USGS
science for a changing world

# 2018 Minerals Yearbook

## ASBESTOS [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

August 2021

# Asbestos

By Daniel M. Flanagan

**Domestic survey tables were prepared by Benjamin N. Bryden, statistical assistant.**

The last company that mined asbestos in the United States ceased operations in 2002; domestic consumers have since been wholly dependent on imports to meet manufacturing needs. In 2018, U.S. apparent consumption of asbestos fiber (mineral or unmanufactured asbestos, not including asbestos in manufactured products) increased to 681 metric tons (t) from 332 t in 2017. Actual consumption in each year may have been higher or lower owing to stockpiling by companies, but information about industry stocks was unavailable. Domestic consumption oscillated in recent years but has not exceeded 775 t, less than 0.1% of peak consumption in the early 1970s, since 2012 (fig. 1). Since 2013, annual consumption of asbestos fiber in the United States averaged approximately 545 t. Global production of asbestos was an estimated 1.15 million metric tons (Mt) in 2018, slightly less than revised 1.16 Mt in 2017 (table 1).

Asbestos, an industry term rather than a mineralogical term, is the generic name applied to a subset of silicate minerals that consist of bundles of separable fibers with high length-to-width ratios. The six asbestos types with a history of use in commercial products are the amphibole minerals actinolite, amosite, anthophyllite, crocidolite, and tremolite, as well as chrysotile, the asbestiform variety of serpentine. Chrysotile accounted for more than 93%, by weight, of global asbestos production from 1900 to 2000, followed by crocidolite, amosite, and anthophyllite, and has been the only type of asbestos with significant commercial use in the 21st century. Actinolite and tremolite have never been widely produced or used. Other forms of amphibole asbestos also occur in nature but have no commercial applications (Virta, 2006, p. 195, 197).

U.S. consumption of asbestos was minimal during the late 1800s, when primary uses were fireproof garments, insulation and packing for steam locomotive and other boiler systems, and paper and millboard for fireproofing and heat insulation (Bowles, 1937, p. 8–10). Expansion of the automotive and construction industries during the early 20th century provided ready markets for asbestos, and demand for asbestos-containing items such as brake shoes and clutches, cement, flooring, packings and gaskets, and thermal and electrical insulation grew rapidly. Apparent consumption of asbestos in the United States increased from 20,400 t in 1900 (estimated) to 153,000 t in 1920 and 660,000 t in 1950 (fig. 1). Consumption continued to rise with the expansion of the U.S. economy following World War II and reached an alltime high of 803,000 t in 1973 (Virta, 2003, p. 3, 28–30). Asbestos was widely used in a variety of products because it is relatively inexpensive; resists corrosion, fire, and wear; has high mechanical strength; serves as a thermal and electrical insulator; and is flexible enough to be spun and woven. The United States dominated global consumption of asbestos for most of the 20th century, accounting for as much as 83% of the worldwide total in 1920 and averaging 48% from 1920 through 1960. The Soviet Union surpassed the United States as the leading global asbestos consumer in 1970, and the United States remained one of the top five worldwide consumers until the late 1980s (Virta, 2003, p. 36–56).

Domestic and overseas markets began to contract during the early 1970s, when the first of numerous bans on asbestos products in the United States and abroad went into effect in response to health and liability issues associated with asbestos use (fig. 1). By 2000, domestic consumption decreased to 14,600 t, similar to late-19th-century levels (Virta, 2003, p. 30). Most U.S. manufacturers had halted production of asbestos-containing products, begun using asbestos substitutes, and (or) replaced asbestos-containing products with ones that did not contain asbestos.

## Legislation and Government Programs

The Frank R. Lautenberg Chemical Safety for the 21st Century Act, which amended the Toxic Substances Control Act of 1976, was signed into law during 2016. The legislation granted the U.S. Environmental Protection Agency (EPA) greater authority to evaluate the risks to human health and the environment posed by new chemicals and those already in the marketplace. In 2017 and 2018, the EPA released reports that identified and refined the end uses, exposure pathways, and environmental and human health hazards that will be considered in the asbestos evaluation. If the agency determines that asbestos presents an unreasonable risk, it will be required to take mitigating actions (U.S. Environmental Protection Agency, 2016, 2017, 2018b).

In June 2018, the EPA proposed a significant new use rule (SNUR) under section 5 of the Toxic Substances Control Act of 1976. If adopted, the regulation would require manufacturers to request approval from the EPA before importing, manufacturing, or processing asbestos for adhesives, arc chutes, beater-add gaskets, extruded sealant tape and other tape, filler for acetylene cylinders, high-grade electrical paper, millboard, missile liner, pipeline wrap, reinforced plastics, roof and other coatings, roofing felt, sealants, separators in fuel cells and batteries, vinyl floor tile, and any other building material (other than cement). Asbestos-containing products subject to the proposed SNUR are not currently manufactured in the United States (U.S. Environmental Protection Agency, 2018a, p. 26922).

## Consumption

Domestic consumption of unmanufactured asbestos fiber increased to 681 t in 2018 from 332 t in 2017. Asbestos consumption in the United States fluctuated in recent years but remained less than 0.1% of peak consumption in the early 1970s. Since 2014, annual U.S. consumption has averaged approximately 500 t (table 1). The chloralkali industry, which

uses asbestos to manufacture semipermeable diaphragms that separate chlorine generated in electrolytic cells from the starting brine, accounted for all domestic consumption of asbestos fiber in 2018 (table 2). The proportion of asbestos used by the chloralkali industry increased over the past several years, rising from an estimated 35% of consumption in 2010 as other end uses ceased (Virta, 2011).

Many industrial applications in the United States have terminated since the first domestic ban on asbestos-containing products was implemented in 1973. In 2000, U.S. asbestos was principally sold for roofing products (62% of the market), gaskets (21%), and friction products (12%), whereas near peak consumption in 1972, the major uses were vinyl-asbestos tile and sheet flooring (31%), asbestos-cement pipe (27%), roofing (10%), packings and gaskets (9%), friction products (brakes and clutches) (8%), and insulation (6%) (Clifton, 1975; Virta, 2002).

## Prices

In 2018, the average U.S. customs unit value for all grades of imported unmanufactured asbestos decreased by 11% to $1,670 per metric ton from $1,870 per metric ton in 2017. Unit values of individual fiber grades were $1,540 per metric ton for grade 3 and $1,980 per metric ton for grades 4 and 5 (table 5). The length of asbestos fibers decreases from grade 1 through grade 7 (Virta, 2006, p. 9).

## Foreign Trade

In 2018, the United States imported 681 t of chrysotile valued at $1.13 million, compared with 332 t valued at $621,000 in 2017. Additional imports were reported each year by the U.S. Census Bureau, but information from a commercial trade database suggests that some of the shipments were misclassified. All asbestos mineral imports originated from Brazil (89%) and Russia (11%) (table 5). The United States also imported an unknown quantity of asbestos within manufactured products; the total value of these items was reported as $11.4 million, an increase of 35% from $8.39 million in 2017 (tables 1, 6). However, some nonasbestos products likely were imported under the Harmonized Tariff Schedule of the United States codes for asbestos-containing articles, based on reported imports from countries that have banned asbestos. Known applications of asbestos in imported manufactured products were gaskets used to create a chemical containment seal in the production of titanium dioxide and brake blocks for use in the oil industry. Other potential uses suggested by bill of lading data in a commercial trade database and (or) company safety data sheets included automotive brake linings and other friction materials, cement products, knitted fabrics, other gaskets and packing, tile, and wallpaper, but the available information was insufficient for definitive confirmation (U.S. Environmental Protection Agency, 2018b, p. 21–26).

Reported exports of unmanufactured asbestos fiber totaled 235 t with a free alongside ship value of $63,000 in 2018, compared with 143 t valued at $92,000 during 2017 (table 4). However, these shipments were likely waste material or improperly classified because asbestos has not been mined domestically since 2002. The United States exported and (or) reexported $27.7 million of manufactured asbestos products in 2018, a 9% decrease from $30.4 million in 2017 (table 3). Many reported export destinations have banned the use of asbestos and asbestos products, indicating that shipments to these countries likely were misclassified. In addition, little or no asbestos products, such as asbestos board, asbestos friction components, asbestos gaskets and packings, asbestos insulating paper, and asbestos-cement products have been produced in the United States for many years. Shipments reported under these categories may have been reexports and (or) exports of products that were similar but did not contain asbestos (table 4).

## World Review

Estimates of global unmanufactured asbestos consumption are presented in table 7. At the time of compilation, the available data were insufficient to make reliable 2018 estimates for most countries. Apparent consumption was calculated as production plus imports minus exports; data regarding changes in industry and Government stocks were not available and thus were not considered. In 2017, apparent world consumption of asbestos declined by 6% to 1.14 Mt from 1.21 Mt in 2016. Decreases in consumption of more than 10,000 t took place in Brazil, China, Kazakhstan, Sri Lanka, and Vietnam, whereas consumption in India, Russia, and Uzbekistan increased by more than 10,000 t. India was the leading consumer of asbestos, followed by China, Russia, Indonesia, Uzbekistan, Vietnam, Thailand, Brazil, Sri Lanka, and Bangladesh; these 10 countries collectively accounted for 93% of the estimated worldwide asbestos consumption.

World production of asbestos fiber in 2018 was an estimated 1.15 Mt, slightly less than 1.16 Mt in 2017. Russia was the leading producer and accounted for roughly 60% of global output, followed by Kazakhstan, China, and Brazil (table 8).

***Brazil.***—The Supreme Federal Court of Brazil enacted a comprehensive national ban on asbestos in November 2017. The court ruling extended an asbestos prohibition that was limited to the State of Rio de Janeiro to the entire country. However, Eternit S.A., the sole asbestos producer in the country, continued to operate in 2018. Pending the release of the full court ruling, the company disputed the national nature of the ban and considered asbestos to be legal in those States without explicit laws that disallow its use (Eternit S.A., 2018, p. 11; 2019).

***Canada.***—Regulations banning the exportation, importation, sale, and use of asbestos, as well as the exportation, importation, manufacture, sale, and use of asbestos-containing products, took effect on December 30, with limited exceptions. The use of asbestos diaphragms in the chloralkali industry, which manufactures chlorine and sodium hydroxide, would continue to be permitted until the end of 2029. Extraction of byproduct materials from asbestos mining wastes was also excluded, and the Government granted a $12 million loan to Alliance Magnesium Inc. to extract magnesium metal from asbestos tailings at former mines in the towns of Asbestos and Thetford Mines in southern Quebec (Franklin, 2018; Rabson, 2018).

***Ukraine.***—The Ministry of Health issued an order prohibiting the production and use of asbestos and asbestos-containing products on June 26, 2017, that was expected to take effect

at the beginning of 2018 (LB.ua, 2017). However, the Ministry of Justice repealed the rule in April 2018 owing to anticipated adverse economic effects on the asbestos-cement and construction industries (Robert J. Pigg, Principal Officer, Asbestos Information Association/North America, written commun., April 26, 2018).

***Zimbabwe.***—The Government had previously announced that it secured a $100 million loan to reopen the Mashava and Shabanie Mines in southern Zimbabwe by yearend 2017 (Bara, 2017). However, official Government statistics indicated that no asbestos was mined in the country during 2018 (Zimbabwe National Statistics Agency, 2019, p. 51). Information about the status of the mine restarts was not available as of yearend 2018.

### Outlook

Domestic use of unmanufactured asbestos fiber has declined significantly since the 1970s and will likely remain steady or continue to decrease over the long term as alternative materials and (or) new technologies displace it from the chloralkali production process. The trajectory of world production and consumption in the coming years will depend on the outcome of the asbestos ban in Brazil and the restart of mining in Zimbabwe. However, significant global demand for asbestos products, such as brake pads and linings, cement pipe, construction materials, floor and ceiling tiles, and roofing sheets, is expected to continue in several regions of the world, particularly Asia.

### References Cited


Bara, Energy, 2017, Zim to resume asbestos production: African Independent [Cape Town, South Africa], September 9. (Accessed September 15, 2017, at https://www.africanindy.com/environment/zim-to-resume-asbestos-production-11117891.)

Bowles, Oliver, 1937, Asbestos: U.S. Bureau of Mines Bulletin 403, 92 p.

Clifton, R.A., 1975, Asbestos, *in* Metals, minerals, and fuels: U.S. Bureau of Mines Minerals Yearbook 1973, v. I, p. 171–179. (Accessed May 23, 2019, via https://www.usgs.gov/centers/nmic/asbestos-statistics-and-information.)

Eternit S.A., 2018, Eternit reduz a sua dívida líquida em 41% no 4T17 [Eternit reduces its net debt by 41% in 4Q17]: Sao Paulo, Brazil, Eternit S.A. press release, April 27, 18 p. (Accessed November 18, 2019, at https://ri.eternit.com.br/Download.aspx?Arquivo=F6fpp0woYgoSTrQoNFSnKg==.)

Eternit S.A., 2019, Eternit opera em linha com a demanda de mercado e dá continuidade ao processo de reestruturação no 4T18 [Eternit operates in line with market demand and continues the restructuring process in 4Q18]: Sao Paulo, Brazil, Eternit S.A. press release, March 22, 13 p. (Accessed March 25, 2019, at https://ri.eternit.com.br/Download.aspx?Arquivo=PHDeeR32yKym1S55R/VsWg==.)

Franklin, Kelly, 2018, Canada publishes final asbestos regulations—Exemption for chlor-alkali industry extended until 2030: Shrewsbury, United Kingdom, Chemical Watch, October 23. (Accessed October 26, 2018, at https://chemicalwatch.com/71203/canada-publishes-final-asbestos-regulations.)

LB.ua, 2017, Ukraine bans asbestos—Changes will come into force before yearend: Kiev, Ukraine, LB.ua, June 26. (Accessed May 24, 2019, at https://en.lb.ua/news/2017/06/26/4016_ukraine_bans_asbestos.html.)

Rabson, Mia, 2018, Company extracting metals from asbestos waste gets $12M from Ottawa: Financial Post [Toronto, Ontario, Canada], October 19. (Accessed May 24, 2019, at https://business.financialpost.com/pmn/business-pmn/company-extracting-metals-from-asbestos-waste-gets-12m-from-ottawa.)

U.S. Environmental Protection Agency, 2016, EPA names first chemicals for review under new TSCA legislation: Washington, DC, U.S. Environmental Protection Agency press release, November 29. (Accessed April 21, 2017, at https://19january2017snapshot.epa.gov/newsreleases/epa-names-first-chemicals-review-under-new-tsca-legislation_.html.)

U.S. Environmental Protection Agency, 2017, Scope of the risk evaluation for asbestos: Washington, DC, EPA Document# EPA-740-R1-7008, June, 58 p. (Accessed July 1, 2017, at https://www.epa.gov/sites/production/files/2017-06/documents/asbestos_scope_06-22-17.pdf.)

U.S. Environmental Protection Agency, 2018a, Asbestos; significant new use rule: Federal Register, v. 83, no. 112, June 11, p. 26922–26933. (Accessed June 15, 2018, at https://www.govinfo.gov/content/pkg/FR-2018-06-11/pdf/2018-12513.pdf.)

U.S. Environmental Protection Agency, 2018b, Problem formulation of the risk evaluation for asbestos: Washington, DC, EPA Document# EPA-740-R1-7018, May, 80 p. (Accessed June 15, 2018, at https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluation-asbestos-0#problem%20formulation.)

Virta, R.L., 2002, Asbestos, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2000, v. I, p. 9.1–9.6. (Accessed May 23, 2019, via https://www.usgs.gov/centers/nmic/asbestos-statistics-and-information.)

Virta, R.L., 2003, Worldwide asbestos supply and consumption trends from 1900 through 2003: U.S. Geological Survey Circular 1298, 80 p. (Accessed May 23, 2019, at https://pubs.usgs.gov/circ/2006/1298/.)

Virta, R.L., 2006, Asbestos, *in* Kogel, J.E., Trivedi, N.C., Barker, J.M., and Krukowski, S.T., eds., Industrial minerals and rocks—Commodities, markets, and uses (7th ed.): Littleton, CO, Society for Mining, Metallurgy, and Exploration Inc., p. 195–217.

Virta, R.L., 2011, Asbestos, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2010, v. I, p. 8.1–8.5. (Accessed May 23, 2019, via https://www.usgs.gov/centers/nmic/asbestos-statistics-and-information.)

Zimbabwe National Statistics Agency, 2019, Quarterly digest of statistics—First quarter 2019: Harare, Zimbabwe, Zimbabwe National Statistics Agency, May, 89 p. (Accessed July 25, 2019, at http://www.zimstat.co.zw/sites/default/files/img/publications/Digest/Q_1_2019.pdf.)


## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

Asbestos. Ch. in Mineral Commodity Summaries, annual.

Asbestos. Ch. in United States Mineral Resources, Professional Paper 820, 1973.

Asbestos: Geology, Mineralogy, Mining, and Uses. Open-File Report 02–149, 2002.

Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140.

Mineral Commodity Profiles—Asbestos. Circular 1255–KK, 2005.

Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Natural Asbestos Occurrences in the Eastern United States. Open-File Report 2005–1189, 2005.

Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Natural Asbestos Occurrences in the Rocky Mountain States of the United States (Colorado, Idaho, Montana, New Mexico, and Wyoming). Open-File Report 2007–1182, 2007.

Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Natural Asbestos Occurrences in the Southwestern United States (Arizona, Nevada, and Utah). Open-File Report 2008–1095, 2008.

Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California. Open-File Report 2011–1188, 2011.

Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in Oregon and Washington. Open-File Report 2010–1041, 2010.

Reported Historic Asbestos Prospects and Natural Asbestos Occurrences in the Central United States. Open-File Report 2006–1211, 2006.

Tabulation of Asbestos-Related Terminology. Open-File Report 02–458, 2002.
World Asbestos Consumption From 2003 Through 2007. Mineral Industry Surveys, July 2009.
Worldwide Asbestos Supply and Consumption Trends From 1900 Through 2003. Circular 1298, 2006.

**Other**

Asbestos. Ch. in Industrial Minerals and Rocks—Commodities, Markets, and Uses (7th ed.). Society for Mining, Metallurgy, and Exploration Inc., 2006.
Asbestos. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.
Asbestos: Economic Assessment of Bans and Declining Production and Consumption. World Health Organization, 2017.
Asbestos Information Association/North America.
U.S. Consumer Product Safety Commission.
U.S. Department of Health and Human Services:
Agency for Toxic Substances and Disease Registry.
National Institute for Occupational Safety and Health.
National Institutes of Health.
U.S. Department of Labor:
Mine Safety and Health Administration.
Occupational Safety and Health Administration.
U.S. Environmental Protection Agency.

TABLE 1
SALIENT ASBESTOS STATISTICS[1]

| | | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| United States: | | | | | | |
| Exports and reexports: | | | | | | |
| Unmanufactured:[2] | | | | | | |
| Quantity | metric tons | 279 | 517 | 587 | 143 | 235 |
| Value[3] | thousands | $54 | $116 | $116 | $92 | $63 |
| Asbestos products, value[3, 4] | do. | $29,800 | $26,100 | $35,400 | $30,400 | $27,700 |
| Imports for consumption: | | | | | | |
| Unmanufactured:[5] | | | | | | |
| Quantity | metric tons | 416 r | 325 | 747 | 332 | 681 |
| Value[6] | thousands | $757 r | $612 | $1,430 | $621 | $1,130 |
| Asbestos products, value[4, 6] | do. | $5,630 | $4,640 | $7,670 | $8,390 | $11,400 |
| Consumption, apparent[7] | metric tons | 416 r | 325 | 747 | 332 | 681 |
| World, production | do. | 1,520,000 | 1,290,000 r | 1,250,000 r | 1,160,000 r | 1,150,000 e |

eEstimated. rRevised. do. Ditto.
[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits.
[2]May include nonasbestos materials and (or) exports of crudes, fibers, stucco, sand, and refuse. Asbestos is no longer mined in the United States.
[3]Free alongside ship value.
[4]May include nonasbestos products.
[5]Additional imports were reported by the U.S. Census Bureau, but bill of lading information from a commercial trade database suggests that some shipments were misclassified.
[6]U.S. customs declared value.
[7]Consumption of unmanufactured asbestos; assumed to equal imports. Information to make a reliable estimate of company stockpiles was unavailable.

TABLE 2
U.S. ASBESTOS CONSUMPTION BY END USE, GRADE, AND TYPE[1, 2, 3]

(Metric tons)

| | Chrysotile | | | |
|---|---|---|---|---|
| End use | Grade 3 | Grades 4, 5 | Unspecified grade | Total |
| 2017: | | | | |
| Chloralkali industry | 117 | 142 | 73 | 332 |
| Other | -- | -- | -- | -- |
| Total | 117 | 142 | 73 | 332 |
| 2018: | | | | |
| Chloralkali industry | 483 | 198 | -- | 681 |
| Other | -- | -- | -- | -- |
| Total | 483 | 198 | -- | 681 |

-- Zero.

[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Estimated end-use distribution based on bill of lading data.

[3]Consumption assumed to equal imports. Information to make a reliable estimate of company stockpiles was unavailable. Additional imports were reported by the U.S. Census Bureau, but bill of lading information from a commercial trade database suggests that some shipments were misclassified.

TABLE 3
VALUE OF U.S. EXPORTS AND REEXPORTS OF UNMANUFACTURED ASBESTOS FIBERS AND ASBESTOS-BASED PRODUCTS, BY COUNTRY OR LOCALITY[1, 2]

(Thousand dollars)

| | 2017 | | | 2018 | | |
|---|---|---|---|---|---|---|
| Country or locality | Unmanufactured fiber[3] | Manufactured products[4] | Total | Unmanufactured fiber[3] | Manufactured products[4] | Total |
| Afghanistan | -- | -- | -- | -- | 165 | 165 |
| Algeria[5] | -- | 148 | 148 | -- | -- | -- |
| Canada | 11 | 2,860 | 2,870 | 22 | 2,640 | 2,660 |
| China | -- | 2,360 | 2,360 | -- | 1,740 | 1,740 |
| Colombia | -- | 474 | 474 | -- | 616 | 616 |
| Dominican Republic | -- | 578 | 578 | -- | 483 | 483 |
| Egypt[5] | -- | 251 | 251 | -- | 27 | 27 |
| El Salvador | -- | 2,170 | 2,170 | -- | 2,020 | 2,020 |
| Gabon | -- | -- | -- | -- | 230 | 230 |
| Guatemala | -- | 1,170 | 1,170 | -- | 1,770 | 1,770 |
| Honduras | -- | 1,450 | 1,450 | -- | 6,870 | 6,870 |
| Hong Kong[5] | -- | 848 | 848 | -- | 32 | 32 |
| Italy[5] | -- | 91 | 91 | -- | 195 | 195 |
| Japan[5] | -- | 63 | 63 | -- | 153 | 153 |
| Kenya | -- | 426 | 426 | -- | 385 | 385 |
| Korea, Republic of[5] | 3 | 332 | 335 | -- | 478 | 478 |
| Liberia | -- | 454 | 454 | -- | -- | -- |
| Malaysia | -- | 46 | 46 | -- | 256 | 256 |
| Mexico | -- | 4,900 | 4,900 | 38 | 5,460 | 5,500 |
| Panama | -- | 31 | 31 | -- | 191 | 191 |
| Saudi Arabia[5] | -- | 374 | 374 | -- | 51 | 51 |
| Sierra Leone | -- | 459 | 459 | -- | -- | -- |
| Singapore | 11 | 41 | 52 | -- | 336 | 336 |
| Sint Maarten[5] | -- | 174 | 174 | -- | 90 | 90 |
| Taiwan | -- | 109 | 109 | -- | 172 | 172 |
| Trinidad and Tobago | -- | 133 | 133 | -- | 15 | 15 |
| United Arab Emirates | 47 | 309 | 356 | -- | 77 | 77 |
| United Kingdom[5] | 3 | 8,590 | 8,590 | -- | 1,560 | 1,560 |
| Venezuela | -- | 31 | 31 | -- | 354 | 354 |
| Other[5] | 17 r | 1,550 r | 1,560 r | 3 | 1,380 | 1,380 |
| Total | 92 | 30,400 | 30,500 | 63 | 27,700 | 27,800 |

rRevised. -- Zero.

[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Free alongside ship value.

[3]May include nonasbestos materials and (or) exports of crudes, fibers, stucco, sand, and refuse. Asbestos is no longer mined in the United States.

[4]Little to no manufacturing of these products has taken place in the United States for many years. Shipments reported under these categories may have been reexports and (or) exports of products that were similar to but did not contain asbestos.

[5]Destination has banned the use of asbestos. Data may include some nonasbestos products.

Source: U.S. Census Bureau.

TABLE 4
U.S. EXPORTS AND REEXPORTS OF UNMANUFACTURED ASBESTOS FIBERS AND ASBESTOS-BASED PRODUCTS, BY PRODUCT[1]

| | 2017 | | 2018 | |
|---|---|---|---|---|
| | Quantity[2] (metric tons) | Value[3] (thousands) | Quantity[2] (metric tons) | Value[3] (thousands) |
| Unmanufactured, asbestos[4] | 143 | $92 | 235 | $63 |
| Manufactured:[5] | | | | |
| Cement products | 28 | 33 | 13 | 100 |
| Friction products | NA | 7,500 | NA | 8,170 |
| Gaskets, packing, and seals | 485 | 3,760 | 222 | 2,390 |
| Paper and millboard | NA | 189 | NA | 190 |
| Other articles | 4,310 | 18,900 | 7,240 | 16,900 |
| Total | 4,820 | 30,400 | 7,480 | 27,700 |

NA Not available.
[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]For manufactured products, the quantity is the gross weight and represents the minimum quantity because data for some Harmonized Tariff Schedule of the United States codes and (or) countries are not available.
[3]Free alongside ship value.
[4]May include nonasbestos materials and (or) exports of crudes, fibers, stucco, sand, and refuse. Asbestos is no longer mined in the United States.
[5]Little to no manufacturing of these products has taken place in the United States for many years. Shipments reported under these categories may have been reexports and (or) exports of products that were similar to but did not contain asbestos.

Source: U.S. Census Bureau.

TABLE 5
U.S. IMPORTS FOR CONSUMPTION OF ASBESTOS FIBERS, BY TYPE AND ORIGIN[1, 2]

| | Brazil | | Russia | | Total | |
|---|---|---|---|---|---|---|
| Type | Quantity (metric tons) | Value[3] (thousands) | Quantity (metric tons) | Value[3] (thousands) | Quantity (metric tons) | Value[3] (thousands) |
| 2017: | | | | | | |
| Chrysotile: | | | | | | |
| Spinning fibers, grade 3 | 117 | $173 | -- | -- | 117 | $173 |
| Milled, grades 4 and 5 | 142 | 282 | -- | -- | 142 | 282 |
| Unspecified grade | 73 | 165 | -- | -- | 73 | 165 |
| Total | 332 | 621 | -- | -- | 332 | 621 |
| 2018: | | | | | | |
| Chrysotile: | | | | | | |
| Spinning fibers, grade 3 | 408 | 654 | 75 | $89 | 483 | 743 |
| Milled, grades 4 and 5 | 198 | 392 | -- | -- | 198 | 392 |
| Unspecified grade | -- | -- | -- | -- | -- | -- |
| Total | 606 | 1,050 | 75 | 89 | 681 | 1,130 |

-- Zero.
[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Additional imports were reported by the U.S. Census Bureau, but bill of lading information from a commercial trade database suggests that some shipments were misclassified.
[3]U.S. customs declared value.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF MANUFACTURED PRODUCTS WITH BASIS OF ASBESTOS IN 2018[1]

| HTS[2] code | Category | Quantity[3] (metric tons) | Value[4] | Major sources[5] | Percent of value[6] |
|---|---|---|---|---|---|
| 6811.40.0000 | Asbestos-cement products | 48 | $97,800 | China | 92 |
| 6812.80.9000 | Crocidolite products (except footwear)[7] | 52 | 26,400 | China, Italy[8] | 100 |
| 6812.91.9000 | Clothing (except footwear)[7, 9] | 1 | 42,800 | Germany,[8] Spain[8] | 91 |
| 6812.92.0000 | Paper, millboard, and felt[7, 9] | NA | 25,200 | India, Germany,[8] France[8] | 100 |
| 6812.93.0000 | Compressed asbestos fiber jointing[7, 9] | NA | 38,500 | China, India | 100 |
| 6812.99.0002 | Yarn and thread[7, 9] | 51 | 410,000 | Mexico | 100 |
| 6812.99.0003 | Cords and string[7, 9] | (10) | 2,500 | Japan[8] | 100 |
| 6812.99.0010 | Products for use in civil aircraft[7, 9] | NA | 9,090 | China, Israel,[8] Canada | 100 |
| 6812.99.0020 | Gaskets, packing, and seals[7, 9] | 8 | 310,000 | Japan,[8] Guatemala, Taiwan, Germany[8] | 81 |
| 6812.99.0025 | Building materials[7, 9] | NA | 248,000 | Canada | 91 |
| 6812.99.0055 | Asbestos articles not elsewhere specified[7, 9] | NA | 340,000 | China | 95 |
| 6813.20.0010 | Brake linings and pads, civil aircraft[11] | NA | 370,000 | Japan[8] | 97 |
| 6813.20.0015 | Brake linings and pads, other[11] | NA | 2,990,000 | China | 81 |
| 6813.20.0020 | Other friction materials, civil aircraft[11] | NA | 12,400 | France[8] | 100 |
| 6813.20.0025 | Other friction materials[11] | NA | 6,450,000 | Japan[8] | 98 |
| Total | | 160 | 11,400,000 | | |

NA Not available.
[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Harmonized Tariff Schedule of the United States.
[3]Gross weight of product; represents the minimum quantity because data for some countries are not available.
[4]U.S. customs declared value.
[5]Countries and (or) localities are listed in decreasing order of value. Includes all countries with a percentage contribution of 10% or more by value.
[6]Percentage contribution of total imports by major import sources.
[7]Articles of fabricated asbestos fibers or of mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate.
[8]Country has imposed a ban on asbestos. Material may have been misclassified as asbestos or transshiped.
[9]Excludes crocidolite products.
[10]Less than ½ unit.
[11]Articles with a basis of asbestos, of other mineral substances, or of cellulose, whether or not combined with textile or other materials (containing asbestos).

Source: U.S. Census Bureau.

TABLE 7
ESTIMATED CONSUMPTION OF ASBESTOS FIBERS, BY COUNTRY OR LOCALITY, 2014–17[1, 2, 3]

(Metric tons)

| Region and country or locality | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| Africa: | | | | |
| Angola | 409 | 326 | 167 | NA |
| Benin | NA | 184 | 1,630 | NA |
| Ghana | 451 | NA | (4) | -- |
| Nigeria | -- | 35 | 353 | 18 |
| South Africa | 4 | 1,530 | 3,520 | 3,180 r |
| Zimbabwe | 5,280 | 1,550 | 265 r | 851 r |
| Other | 470 | 578 | 1,030 | 68 |
| Total | 6,620 | 4,200 | 6,960 r | 4,120 r |
| Asia and the Middle East: | | | | |
| Bangladesh | 12,100 | 10,400 | 11,900 | 18,300 |
| China | 366,000 | 304,000 | 280,000 | 235,000 r |
| India | 379,000 | 370,000 | 308,000 | 318,000 |
| Indonesia | 109,000 | 120,000 | 114,000 | 105,000 r |
| Kazakhstan | 39,500 | 11,400 r | 25,300 | 10,500 |
| Korea, North | 710 | 362 | 577 | 629 r |
| Kyrgyzstan | 5,630 | 4,450 | 6,800 | 9,170 |
| Malaysia | 3,590 | 2,980 | 2,240 | 2,460 r |
| Pakistan | 2,300 | 2,850 | 2,880 | 3,430 r |
| Philippines | 2,670 | 1,780 | 3,110 | 2,910 r |
| Russia | 156,000 | 124,000 | 101,000 | 118,000 r |
| Sri Lanka | 42,100 | 34,500 | 47,400 | 35,700 r |
| Tajikistan | 60 | 514 | 1,430 | 4,380 r |
| Thailand | 41,900 | 36,500 | 32,700 | 42,600 r |
| Turkmenistan | 4,280 | 4,790 | 4,280 | 6,410 |
| Uzbekistan | 76,400 | 56,100 | 70,600 | 97,000 |
| Vietnam | 52,900 | 61,300 | 58,100 | 43,100 r |
| Other | 1,350 | 1,700 | 959 | 857 r |
| Total | 1,300,000 | 1,150,000 | 1,070,000 | 1,050,000 r |
| Central America and North America: | | | | |
| Cuba | 2,890 | 4,100 | 3,080 | 4,610 |
| El Salvador | 723 | 487 | 365 | 960 |
| Mexico | 10,200 | 12,100 | 4,150 | 587 |
| United States | 416 r | 325 | 747 | 332 |
| Other | 398 | 100 | 5 | 40 |
| Total | 14,600 | 17,100 | 8,350 | 6,530 |
| Europe: | | | | |
| Belarus | 6,210 | 7,180 | 5,530 | 6,580 r |
| Romania | 103 | 4,160 | 2,700 | 887 |
| Ukraine | 24,700 | 10,400 | 15,500 | 16,000 |
| Other | 115 | 161 r | 306 | 218 |
| Total | 31,200 | 21,900 r | 24,100 | 23,700 r |
| Oceania | 26 | 109 | 27 | 163 |
| South America: | | | | |
| Bolivia | 6,260 | 4,170 | 4,740 | 2,200 |
| Brazil | 181,000 | 125,000 r | 89,900 r | 40,300 r |
| Colombia | 8,940 | 5,960 | 197 | 3,330 |
| Ecuador | 4,470 | 4,100 | 2,750 | 1,510 |
| Other | 220 | 1,130 | 690 | 720 |
| Total | 201,000 | 141,000 r | 98,300 r | 48,100 r |
| Grand total | 1,550,000 | 1,330,000 r | 1,210,000 r | 1,140,000 r |

rRevised. NA Not available. -- Zero.

[1]Table includes data available through September 11, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Calculated as country production plus imports minus exports. Changes in Government and industry stocks were not considered because data were unavailable. Production data were from table 8 and trade data were from the United Nations Comtrade Database.

[3]Owing to data limitations, the apparent consumption estimates are best used for identifying trends in asbestos consumption over time rather than absolute consumption for a particular country in a particular year.

[4]Less than ½ unit.

TABLE 8
ASBESTOS: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1, 2]

(Metric tons)

| Country or locality | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Brazil | 311,227 | 232,052 [r] | 170,000 [r, e] | 135,000 [r, e] | 110,000 [e] |
| China | 258,632 | 227,073 | 191,632 | 124,723 | 125,000 [e] |
| India | 227 | -- | -- | -- | -- |
| Kazakhstan | 213,100 | 179,800 [r] | 192,600 | 192,700 | 202,900 |
| Russia | 733,067 | 650,375 | 691,712 | 710,248 [r] | 710,000 [e] |
| Total | 1,520,000 | 1,290,000 [r] | 1,250,000 [r] | 1,160,000 [r] | 1,150,000 [e] |

[e]Estimated. [r]Revised. -- Zero.

[1]Table includes data available through April 3, 2019. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Marketable fiber production.

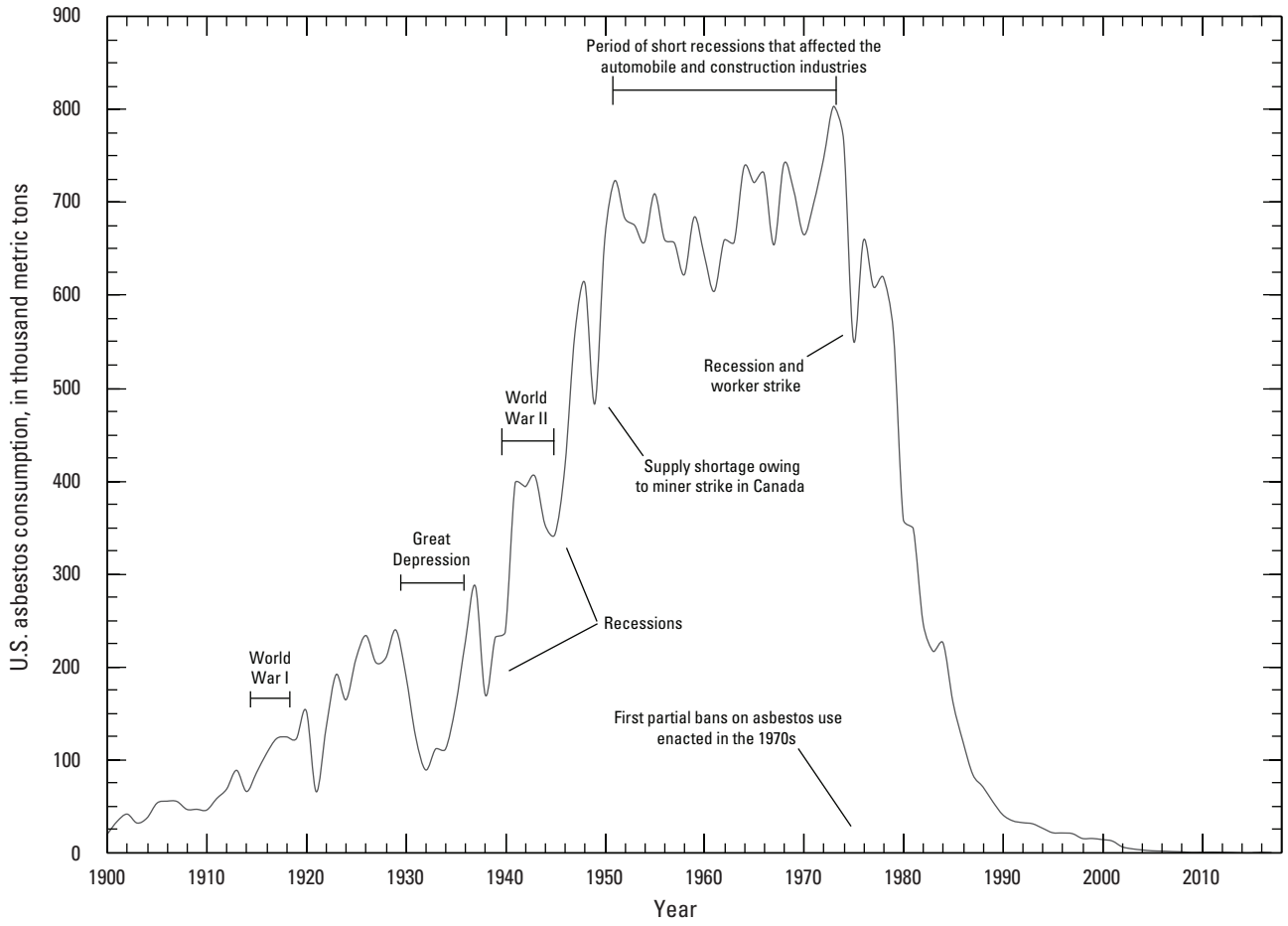


**Figure 1**. U.S. asbestos consumption from 1900 to 2018.