SAND AND GRAVEL (INDUSTRIAL)[1]

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: In 2018, industrial sand and gravel valued at about $6.2 billion was produced by about 191 companies from 321 operations in 35 States. The value of production of industrial sand and gravel in 2018 increased by 22% compared with that of the previous year, and by 130% compared with 2016, owing primarily to increased demand for hydraulic-fracturing sand for the oil and gas sector. Leading States were Wisconsin, Texas, Illinois, Missouri, Minnesota, Oklahoma, North Carolina, Mississippi, Iowa, and Arkansas, in order of tonnage produced. Combined production from these States accounted for 87% of the domestic total. About 73% of the U.S. tonnage was used as hydraulic-fracturing sand and well-packing and cementing sand; as glassmaking sand and other whole-grain silica, 7% each; as foundry sand, 4%; as other ground silica, and whole-grain fillers and building products, 2% each; as ground and unground sand for chemicals, filtration sand, and recreational sand, 1% each; and for other uses, 2%.

Salient Statistics—United States:	2014	2015	2016	2017	2018[e]
Sold or used	110,000	102,000	79,400	102,000	120,000
Imports for consumption	245	289	281	365	370
Exports	4,470	3,910	2,780	4,680	7,000
Consumption, apparent[2]	106,000	98,400	76,900	97,700	110,000
Price, average value, dollars per ton	74.80	47.30	35.40	52.60	53.10
Employment, quarry and mill, number[e]	4,000	3,500	3,500	4,000	4,000
Net import reliance[3] as a percentage of apparent consumption	E	E	E	E	E

Recycling: Some foundry sand is recycled, and recycled cullet (pieces of glass) represents a significant proportion of reused silica. About 34% of glass containers are recycled.

Import Sources (2014–17): Canada, 86%; Mexico, 1%; and other, 13%.

Tariff: Item	Number	Normal Trade Relations 12–31–18
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 an estimated 110 million tons in 2018, a 13% increase from that of the previous year, owing primarily to increased activity in the oil and gas sector. Mine output was sufficient to accommodate many uses, which included abrasives, ceramics, chemicals, fillers (ground and whole-grain), glassmaking sand, filtration sand for swimming pools, foundry sand, other ground silica, recreational sand, roofing granules and fillers, and sand for well packing and cementing. Increased oil and gas drilling in North America and oil well completion activity triggered a corresponding increase in the production of hydraulic-fracturing sand in 2018 compared with that of the previous year. More efficient hydraulic-fracturing techniques, which require more silica sand use per well (mostly for secondary recovery at mature wells) also led to increased demand for hydraulic-fracturing sand. Imports of industrial sand and gravel in 2018 were about 370,000 tons—essentially unchanged from those of 2017. Imports of silica are generally of two types—small shipments of very high-purity silica or a few large shipments of lower grade silica shipped only under special circumstances (for example, very low freight rates). The United States remains a net exporter of industrial sand and gravel; U.S. exports of industrial sand and gravel increased by 50% in 2018 compared with those of 2017.

The United States was the world's leading producer and consumer of industrial sand and gravel based on estimated world production figures. It is difficult to collect definitive data on silica sand and gravel production in most nations because of the wide range of terminology and specifications found among different countries. The United States remained a major exporter of silica sand and gravel, shipping it to almost every region of the world. The high level of exports was attributed to the high quality and advanced processing techniques used in the United States for many grades of silica sand and gravel, meeting virtually every specification.

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SAND AND GRAVEL (INDUSTRIAL)

The industrial sand and gravel industry continued to be concerned with safety and health regulations and environmental restrictions in 2018, especially those concerning crystalline silica exposure. The Occupational Safety and Health Administration finalized new regulations to further restrict exposure to crystalline silica at mine sites and other industries that use it. Phased implementation of the new regulations is scheduled to take effect through 2021. Most provisions of the new regulations became enforceable on June 23, 2018, for general industry and maritime operations. Local shortages of industrial sand and gravel were expected to continue to increase owing to land development priorities, local zoning regulations, and logistical issues, including ongoing development and permitting of operations producing hydraulic-fracturing sand. Natural gas and petroleum operations that use hydraulic fracturing may also undergo increased scrutiny. These factors may result in future sand and gravel operations being located farther from high-population centers.

World Mine Production and Reserves:

	Mine production[e]		Reserves[4]
	2017	**2018**	
United States	102,000	120,000	Large. Industrial sand and gravel deposits are widespread.
Australia	3,000	3,000	
Bulgaria	7,250	7,300	
Canada	2,300	2,300	
France	9,310	9,300	
Germany	7,500	7,500	
India	8,500	8,500	
Italy	14,000	14,000	
Japan	2,700	2,700	
Korea, Republic of	4,480	4,500	
Malaysia	10,000	10,000	
Mexico	2,400	2,400	
Netherlands	54,000	54,000	
New Zealand	2,320	2,300	
Poland	4,800	4,800	
South Africa	1,900	2,200	
Spain	6,300	6,300	
Turkey	10,500	15,000	
United Kingdom	4,000	4,000	
Other countries	15,700	16,000	
World total (rounded)	273,000	300,000	

World Resources: 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 uneconomic. 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 and for foundry and molding sands are chromite, olivine, staurolite, and zircon sands. Although costlier and mostly used in deeper wells, alternative materials that can be used as proppants are sintered bauxite and kaolin-based ceramic proppants.

[e]Estimated. E Net exporter.
[1]See also Sand and Gravel (Construction).
[2]Defined as production + imports – exports.
[3]Defined as imports – exports.
[4]See Appendix C for resource and reserve definitions and information concerning data sources.