

Properzi's CO₂ntinuous Green Ingot for a smaller carbon footprint

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At all stages of the aluminium chain it is of paramount importance not to waste even one sole gram since the production of primary aluminium is energy-intensive. In the electrolysis process, direct CO₂ emissions occur due to the reaction between oxygen and carbon anodes, and so-called anode effects generate PFC emissions. Direct emissions depend largely on the type of electrolysis cell used, and up to 17 MWh of electricity can be required to produce one tonne of aluminium. This article is about Continuous-Properzi's contribution towards reducing CO₂ emissions during the solidification of liquid aluminium into ingots.

the savings made by the smelters, but rather to improve them! For this purpose, we have developed processes that do not waste liquid aluminium and the energy bank inside it, which corresponds to a huge reduction in CO₂ emissions.

CO₂ntinuous Green Ingots

Continuous-Properzi started almost 30 years ago with the development of a new process for the production of aluminium ingots to overcome the limitations of traditional ingots produced in open top moulds. Eng. Giulio Properzi, the current president and CEO, had the brilliant idea of applying the Properzi

of direct CO₂ emissions into the atmosphere. Average total global emissions vary somewhat in the literature, but the most commonly reported values are currently between 12 and 17 tonnes of CO₂-equivalents per tonne of aluminium. In our calculation, which compares the Properzi ingot casting technology with the other technologies available on the market, we have prudently considered a global average value of 11.5 tonnes of CO₂.

The Properzi process generates no loss of aluminium while the dross generated during the production of open top mould ingots must be removed from each ingot, usually done manually by the operators. This equates to hundreds of tonnes of aluminium being converted and removed in the form of dross every year! The management and further processing of the dross produces additional CO₂.

In other processes ingots are made by saw cutting which creates aluminium waste in the form of chips, thereby wasting aluminium (and the related CO₂) and creating a significant environmental impact linked to the management of wet lubricants. In the Properzi process the continuous cast bar is cut with a rotary shear that does not generate aluminium chips. The result is evident: no aluminium is lost by producing CO₂ntinuous Green Ingots.

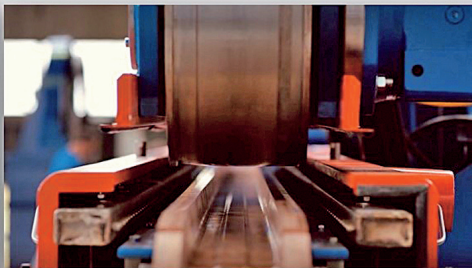
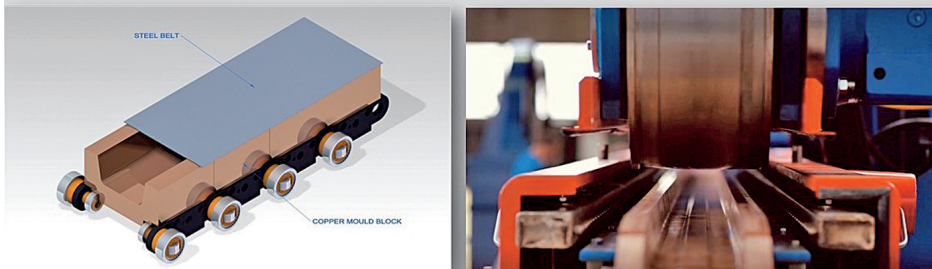
Furthermore, the dross that forms when liquid aluminium comes into contact with air cannot be completely removed from the ingots produced with open top moulds; these oxides (mainly Al₂O₃ and MgO), together with external components caused by the casting process (such as fragments of refractory material of the casting channels), have much higher melting points and for this reason also create, apart from causing operational problems, higher consumption and larger quantities of slag, resulting in additional CO₂-equivalents.

The Properzi ingot bundles are more compact and stable than bundles of traditional open top mould ingots. This reduces PET and/or steel strapping material needed to ship a tonne of ingots by about 40% with corresponding savings in CO₂ generated to produce it.

Properzi technology in comparison

After a thorough study of all the savings, Continuous-Properzi has issued a detailed

THE CASTING MACHINE COPPER MOULD CLOSED BY A STEEL BELT



The vision of a 'greener' aluminium starts at the beginning of the chain, where primary aluminium is produced and solidified in semi-finished products that are then re-melted and/or further processed.

In fact, the most important primary producers are already reducing CO₂ emissions by sourcing renewable energy for liquid aluminium production. Continuous-Properzi's commitment to a green industry is not to dissipate

continuous casting method, patented by his father Eng. Ilario Properzi in the 1940s, to the production of ingots.

We call the Properzi ingots 'CO₂ntinuous Green Ingots' as they greatly reduce CO₂ emissions compared to traditional ingots solidified in an open top mould.

The most important aspect of the Properzi technology is that the liquid aluminium solidifies in the copper mould of the casting machine, which is closed by a steel belt, thus avoiding any contact with the air.

Thanks to this key aspect, no (!) dross is created and consequently no loss of aluminium. Keep in mind, the process from bauxite mining to the production of aluminium ingots requires 17 MWh/tonne and generates 3.5 tonnes



Properzi ingot bundles

technical report which quantifies the above-mentioned advantages and others that correspond to less CO₂ emissions and can be characterized by the following main attributes:

- Higher metallic yield
- Higher quality
- Higher packing density
- Less consumption of straps
- Absence of preheating need.

The report includes only the main benefits of the Properzi ingot casting technology (in terms of ingot quality, operational costs, procedures and several other characteristics) and provides clear evidence that CO₂ntinuus Green Ingots are greener compared to the other ingot types available on the market – with a reduction in CO₂ emissions into the atmosphere conservatively calculated to be above 280 kg of CO₂/tonne of primary aluminium converted into Properzi ingots.

The data and information mentioned in this article have been calculated with a scientific approach, all the necessary references to the technical literature and the detailed explanation of the calculations are included in



Properzi track and belt in operation

a technical report issued by Continuus-Properzi and validated by BSI Group (British Standards Institution).

We are available to provide more information regarding the above data and report to anyone in the aluminium industry interested in producing Properzi ingots. In the coming weeks, we will inform our customers, who produce Properzi ingots, about the results

achieved with our process so that they too can have these savings certified in their production chain.

We at Properzi have no doubt that the CO₂ntinuus Green Ingots are the most eco-friendly and best available technology for the production of primary and secondary aluminium ingots. ■