

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 24.7 million tons valued at \$1.54 billion in 2017, with about 145 companies operating clay and shale mines in 40 States. The leading 20 firms produced approximately 43% of the U.S. tonnage and 70% of the value for all types of clay. Principal uses for specific clays were estimated to be as follows: ball clay—56% floor and wall tile and 17% sanitaryware; bentonite—42% pet waste absorbents and 26% drilling mud; common clay—46% brick, 17% cement, and 31% lightweight aggregate; fire clay—62% refractory products and miscellaneous uses and 38% heavy clay products (for example, brick and cement); fuller's earth—84% pet waste absorbents; and kaolin—32% paper coating and filling, 25% ceramics, and 13% refractories. Lightweight ceramic proppants for use in hydraulic fracturing are also a significant market for kaolin, but available data were insufficient for a reliable estimate of the market size.

The United States accounted for 15% to 25% of the global production of refined clays, excluding common clay and shale. U.S. exports of bentonite increased by an estimated 17% in 2017 relative to the prior year. Canada, Saudi Arabia and Japan (in decreasing order by tonnage) were the leading destinations for United States bentonite and accounted for 66% of exports. Kaolin exports were essentially the same as in 2016. Exports of kaolin went primarily to Japan, China, Mexico, Finland, and Canada (in decreasing order by tonnage).

Salient Statistics—United States:	2013	2014	2015	2016	2017^e
Production (sold or used):					
Ball clay	1,000	1,030	1,030	941	960
Bentonite	4,350	4,800	4,010	3,600	3,700
Common clay	11,000	11,400	12,200	11,700	12,300
Fire clay	194	222	225	528	530
Fuller's earth ¹	1,990	1,980	1,930	1,680	1,700
Kaolin	<u>6,140</u>	<u>6,250</u>	<u>6,030</u>	<u>5,170</u>	<u>5,500</u>
Total ^{1, 2}	24,700	25,700	25,400	23,600	24,700
Imports for consumption:					
Artificially activated clays and earths	24	26	24	26	28
Kaolin	467	518	426	389	480
Other	<u>136</u>	<u>47</u>	<u>70</u>	<u>57</u>	<u>76</u>
Total ²	627	591	520	472	580
Exports:					
Artificially activated clays and earths	160	175	173	143	140
Ball clay	52	33	48	41	84
Bentonite	890	901	938	801	940
Clays, not elsewhere classified	304	282	268	256	240
Fire clay ³	268	237	217	184	240
Fuller's earth	86	92	77	86	77
Kaolin	<u>2,540</u>	<u>2,640</u>	<u>2,420</u>	<u>2,290</u>	<u>2,300</u>
Total ²	4,300	4,360	4,140	3,800	4,000
Consumption, apparent ⁴	20,900	21,900	21,800	20,300	21,000
Price, ex-works, average, dollars per ton:					
Ball clay	43	44	46	45	46
Bentonite	65	69	74	75	75
Common clay	12	11	13	15	15
Fire clay	18	17	14	13	13
Fuller's earth ¹	88	86	106	93	96
Kaolin	146	144	151	160	160
Employment (excludes office workers):					
Mine (may not include contract workers)	1,130	1,150	1,130	1,120	1,140
Mill	4,820	4,930	4,730	4,440	4,500
Net import reliance ⁵ as a percentage of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (2013–16): All clay types combined: Brazil, 76%; Mexico, 7%; China, 5%; and other, 12%.

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Tariff: Item	Number	Normal Trade Relations <u>12-31-17</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 dinas 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 by 5% in 2017 compared with those in 2016. Increases in construction spending and housing starts led to a 5% growth in sales of common clay, and bentonite sales increased by 3%, driven by increased domestic oil drilling activity. Higher kaolin production was likely a result of increased 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 Fuller's earth		Kaolin	
	<u>2016</u>	<u>2017^e</u>	<u>2016</u>	<u>2017^e</u>	<u>2016</u>	<u>2017^e</u>
United States	3,600	3,700	¹ 1,680	¹ 1,700	5,170	5,500
Brazil (beneficiated)	405	400	—	—	2,100	2,100
China	5,600	5,600	—	—	3,200	3,200
Czechia	369	370	—	—	⁷ 3,450	⁷ 3,500
Germany	395	400	—	—	4,300	4,300
Greece	⁷ 808	⁷ 800	238	240	—	—
India	802	800	6	6	⁷ 4,110	⁷ 4,100
Iran	436	440	—	—	791	790
Mexico	470	470	250	260	320	320
Senegal	—	—	188	190	—	—
Spain	113	110	647	650	⁷ 330	⁷ 250
Turkey	3,135	3,100	10	10	1,890	1,900
Ukraine	210	210	—	—	1,820	1,800
United Kingdom	—	—	—	—	1,010	1,000
Other countries	<u>2,700</u>	<u>2,600</u>	<u>275</u>	<u>340</u>	<u>7,000</u>	<u>8,200</u>
World total (rounded)	19,000	19,000	¹ 3,290	¹ 3,400	35,500	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.

⁷Includes production of crude ore.