

SAND AND GRAVEL (INDUSTRIAL)¹

(Data in thousand metric tons unless otherwise specified)

Domestic Production and Use: In 2023, industrial sand and gravel production was an estimated 130 million tons valued at an estimated \$7.0 billion. The quantity of industrial sand and gravel sold or used increased by 14%, and the value increased by 36% compared with that in 2022. Industrial sand and gravel was produced by 106 companies from 199 operations in 33 States. The leading producing States were, in descending order of production, Texas, Wisconsin, Illinois, Louisiana, Oklahoma, Missouri, Arkansas, Michigan, California, and Iowa. Combined production from these States accounted for about 89% of total domestic sales and use. Approximately 81% of the U.S. tonnage was used as hydraulic-fracturing sand (frac sand) and well-packing and cementing sand, and 8% as glassmaking sand. Other common uses were, in decreasing quantity of use, foundry sand, whole grain fillers for building products, filtration sand, and recreational sand, which accounted for 7% combined. Other minor uses were, in decreasing quantity of use, chemicals, roofing granules, abrasives, silicon and ferrosilicon, ceramics, fillers, traction, filtration gravel, and metallurgic flux, which accounted for 2% combined. Other unspecified uses accounted for 2% combined.

Salient Statistics—United States:

	2019	2020	2021	2022	2023^e
Sold or used	108,000	75,800	91,200	114,000	130,000
Imports for consumption	389	417	350	338	290
Exports	5,590	4,070	5,400	6,350	7,500
Consumption, apparent ²	103,000	72,100	86,200	108,000	120,000
Price, average value, dollars per metric ton	46.00	29.50	40.80	45.30	54.00
Employment, quarry and mill, number ^e	7,500	4,500	5,300	6,000	6,100
Net import reliance ³ as a percentage of apparent consumption	E	E	E	E	E

Recycling: Recycled cullet (pieces of glass) represents a significant proportion of reused silica. About 33% of glass containers are recycled. Some abrasive, foundry, frac sands are recycled or reclaimed.

Import Sources (2019–22): Canada, 86%; Vietnam, 4%; Taiwan, 3%; Brazil, 2%; and other, 5%.

Tariff:	Item	Number	Normal Trade Relations 12–31–23
	Sand containing 95% or more silica and not more than 0.6% iron oxide	2505.10.1000	Free.

Depletion Allowance: Industrial sand or pebbles, 14% (domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: U.S. apparent consumption of industrial sand and gravel was estimated to be 120 million tons in 2023, an 11% increase from that in 2022. The most important driving force in the industrial sand and gravel industry remained the production and sale of frac sand. In recent years, the consumption of frac sand increased as hydrocarbon extraction from shale deposits increased and the quantity of frac sand used per well increased in the United States. In 2023, industrial sand and gravel consumption increased as demand for frac sand increased and also led to higher prices for frac sand. Increased apparent consumption for other end uses in 2023 resulted from continued economic recovery from the effects of the global coronavirus disease 2019 (COVID-19) pandemic. Imports of industrial sand and gravel in 2023 were an estimated 290,000 tons, a 14% decrease from those in 2022. The United States remained a net exporter of industrial sand and gravel; U.S. exports of industrial sand and gravel were an estimated 7,500,000 tons, an 18% increase from those in 2022.

The United States was the world's leading producer and consumer of industrial sand and gravel based on estimated world production figures. Collecting definitive data on industrial sand and gravel production for most nations is difficult because of the wide range of terminology and specifications used by different countries. The United States remained a major exporter of industrial sand and gravel, shipping it to almost every region of the world. High global demand for U.S. industrial sand and gravel is attributed to its high quality and to the advanced processing techniques used in the United States for many grades of industrial sand and gravel, meeting specifications for virtually any use.

SAND AND GRAVEL (INDUSTRIAL)

The industrial sand and gravel industry continued to be concerned with safety and health regulations and environmental restrictions in 2023, especially those concerning crystalline silica exposure.

Local shortages of industrial sand and gravel were expected to continue to increase owing to land development priorities, local zoning regulations, and logistical issues. These factors may result in future sand and gravel operations being located farther from high-population centers. Increased efforts to reduce cost, emissions, and the risk of exposure to crystalline silica have led to an increase of undried “wet sand” being sold or used as frac sand instead of conventional “dry sand.”

World Mine Production and Reserves:

	Mine production		Reserves ⁴
	<u>2022</u>	<u>2023^e</u>	
United States	114,000	130,000	Large. Industrial sand and gravel deposits are widespread.
Argentina	^e 3,900	4,000	
Australia	^e 5,000	5,500	
Bulgaria	^e 8,450	8,500	
Canada	^e 5,000	5,500	
China	^e 87,700	88,000	
France	^e 13,000	14,000	
Germany	^e 11,100	11,000	
India	^e 11,900	12,000	
Indonesia	^e 3,540	3,500	
Italy	^e 14,000	33,000	
Japan	2,010	2,000	
Malaysia	^e 4,500	7,000	
Mexico	^e 2,700	2,700	
Netherlands	^e 10,000	12,000	
Poland	^e 5,570	5,800	
Russia	^e 7,300	7,300	
Spain	^e 6,600	6,600	
Turkey	14,500	15,000	
United Kingdom	^e 4,200	4,200	
Other countries	<u>^e24,000</u>	<u>25,000</u>	
World total (rounded)	359,000	400,000	

World Resources:⁴ Sand and gravel resources of the world are large. However, because of their geographic distribution, environmental restrictions, and quality requirements for some uses, extraction of these resources is sometimes uneconomical. Quartz-rich sand and sandstone, the main sources of industrial silica sand, occur throughout the world.

Substitutes: Alternative materials that can be used for glassmaking, foundry, and molding sands are chromite, olivine, staurolite, and zircon sands. Alternative materials that can be used for abrasive sands are garnet, olivine, and slags. Although costlier and mostly used in deeper wells, alternative materials that can be used as proppants are sintered bauxite and kaolin-based ceramic proppants.

^eEstimated. E Net exporter.

¹See also the Sand and Gravel (Construction) chapter.

²Defined as production (sold or used) + imports – exports.

³Defined as imports – exports.

⁴See Appendix C for resource and reserve definitions and information concerning data sources.