

The company EKO-SWIAT awarded Melting Technology (Presezzi Extrusion division) for the design and manufacturing of a new complete aluminium foundry plant. The new foundry plant will be composed by a 40t static melting furnace equipped with the innovative **Low Energy Consumption Stirrer** for metal recirculation, a 35t static holding furnace, one automatic charging machine, one dross cooler system and the fumes treatment plant suitable for the respect of last EU environmental limits (**Best Available Techniques (BAT) Reference Document for the NON-FERROUS Metal Industries dated February 2013**). All the plant will be studied and designed with the aim of reaching the best performance in terms of productivity, metal loss reduction and energy saving.

The clean & dirty scrap will be charged in the melting furnace via dedicated automatic charging machine. The charging machine will be designed to ease and speed up the loading of scraps and primary ingots into the furnace to optimize production and to reduce heat leakage. The oxy-air-fuel burners use independently controlled streams of gas, air and oxygen to overcome the conventional limitations of oxygen use. It produces a flame with high temperature, luminosity and velocity, increasing both radiative and convective heat transfer.

The use of oxygen in substitution of air allow to obtain a very efficient combustion process thanks to elimination of N₂. With Oxy-combustion the melting cycle is faster due to the increase of the energy absorbed by metal.

Decreasing the percentage of solid inside the aluminium bath there is a significant reduction in the capacity to absorb energy by the metal contained in the furnace. In these conditions, the application of an oxygen burner can lead as a superposition of thermal energy that the metal cannot absorb and which then is dispersed through the fumes and the furnace walls. During refining, holding and fluxing phases, the two burners can operate with air so as to save energy reducing the specific consumption.

The furnace will be equipped with a refractory lined chimney where is installed an automatic gate valve, and a new concept of air-blade, controlled automatically by the internal pressure of the furnace. The shutter material is metal fibre reinforced refractory so as to ensure reliability and durability.

The recirculation of the molten metal in the melting furnace will be ensured by the new **Low Energy Consumption** stirrer. This innovative stirrer doesn't require water piping, pumps and water treatment plant, as well it doesn't require insulation transformer, furthermore ensures better efficiency than any other conventional electromagnetic system due to there is no heat loss by Joule effect. The combination of rotation and translation movements contributes considerably to the drop melting decrease (maximizing the scrap metal return) and to the minimization of the specific energy consumption of combustible. The aluminum bath, before each transfer in the holding furnace, will be homogeneous thermally (variation of 2-3 °C between start and end of transfer) and chemically (the heavy elements will become homogeneously distributed over the whole bath volume avoiding the stratification phenomenon). All the melting furnace's drosses will be treated with our "PE ARGON DROSS COOLER". This system is the most efficient, safest and environmentally sound of all the cooling methods. The recovery of aluminium with "PE ARGON DROSS COOLER" is always higher than with other methods: this can be explained by the fact that thermiting is stopped as soon as the inert gas is applied. The "PE ARGON DROSS COOLER" can process up to 1.000 kg and has the following features: completely safe because no water is used either in the cooling of the dross or with the equipment, environmentally sound therefore no emission of dust or fume, provides for easy working conditions therefore is operator friendly, treats all kinds of drosses (black and non-reactive or white and reactive);

In summary, the new plant will offer the following advantages to EKO-SWIAT Company:

- The possibility of increasing the percentage of contaminated material in the load mix;
- Reduced CO, TOC, NO_x, Acids and particulate emissions;
- Reduced specific gas consumption;
- Increased melting performance and reduced metal loss;
- Increased metal quality;
- Dross with higher sales value;