRIKOMELTER®**



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Rule of thumb for melt loss

$$\begin{aligned} & 1\% \text{ melt loss} \\ & 1 \text{ to/h melting capacity} \\ & 5000 \text{ h/a} \\ & = \\ & \text{app. } 100.000 \text{ €/a loss}^* \end{aligned}$$

* Basis: Al- Ingots 2.000 €/t,



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Composition of the charge



block material: 6 kg ingots



Return material, without flash



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Gross metal yield StrikoMelter[®]

- 99,75 % for 100% ingots
- 99 % for 100% returns
- 99,4 % for 50 % ingot and 50 % return material

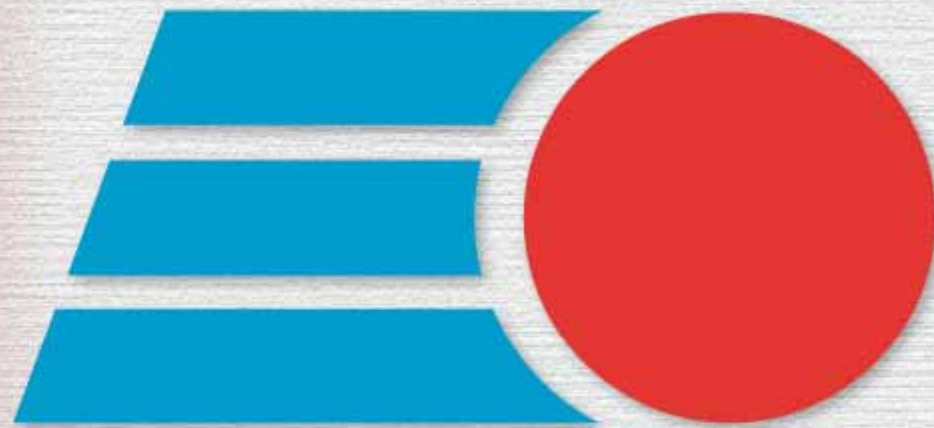


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Thank you again for your attention



STRIKOMELTER[®] with ETAm[®]



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