

CO₂ntinuous Green Ingots and Vert-Melt Furnace: the significant contribution by Continuous-Properti to a greener aluminium chain



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Aluminium can be defined as the most circular material being infinitely and 100% recyclable, and it can be transformed reusing all the material in the production cycle. Through all the phases 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 for primary aluminium production, direct CO₂ emissions occur due to the reaction between oxygen and carbon anodes and the number of anode effects results in PFC emissions. Direct emissions strongly vary with the kind of electrolysis cell used, furthermore up to 17,000 kWh of electricity can be required to produce 1 ton of aluminium.

The vision of a Greener Aluminium starts at the beginning of the Chain, where the primary aluminium is produced and is solidified in semi-finished products to be re-melted or processed for different types of productions.

In fact, the most important primary producers are already reducing the consumption of electricity by sourcing it through renewable energy to reduce the CO₂ emissions during liquid aluminium production. Continuous-Properti's commitment to the green industry is not to dissipate the savings made by the smelters, but rather to improve them! For this purpose, we have designed processes that do not waste liquid aluminium and the energy bank inside it which is equivalent to a huge reduction of CO₂ emissions.

In this article we will emphasize and

illustrate Continuous Properti's significant contribution to reducing the CO₂ emission in two links of the Aluminium Chain: solidification of the liquid aluminium into Ingots and melting of aluminium solid forms to manufacture aluminium products.

Continuous-Properti started almost 30 years ago to design a new process to produce aluminium ingots to overcome the limits of the traditional ingot produced in open top moulds. Eng. Giulio Properti, current President and CEO, had the brilliant idea to apply the Properti continuous casting method, patented by his father the Eng. Ilario Properti in the 1940s, for the production of ingots.

Properti ingot casting technology has several advantages in terms of ingot quality, operational costs, procedures, and several other characteristics. However, in this article, we will focus our attention on the "Green" aspects of our Ingot.

We have called the Properti ingots as "CO₂ntinuous Green Ingots" as they greatly reduce CO₂ emissions compared to traditional ingots solidified in an open top mould.

The most important aspect of Properti technology is that the liquid aluminium solidifies inside the casting machine copper ring closed by a steel belt thereby eliminating any contact with the air.

Thanks to this key aspect, NO dross is created and consequently zero loss of aluminium. Remember, aluminium requires 17,000 kWh per ton and generates direct CO₂ emissions into the atmosphere. On

the contrary, the dross generated during production of open top mould ingots must be removed from each ingot, usually done manually by the operators. This equates to hundreds of tons 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 aluminium chips thereby wasting aluminium (and the related CO₂) and creating a significant environmental impact linked to the management of wet lubricants. In the Properti process the continuous cast bar is cut with a rotary shear that does not generate any aluminium chips. The result is evident: zero aluminium is lost by producing the CO₂ntinuous Green Ingots.

Furthermore, the Properti ingot bundles are more compact and stable than bundles of traditional open top mould ingots. This reduces the PET and/or steel strapping material require/ed to deliver a ton of ingots by about 40% which represents an equivalent savings of CO₂ generated to produce it.

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A detailed study of all the savings, including other benefits of our ingot casting technology, including the elimination of 'out-of-dimension' ingots and transportation of the same, has provided evidence that "CO₂ntinuus Green Ingots" are Greener compared with other ingot types available on the market. Continuus-Properzi is also working to support our customers in certifying such CO₂ savings. During the last 30 years several Properzi Ingot Casting Lines have been supplied to various secondary and primary aluminium smelters, including Alba, EGA, Yunnan and Rusal.

We are available to provide more information to anyone in the aluminium industry interested in producing Properzi ingots; they are the most eco-friendly and best available technology for the production of primary and secondary aluminium ingots.

Lastly, with this article, we also want to emphasize another important contribution by Continuus-Properzi in making the Aluminium chain Greener.

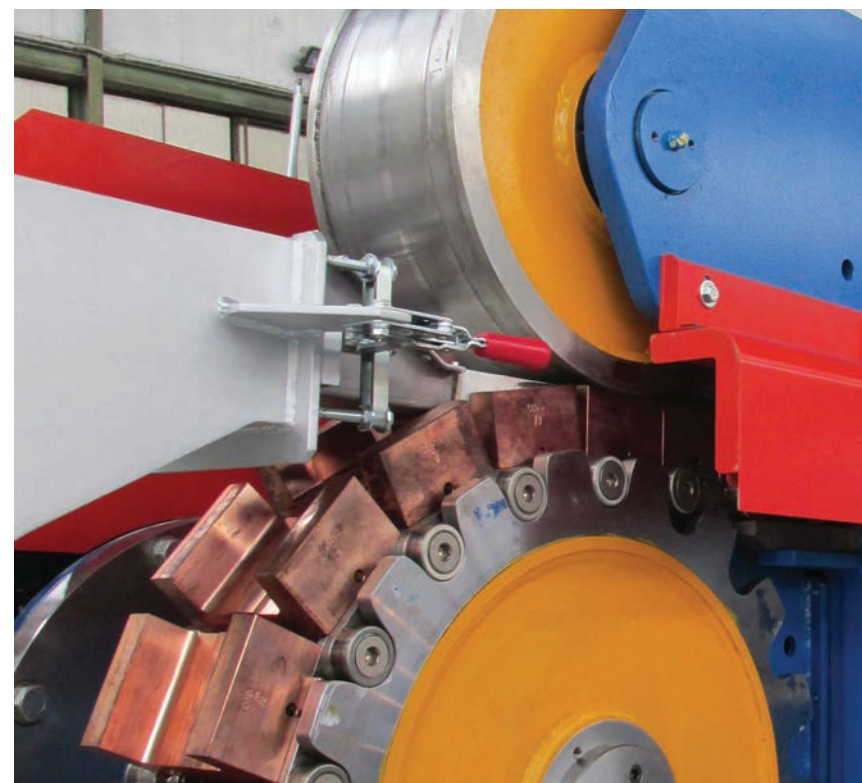
The next step after solidification into ingots is required by all producers of aluminium products regardless of what they are producing...the ingots must be remelted! From the environmental point of view, Melting has three key aspects: energy consumption, dross generation, and the quality of the fumes.

Properzi technology has over 40 years of experience with shaft melting furnaces, which has led to the development of the Vert-Melt family of furnaces with continuous melting speeds of up to over 10 tons per hour. Compared with the traditional melting furnaces, there are several advantages of the Vert-Melt such as easier operability, low maintenance, and more constant melting rate. Here we will limit our evaluation to the benefits related to the three green key aspects indicated below when compared with the traditional melting furnace:

- **Energy efficiency:** higher than any kind of reverberatory furnace with an energy consumption up to 40% lower, and no need for sophisticated, energy-wasting stirring systems.

- **Dross generated:** metal losses are three or more times less.

- **Emissions:** significantly reduced since the melting chamber is smaller and fumes



temperature is lower.

The goal of the global community is to make the aluminium chain greener and Continuus-Properzi is ready to make a significant contribution in this field, as indicated in this article. This is also the case in

the copper sector, with our range of Refining Furnaces to recycle copper scrap and our revolutionary Self-Annealing rod break-down for Green Cu Wire. ■

For further details visits our website www.properzi.com.

HOW CAN WE REDUCE CO₂ EMISSION?

UTILIZING PROPERZI TRACK & BELT METHOD FOR INGOTS PRODUCTION

Aluminium production requires tremendous energy which generates direct CO₂ emissions into the atmosphere. NO dross is created in the Properzi method thereby eliminating the loss of aluminium, thus **saving energy and reducing CO₂ emissions.**

Ingot bundles are more compact and stable: saving 40% of strapping materials (PET and/or steel) representing an equivalent **savings of CO₂** generated in their production.

The Properzi continuous cast bar is cut with a rotary shear that does not generate any aluminium chips. The result is evident: **zero aluminium is lost** by producing the CO₂ntinuus Green Ingots.

Another milestone achieved with Properzi technology in the green field!

