

Alloy Additions

Question

Since aluminum is the strongest deoxidizer in Al killed steels, why does it make any difference in the timing or order of ladle alloying additions? M.S. USA

Answer

If you only had to be considered about thermodynamics, the timing and order of alloy additions would not be an issue. However, as in most steelmaking situations, kinetics is a major factor. Al is added first, after the ladle bottom has an adequate steel covering forming an Al rich metal. Taking advantage of the mixing created by the tapping stream, the balance of liquid steel is deoxidized by the Al enriched metal with minimal interference from slag. Immediately after Al, manganese, ferrosilicon, and other alloying elements are added.

Dissolved Al increases and stabilizes the recovery of the other elements. The amount of Al added is usually based on an oxygen probe measurement and of course, the desired residual. (Answer provided courtesy of Donald Dukelow, retired steel researcher, Mt. Lebanon, PA)