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 26 million tons valued at $1.8 billion in 2019, with about 145 companies operating clay and shale mines in 40 States. The leading 20 firms produced approximately 50% of the U.S. tonnage and 85% of the value for all types of clay. Principal uses for specific clays were estimated to be as follows: ball clay—50% floor and wall tile and 15% sanitaryware; bentonite—52% pet waste absorbents and 31% drilling mud; common clay—34% brick, 29% lightweight aggregate, and 24% cement; fire clay—70% heavy clay products (for example, brick and cement) and 30% refractory products and miscellaneous uses; fuller's earth—98% pet waste absorbents; and kaolin—60% paper coating and filling, 12% paint, and 9% catalysts. Lightweight ceramic proppants for use in hydraulic fracturing are also a significant market for kaolin, but data were insufficient to estimate market size.

Exports of clay and shale were estimated to have increased by 4% in 2019 after remaining essentially unchanged in 2018. In 2019, the United States exported 820,000 tons of bentonite mainly for pet waste absorbent, drilling mud, foundry sand bond, and iron ore pelletizing applications, with Canada, Japan, and Mexico being the leading destinations. About 2.5 million tons of kaolin were exported mainly as a paper coating and filler; a component in ceramic bodies; and fillers and extenders in paint, plastic, and rubber products, with China, Japan, and Mexico being the leading destinations. Lesser quantities of ball clay, fire clay, and fuller's earth were exported for ceramic, refractory, and absorbent uses, respectively.

Salient Statistics—United States:	**2015**	**2016**	**2017**	**2018**	**2019[e]**
Production (sold or used):					
Ball clay	1,220	1,270	1,270	1,120	1,100
Bentonite	4,080	4,000	4,430	4,670	4,700
Common clay	12,000	13,000	13,300	12,700	12,000
Fire clay	398	534	575	567	560
Fuller's earth[1]	1,960	1,860	1,840	1,880	2,000
Kaolin	5,810	5,290	5,560	5,530	5,500
Total[1, 2]	25,500	26,000	27,000	26,400	26,000
Imports for consumption:					
Artificially activated clays and earths	24	26	28	23	16
Kaolin	426	389	316	330	260
Other	71	57	86	68	58
Total[2]	520	473	430	421	330
Exports:					
Artificially activated clays and earths	173	143	147	149	160
Ball clay	48	41	83	90	93
Bentonite	938	801	961	845	820
Clays, not elsewhere classified	268	256	244	244	290
Fire clay[3]	217	184	225	250	300
Fuller's earth	77	86	78	70	67
Kaolin	2,420	2,290	2,310	2,390	2,500
Total[2]	4,140	3,800	4,040	4,030	4,200
Consumption, apparent[4]	21,800	22,600	23,400	22,800	22,000
Price, ex-works, average, dollars per ton:					
Ball clay	50	39	49	54	55
Bentonite	98	99	99	99	100
Common clay	14	14	15	16	17
Fire clay	13	13	13	12	11
Fuller's earth[1]	86	89	93	88	89
Kaolin	151	157	156	156	158
Employment (excludes office workers):					
Mine (may not include contract workers)	1,130	1,120	1,220	1,110	1,110
Mill	4,730	4,440	4,370	4,360	4,360
Net import reliance[5] as a percentage of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (2015–18): All clay types combined: Brazil, 75%; China, 7%; Mexico, 6%; and other, 12%.

Prepared by **Jason C. Willett [(703) 648–6473, jwillett@usgs.gov]**

CLAYS

Tariff: Item	Number	Normal Trade Relations 12–31–19
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 U.S. sales of clays decreased slightly in 2018 and again in 2019 compared with those of the previous year. Over the past 2 years, other industrial minerals associated with construction activity have been estimated to have increased. Ball clay and common clay experienced decreases during this period and sales of bentonite increased in 2018 and were essentially unchanged in 2019.

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

	Mine production					
	Bentonite		Fuller's earth		Kaolin	
	2018	2019[e]	2018	2019[e]	2018	2019[e]
United States	4,670	4,700	[1]1,880	[1]2,000	5,530	5,500
Brazil (beneficiated)	520	520	—	—	1,800	1,800
China	5,600	5,600	—	—	3,200	3,200
Czechia	277	280	—	—	[7]3,620	[7]3,600
Germany	395	390	—	—	4,300	4,300
Greece	[7]1,360	[7]1,400	53	60	—	—
India	800	810	6	6	[7]4,000	[7]4,000
Iran	360	360	—	—	790	790
Mexico	470	470	110	110	330	330
Senegal	—	—	178	180	—	—
Spain	175	180	625	630	[7]450	[7]450
Turkey	1,500	1,500	20	—	1,400	1,400
Ukraine	110	110	—	—	2,400	2,400
United Kingdom	—	—	—	—	1,000	1,000
Other countries	2,230	2,200	345	350	13,400	13,000
World total (rounded)	18,500	18,500	[1]3,220	[1]3,300	42,200	42,000

World Resources: Resources of all clays are extremely large.

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

[e]Estimated. E Net exporter. — Zero.

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

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

[3]Includes refractory-grade kaolin.

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

[5]Defined as imports – exports.

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

[7]Includes production of crude ore.