SLABCOOLER® ECO – The Energy Saver!

Energy Efficiency for Slab Casters

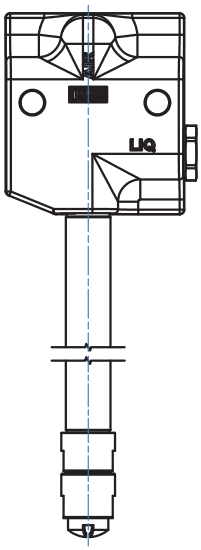
Consumption of compressed air is the main cost driver in operating air mist secondary cooling systems in slab casting. With conventional air mist nozzles the consumption of compressed air and hence energy is very high – especially at low casting speeds when water flow rates are low. In order to reduce the compressed air consumption Lechler has developed the Slabcooler nozzle already for the first generation of thin slab casters whilst the conventional Lechler Mastercooler nozzles were mainly applied in thick slab casting.

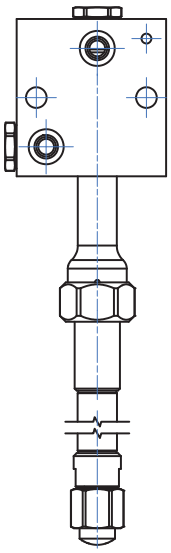
The Lechler Slabcooler® ECO air mist nozzle takes the proven concept of the Lechler Slabcooler to the next level and meets the increasing demand for energy efficient secondary cooling in slab casting. With its enhanced flexibility of the cooling capacity the Slabcooler® ECO provides equivalent spray performance in terms of spray characteristics from min. to max. water pressure whilst the consumption of compressed air has been reduced significantly compared with a Mastercooler nozzle of identical size.

HTC tests at the University of Leoben have confirmed almost identical cooling rates at maximum operating pressures and flow rates. In fact, the turn down ration has been extended by reducing the min. water flow rate providing additional flexibility in existing installations.

Based on these results a conversion of existing slab caster secondary cooling systems to the Slabcooler® ECO technology offers the potential of maintaining the existing maximum productivity while increasing the cooling flexibility and reducing the average secondary cooling compressed air consumption by approximately 30 %.

A segment can easily be converted to the Slabcooler® ECO where Lechler Mastercooler (or equivalent) nozzle are being installed as only small modifications to the existing segment piping are required.



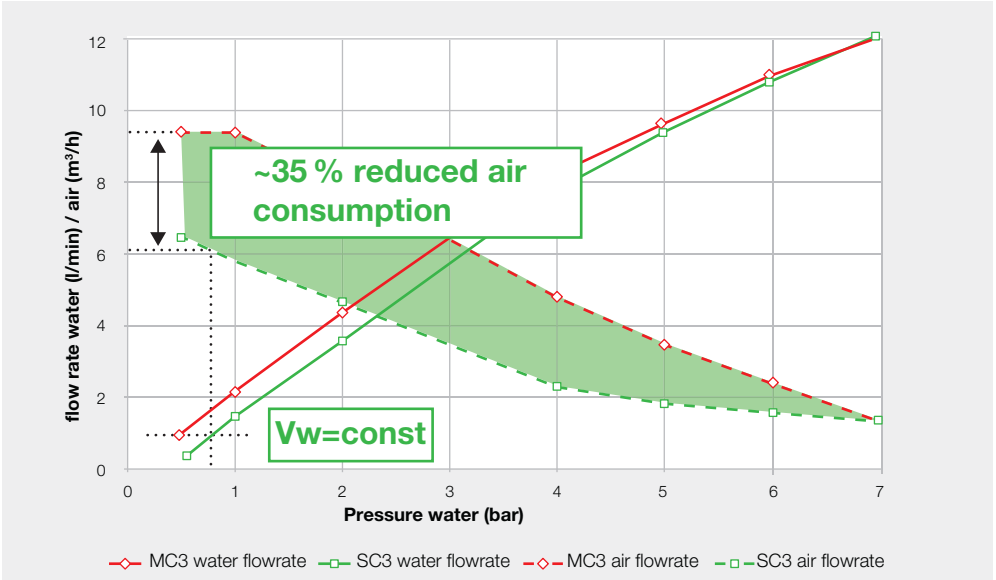


The energy saving potential for each caster is depending on the caster dimensions and mainly on the present air consumption. As an example, a maximum compressed air capacity for a 2-strand slab caster of 16,000 m^3/h (8,000 m^3/h per strand) is assumed. The average air consumption was calculated to be 50 % of the maximum capacity (4,000 m^3/h per strand) whilst the operating time was assumed to be 20 hours per day on 300 days per year. As a result, the yearly air savings potential of 30 % of the average compressed air consumption would amount to approximately 14,400,000 m^3/year when installing the Slabcooler® ECO. Depending on the individual characteristics of each caster the air savings potential in terms of compressed air consumption, related energy costs and CO_2 emission can be very substantial. The return on investment (ROI) for new nozzles and the installation is normally below 12 month.

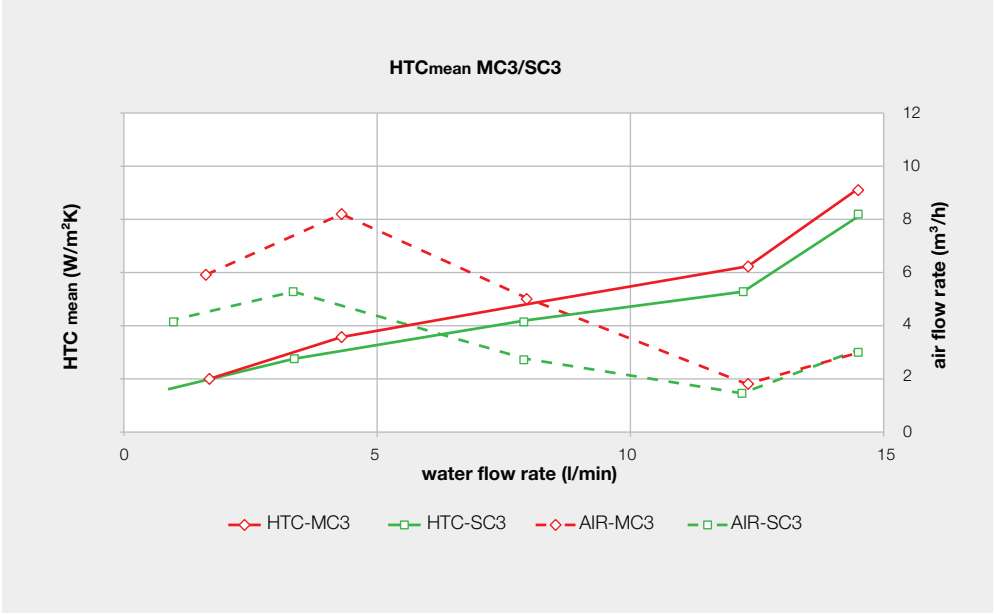
MC 3

SC 3

Mastercooler (MC 3) and Slabcooler® ECO (SC 3) Air Consumption



Mastercooler (MC 3) and Slabcooler® ECO (SC 3) HTC and Air Consumption



SLABCOOLER® ECO – advantages and benefits

Reduced Compressed Air Consuption (TCO)

- Reduced Energy Consumption
- Reduced Operation Costs
- Reduced CO_2 Emission
- “Green Steel” Production

Excellent Cost/Performance Ratio

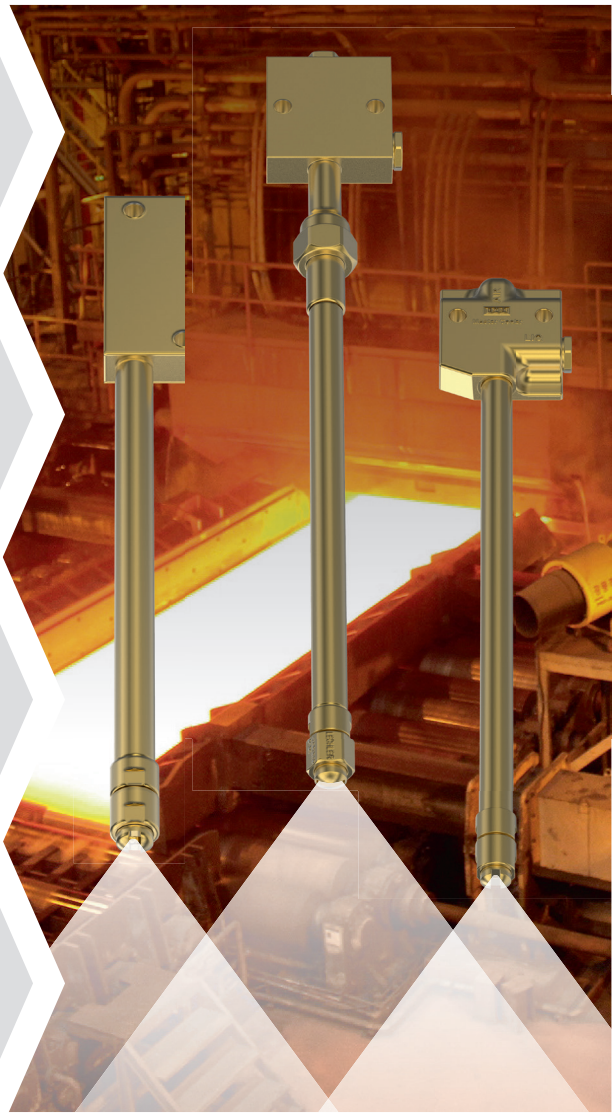
- ROI << 1 Year

Plug And Spray

- No modification of segment piping required
- Conversion during regular segment maintenance
- Change back to Status Quo possible

Well Proven Concept

- High operation safety



Slabcooler® ECO = Savings[5]

The Lechler Slabcooler® ECO is not only an energy saver due to much lower consumption of compressed air. It thereby saves significantly CO_2 emissions and operation costs for provision of compressed air. It is also a time and risk saving revamp due to plug and spray (exchange of nozzles only) as no major segment piping modifications are required and, if desired, can be built back to existing status quo with no additional effort.

ROI calculation example for 1 x strand slab caster

Feature	Conventional Airmist Nozzle	Slabcooler® ECO	Comment
Air Consumption per strand	4,000 m^2/h	2,800 m^3/h	(30 % saving)
Operating Time	20 h/day & 300 days/year	20 h/day & 300 days/year	-
Compressed air cost	0.01 $ per 1m^3/h	0.01 $ per 1m^3/h	-
Cost per year per strand	240,000 $	168,000 $	-
Cost per year for 2 strands	480,000 $	336,000 $	-
Saving per year	-	144,000 $	-
Investment Cost	-	120,000 $	Nozzles, installation
ROI	-	0.83 years = 10 months < 1 year!	-