Processing Electric Arc Furnace Dust into Saleable Chemical Products

Byproducts of Steel Manufacture Can Add to Plant Revenues

Benefits

- Eliminates need to dispose of hazardous waste
- No need to transport hazardous waste off-site for processing
- Reduced energy requirements
- Production of saleable products from former waste products
- Frees landfill space

Applications

Applies throughout the steel industry, where 65,000 tons of electric arc furnace dust are generated each year in North America.

The modern steel industry uses electric arc furnace (EAF) technology to manufacture steel. A major drawback of this technology is the production of EAF dust, which is listed by the U.S. Environmental Protection Agency as a hazardous waste under the Resource Conservation and Recovery Act. The annual disposal of approximately 0.65 million tons of EAF dust in the United States and Canada is an expensive, unresolved problem for the steel industry.

EAF dust byproducts are generated during the manufacturing process by a variety of mechanisms. The dust consists of various metals (e.g., zinc, lead, cadmium) that occur as vapors at 1,600°C (EAF hearth temperature); these vapors are condensed and collected in a baghouse. The production of one ton of steel will generate approximately 25 pounds of EAF dust as a byproduct, which is currently disposed of in landfills.

The Technology Solution

Drinkard Metalox, Inc. (DMI) has developed a unique technology to completely process EAF dust into saleable products using a hydro metallurgical process. The process technology is based on digestion of EAF dust, followed by a series of steps to isolate and retrieve the individual components. The DMI

Furnace Dust Transformed Into Valuable Products

This technology will benefit the steel industry because it produces a saleable product at a reasonable price, lowering energy costs and the need to truck furnace dust off site for processing.

technology saves energy by eliminating the need for furnace treatment, whereas the competing Waelz kiln process requires two furnace treatment steps to adequately separate EAF dust. The DMI technology reduces waste by making saleable chemicals from materials that otherwise would be landfilled or have very low value. Unlike the Waelz process, the DMI process will be implemented on-site at a steel mill, thereby eliminating the expense and risk of transporting hazardous waste.

Current Status

Pilot plant production runs began in July 1997, and have now been completed. DMI now has a Letter of Intent with a major steel company to install a full-scale, on-site demonstration unit. Assuming contract negotiations are successful, DMI expects to begin construction in 1998, with plant operations beginning in 1999.

Energy Savings per Unit* (projected)

Current Energy Use (Btu)		776 billion
With Proposed Technology		106 billion
	Energy Savings	670 billion

Waste Savings per Unit* (projected)

	CO_2 Emissions from Production	CO_2 Emissions from Energy Use	Slag	Total
Current Waste (tons)	44,600	12,300	28,400	86,000
With Proposed Technology	0	4,600	0	5,000
Waste Savings	44,600	7,700	28,400	81,000

*for a facility converting 40,000 tons of EAF dust into saleable material per year.

Industries of the Future—Steel

Through OIT's Industries of the Future initiative, the Steel Association, on behalf of the steel industry, has partnered with the U.S. Department of Energy (DOE) to spur technological innovations that will reduce energy consumption, pollution, and production costs. In March 1996, the industry outlined its vision for maintaining and building its competitive position in the world market in the document, ***The Re-emergent Steel Industry: Industry/Government Partnerships for the Future.***

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Partners

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NICE^3

North Carolina Office of Waste Reduction

For more information

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