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 1999, about 19 million tons of domestic iron and steel slags, valued at about $150 million[1] (f.o.b), were consumed. Of this, iron or blast furnace slag accounted for about 65% of the tonnage sold and was worth about $128 million. Steel slags, produced from open hearth,[2] basic oxygen, and electric arc furnaces accounted for the remainder. There were 15 slag-processing companies, servicing either iron and steel or just steel facilities at about 100 locations: iron slags at about 30 sites in a dozen States and steel slags at about 90 sites in about 30 States. The North Central region (Illinois, Indiana, Michigan, Ohio) was the source of about 61% of total sales of slag of domestic origin. The major uses for iron slag were for road bases, 40%; asphaltic aggregate and cement and concrete applications, 33%; and fill, 15%. Steel slags were mainly used for asphaltic aggregate, 30%; fill, 28%; and road bases, 23%. About 90% of iron and steel slag shipments was by truck, generally to customers within approximately 80 kilometers of the plant. Rail and waterway transport each accounted for about 5% of shipments, but these included destinations farther afield.

Salient Statistics—United States:	1995	1996	1997	1998	1999[e]
Production, marketed[3]	21,000	20,500	18,900	18,400	19,000
Imports for consumption	280	346	663	700	920
Exports	4	3	9	10	12
Consumption, apparent[4]	21,300	20,800	19,600	19,000	19,900
Price average value, dollars per ton, f.o.b. plant	7.00	6.90	7.70	8.00	8.50
Stocks, yearend	NA	NA	NA	NA	NA
Employment, number[e]	2,500	2,500	2,500	2,700	2,750
Net import reliance[5] as a percent of reported consumption	1	2	3	4	5

Recycling: No longer regarded largely as waste, ferrous slags are viewed as valuable byproducts of iron- and steelmaking 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 used internally—being recycled to the furnaces as ferrous and flux feed. Entrained metal, particularly in steel slag, is routinely recovered during slag processing for return to the furnaces. However, data for such furnace feed uses are unavailable.

Import Sources (1995-98): Year-to-year import data for ferrous slags show great variations in both tonnages and unit values; many of the data contain unresolved discrepancies. Slag was imported in 1995-96 mainly from Canada and South Africa; prior sources were mainly Canada and Japan. Data for 1998 only: France, 37%; Brazil, 10%; United Kingdom, 9%; Italy, 8%; other, 36%.

Tariff: Item	Number	Normal Trade Relations 12/31/99
Granulated slag	2618.00.0000	Free.
Basic slag	3103.20.0000	Free.
Ferrous scale	2619.00.9000	Free.
Slag, dross, scalings, from manufacture of iron and steel	2619.00.3000	Free.

Depletion Allowance: Not applicable.

Government Stockpile: None.

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Events, Trends, and Issues: Sales of iron and steel slags depend, to a large degree, on the price and availability of natural aggregates, which are slag's main competitor in the construction sector. There has been increasing demand for granulated blast furnace slag (as a pozzolan or cement extender) in the United States; such use is common overseas. This material makes up the bulk of slag imports. The long-term availability of iron slag in the United States will probably decline as existing blast furnaces are shut down; no new blast furnaces are under construction or planned. 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 chemical inertness, the industry has thus far succeeded at keeping slag exempt from such regulation. No new government regulation is pending.

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 current 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 common aggregate substitutes in the construction sector. Certain rock types, as well as silica fume and fly ash, are pozzolan substitutes in blended cements and concrete. Fly ash represents the bulk of the substitutes, with about 2 million tons of the total 9 million tons used going into cement manufacture, either as raw feed or cement additive.

[e]Estimated. NA Not available.

[1]The reported value of $150 million (obtained from annual survey of processors) represents the quantities sold rather than processed and 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.

[2]Sales of open hearth furnace steel slag were from stockpiles; there was no domestic open hearth steel production in 1999.

[3]Data for actual production of marketable slag are unavailable and the data shown are for sales, largely from stockpiles. Production may be estimated as equivalent to 25% to 30% of crude (pig) iron production and 10% to 15% of crude steel output.

[4]Defined as production + imports - exports.

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