

**SAND AND GRAVEL (INDUSTRIAL)<sup>1</sup>**

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** In 2014, industrial sand and gravel valued at about \$4.2 billion was produced by 118 companies from 183 operations in 33 States. The value of production of industrial sand and gravel in 2014 increased by 20% over the previous year. Leading States were, in order of tonnage produced, Wisconsin, Illinois, Texas, Minnesota, Arkansas, Oklahoma, Missouri, and Iowa. Combined production from these States accounted for 78% of the domestic total. About 72% of the U.S. tonnage was used as hydraulic fracturing sand and well-packing and cementing sand, 13% as glassmaking sand, 6% as foundry sand, 3% as whole-grain fillers and building products, 2% as other whole-grain silica, 2% as ground and unground sand for chemicals, and 2% for other uses.

<b>Salient Statistics—United States:</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014<sup>e</sup></b>
Production	32,300	43,800	50,600	62,100	75,000
Imports for consumption	132	316	306	160	280
Exports	3,950	4,330	4,360	2,960	3,000
Consumption, apparent	28,500	39,800	46,600	59,300	72,300
Price, average value, dollars per ton	35.63	45.74	52.80	55.80	56.00
Employment, quarry and mill, number <sup>e</sup>	3,000	3,000	3,500	3,800	4,000
Net import reliance <sup>2</sup> 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 (2010–13):** Canada, 77%; Mexico, 18%; and other, 5%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–14</b>
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 about 72.3 million tons in 2014, a 22% increase from that of the previous year. Mine output was sufficient to accommodate many uses, which included ceramics, chemicals, fillers (ground and whole grain), container, filtration, flat and specialty glass, foundry, hydraulic fracturing, and recreational uses. Strong demand for hydraulic fracturing sand to support production of natural gas and petroleum from shale deposits has led to production capacity upgrades and ongoing permitting and opening of new mines. New and more efficient hydraulic fracturing techniques, which require more silica sand use per well, will further increase demand for hydraulic fracturing sand. Although the United States remains a net exporter of industrial sand and gravel, imports in 2014 increased to about 280,000 tons from 160,000 tons in 2013. 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 2014 compared with those of 2013.

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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 was difficult to collect definitive data on silica sand and gravel production in most nations because of the wide range of terminology and specifications from country to country. 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 2014, 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, to be implemented in the near future. 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 production <sup>e</sup>		Reserves <sup>3</sup>
	<u>2013</u>	<u>2014</u>	
United States	62,100	75,000	Large. Industrial sand and gravel deposits are widespread.
Australia	5,500	5,500	
Canada	1,690	1,800	
Chile	1,360	1,400	
Czech Republic	1,340	1,340	
Finland	2,400	2,400	
France	6,290	6,300	
Germany	7,500	7,500	
India	1,210	1,200	
Italy	16,400	16,400	
Japan	3,000	3,000	
Malaysia	1,000	1,000	
Mexico	3,590	3,590	
Moldova	3,000	3,000	
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	15,000	15,000	
United Kingdom	3,760	3,800	
Other countries	<u>6,690</u>	<u>7,000</u>	
World total (rounded)	152,000	165,000	

**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 sandstones, 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 more costly, alternative materials that can be used as proppants are sintered bauxite and kaolin-based ceramic proppants.

<sup>e</sup>Estimated. E Net exporter.

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

<sup>2</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>3</sup>See [Appendix C](#) for resource/reserve definitions and information concerning data sources.