## SAND AND GRAVEL (INDUSTRIAL)1

(Data in thousand metric tons unless otherwise noted)

<u>Domestic Production and Use</u>: In 2015, industrial sand and gravel valued at about \$8.3 billion was produced by 230 companies from 335 operations in 35 States. The value of production of industrial sand and gravel in 2015 remained unchanged over the previous year. Leading States were, in order of tonnage produced, Wisconsin, Texas, Illinois, Minnesota, Missouri, Oklahoma, Arkansas, Ohio, North Carolina, and Louisiana. Combined production from these States accounted for 83% of the domestic total. About 71% of the U.S. tonnage was used as hydraulic-fracturing sand and well-packing and cementing sand; 8% as other whole-grain silica; 7% as glassmaking sand; 6% as foundry sand; 2%, each, as whole-grain fillers and building products, and other ground silica; 1% as ground and unground sand for chemicals; and 3% for other uses.

Salient Statistics—United States:	2011	2012	2013	2014	2015 <sup>e</sup>
Production	43,800	50,600	62,100	110,000	94,900
Imports for consumption	316	306	160	244	300
Exports	4,330	4,360	2,960	4,450	4,500
Consumption, apparent	39,800	46,600	59,300	106,000	90,700
Price, average value, dollars per ton	45.74	52.80	55.80	74.80	86.93
Employment, quarry and mill, number <sup>e</sup>	3,000	3,500	3,800	4,000	3,800
Net import reliance <sup>2</sup> as a percentage					
of apparent consumption	Е	Е	E	Е	Е

**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 (2011-14): Canada, 83%; Mexico, 11%; and other, 6%.

Tariff: Item Number Normal Trade Relations
12–31–15

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 90.7 million tons in 2015, a 14% decrease from that of the previous year. Mine output was sufficient to accommodate many uses, which included ceramics, chemicals, container, fillers (ground and whole grain), filtration, flat and specialty glass, foundry, hydraulic fracturing, and recreational uses. Decreased demand for hydraulic-fracturing sand to support production of natural gas and petroleum from shale deposits has led to slackened production beginning at yearend 2014 and continuing into 2015. New and more efficient hydraulic-fracturing techniques, which require more silica sand use per well (mostly for secondary recovery at mature wells) could stabilize demand for hydraulic-fracturing sand. Although the United States remains a net exporter of industrial sand and gravel, imports in 2015 increased to about 300,000 tons from 244,000 tons in 2014. 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). Exports of industrial sand and gravel increased slightly in 2015 compared with those of 2014.

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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.

The industrial sand and gravel industry continued to be concerned with safety and health regulations and environmental restrictions in 2015, especially those concerning crystalline silica exposure. The Occupational Safety and Health Administration was formulating new regulations to further restrict exposure to crystalline silica at mine sites, with final implementation scheduled for January 2017. Local shortages of industrial sand and gravel were expected to continue to increase owing to local zoning regulations and land development alternatives, 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 situations are expected to cause future sand and gravel operations to be located farther from high-population centers.

## **World Mine Production and Reserves:**

	Mine 2014	production <sup>e</sup> 2015	Reserves <sup>3</sup>
United States	110,000	94,900	
Australia	5,500	5,500	Large. Industrial sand and gravel deposits
Canada	1,690	1,700	are widespread.
Chile	1,360	1,350	•
Czech Republic	1,270	1,270	
Finland ·	2,400	2,400	
France	8,750	8,750	
Germany	7,500	7,500	
India	3,430	3,400	
Italy	13,900	13,900	
Japan	3,000	3,000	
Malaysia	1,240	1,250	
Mexico	3,590	3,600	
Moldova	3,500	3,800	
Norway	1,000	1,000	
Poland	2,300	2,300	
Saudi Arabia	1,400	1,400	
South Africa	2,110	2,100	
Spain	3,400	3,400	
Turkey	7,970	8,000	
United Kingdom	4,000	4,000	
Other countries	6,030	6,000	
World total (rounded)	196,000	181,000	

<u>World Resources</u>: 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.

<u>Substitutes</u>: Alternative materials that can be used for glassmaking and for foundry and molding sands are chromite, olivine, staurolite, and zircon sands. Although more costly and mostly used in deeper wells, alternative materials that can be used as proppants are sintered bauxite and kaolin-based ceramic proppants.

<sup>&</sup>lt;sup>e</sup>Estimated. E Net exporter.

<sup>&</sup>lt;sup>1</sup>See also Sand and Gravel (Construction).

<sup>&</sup>lt;sup>2</sup>Defined as imports – exports.

<sup>&</sup>lt;sup>3</sup>See Appendix C for resource/reserve definitions and information concerning data sources.