Inventions & Innovation Project Abstract

Cost-Effective Consolidation of Fine Aluminum Scrap for Increased Remelting Efficiency

Remelting of fine aluminum scrap poses a particularly difficult problem from a melt loss perspective. Fine scrap forms have high surface are to volume ratios and include products such as chips from ingot scalping, chips from machining of semi-fabricated products, chips from sawing aluminum products, and scrap consisting of fine final product forms such as wire and foil. EMV Technologies is developing an improved process for increasing the energy efficiency of remelting of fine aluminum scrap products. Specifically, the process will develop a direct extrusion consolidation method to convert light scrap with high surface area into a low surface area product that can be remelted in conventional processes with low melt loss. The primary strategy of this project is to reduce the surface area to volume ratio by consolidating the scrap into a bulk product with a greatly reduced surface area to volume ratio, making it suitable for remelting in conventional secondary furnaces.

Through implementation of the technology for consolidation of high surface area scrap prior to remelting, melt losses could be reduced to levels comparable to those achieved processing low surface area scrap - typically on the order of 4%. Reduced melt loss would lead to a net gain in metal recovery of 4.8 million pounds/year in recycling metal scrap from a unit rolling mill. It is estimated that implementation of the proposed technology for processing all US light gauge scrap (estimated to be about 1 billion pounds/year) would be on the order of 11.6 trillion Btu/year. These savings will be realized as reduced electrical energy for the production of aluminum metal. The most significant cost benefits will be realized through improved metal recovery in remelt operations. Additionally, a majority of environmental savings other than power generation emissions will be realized as reduction of dross and skin formation during the scrap remelting process.

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