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2006 Minerals Yearbook

ASBESTOS

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

June 2007

Published by AsbestosClaims.Law
asbestosclaims.law/library/11041/1

ASBESTOS

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Domestic survey tables were prepared by Richard H. Kraft, statistical assistant, and the world production table was prepared by Glenn J. Wallace, international data coordinator.

Asbestos has not been mined in the United States since 2002 and imports, mostly from Canada, satisfied domestic manufacturing needs. U.S. apparent consumption declined to 2,230 metric tons (t) in 2006 from 2,530 t in 2005. World production was 2.30 million metric tons (Mt), a decrease from 2.32 Mt in 2005.

Legislation and Government Programs

The Mine Safety and Health Administration (2005) reviewed testimony related to its proposed reduction of the 8-hour time-weighted average permissible exposure level to 0.1 fiber per cubic centimeter from 2.0 fibers per cubic centimeter for asbestos. No deadline was set for a decision concerning this action.

The U.S. Geological Survey (USGS) published a report discussing worldwide production and consumption of asbestos, by country, from 1900 to 2003 (Virta, 2006). With numerous national bans on asbestos use, continued public pressure to stop its use in user nations, and liability issues worldwide, consumption in many parts of the world has declined. This has resulted in major regional shifts in asbestos use during the past 40 years. Major consuming nations and regions such as the United States and Western Europe now use little or no asbestos. Russia continued to be a major user, and the use of asbestos in several other former Soviet bloc countries and the Far East increased. The leading consumers of asbestos in 2003 were Brazil, China, India, Iran, Kazakhstan, Russia, Thailand, and Ukraine, with each using more than 75,000 t. These eight countries accounted for more than 82% of the world's apparent consumption in 2003. Sizable consumption increases took place in Azerbaijan, China, India, Iran, Kazakhstan, Thailand, and Ukraine between 2000 and 2003.

Federal agencies continued their work on the health risk posed by asbestos exposure in populated areas, such as housing developments, hiking trails, and school settings. This has been an issue for the past few years because residential development, particularly in California, expanded into areas where asbestos-bearing rock is common. The USGS published a report documenting the mineralogy and morphology of amphiboles observed in the region around El Dorado Hills, CA, where most of this controversy was focused (Meeker and others, 2006). Among the findings were that the amphiboles actinolite, magnesiohornblende, and tremolite were present, these amphiboles had morphologies ranging from prismatic to acicular to fibrous, and particle populations for the specific amphibole compositions (actinolite, magnesiohornblende, and tremolite) had particle size distributions that were intermediate between cleavage fragments and asbestos.

The USGS released its latest map identifying historic asbestos prospects and natural asbestos occurrences in the Central United States (Van Gosen, 2006). The map provides information on 26 natural asbestos occurrences extracted from the geologic literature. This map is the second in a series of maps on reported asbestos occurrences; the first map covered the Eastern United States (Van Gosen, 2005).

The U.S. International Trade Commission (ITC) developed new Harmonized Tariff Schedule of the United States (HTS) codes for asbestos imports. These were to be used beginning in January 2007. Prior to 2007, exports and imports of asbestos products and products manufactured using asbestos substitutes were reported under the same HTS codes (U.S. Census Bureau, 2001; U.S. International Trade Commission, 2006). This did not cause a problem with asbestos trade analysis before the mid- to late-1990s because asbestos products accounted for most of the product trade under most of these categories. During the past 4 or 5 years, with the continued decline in use of asbestos products in the United States and bans on the manufacture of asbestos products in many source countries for U.S. imports, products manufactured using asbestos probably accounted for the bulk of product trade reported under the 4-digit HTS codes 6811 (cement products such as pipe and sheet) and 6813 (friction products such as brake pads and clutches). The new HTS codes will allow for more accurate analysis of U.S. asbestos trade data.

Consumption

U.S. consumption of asbestos was 2,230 t in 2006, a decrease from 2,530 t in 2005 (table 1). Roofing products accounted for 42% of U.S. consumption; coating and compounds, 42%; and other unknown or unspecified uses, 16%. Most of the asbestos reported under "Coating and compounds" probably was used in roofing products. Chrysotile was the only type of asbestos used in the United States. About 75% of the chrysotile used in the United States in 2006 was grade 7; the rest was grades 5, 4, and 3, in descending order of percentage (table 2).

Prices

The average free alongside ship (f.a.s.) unit value of asbestos fiber exports and reexports was $254 per metric ton in 2006, a decrease from $262 per ton in 2005. The average U.S. customs unit value for all grades of imported asbestos decreased to $450 per ton in 2006 from $561 per ton in 2005. The average value of imported crude chrysotile decreased to $180 per ton in 2006 from $188 per ton in 2005. The average unit value for imports of spinning-grade chrysotile from all sources was $195 per ton in 2006, an increase from $150 per ton in 2005. The unit value of other grades of chrysotile from all sources was $483 per ton in 2006, a decrease from $613 per ton in 2005. Except for spinning

Minerals Yearbook: Asbestos Chapters, 2006
Published by AsbestosClaims.Law
ACL Doc 11041 · Page 2 of 8
asbestosclaims.law/library/11041/2

fiber, chrysotile imports from Canada were of lesser unit value in 2006 than in 2005, resulting in a net decrease of the unit value for all grades of imported asbestos (table 5).

Foreign Trade

The following section summarizes significant trade statistics on asbestos and products manufactured using asbestos and asbestos substitutes. Detailed trade statistics, by country and individual U.S. port districts, are available from the ITC on its Interactive Tariff and Trade Dataweb Web site (U.S. International Trade Commission, 2006).

Caution is advised when analyzing recent trade data for asbestos products because exports and imports of asbestos products and products manufactured using asbestos substitutes were reported under the same HTS codes (see discussion under Legislation and Government Programs) (U.S. Census Bureau, 2001; U.S. International Trade Commission, 2006).

In 2006, U.S. exports of asbestos fiber were 3,410 t with an f.a.s. value of $866,000, an increase from 1,510 t valued at $398,000 in 2005. There has been no U.S. production since 2002, so exports consisted of reexports of imported fiber or nonasbestos products misclassified under the HTS codes (table 4). The United States exported $443 million of products manufactured using asbestos or asbestos substitutes in 2006 compared with $375 million of exports in 2005. Canada was the leading importer, followed by Mexico, Netherlands, China, France, Japan, the Republic of Korea, the United Kingdom, Italy, and Germany. These 10 countries accounted for 85% of the value of manufactured products exported from the United States in 2006 (table 3). Brake linings, clutch linings, disk pads, mounted brake linings manufactured using asbestos, other mineral substances, or cellulose accounted for 82% of the value of manufactured products exported in 2006 (table 4). Because no asbestos brake components or clutch linings (HTS code 6813) are manufactured in the United States, these values represent either reexports of asbestos products or exports of products manufactured using asbestos substitutes. The same is true for exports of cement panel, sheet, tile, and tube (HTS code 6811), which accounted for 14% of U.S. product exports under the HTS codes for asbestos products.

In 2006, Canada supplied 91% of the asbestos tonnage imported by the United States. Asbestos also was imported from Zimbabwe (table 5). Only chrysotile was imported into the United States in 2006. Based on the import source, asbestos listed under "Other, unspecified asbestos type" in table 5 probably was chrysotile.

The United States also imported $598 million worth of products with a basis of asbestos, asbestos and magnesium carbonate, cellulose fiber, or other mineral substances (U.S. International Trade Commission, 2006). Products manufactured using asbestos substitutes probably comprised most of the cement and friction product imports under the 4-digit HTS codes 6811 and 6813 (table 6).

World Review

World production of asbestos was estimated to be 2.30 Mt in 2006, a decrease from 2.32 Mt in 2005. Russia continued to be the leading producer of asbestos, followed by Kazakhstan, China, Canada, Brazil, and Zimbabwe. These countries accounted for 96% of the world production (table 7).

The United Nations (UN) decided to withhold a decision concerning the inclusion of chrysotile on its Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Hazardous Chemicals and Pesticides in International Trade. The UN will revisit the issue at its next meeting in 2008. Amphibole asbestos varieties currently are covered by PIC (United Nations, 2006).

The World Health Organization (WHO) issued a set of strategies for the elimination of asbestos-related disease as part of World Health Assembly Resolution 58.22. The WHO resolution advocated a stoppage in the use of asbestos, the promotion of the use of safe asbestos substitutes, prevention of further exposure to asbestos in place and during abatement activities, and improvement of early diagnosis and treatment of asbestos-related diseases (World Health Organization, 2006a).

The WHO also evaluated several asbestos substitutes for health risk. The agency determined that short attapulgite fibers, carbon fibers, non-biopersistent synthetic vitreous fiber, wollastonite, and xonotlite pose a low human risk with regard to inhalation. Magnesium sulphate whiskers were classified as low or indeterminate health risk. Para-aramid fibers were deemed to pose a medium health risk. Long attapulgite fibers, potassium octatitanate, and biopersistent synthetic vitreous fibers were classed as posing a high health risk. Graphite whiskers and fibers of polyethylene, polypropylene, polyvinyl alcohol, and polyvinyl chloride were classified as indeterminate health risks (World Health Organization, 2006b).

Outlook

U.S. consumption is likely to decline as the U.S. asbestos product manufacturing industry continues to eliminate asbestos from its product lines. Based on the current trend, U.S. asbestos consumption may decline to 2,000 t within 1 to 2 years. Use of asbestos-base product imports is likely to continue to decline in the United States, particularly for cement and friction product applications. World production probably will remain between 2.0 and 2.3 Mt for the next few years as demand still remains high in many regions of the world, particularly in Asia and Eastern Europe.

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TABLE 1
SALIENT ASBESTOS STATISTICS[1]

		2002	2003	2004	2005	2006
United States:						
Production, sales	metric tons	2,720	--	--	--	--
Exports and reexports:[2]						
Unmanufactured, value	thousands	$2,020	$920	$333	$398	$866
Asbestos products, value	do.	$203,000	$290,000	$341,000	$375,000 r	$443,000
Imports for consumption, unmanufactured:						
Quantity	metric tons	6,850	4,650	3,450	2,530	2,230
Value[3]	thousands	$1,770	$5,840	$806	$1,420	$1,000
Consumption, apparent[4]	metric tons	6,850	4,650	3,450	2,530	2,230
World, production	do.	2,320,000	2,440,000 r	2,310,000 r	2,320,000 r	2,300,000

rRevised. -- Zero.
[1]Data are rounded to no more than three significant digits.
[2]Free alongside ship value; includes exports of crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.
[3]U.S. customs declared value.
[4]Production plus imports minus producer exports of asbestos fiber plus adjustments in Government and industry stocks.

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

(Metric tons)

End use	Chrysotile					
	Grade 3	Grade 4	Grade 5	Grade 7	Unspecified grade	Total
2005	21	84	293	1,840	298	2,530
2006:						
Coatings and compounds[3]	5	5	294	629	--	933
Roofing products	--	--	--	927	--	927
Other	14	24	--	119	213	370
Total	19	29	294	1,680	213	2,230

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Estimated distribution based upon data provided by the Chrysotile Institute, Montreal, Quebec, Canada.

[3]Most of the asbestos reported under "Coating and compounds" probably was used in roofing products.

TABLE 3
VALUE OF U.S. EXPORTS AND REEXPORTS OF ASBESTOS FIBERS AND ASBESTOS–, CELLULOSE–, AND OTHER FIBER–BASED PRODUCTS[1, 2]

(Thousand dollars)

Country	2005			2006		
	Unmanufactured fiber[3]	Manufactured products[4]	Total	Unmanufactured fiber[3]	Manufactured products[4]	Total
Australia	--	4,060	4,060	--	3,370	3,370
Brazil	--	3,800	3,800	--	2,710	2,710
Canada	--	177,000	177,000	6	184,000	184,000
China	43	11,300	11,400	12	20,900	20,900
France	--	15,800	15,800	--	16,800	16,800
Germany	--	10,100	10,100	--	9,210	9,210
Italy	--	4,770	4,770	--	10,500	10,500
Japan	--	15,500	15,500	--	15,400	15,400
Korea, Republic of	--	9,450	9,450	--	15,100	15,100
Mexico	347	46,300	46,600	806	55,800	56,600
Netherlands	--	15,700	15,700	--	34,900	34,900
Saudi Arabia	--	7,220 r	7,220 r	--	8,010	8,010
Thailand	--	12,000	12,000	--	4,510	4,510
United Kingdom	--	8,780	8,780	--	13,800	13,800
Venezuela	--	1,590	1,590	--	3,120	3,120
Other	8 r	31,500 r	31,500 r	42	44,600	44,600
Total	398	375,000 r	376,000 r	866	443,000	444,000

rRevised. -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Free alongside ship value.

[3]Includes exports of crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.

[4]Includes products manufactured using asbestos, cellulose fiber, and other asbestos substitutes.

Source: U.S. Census Bureau.

Minerals Yearbook: Asbestos Chapters, 2006
ACL Doc 11041 · Page 5 of 8
Published by AsbestosClaims.Law
asbestosclaims.law/library/11041/5

TABLE 4
U.S. EXPORTS AND REEXPORTS OF ASBESTOS AND ASBESTOS–, CELLULOSE–, AND OTHER FIBER–BASED PRODUCTS[1]

	2005		2006	
	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)
Unmanufactured, asbestos[3]	1,510	$398 r	3,410	$866
Manufactured:				
Brake linings and disk brake pads[4]	NA	293,000	NA	330,000
Clutch facings and linings[5]	NA	28,600	NA	33,600
Clothing, cord, fabric, yarn	NA	--	NA	1,940
Gaskets, packing and seals	NA	1,480	NA	1,780
Panel, sheet, tile, tube[6]	NA	39,700	NA	63,500
Paper and millboard	NA	983	NA	1,310
Other articles[7]	NA	10,700	NA	11,100
Total	NA	375,000 r	NA	443,000

rRevised. NA Not available. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Free alongside ship value.
[3]Includes crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.
[4]Includes asbestos and cellulose fiber brakes and similar materials.
[5]Includes clutches and other friction materials, excluding brakes and brake pads.
[6]Includes asbestos cement and cellulose fiber cement products.
[7]Includes asbestos and cellulose fiber products.

Source: U.S. Census Bureau.

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

	Canada		South Africa		Other		Total	
Type	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)
2005:								
Chrysotile:								
Crude	288	$54	--	--	--	--	288	$54
Spinning fibers	20	3	--	--	--	--	20	3
Milled, grade 4	--	--	32 [3]	$157	266	$562	298	719
All other	1,510	366	--	--	--	--	1,510	366
Other, unspecified asbestos type	417	278	--	--	--	--	417	278
Total	2,240	701	32 [3]	157	266	562	2,530	1,420
2006:								
Chrysotile:								
Crude	200	36	--	--	--	--	200	36
Spinning fibers	41	8	--	--	--	--	41	8
Milled, grade 4	--	--	--	--	213	442	213	442
All other	1,400	302	--	--	--	--	1,400	302
Other, unspecified asbestos type	377	216	--	--	--	--	377	216
Total	2,020	562	--	--	213	442	2,230	1,000

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]U.S. customs declared value.
[3]These are probably transhipments of chryostile from Zimbabwe through South Africa.

Source: U.S. Census Bureau.

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TABLE 6
U.S. IMPORTS OF PRODUCTS WITH BASIS OF ASBESTOS, CELLULOSE, OR OTHER MINERALS IN 2006

HTS[1] code	Category	Quantity (metric tons)	Value	Major sources[2]	Percentage of category total[3]
2524.00.00.00	Asbestos	2,230	$906,000	Canada	90% of weight.
6811.10.00.00	Corrugated cement sheet[4]	963	600,000	Finland[5], Denmark[5]	83% of weight.
6811.20.00.00	Flat cement panel, sheet, and tile[4]	104,000	47,400,000	Mexico, Chile, Canada	94% of weight.
6811.30.00.00	Cement pipe, tube, and pipe fittings[4]	462	144,000	Mexico	98% of weight.
6811.90.00.00	Other cement products[4]	504	988,000	China	52% of weight.
6812.50.00.00	Fabricated asbestos fibers; clothing[6]	4	51,800	United Kingdom[5]	75% of weight.
6812.60.00.00	Felt, millboard, and paper	NA	83,700	China	87% of value.
6812.70.00.00	Compressed asbestos fiber jointing	NA	745,000	Canada	81% of value.
6812.90.01.01	Other, miscellaneous[6]	20	4,610	do.	100% of weight.
6812.90.01.02	Yarn and thread[6]	77	430,000	Mexico	99% of weight.
6812.90.01.03	Cord and string[6]	2	23,000	China	97% of weight.
6812.90.01.04	Woven or knitted fabric[6]	59	476,000	South Africa	92% of weight.
6812.90.01.10	Articles for use in civil aircraft[6]	NA	12,900	United Kingdom[5]	100% of value.
6812.90.01.20	Gaskets, packing, and seals[6]	138	1,070,000	Japan, India, China	94% of weight.
6812.90.01.25	Other, building materials[6]	NA	100,000	Australia	100% of value.
6812.90.01.55	Other, fabricated asbestos fiber[6]	NA	125,000	United Kingdom[5]	65% of value.
6813.10.00.10	Brake lining and pads, civil aircraft[7]	NA	11,500,000	France[5]	85% of value.
6813.10.00.50	Brake lining and pads, other[7]	NA	121,000,000	Brazil, China	70% of value.
6813.90.00.10	Other, articles, civil aircraft[7]	NA	1,130,000	Mexico	93% of value.
6813.90.00.50	Other, friction materials[7]	NA	16,800,000	United Kingdom[5], Japan	79% of value.
8708.31.00.00	Mounted brake linings for tractors	NA	596,000	Germany[5], Canada	51% of value.
8708.31.50.00	Mounted brake linings, other	NA	395,000,000	Japan[5], Canada	52% of value.

NA Not available.

[1]Harmonized Tariff Schedule of the United States.

[2]Countries are listed in decreasing order.

[3]Percentage contribution of total imports by major import sources, by weight or value.

[4]Articles of asbestos-cement, of cellulose fiber-cement or the like.

[5]Source likely a supplier of nonasbestos products only.

[6]Mixtures with basis of asbestos or with a basis of asbestos and magnesium carbonate.

[7]Articles with a basis of asbestos, of other mineral substances, or of cellulose.

Source: U.S. Census Bureau.

Minerals Yearbook: Asbestos Chapters, 2006
ACL Doc 11041 · Page 7 of 8
Published by AsbestosClaims.Law
asbestosclaims.law/library/11041/7

TABLE 7
ASBESTOS: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country[3]	2002	2003	2004	2005	2006
Argentina	155	166	267	290 r	300 e
Brazil, fiber	194,732 r	231,117 r	252,067 r	236,047 r	236,100 p
Bulgaria[e]	300	300	300	300	300
Canada	242,241 r	240,500 r	200,500 r	243,000 r	243,500 p
China[e]	562,000	500,000	400,000 r	350,000 r	350,000
Colombia, crude ore[e]	62,785 [4]	60,000	60,000	60,000	60,000
India[e]	18,000	19,000	18,000	19,000	20,000
Iran[e]	1,500	1,470 [4]	6,000 [4]	5,000	5,000
Kazakhstan	291,100	354,500	346,500	355,000	355,000 e
Russia[e]	775,000	878,000 [4]	923,000 [4]	925,000	925,000
Serbia and Montenegro	372	111	110	100	100 e
South Africa, chrysotile	--	6,218	--	--	--
United States, sold or used by producers	2,722	--	--	--	--
Zimbabwe	168,000 e	147,000	104,000	122,041	100,000 e
Total	2,320,000	2,440,000 r	2,310,000 r	2,320,000 r	2,300,000

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

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Marketable fiber production. Table includes data available through April 23, 2007.

[3]In addition to the countries listed, Afghanistan, North Korea, Romania, and Slovakia also produce asbestos, but output is not officially reported, and available general information is inadequate for the formulation of reliable estimates of output levels.

[4]Reported figure.

Minerals Yearbook: Asbestos Chapters, 2006
ACL Doc 11041 · Page 8 of 8
Published by AsbestosClaims.Law
asbestosclaims.law/library/11041/8