ZEOLITES (NATURAL)

(Data in metric tons unless otherwise noted)

Domestic Production and Use: Natural zeolites were mined by nine companies in the United States. About 67,000 tons of natural zeolites were produced in 2014. Chabazite was mined in Arizona; clinoptilolite was mined in California, Idaho, New Mexico, Oregon, and Texas. New Mexico was the leading zeolite-producing State in 2014, followed by Texas, Idaho, Arizona, California, and Oregon.

In 2014, about 65,400 tons of natural zeolites were consumed in the United States. Domestic uses for natural zeolites were, in decreasing order by tonnage, animal feed, pet litter, odor control, cement (primarily down-hole cement applications by the drilling industry), water purification, wastewater treatment, fertilizer carrier, fungicide or pesticide carrier, gas absorbent (and air filtration), oil absorbent, desiccant, aquaculture, and catalyst. The five leading uses accounted for more than 70% of the domestic natural zeolite sales tonnage.

Salient Statistics—United States:	2010	2011	2012	2013	2014[e]
Production	61,300	65,400	74,000	69,500	67,600
Sales, mill	60,000	65,200	70,500	68,300	65,400
Imports for consumption[e]	150	150	5	5	5
Exports[e]	400	1,100	750	200	200
Consumption, apparent[e, 1]	59,800	64,200	69,800	68,100	65,200
Price, range of value, dollars per metric ton[2]	30–900	40–800	50–800	50–800	50–800
Net import reliance[3] as a percentage of estimated consumption	E	E	E	E	E

Recycling: Natural zeolites used for such applications as desiccants, gas absorbents, wastewater cleanup, or water purification may be reused after reprocessing of the spent zeolites.

Import Sources (2010–13): Comprehensive trade data are not available for natural zeolites. Nearly all exports and imports were synthetic zeolites.

Tariff: Item	Number	Normal Trade Relations 12–31–14
Mineral substances not elsewhere specified or included	2530.90.8050	Free.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: U.S. consumption of natural zeolites decreased by 3% in 2014. Because of the markets served by the natural zeolite producers, sales do not always follow economic trends, which have improved in the past 3 years. During the past 20 years, the greatest increase in market sales have been for animal feed, the leading market in 2014. Sales of natural zeolites for cement, odor control, wastewater treatment, and water treatment applications have increased in the past 10 years, although expansion of those markets has not been as great as with animal feed. Sales for pet litter declined during the past 20 years because of competition from other products and shifting of some pet litter sales to other zeolite markets. Although specific data are not available on U.S. trade of natural zeolites, the United States was believed to be a net exporter of natural zeolites in 2014.

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ZEOLITES (NATURAL)

World Mine Production and Reserves: Natural zeolite production data are not available for most countries. Countries mining large tonnages of zeolites typically use them in low-value applications. The ready availability of zeolite-rich rock at low cost and the shortage of competing minerals and rocks are probably the most important factors encouraging its large-scale use. It is also likely that a significant percentage of the material sold as zeolites in some countries is ground or sawn volcanic tuff that contains only a small amount of zeolites. Examples of such usage are dimension stone (as an altered volcanic tuff), lightweight aggregate, pozzolanic cement, and soil conditioners.

World reserves of natural zeolites have not been estimated. Deposits occur in many countries, but companies rarely, if ever, publish reserves data. Further complicating estimates of reserves is the fact that much of the reported world production includes altered volcanic tuffs that contain low to moderate concentrations of zeolites. These typically are used in high-volume construction applications, and therefore some deposits should be excluded from reserves estimates because it is the rock itself and not its zeolite content that makes the deposit valuable.

	Mine production		Reserves[4]
	2013	2014[e]	
United States	69,500	67,600	
China[5]	2,000,000	2,000,000	World reserves are not determined but are estimated to be large.
Jordan	15,000	13,000	
Korea, Republic of	230,000	230,000	
Turkey	50,000	70,000	
Other countries[5]	350,000	350,000	
World total (rounded)	2,710,000	2,730,000	

World Resources: World resources have not been estimated for natural zeolites. An estimated 120 million tons of clinoptilolite, chabazite, erionite, mordenite, and phillipsite is present in near-surface deposits in the Basin and Range province in the United States. Resources in the United States may approach 10 trillion tons for zeolite-rich deposits.

Substitutes: For pet litter, natural zeolites compete with other mineral-based litters, such as those manufactured using attapulgite, bentonite, diatomite, fuller's earth, and sepiolite; organic litters made from shredded corn stalks and paper, straw, and wood shavings; and litters made using silica gel. Diatomite, perlite, pumice, vermiculite, and volcanic tuff compete with natural zeolite as lightweight aggregate. Zeolite desiccants compete against such products as magnesium perchlorate and silica gel. Zeolites compete with bentonite, gypsum, montmorillonite, peat, perlite, silica sand, and vermiculite in various soil amendment applications. Carbon, diatomite, or silica sand may substitute for zeolites in water purification applications. As an oil absorbent, zeolites compete mainly with bentonite, diatomite, fuller's earth, sepiolite, and a variety of polymer and natural organic products. In animal feed, zeolites compete with bentonite, diatomite, fuller's earth, kaolin, talc, and silica as anticaking and flow-control agents.

[e]Estimated. E Net exporter.

[1]Defined as sales, mill + imports – exports.

[2]Estimate based on values reported by U.S. producers and prices published in the trade literature. Bulk shipments typically range from $100 to $230 per ton.

[3]Defined as imports – exports.

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

[5]Includes materials appropriate for pozzolan applications.