IRON AND STEEL SLAG

(Data in million metric tons unless otherwise specified)

Domestic Production and Use: Iron and steel (ferrous) slags are formed by the combination of slagging agents and impurities during the production of crude (or pig) iron and raw steel. The slags are tapped separately from the metals, then cooled and processed, and are primarily used in the construction industry. Granulated slag is produced at a small number of specially equipped blast furnaces by quenching the molten slag with water to produce sand-sized grains of silicate glass. Pelletized slag, a form of expanded slag, is also produced by quenching blast furnace slag with water; though often used as a lightweight aggregate, it is also used in place of granulated slag when finely ground, but very little is produced in the United States. Ground granulated blast furnace slag (GGBFS) is used as a supplementary cementitious material (SCM) that can partially substitute for clinker in finished cement or for some of the portland cement in concrete. Any other slag produced at blast furnaces is air cooled, including some from blast furnaces equipped with granulators if the slag was not suitable for granulation. Air-cooled blast furnace slag (ACBFS) has for many decades been used in place of natural aggregates in concrete and in smaller specialty markets such as glass and mineral wool insulation. ACBFS also shares end uses with steel furnace slag produced in the basic oxygen furnaces (BOFs) at integrated steel mills and at the electric arc furnaces (EAFs) at steel mills that produce steel mainly from scrap metal. Common end uses for ACBFS, and steel slag included asphaltic concrete, fill, and road base. Some iron and steel slags can also be used as a soil conditioner or as filter media in water treatment.

Data were unavailable on actual U.S. ferrous slag production, but slag sales[1] in 2025 were estimated to be 16 million tons valued at about $620 million. Granulated blast furnace slag[2] was less than 30% of the tonnage sold but accounted for about 80% of the total value of slag because of the high value of GGBFS. Steel slag produced from BOFs and EAFs accounted for the remainder of sales. Slag was processed by about 25 companies servicing active iron and steel facilities or reprocessing old slag piles at an estimated 120 processing plants (including some iron and steel plants with more than one slag-processing facility) in 33 States, including facilities that import and grind unground slag to sell as GGBFS.

Prices per ton ranged from a few cents for some steel slags at a few locations to about $140 or more for some GGBFS in 2025. Owing to low unit values, most slag types can be shipped only short distances by truck, but rail and waterborne transportation allow for greater travel distances. Because much higher unit values make it economical to ship GGBFS longer distances, much of the GGBFS consumed in the United States is imported.

Salient Statistics—United States:	**2021**	**2022**	**2023**	**2024**	**2025[e]**
Production (sales)[e, 1]	16	15	16	16	16
Imports for consumption[e, 3]	2.4	2.2	2.5	2.0	2.1
Exports	([4])	([4])	([4])	([4])	([4])
Consumption, apparent[e, 5]	16	15	16	16	16
Price, average unit value, free on board plant, dollars per metric ton[6]	28	29	36	38	40
Employment, number[e]	1,500	1,500	1,500	1,500	1,500
Net import reliance[7] as a percentage of apparent consumption	14	14	15	12	13

Recycling: Following removal of entrained metal, slag can be returned to the blast and steel furnaces as ferrous and flux feed, but data on these returns are incomplete. Entrained metal, particularly in steel slag, is routinely recovered during slag processing for return to the furnaces and is an important revenue source for slag processors; data on metal returns are unavailable.

Import Sources (2021–24): Japan, 60%; China, 22%; Brazil, 6%; Mexico, 6%; and other, 6%.

Tariff: Item	**Number**	**Normal Trade Relations 12–31–25**
Granulated slag	2618.00.0000	Free.
Slag, dross, scalings, and other waste from manufacture of iron and steel:		
Ferrous scale	2619.00.3000	Free.
Other	2619.00.9000	Free.

Depletion Allowance: Not applicable.

Government Stockpile: None.

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Events, Trends, and Issues: In 2025, the supply of domestic GGBFS increased with the startup of a new granulator in the second quarter of 2025; however, a separate granulator was idled in the second quarter of 2025, keeping the overall number of domestic granulators at four, but at three granulation operations. In 2024, permits were obtained to install granulators for both blast furnaces at another integrated steel mill, underscoring the increasing importance of granulated slag for its use as a SCM in blended cements and in concrete. Startup was expected in 2026. In addition to reducing unit consumption of fuel and limestone in cement plant kilns, which reduces the unit emissions of pollutants such as carbon dioxide, the addition of slag cement in concrete mixtures is advantageous when certain requirements need to be met, such as a lower heat of hydration. Relatively few integrated U.S. steel mills were originally equipped with granulators on their blast furnaces and, for many years as blast furnaces were being shut down, the supply of domestic granulated blast furnace slag decreased; at yearend 2015, there were only two granulators operating. Although the additional granulator capacity coming online was expected to increase the domestic supply, the availability of imported granulated slag was expected to eventually decrease as foreign blast furnaces are shut down in decarbonization efforts and replaced with EAFs or with direct-reduced iron facilities such as one being planned for a major integrated mill in Canada. In addition, the use of fly ash, which is used as an additive in concrete production similar to GGBFS, was expected to increase. Domestic supply from coal-fired powerplants was expected to be stable in the upcoming years, but the quantity of fly ash harvested and beneficiated from landfill storage was expected to increase because utilization is expected to increase. Granulated slag needs to be ground into a fine powder at grinding plants; in Texas, a new slag cement facility became fully operational in February and another slag cement plant was commissioned in the fourth quarter of 2024. In addition, a groundbreaking was held in June for a new slag cement facility being built in Indiana and plans for a new slag grinding plant in Florida were announced in November.

New uses for steel slag were being investigated. In 2024, the U.S. Department of Transportation awarded a grant spanning a 5-year period for research on uses for steel slag in concrete and cement. Typically, ACBFS and GGBFS are used for this purpose, but steel slag is more plentiful. Companies were also working with steel slag in decarbonization efforts, such as using it as a passive absorbent in a carbon dioxide removal process. Additional research investigations involving steel slag included its use in a novel process to treat wastewater and its incorporation into various road construction materials. Plans for a new slag recycler facility were announced for a steel plant in Pennsylvania.

World Production and Reserves: Because slag is not mined, the concept of reserves does not apply. World production data for slag were not available, but iron slag production from blast furnaces was estimated to be 25% to 30% of crude (pig) iron production, and steel furnace slag production was estimated to be 10% to 15% of raw steel production. In 2025, world iron slag production was estimated to be between 330 million and 390 million tons, and steel slag production was estimated to be between 190 million and 290 million tons.

World Resources: Not applicable.

Substitutes: In the construction sector, ferrous slags compete with natural aggregates (crushed stone and construction sand and gravel) but are far less widely available than the natural materials, although macadam of slag can also be used for aggregate material. As a cementitious additive in blended cements and concrete, GGBFS mainly competes with fly ash, metakaolin, and volcanic ash pozzolans. In this respect, GGBFS reduces the amount of portland cement per ton of concrete, thus allowing more concrete to be made per ton of portland cement. Portland-limestone cement can be used instead of GGBFS for the same purpose. Slags (especially steel slag) can be used as a partial substitute for limestone and some other natural raw materials for clinker (cement) manufacture and compete in this use with fly ash and bottom ash. Some other metallurgical slags, such as copper slag, can compete with ferrous slags in some specialty markets, such as a ferrous feed in clinker manufacture, but the supplies of these metallurgical slags are generally much more restricted than ferrous slags.

[e]Estimated.
[1]Processed slag sold during the year, excluding entrained metal.
[2]Data include sales of domestic and imported granulated blast furnace slag.
[3]U.S. Census Bureau data adjusted by the U.S. Geological Survey to remove nonslag materials (such as cenospheres, fly ash, and silica fume) and slags or other residues of other metallurgical industries (especially copper slag), whose unit values are outside the range expected for granulated slag. In some years, tonnages may be underreported.
[4]Less than 100,000 tons.
[5]Defined as sales – exports.
[6]Average of all types of slag. GGBFS has the highest prices because of its cementitious properties. ACBFS averages a higher price than steel slag, but both are generally lower than prices for aggregates except for some special uses.
[7]Defined as imports – exports.