

Energy efficient operations

Our young company T. T. Tomorrow Technology S.p.A. is continuously meeting the challenges of designing and manufacturing energy efficient products and systems. Two very different sectors of aluminium production where we are most active aim at a common goal. Both the anode rodding shops and the primary and secondary casthouses have a target to reduce specific energy consumption. In particular we are an advocate for energy efficiency whilst slotting anodes and tending furnaces.

It was 14 years ago, in one of the most active industrial regions of Italy, that a new company was founded. The short history of T.T. Tomorrow Technology shows an important track record of experiences, research and development, manufactured products and services supplied to clients spread all over the world. Since its beginning, the activity of the company has been to focus on solutions contributing to energy saving and to the reduction of associated operating costs.

While manufacturing anode handling lines, we were required to manufacture one anode cutting machine which, as far as we know, was the first in the world to split one big 'green' carbon block into two smaller regular anodes to be baked. This brought us close to the anodes slotting technology.

While today high energy and material costs force the Aluminium Industry to focus attention on cost effective solutions, anodes slotting technology is providing major economic and operational benefits. It is well proven that slots in the bottom of anodes can reduce anode cathode distance, increase pot stability, and improve current efficiency, as well as have better alumina dissolution.

Related economic benefits are extremely high, as feedback from smelters is demonstrating energy saving from 0.11 to 0.17 kWh/kg of produced metal. This may lead to a production increase of up to 1.3 - 1.7 per cent. From the above saving of specific energy and the total plant production, the energy saved per year can be easily computed. As well as the additional income, the smelter can gain from the increased production.

We are proud to have developed our T.T. Automatic Anodes Slotting Machine to meet



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the request we had from our customers. The machine we manufacture is capable of cutting slots up to 450 mm depth, thus ensuring that the benefits of the slots last for the full anode life (the economic and production benefits that are so achieved in the pot room management are bigger than those achieved with shorter or pre-formed slots).

The depth and the inclination of the slots can be managed and adjusted even during production. The slot configuration is therefore flexible, as well as the slot shapes. A big and important advantage of the T.T. Automatic Anodes Slotting Machine is the ability to cut interrupted slots (which enable control of the gas flow direction toward the centre of the pots).

Downstream of the slotting machine we developed and manufactured a customised carbon material recovery system. With the combined air filtration system we may reach 100 % recovery and recycling rate of the highly valuable carbon removed from anodes while cutting the slots (only a maximum of 5 ppm of carbon dust discharged with filtered air may be lost).

One of the latest projects we have just completed enables the customer to manage and cut slots in different types of anodes (i.e. with different dimensions), even when fed randomly to the slotting machine.

The proprietary software we have developed to check and optimise cutting parameters results in prolonged blades and cutters life,

so reducing running and maintenance costs.

In one of the latest projects in Australia, the T. T. Anodes Slotting Machine originally designed with a 'passing through' concept was customised as end line equipment. The machine could therefore fit the very narrow space available at site, allowing the implementation of slotting of anodes in a very congested brownfield project.

All T.T. machines are fully tested and fine-tuned at our workshop in Italy, where anodes received from clients are slotted at design capacity to positively pass the Factory Acceptance Test. After equipment has been tested, it is dismantled and delivered to the erection site where the time necessary to have the anodes slotting machines in operation is reduced to a couple of weeks only, thus reducing any impact on ongoing operations.

Rodding shops are not the only area where we are most active. Casthouses are also places where the use of the best technologies available is important to gain strategic advantages and to better use energy resources. Specific gas consumption for melting operations can be a consequence of the efficient loading of furnaces. Shorter charging time allows a reduced time with the furnace door open. Effective and fast skimming and furnace cleaning operations are a second key factor for smart management.

Design and manufacturing of multifunctional furnaces tending vehicles, skimming and furnace cleaning vehicles and rail mounted systems are the most important second part of the manufacturing activities at T. T. Tomorrow Technology. Our equipment for the casthouse, in addition to the effectiveness to safeguard energy resources, is programmed to reduce environmental impact, as well as to improve safety in plants and the health of employees. The strategic point we always wish to emphasise at T.T. Tomorrow Technology is our flexibility and care to better answer customers' requests, trying our utmost to find the most valuable and effective technical solutions to meet their targets.

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