

## Application**brief**

**Eclipse Product:** Primefire 100 & 300 Burners

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**Application:** Aluminum melter

**Description:** Barlan Metals, a producer of steel and aluminum, formed a secondary company: Ecomelt. Until that point, Barlan's most important process was the production of iron and aluminum ingots from ore. The new company, Ecomelt, would specialize in recycling aluminum waste material. The contract to provide a complete oxy-fuel combustion system for their new factory in Turkey was awarded to Eclipse.

The waste being recycled at the Ecomelt plant comes mostly from used aluminum cans, byproducts from extrusions and waste from double glazing production. Since these metals all contain several impurities, Eclipse engineers needed to build a combustion system that would not just melt aluminum down, but also refine it and incinerate high levels of VOCs (volatile organic compounds). It was decided to build a chamber-type melter with two separate chambers that would fire independently. The engineers chose to use a different type of oxygen burner for each chamber based on their particular flame patterns.

The melter was designed not to run continuously because each of the two chambers has a different function and control sequence. The first chamber, used to control contaminants in the metal and burn off unwanted VOCs, has three firing levels. Each of these firing levels has a different fuel-to-oxygen ratio control which is used to control the oxidants in both the aluminum and the atmosphere until pure aluminum is produced. The second chamber is a refining chamber with three pre-set firing levels available to operate and control the firing level and firing time of different parts of the sequence.

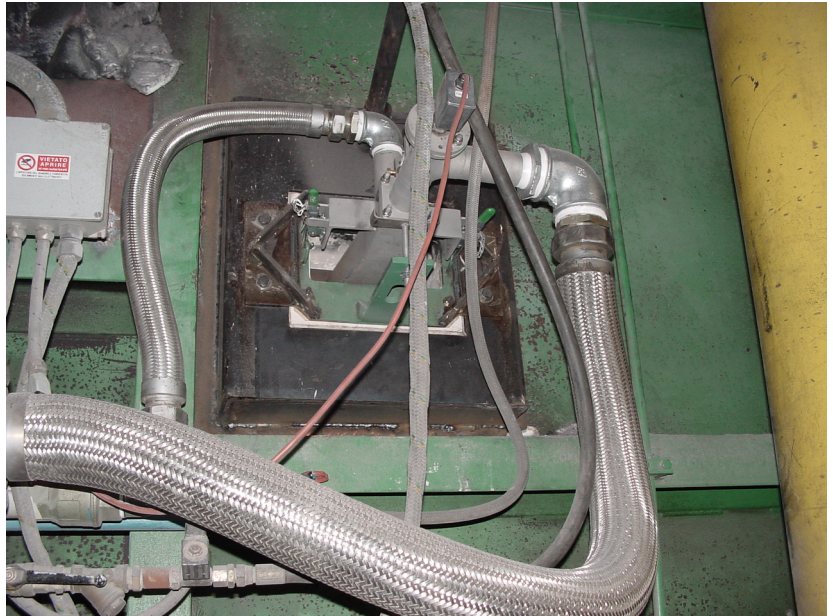
Due to the operation of the two chambers and the requirement for independent firing systems, each was equipped with safety shut-off valves, pilot burners and UV sensors for flame detection. The first chamber uses Eclipse Primefire 100 burners and the second chamber uses Eclipse Primefire 300 burners. Both Primefire 100 and 300 burners operate at 1.4MMBTU and use LPG as a fuel and LOX (liquid oxygen) as a source of oxygen.



*Inside one of the chambers of the aluminum melter*

A PLC control system with touch screen panel operates many of the controls and functions. If the door is open on either chamber, the burner in that chamber must be switched off. While the burner is off, a pilot will stay on to allow a fast restart. When the door closes again the main burner lights and, the pilot stops. If the operating temperature is reached, the burner stops. At a pre-set time, another flow rate is automatically selected until the timer or temperature control comes into operation for the next part of the sequence.

It should be noted that neither Ecomelt nor Eclipse had operated a melter exactly like this before, so it was quite an achievement that both chambers were in operation after only two days of on-site work with the Eclipse engineers. Ecomelt was so satisfied with the design and function of the system that they asked Eclipse to give them a quote on the conversion of some of the existing burners in the plant to oxygen-firing burners.



*Eclipse PF-300 on the aluminum melter*



*An Internal view of the firing chamber*