

Proposal for CC casting:

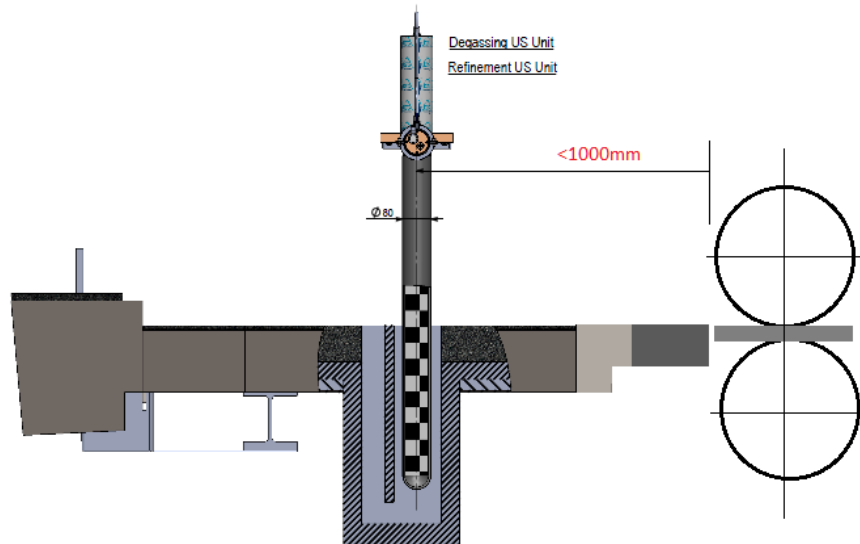
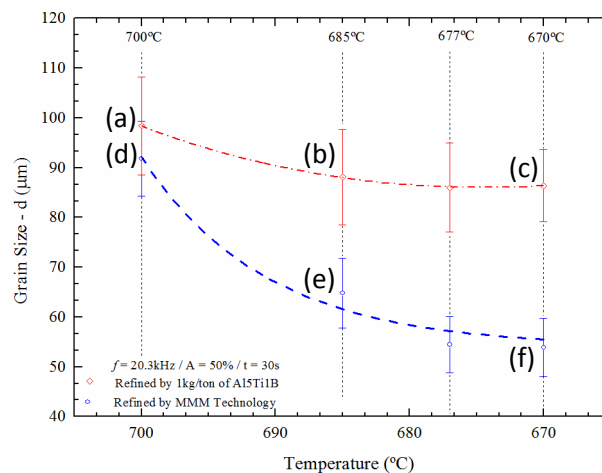


Figure 1 – Proposed Layout for CC casting.

Proposed layout should be adjusted to real dimensions of relevant casting equipment. Also there are situations convenient to introduce 2 of such US systems for degassing/refinement.

The Figure below shows the average α -Al grain size for different temperatures of processing of alloy 5xxx. It is clear that by lowering the temperature from 700°C to 670°C, this will promote significant grain size reduction when the melt is processed by high intensity ultrasound. However temperatures below 677°C do not promote higher grain refinement.

Also, in the Figure below, it can be noticed that the average α -Al grain size for this experiment, without ultrasonic processing, does not present a significant grain size reduction.



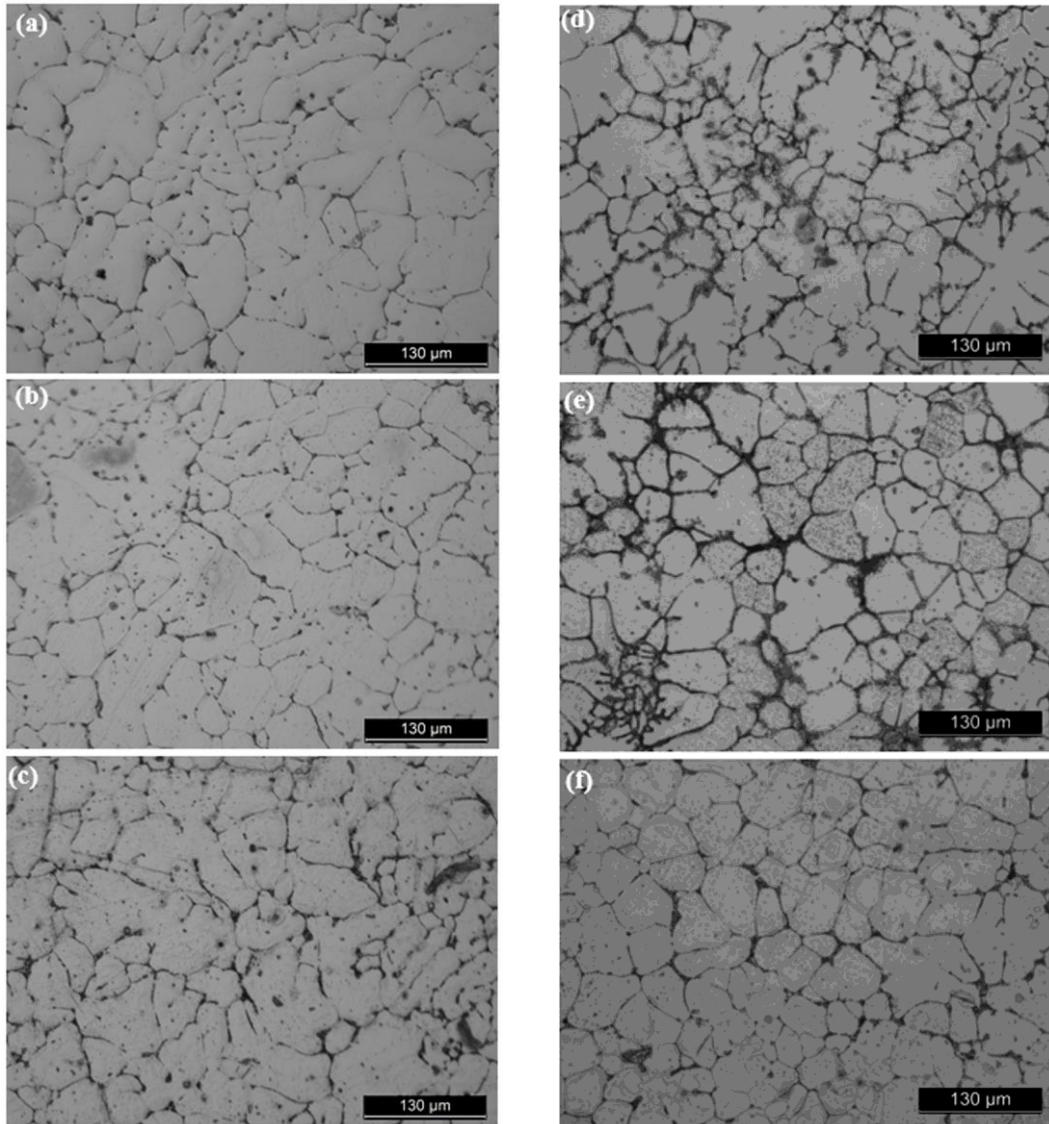
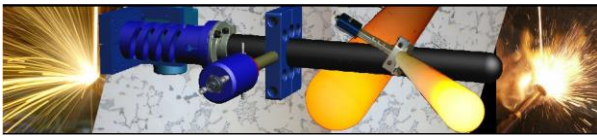
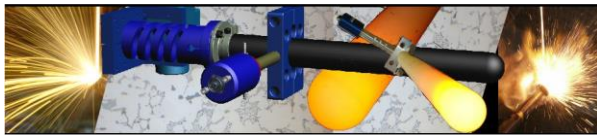


Figure 2 – Grain size vs Temperature.



Proposal for DC casting

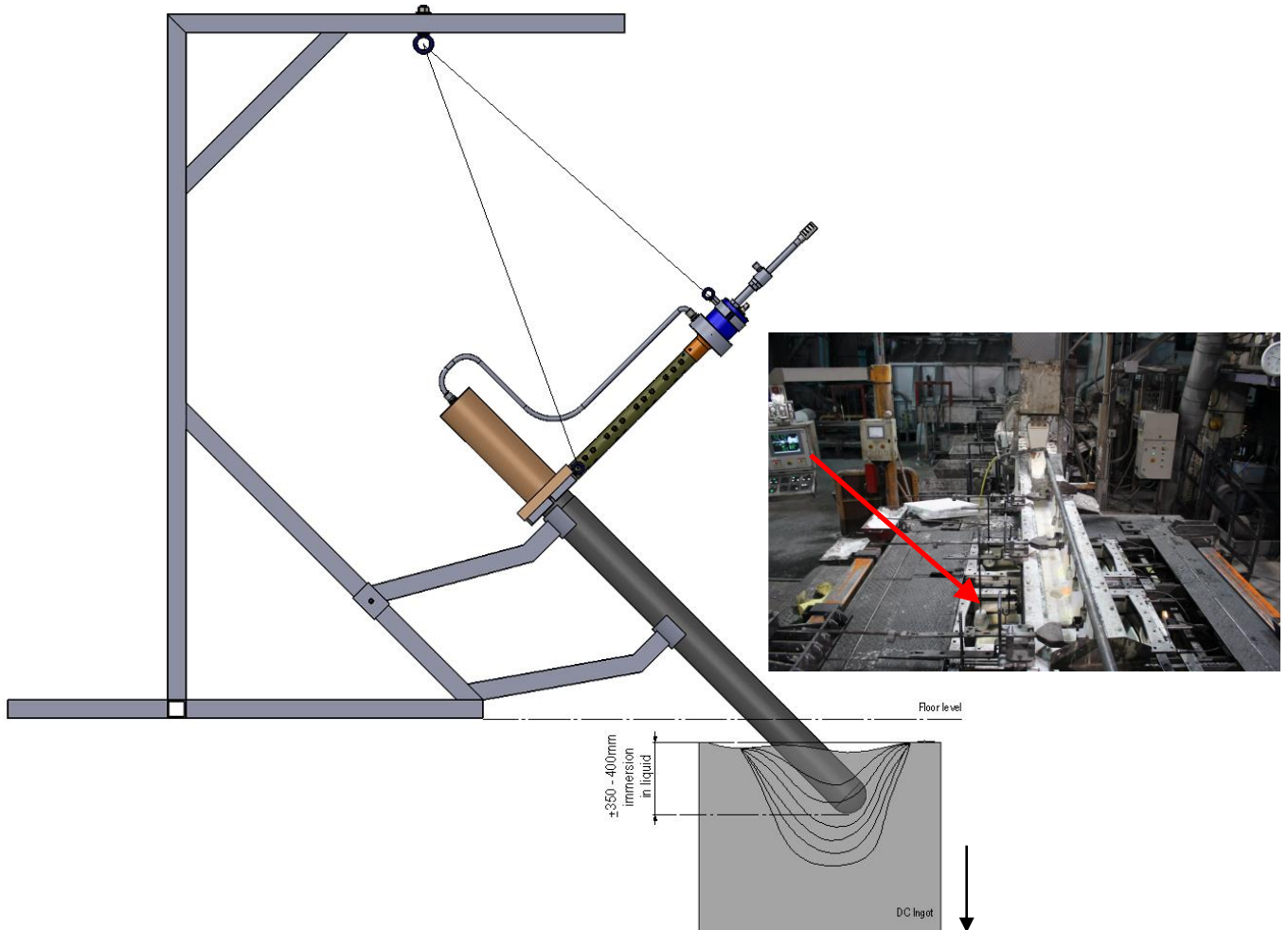
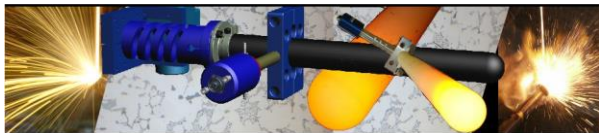


Figure 3 – Proposed Layout for DC casting.

Figure 3 shows the proposal of ultrasonic device to perform treatment of aluminum alloys in the sump of DC-cast billets. The use of ultrasonic device based on the MMM technology will allow the formation of non-dendritic structure during DC casting making the billet structure more homogeneous and decreasing the macro segregation. The layout proposed should be adjusted to real dimensions of DC casting equipment.



Proposal for Static casting

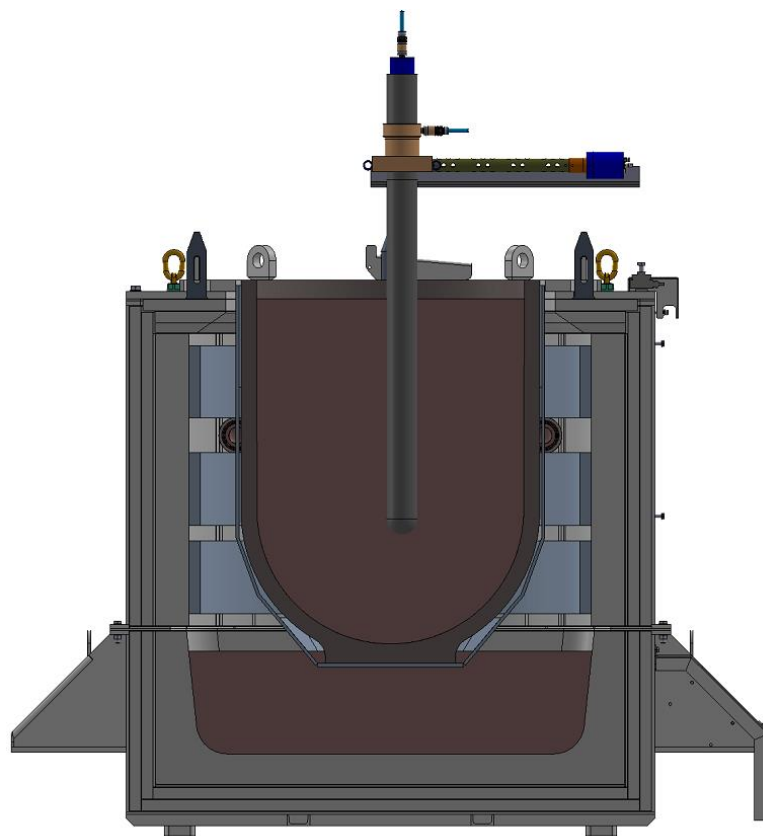
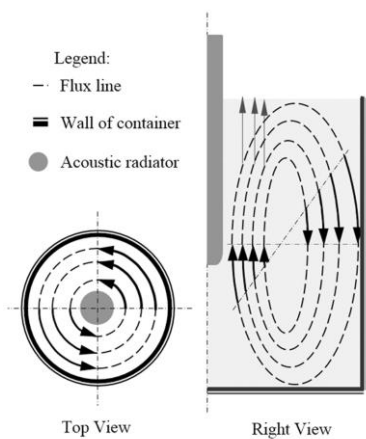
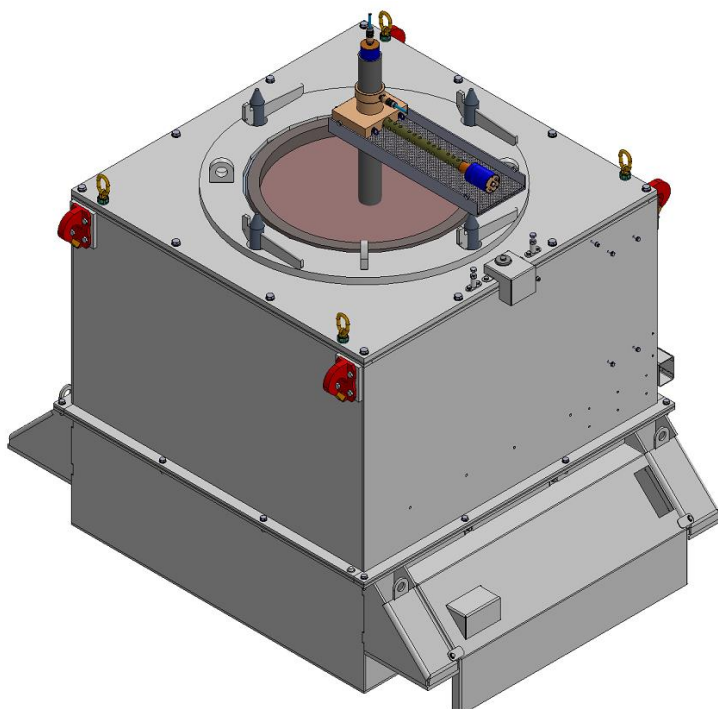
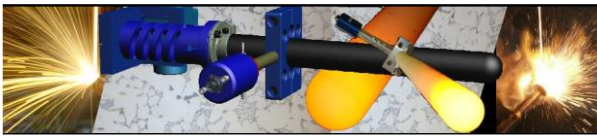


Figure 4 – Proposed Layout for Static casting.

Figure 4 shows the proposal of ultrasonic device to perform degassing of aluminum alloys in a crucible.



Proposal for Small Ladle

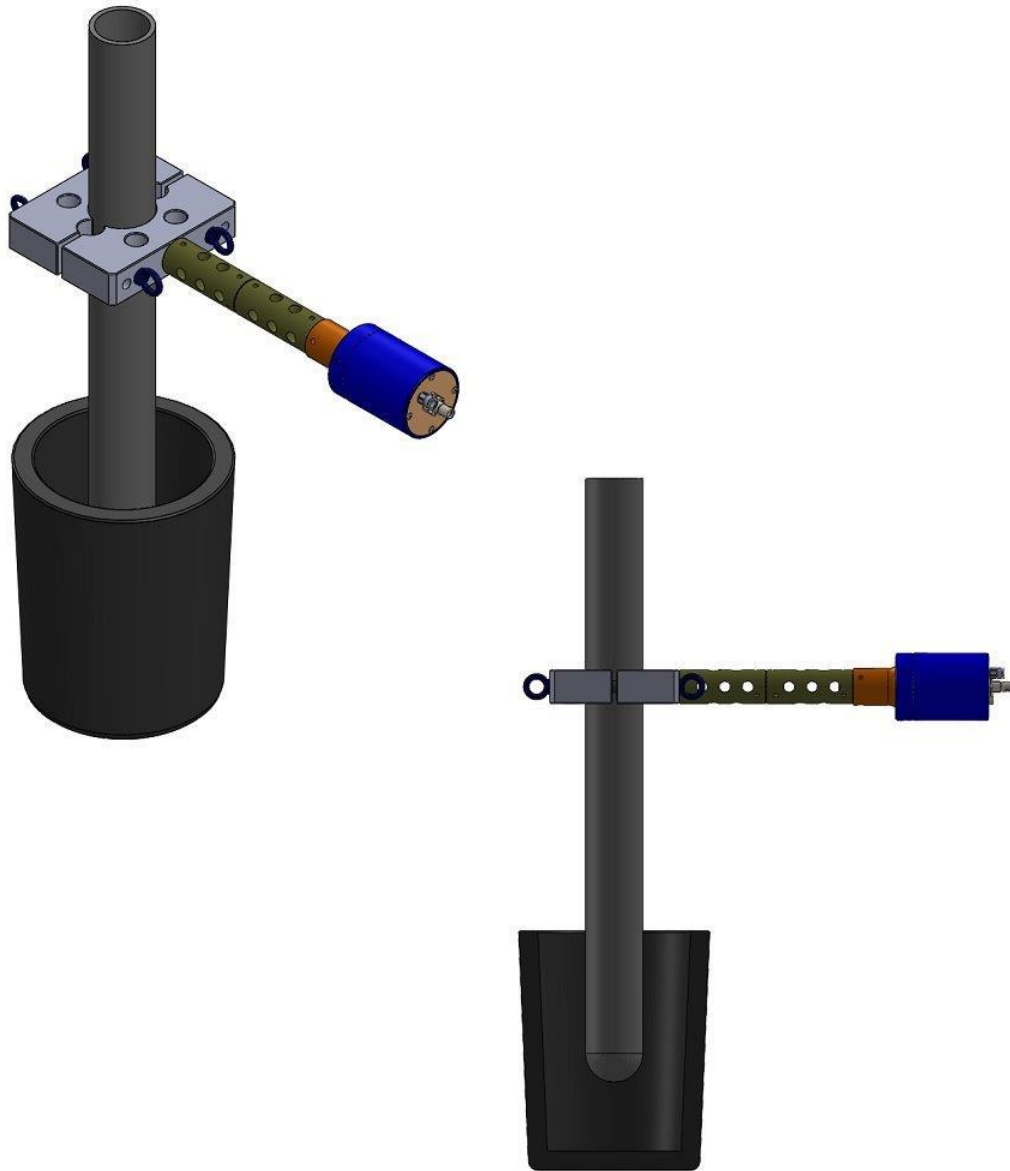


Figure 5 – Proposed Layout for Small Ladle.