

CLAYS

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Production of clays (sold or used) in the United States was estimated to be 25.7 million tons valued at \$1.43 billion in 2016, with about 145 companies operating clay and shale mines in 40 States. The leading 20 firms produced approximately 60% of the U.S. tonnage and 80% of the value for all types of clay. The United States accounted for 15% to 25% of the global production of refined clays, excluding common clay and shale. Principal uses for specific clays were estimated to be as follows: ball clay—41% floor and wall tile and 21% sanitaryware; bentonite—38% pet waste absorbents, 31% drilling mud, and 21% foundry sand and iron ore pelletizing (combined); common clay—40% brick, 32% cement, and 22% lightweight aggregate; fire clay—62% refractory products and miscellaneous uses and 38% heavy clay products (for example, brick and cement); fuller's earth—67% pet waste absorbents; and kaolin—43% paper coating and filling, 19% ceramics, and 8% refractories. Lightweight ceramic proppants for use in hydraulic fracturing are also a significant market for kaolin, but available data are insufficient for a reliable estimate of the market size.

U.S. exports of bentonite and kaolin decreased by an estimated 36% and 28%, respectively, in 2016 relative to the prior year. Canada, Japan, and Saudi Arabia (in decreasing order by tonnage) were the leading destinations for U.S. bentonite and accounted for 68% of exports. About 1.7 million tons of kaolin (30% of production) was exported primarily to Japan, Mexico, China, Finland, and Canada (in decreasing order by tonnage), which collectively received 62% of U.S. international kaolin shipments. Based on the ports from which fire clay was shipped, up to 70% of listed fire clay exports were thought to be misclassified refractory-grade kaolin.

Salient Statistics—United States:	2012	2013	2014	2015	2016^e
Production (sold or used):					
Ball clay	973	1,000	1,030	1,030	1,020
Bentonite	4,980	4,350	4,800	4,040	3,800
Common clay	11,900	11,000	11,400	12,200	12,800
Fire clay	183	194	222	225	448
Fuller's earth ¹	1,980	1,990	1,980	1,930	1,850
Kaolin	5,900	6,140	6,250	5,990	5,710
Total ^{1,2}	25,900	24,700	25,600	25,400	25,700
Imports for consumption:					
Artificially activated clays and earths	31	24	26	24	27
Kaolin	472	467	518	426	353
Other	21	27	33	61	52
Total ²	524	518	576	511	432
Exports:					
Ball clay	77	52	33	48	30
Bentonite	1,030	890	901	938	600
Clays, not elsewhere classified	315	304	282	268	190
Fire clay ³	289	268	237	217	135
Fuller's earth	107	86	92	77	65
Kaolin	2,450	2,540	2,640	2,420	1,740
Total ²	4,270	4,140	4,190	3,970	2,760
Consumption, apparent ⁴	22,200	21,100	22,300	21,900	23,400
Price, ex-works, average, dollars per ton:					
Ball clay	46	43	44	46	45
Bentonite	62	65	69	74	74
Common clay	12	12	11	13	13
Fire clay	27	18	17	14	11
Fuller's earth ¹	92	88	86	106	99
Kaolin	149	146	144	130	132
Employment (excludes office workers):					
Mine (may not include contract workers)	1,190	1,110	1,140	1,130	1,370
Mill	4,720	4,820	4,930	4,730	4,470
Net import reliance ⁵ as a percentage of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (2012–15): All clay types combined: Brazil, 85%; Mexico, 5%; China, 4%; United Kingdom, 2%; and other, 4%.

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Tariff: Item	Number	Normal Trade Relations <u>12-31-16</u>
Kaolin and other kaolinic clays, whether or not calcined	2507.00.0000	Free.
Bentonite	2508.10.0000	Free.
Fire clay	2508.30.0000	Free.
Common blue clay and other ball clays	2508.40.0110	Free.
Decolorizing earths and fuller's earth	2508.40.0120	Free.
Other clays	2508.40.0150	Free.
Chamotte or dina's earth	2508.70.0000	Free.
Activated clays and activated earths	3802.90.2000	2.5% ad val.
Expanded clays and other mixtures	6806.20.0000	Free.

Depletion Allowance: Ball clay, bentonite, fire clay, fuller's earth, and kaolin, 14% (Domestic and foreign); clay used in the manufacture of common brick, lightweight aggregate, and sewer pipe, 7.5% (Domestic and foreign); clay used in the manufacture of drain and roofing tile, flower pots, and kindred products, 5% (Domestic and foreign); clay from which alumina and aluminum compounds are extracted, 22% (Domestic).

Government Stockpile: None.

Events, Trends, and Issues: Total sales of U.S. clay increased slightly in 2016 compared with those in 2015. Increases in construction spending and housing starts led to a 5% growth in sales of common clay, but bentonite sales declined by 6%, driven by decreased domestic oil drilling activity. Lower kaolin production was likely a result of declining sales to paper markets and reduced demand for ceramic proppants used by the oil and gas industry.

World Mine Production and Reserves:⁶ Global reserves are large, but country-specific data are not available.

	Bentonite		Mine production ^e Fuller's earth		Kaolin	
	2015	2016	2015	2016	2015	2016
United States	⁷ 4,040	3,800	^{1,7} 1,930	¹ 1,850	⁷ 5,990	⁵ 7,100
Brazil (beneficiated)	405	405	—	—	1,800	1,800
China	3,650	3,650	—	—	3,200	3,200
Czech Republic	⁷ 369	370	—	—	^{7,8} 3,450	⁸ 3,500
Germany	395	360	—	—	4,300	4,300
Greece	⁸ 1,010	⁸ 1,200	—	—	—	—
India	1,100	1,100	6	6	⁸ 4,770	⁸ 4,800
Iran	420	600	—	—	820	1,500
Mexico	470	500	250	250	⁷ 320	320
Senegal	—	—	190	190	—	—
Spain	113	115	647	645	⁸ 247	⁸ 330
Turkey	1,090	1,200	10	10	2,030	2,000
Ukraine	210	210	—	—	1,430	1,450
United Kingdom	—	—	—	—	1,090	1,100
Other countries	<u>2,710</u>	<u>2,700</u>	<u>276</u>	<u>275</u>	<u>6,980</u>	<u>7,000</u>
World total (rounded)	16,000	16,200	¹ 3,310	¹ 3,230	36,400	37,000

World Resources: Resources of all clays are extremely large.

Substitutes: Clays compete with calcium carbonate in filler and extender applications; diatomite, organic litters, polymers, silica gel, and zeolites as absorbents; and various siding and roofing types in building construction.

^eEstimated. E Net exporter. — Zero.

¹Does not include U.S. production of attapulgite.

²Data may not add to totals shown because of independent rounding.

³Includes refractory-grade kaolin.

⁴Defined as production (sold or used) + imports – exports.

⁵Defined as imports – exports.

⁶See [Appendix C](#) for resource and reserve definitions and information concerning data sources.

⁷Reported figure.

⁸Includes production of crude ore.