

IRON AND STEEL SLAG

(Data in thousand metric tons, unless otherwise noted)

Domestic Production and Use: Ferrous slags are valuable coproducts of iron- and steelmaking. In 1997, approximately 21.4 million tons of iron and steel slags, valued at about \$147 million¹ (f.o.b), were consumed. Of this, iron or blast furnace slag accounted for approximately 65% of the tonnage and was worth about \$118 million. Steel slags, produced from open hearth, basic oxygen, and electric arc furnaces, accounted for the remainder. There were 16 slag-processing companies, of which 3 processed only iron slag, 5 processed only steel slag, and the remainder did both. Slag processing facilities spread over almost 100 locations Nationwide: iron slags at 25 sites in 13 States and steel slags at 82 sites in 29 States. The North Central region (Illinois, Indiana, Michigan, Ohio) accounted for 60% of total sales of slag of domestic origin. Iron and steel slags were used mainly in construction projects. The major uses for iron slag were for road bases, 43%; asphaltic concrete aggregate and other concrete applications, 40%; and fill, 11%. Steel slags were mainly used for road bases, 40%; fill, 20%; and asphaltic concrete aggregate, 16%. Approximately 90% of iron and steel slag shipments were by truck, generally to within a 65-kilometer (approximately 40-mile) radius of the plant, and rail and waterway transport each accounted for about 5% of shipments. Rail and waterway shipments included destinations farther afield.

Salient Statistics—United States:	1993	1994	1995	1996	1997^e
Production, marketed ²	19,000	20,100	21,000	20,500	21,000
Imports for consumption	162	199	280	346	350
Exports	4	4	4	3	3
Consumption, apparent	19,200	20,300	21,300	20,800	21,400
Price average value, dollars per ton, f.o.b. plant	6.65	6.99	6.89	6.90	7.00
Stocks, yearend	NA	NA	NA	NA	NA
Employment, number ^e	3,000	2,500	2,500	2,500	2,500
Net import reliance ³ as a percent of reported consumption	1	1	1	1	1

Recycling: No longer regarded as waste or minimally useful byproducts of iron- and steelmaking, ferrous slags today are viewed as valuable coproducts of ferrous smelting and are among the most voluminous of recycled materials. Apart from the large outside markets for slag in the construction sector, some iron and steel slags are utilized internally—being recycled to the furnaces as ferrous and flux feed. Entrained metal, particularly in steel slag, routinely is recovered during slag processing for return to the furnaces. However, data for such furnace feed uses are unavailable.

Import Sources (1993-96): NA. 1996 only: Canada, 47%; South Africa, 25%; and other, 28%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/97	Non-MFN⁴ 12/31/97
Granulated slag	2618.00.0000	Free	10% ad val.
Basic slag	3103.20.0000	Free	Free.
Slag, dross, scalings, from manufacture of iron and steel	2619.00.3000	17.7¢/ton	73.8¢/ton.

Depletion Allowance: Not applicable.

Government Stockpile: None.

IRON AND STEEL SLAG

Events, Trends, and Issues: Sales of iron and steel slags are increasing slowly but are significantly affected by, to a large degree, the price and availability of natural aggregates—slag's main competitor in the construction sector. Although data are lacking, there appears to be growing demand in the U.S. concrete industry for granulated blast furnace slag as a pozzolan or cement extender (in blended cements); such use is common overseas. The long-term availability of iron slag likely will decline as remaining blast furnaces are decommissioned. It is unclear if imports will increase to compensate for the domestic decline. Steel slag availability is more assured.

Iron and steel slags have been proposed for regulation under various waste classifications by Federal and State agencies. Citing slag's widespread marketability and general chemical inertness, the industry has thus far succeeded at keeping slag exempted from such regulation.

World Mine Production, Reserves, and Reserve Base: Not strictly applicable because slag is not a mining product, per se. Production data for the world are unavailable, but it may be estimated that recent annual world iron and steel slag output is on the order of 250 to 300 million tons, based on typical ratios of slag to crude iron and steel output.

World Resources: Not applicable.

Substitutes: Crushed stone and sand and gravel are the predominant aggregate substitutes in the construction sector. Certain rock types, as well as silica fume and fly ash, are pozzolan substitutes in blended cements.

^eEstimated. NA Not available,

¹The reported value of slag excludes the value of any entrained metal that may be recovered during slag processing and returned to the iron and, especially, steel furnaces. Value data for such recovered metal were unavailable.

²Data for actual production of marketable slag are unavailable. Output may be estimated as equivalent to 25% to 30% of crude (pig) iron production and 10% to 15% of crude steel output.

³Defined as imports - exports. Data are unavailable to allow adjustments for changes in stocks.

⁴See Appendix B.