

How a German Aluminium plate producer is on a worldwide solo attempt and sets new quality standards

Especially now – Heat treatment without usage of (natural) gas

by Sebastian Ricken, General Manager, Gleich Aluminium Service-Center, Kaltenkirchen

The daily reports are countless. One of the biggest concerns of the German industry and its customers is reduced or even no availability of natural gas. Apart from heating of buildings Aluminium producers usually need natural gas for their heat treatment process. Therefore, natural gas is an extremely important component in the manufacturing process after casting. Electricity as alternative to natural gas is not wide spread, but it is tested and has been continuously improved over the last decades.

Electricity as an alternative to natural gas

To understand the biggest advantage of electricity over natural gas in the heat treatment process, we have to have a look at the usual gas driven heat treatment process. This process was adapted from the Steel industry. Traditionally numerous Aluminium slabs at the same time are heat treated in gas driven batch furnaces. With the heat treatment a target oriented metal structure can be achieved that delivers mechanical properties to point and at the same time should guarantee a maximum of stress relief. Nevertheless, it is not only the heat input into the metal that makes a difference in the final product quality. It is necessary to know the material structure before starting heat treatment as well as knowing the precise temperature curves in every single part of the Aluminium slabs.

Precise control of heat input

In the original operation area of gas driven batch furnaces – i.e. heat treatment of steel – difference in temperatures of 30 - 50 °C did not have big

influence on the final steel product. With heat treatment of Aluminium – depending on alloy – a temperature difference of 3 - 10 °C can already destroy volitional material properties, or at least those will be below the expectations. With heat treatment of Aluminium, it is mandatory to know the heat input every minute exactly to the degree. A natural flame that heats numerous Aluminium slabs in different positions in a batch furnace is very limited in that regard. This can be compared to baking cakes in your home oven without circulating air: if you were baking several cakes on different levels of your home oven at the same time, you would not expect them to be all the same quality after one hour of baking.

Unique single-slab heat treatment

This is different with electricity driven furnaces for heat treatment of Aluminium slabs. Especially in a single slab process superior microstructure qualities can be achieved. The more machining you do on the semi-finished product made from those slabs the higher is its material superiority. Stress relief and outstanding microstructural homogeneity besides repro-



Fully automatic plant for heat treatment at Gleich

ducibility slab by slab is the achieved goal. At Gleich Aluminium, not numerous Aluminium slabs (8 - 14 pc in a batch furnace) are heat-treated at the same time, but every single slab sits in an electricity driven furnace on its own. The whole system is computer operated and controlled. The temperature curves of each slab are continuously checked by Quality Control and therefore permanent, systematic and statistic quality is achieved. The heat treatment with this method can be set-up and controlled precisely each and every minute

to the degree. This is extremely efficient, delivers exactly the wanted microstructure, and results in superior mechanical properties. Of course, the chemical analysis of the slabs as well as the casting method is aligned to this single slab heat treatment. It guarantees that the unique single slab heat treatment process is able to achieve material superiority of the heat-treated slabs.

Fully automated overall process at Gleich

In the cooling phase, the released thermal energy of the slabs will be used to pre-heat

cold slabs. The rejected heat of the furnaces will be used for heating the building and with this in sense of sustainability used twice. A direct independency from fossil fuels like natural gas can be achieved also in a high industrial process. Thinking a bit further the geographic location of Gleich Aluminium in the very north of Germany in between North Sea and Baltic-Sea offers great perspectives for the future. For sure, wind power will become an even bigger part of environmentally friendly energy production directly in front of our factory. In other words, the glossy silver Gleich Aluminium will see a green touch in the near future.

In the end, there is for sure one question to be posed: Why is only Gleich Aluminium following the way of electricity driven heat treatment and all producers remain gas driven?

The answer can be found in a fully automated total process, as well as in the absolute quality commitment of the traditional-conscious family business.

The electricity driven heat treatment was the best way to highest material quality, but unfortunately in the beginning also the most expensive one. As a result, the overall production process needed to be updated and automated to absorb those extra costs and make the resulting products competitive. Gleich Aluminium today has fully automated the majority of plant sections, which more or less work self-governed.

New challenges to secure the supply chain

Looking for a cheaper way of implementing an in-house heat treatment, gas driven furnaces traditionally offered a feasible solution, even at the expense of superior quality. The current worldwide development questions this traditional approach more and more. Imminent shortages lead to new challenges to secure the supply chains of all industrial sectors. Gleich Aluminium faces these challenges with its own way.



Aluminium slabs before heat treatment

