Use and Market Profile for Asbestos

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Notice

Mention of the names of specific companies, organizations, or entities does not constitute an endorsement by EPA.

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1. Introduction

The purpose of this report is to discuss the evidence for current uses of asbestos and products containing asbestos by the consumer, commercial, and industrial sectors within the U.S. The current uses are determined by synthesizing information that is publically available. The primary sources include chemical databases, government reports, Safety Data Sheets (SDSs) or Material Data Safety Sheets (MSDSs), and manufacturer and distributor websites.

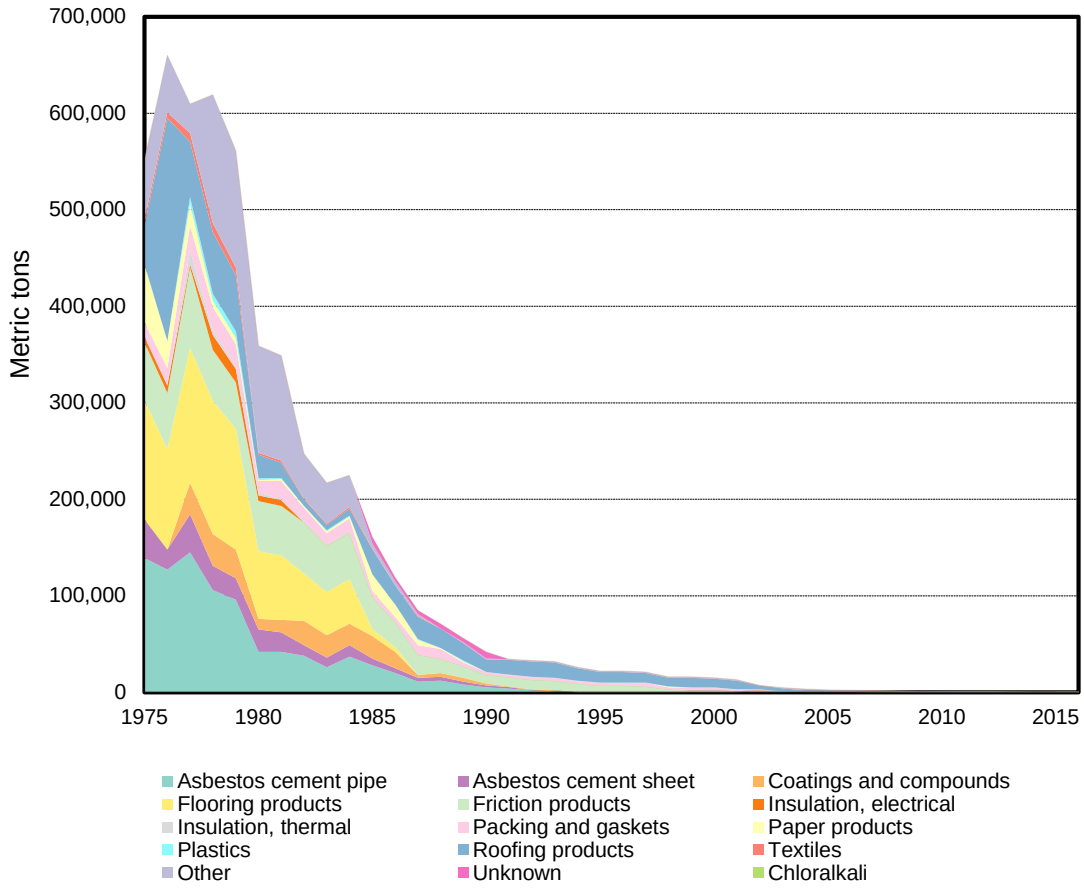
The remainder of this section provides a brief background of regulated asbestiform minerals and their use domestically. Section 2 describes the method for compiling asbestos uses and determining which uses may be ongoing. Section 3 presents information concerning the import values of asbestos and asbestos products.

1.1 Background

Pursuant to 40 FR §763.83, the definition of asbestos includes the asbestiform varieties of six different naturally-occurring fibrous minerals: chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. These minerals fall into two main groups, the serpentine group, which includes chrysotile, and the amphibole group, which includes the other five minerals (ASTDR 2001). "Asbestiform" refers to mineral fibers with high tensile strength and flexibility (40 FR §763.83), and not all minerals with this quality fit the legal definition of asbestos. For example, the mineral talc can grow in an asbestiform variety, but is not included in the definition of asbestos (40 FR §763.83; IARC 2012). In addition, the minerals tremolite, actinolite, and anthophyllite occur in both asbestiform and non-asbestiform habits, which is why the definition of asbestos must specify the "asbestiform" varieties (IARC 2012).

Unmanufactured asbestos fiber consumption in the United States has decreased over the past 30 years (See Figure 1; Flanagan 2017). There have also been large changes in the structure of the market. In 2000, asbestos was primarily used for roofing products and gaskets, 62 percent and 21 percent of the market, respectively. By 2010, the proportion of asbestos used by the chloralkali industry had reached about 35 percent of U.S. consumption, and by 2016 it reached about 100 percent (See ; Flanagan 2016a; Flanagan 2017). The chloralkali industry uses asbestos to manufacture semipermeable diaphragms used in the production of chlorine (Flanagan 2016a). There was insufficient data to identify additional markets (Flanagan 2017).

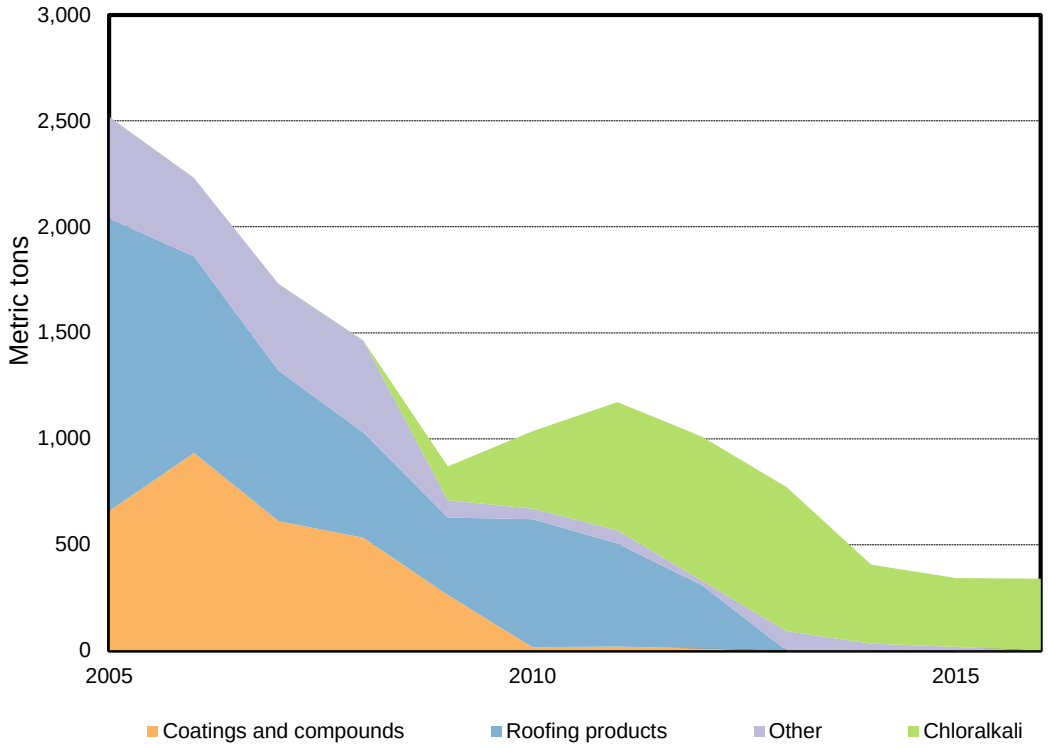
Figure 1. Domestic and Total Uses of Asbestos, 1975-2016



Source(s):

USGS (2016)

Figure 2. Domestic and Total Uses of Asbestos, 2005-2016



Source(s):
USGS (2016)

The last U.S. producer of asbestos ended production in 2002 due to decline in the U.S. and global markets associated with health and liability concerns (Flanagan 2017). Therefore, the U.S. is dependent on imports to meet manufacturing needs. In 2016, the United States imported 340 metric tons of chrysotile, essentially equivalent to 2015 imports of 343 metric tons (Flanagan 2017). According to the USGS, all about 95 percent of asbestos mineral imports originated from Brazil, with the remainder originating from Russia (Flanagan 2017). The United States imported $4.63 million of manufactured products that contain asbestos in 2015. Flanagan (2016a) reported imports of asbestos products from countries that have banned asbestos, which is attributed to countries including some non-asbestos products under asbestos Harmonized Tariff Schedule (HTS). If the countries that have banned asbestos allow asbestos products to be re-exported (this is permitted in the U.S.), this would also explain why these countries are exporting regulated asbestos products.

1.2 Methods for CAS Registry Number search

Each of the six mineral forms of asbestos has multiple Chemical Abstract Service Registry Numbers (CAS RNs) (see note in Table 1-1). A list of CAS RNs for asbestos was compiled by searching the National Library of Medicine's ChemIDPlus (2016) database for the types of asbestos defined in 40 FR §763.83. If the record in ChemIDPlus confirmed an asbestiform variety of the mineral, the CAS RN(s) were included in Table 1-1. The list of CAS RNs was cross-referenced with the Chemical and Product Categories (CPCat) Database, the U.S. Occupational Safety and Health Administration's (OSHA) chemical sampling information site, the International Agency for Research on Cancer's

(IARC) Monograph on asbestos, and the Agency for Toxic Substances and Disease Registry's (ASTDR) Toxicological Profile for Asbestos (Dionisio et al. 2015; OSHA2012; IARC 2012; ASTDR 2001). These additional sources provided confirmation for many of the CAS RNs in Table 1-1.

Table 1-1: Asbestos CAS Registry Numbers

CAS RN[1]	Name(s)[2]
1332-21-4[3]	Asbestos
12413-45-5	Asbestos
329202-13-3	Asbestos
77641-59-9	Asbestos
Serpentine group	
12001-29-5	Chrysotile asbestos
61076-97-9	Chrysotile asbestos
132207-32-0	Asbestos, Chrysotile
Amphibole group	
12001-28-4	Asbestos, crocidolite
132207-34-2	Asbestos, crocidolite
132207-35-3	Asbestos, crocidolite
132207-33-1	Asbestos, crocidolite
53799-46-5	Asbestos, crocidolite
61105-31-5	Asbestos, crocidolite
12172-73-5	Amosite asbestos; grunerite
77536-67-5	Asbestos, anthophyllite
17068-78-9	Anthophyllite
37229-03-1	Anthophyllite
61180-72-1	Anthophyllite
77536-66-4	Asbestos, actinolite
77536-68-6	Asbestos, tremolite
14567-73-8	Tremolite asbestos
60649-53-8	Tremolite asbestos
65452-00-8	Tremolite asbestos

Note(s):

[1] Different mineral forms of asbestos have different crystal structures, and therefore may be assigned different CAS RNs for the different structures. It is also possible that a CAS RN for a given mineral has changed, and that some historic CAS RNs are captured in this table.

[2] Names appear as they are listed in ChemIDPlus.

[3] Reported to 2012 CDR (EPA 2014b).

Source(s):

40 FR §763.83; ASTDR (2001); Dionisio et al. (2015); IARC (2012); OSHA2012; NLM (2016)

2. Uses

This section describes the method for compiling known uses of asbestos and for determining whether or not the use is ongoing. Several uses have declined or ceased in the U.S. due to both voluntary phaseouts and regulations. Table 2-2 provides a list of uses of asbestos, organized by category of use. Table 2-3 presents products distributed and, in many cases manufactured, domestically that correspond to the uses identified in Table 2-2. This is the primary method used to determine if a particular use was ongoing.

2.1 Methods for Table 2-2: Known Applications of Asbestos

In order to construct Table 2-2, known applications of asbestos were reviewed for relevant use/process information regarding asbestos to determine whether the use and manufacturing status was ongoing, historic, or unknown. In addition, specific product information was added to Table 2-3.

The CPCat search results for a given CAS RN may have a section on "Use Information," which includes a use or process only and/or a section on "Product Information" that lists specific products with company information and a link to the SDS. The CPCat was searched for the asbestos CAS RNs listed in Table 1-1, first for "Use Information" to augment Table 2-2, and then for "Product Information" to augment Table 2-3. Table 2-1 presents the CAS RNs identified in the CPCat and the number of products associated with the chemical. Only eleven of the CAS RNs presented in Table 1-1 were found in the CPCat (see Table 2-1). The CPCat did not include any products associated with two CAS RNs, 132207-32-0 and 132207-33-1.

Table 2-1: Chemical and Product Categories Database

CAS RN	Number of Products
12001-29-5	2,607
1332-21-4	435
14567-73-8	46
17068-78-9	28
12172-73-5	9
12001-28-4	5
77536-68-6	5
77536-67-5	4
77536-66-4	4
132207-32-0	0
132207-33-1	0

For CAS RN 12001-29-5, 1,549 of the products were listed as defense procurement with unknown manufacturer, and therefore excluded from analysis. A random sample was drawn (using Google's random number generator) accounting for 10 percent of the remaining 1,057 products. Using 10 percent is reasonable for a representative sample because the current number of unique uses associated with products containing asbestos is likely to be low. A search of the product name and/or company name listed on the SDS was conducted for each product in the sample of 12001-29-5, and for every single product in the remaining 8 CAS RNs with product lists, to determine the product's use, whether the product was still being sold, and whether the product still contained asbestos. The

majority of products could not be found for sale online. If the use associated with the product was one that had not been previously identified, the use was added to Table 2-2. The "Use or Process Status" was categorized as "Unknown" if a product currently being sold could not be paired with the use category and as "Ongoing" if a product currently being sold could be paired with the use category. The "Use or Process Status" is designated as "Manufacturing" or "Use" to indicate whether individuals in the U.S. appear to be using asbestos to manufacture the product, or using the product. For example, if a use category said "Ongoing (Manufacturing)", then asbestos is currently being used to manufacture products associated with the use category. Ongoing use is determined if an SDS published since 2015 was located. Older SDSs were considered as proof of ongoing use if the SDS was currently linked on the manufacturer's website, or the product was available for sale from a distributor and more recent SDSs were not located. It is assumed the presence of an SDS on a distributor's website indicates that the product is potentially still available for purchase. However, it is also possible that product is no longer being sold but the SDS has not been removed from the website.

The "Use or Process Status" was categorized as "Historic" when the use was banned by a federal regulation or phased out of the marketplace. Typically, the use and manufacturing statuses are the same for any given application category; however, there are some instances in which they differ. For example, in the use category "non-roofing adhesives, sealants and coatings", the product was not found on the manufacturer's website, but it was found for sale by a distributor. It is unknown whether the product is still manufactured, but it is still available for purchase. Therefore, the use category "non-roofing adhesives, sealants and coatings" is designated as "Unknown (Manufacturing); Ongoing (Use)".

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Asbestos Friction Materials Asbestos friction materials were used in a variety of industrial and commercial machinery as braking and gear-changing components. This included agricultural equipment such as combines, mining and oil-well-drilling equipment, construction equipment such as cranes and hoists, heavy equipment used in various manufacturing industries, military equipment, marine engine transmissions, elevators, chain saws, and consumer appliances such as lawn mowers, washing machines, and vacuum cleaners (EPA 1989). In 2015, the Environmental Council of the States (ECOS) and motor vehicle industry signed a Memorandum of Understanding (MOU) with EPA to phase out friction materials with greater than 0.10 percent asbestos by weight (EPA 2015a) , although the MOU includes exemptions for friction materials used in motorcycles, military vehicles, race cars and other off-road vehicles, collector vehicles, etc. U.S. manufacturers have phased out asbestos use in brake friction materials, but these products were still being imported and sold in the U.S. as recently as 2015 (MEMA 2016; USDOC and USITC 2016).			
Automatic Transmission Friction Components	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing, and distribution are allowed in the U.S. (EPA 2016). However, there is no evidence of ongoing production.	Commercial	EPA (1989); Mid America International Trading (2016a) An automatic transmission consists of 5 to 15 friction clutches, which are housed, along with gears, in a metal band called the transmission band. Each friction clutch is covered with a thin friction clutch plate which is made from a friction paper that contains asbestos or some other friction material. In addition, a lining, also made from this friction paper, is bonded to the inside of the transmission band. These automatic transmission friction components – friction clutch plates and transmission band linings – are immersed in a fluid environment which dissipates much of the heat generated when gears are changed (EPA 1989).
Brake Blocks	**Unknown (Manufacturing)** **Ongoing (Use)** Howard Supply Company (Howard Supply Company 2016) lists asbestos-containing brake blocks as current inventory.	Consumer, Commercial, Industrial	EPA (1989); Howard Supply Company (2016) Brake blocks are brake linings used on the drum brakes of heavy vehicles such as heavy trucks, buses, and off-road vehicles (EPA 1989).
Clutch Facings	**Unknown (Manufacturing)** **Unknown (Use)**	Consumer, Commercial	EPA (1989) Clutch facings are made of molded or woven friction materials. Molded facings are used more widely than the woven. Woven clutch facings are used in luxury automobiles and high-performance vehicles. They may also be used in off-road vehicles, such as agricultural tractors and earth-moving equipment, where improved service life is important (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Disc Brake Pads	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing, and distribution is allowed in the U.S. (EPA 2016). However, there is no evidence of ongoing production.	Consumer, Commercial	EPA (1989) Disc brake pads are similar to disk brake linings. However, secondary processing of disc brake pads may have increased exposure to commercial workers in the auto maintenance industry. Activities included installation of pads into new brake assemblies, repackaging for sale to the aftermarket, and retrofitting worn brake pads with new pads for resale (EPA 1989).
Drum Brake Linings and Brake Shoes	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing, and distribution is allowed in the U.S. (EPA 2016). However, there is no evidence of ongoing production.	Consumer, Commercial	EPA (1989) Asbestos drum brake linings were used to line the outside of the metal "shoes" in a drum brake (EPA 1989).
Asbestos Paper, Board, and Felt Asbestos papers were used to prevent against fire, heat, and corrosion in a variety of consumer, commercial, and industrial applications (EPA 1989). Some types of asbestos paper, board, and felt, including corrugated paper, rollboard, commercial paper, specialty paper, and flooring felt, were banned in the U.S. under TSCA, in the revision to the final 1989 rule (59 FR 33208 1994). Other types of paper, millboard, and felt are not banned (EPA 2016) and may continue to be produced or imported (USDOC and USITC 2016).			
Commercial Paper	**Historic (Manufacturing)** **Historic (Use)** Manufacture, import, processing, and distribution are banned in the U.S. under TSCA (59 FR 33208). However, there is an exception for imports with the sole purpose of being shipped outside of the country (59 FR 33208). Asbestos paper, millboard, and/or felt (HTS code 6812920000) were imported from China, Germany, Switzerland, the UK, and/or Japan from 2012 to 2015 (USDOC and USITC 2016). The quantity of commercial paper cannot be determined.	Industrial	EPA (1989); USDOC and USITC (2016) Asbestos insulation paper was used in a variety of industries, such as the steel and aluminum industries. It was used as insulation in furnaces, trough linings, the smelting process, and against hot metal and drippings of molten metal. The glass and ceramic industry used asbestos paper for kiln insulation, as mold liners in foundries, and in the electrical parts and appliance industry for electrical insulation (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Corrugated Paper	**Historic (Manufacturing)** **Historic (Use)** Manufacture, import, processing, and distribution are banned in the U.S. under TSCA (59 FR 33208). However, there is an exception for imports with the sole purpose of being shipped outside of the country (59 FR 33208). Asbestos paper, millboard, and/or felt (HTS code 6812920000) were imported from China, Germany, Switzerland, the UK, and/or Japan from 2012 to 2015 (USDOC and USITC 2016). The quantity of corrugated paper cannot be determined.	Commercial	EPA (1989); USDOC and USITC (2016) Corrugated asbestos paper was used as thermal insulation for pipe coverings and as block insulation. The paper was also used as an insulator in appliance, hot-water and low-pressure steam pipes, and process lines (EPA 1989).
High-Grade Electrical Paper	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos paper, millboard, and/or felt (HTS code 6812920000) were imported from China, Germany, Switzerland, the UK, and/or Japan from 2012 to 2015 (USDOC and USITC 2016). The quantity of high-grade electrical paper cannot be determined.	Commercial, Industrial	EPA (1989); USDOC and USITC (2016) Asbestos electrical paper was used as insulation for high temperature, low voltage applications such as in motors, generators, transformers, switch gears, and other heavy electrical apparatuses (EPA 1989).
Specialty Paper	**Historic (Manufacturing)** **Historic (Use)** Cooling tower fill application was forced out of market due to inexpensive substitutes (EPA 1989). Manufacture, import, processing, and distribution are banned in the U.S. under TSCA (59 FR 33208 1994).	Commercial, Industrial	ASTDR (2001); EPA (1989) Asbestos specialty papers include beverage and pharmaceutical filters and cooling tower fill. Asbestos was used in filters for the purification and clarification of liquids. In the beer, wine, and liquor distilling industries asbestos filters were used to remove yeast cells and other microorganisms. Asbestos filters were also used for filtration of some fruit juices (e.g., apple juice) and for special applications in the cosmetics and pharmaceuticals industries (EPA 1989). Use of asbestos filters in preparation of food or pharmaceuticals has been discontinued (ASTDR 2001).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Millboard	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing and distribution of asbestos-containing millboard are allowed in the U.S. (EPA 2016). Asbestos paper, millboard, and/or felt (HTS code 6812920000) were imported from China, Germany, Switzerland, the UK, and/or Japan from 2012 to 2015 (USDOC and USITC 2016). The quantity of millboard cannot be determined.	Commercial, Industrial	EPA (1989); USDOC and USITC (2016) Asbestos millboard is a heavy cardboard used for gasketing, insulation, fireproofing, and resistance against corrosion and rot (EPA 1989).
Rollboard	**Historic (Manufacturing)** **Historic (Use)** Manufacture, import, processing, and distribution are banned in the U.S. under TSCA (59 FR 33208).	Consumer, Commercial, Industrial	EPA (1989); USDOC and USITC (2016) Rollboard is a thin and flexible material composed of two sheets of paper laminated together with sodium silicate. It was used as a gasket and as a fire-proofing agent for security boxes, safes, and files. Commercial uses included office partitioning and garage paneling. Residential uses included linings for stoves and electric switch boxes (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Flooring Felt	**Historic (Manufacturing)** **Historic (Use)** Manufacture, import, processing, and distribution are banned in the U.S. under TSCA (59 FR 33208 1994). However, there is an exception for imports with the sole purpose of being shipped outside of the country (59 FR 33208). Asbestos paper, millboard, and/or felt were imported (HTS code 6812920000) from China, Germany, Switzerland, the UK and Japan from 2012 to 2015 (USDOC and USITC 2016). The quantity of flooring felt cannot be determined.	Consumer, Commercial, Industrial	EPA (1989); USDOC and USITC (2016) Asbestos flooring felt is a paper product which was used as a backing for vinyl sheet floor products (EPA 1989).
Roofing Felt	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos paper, millboard, and/or felt (HTS code 6812920000) were imported from China, Germany, Switzerland, the UK, and/or Japan from 2012 to 2015 (USDOC and USITC 2016). The quantity of roofing felt cannot be determined. According to Flanagan (2016b), in 2015 roofing products represented part of U.S. asbestos consumption, however, it is not known whether this included roofing felt.	Consumer, Commercial	EPA (1989); Flanagan (2016b); USDOC and USITC (2016) Asbestos roofing felt was used for built-up roofing (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Asbestos Cement Materials In cement materials, such as Portland cement, asbestos was used as a loose fibrous mixture that helped materials bond together (IARC 2012). In 1975, during the peak world production of asbestos, asbestos cement products such as pipes and cement flat sheet, accounted for about 66% of world asbestos consumption (IARC 2012).			
Asbestos Cement Flat Sheet	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing and distribution of asbestos cement flat sheet are allowed in the U.S. (EPA 2016).	Commercial	EPA (1989) Asbestos-cement flat sheet was used for construction/utility applications and can be broken down into two categories: ebonized and non-ebonized. Ebonized flat sheet, or asphalt-impregnated flat asbestos-cement sheet (no longer being produced in the U.S.), was once used as a mounting/insulating board for low to medium temperature, high voltage electrical apparatus. Non-ebonized asbestos-cement sheet was used for low voltage applications with no moisture (EPA 1989).
Asbestos-Cement (aka Transite or Fibrocement) Pipes and Fittings	**Unknown (Manufacturing)** **Unknown (Use)** According to Grant (2014), products associated with this use are manufactured in Mexico and may be used in Canada and/or the United States.	Commercial, Industrial	EPA (1989); Grant (2014); Tuyaux Logard Inc. (2005) Asbestos-cement pipe was used for pressure pipe (water mains) and non-pressure pipe (sewer line) applications. A small amount of asbestos-cement pipe has been used as conduits for electrical and telephone cables and for laterals from street mains to consumers (EPA 1989). Asbestos-containing pipes were also used in hospitals, high-rise buildings and condos because they were inexpensive, flame retardant and masked the sound of flowing water (Grant 2014). Asbestos-cement is manufactured by laminating a paste of cement and asbestos fibers on a metal spindle. Then, pipe is cured until cement is hydrated, forming a strong, non-porous matrix (Tuyaux Logard Inc. 2005).There is some risk in exposure from cutting the pipes during installation, and later during maintenance (Grant 2014).
Blind Nailing Cement	**Unknown (Manufacturing)** **Unknown (Use)** Blind nailing cement products containing asbestos were sold in the U.S. in the 1980s (Kol-Tar Inc. 1988; Monsey Products Co. 1989; Dionisio et al. 2015). There is no evidence of current products containing asbestos.	Consumer, Commercial, Industrial	Kol-Tar Inc. (1988); Monsey Products Co. (1989); United Asphalt Company (2013) Blind nailing cement is a cold-press adhesive used in the laying of roofing paper (United Asphalt Company 2013).
Cement Color	**Ongoing (Manufacturing)** **Ongoing (Use)**	Consumer, Commercial, Industrial	Precision Packing Inc. (2015) Colored cement that is mostly composed of limestone and about 30% asbestos, has been produced in the U.S. as of 2015 (Precision Packing Inc. 2015).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Corrugated Asbestos-Cement Sheet	**Unknown (Manufacture)** **Unknown (Use)** Manufacture, import, processing and distribution of corrugated asbestos-cement sheet are allowed in the U.S. (EPA 2016).	Consumer, Commercial, Industrial	EPA (1989) Corrugated asbestos-cement sheet has been used as siding and roofing in factories and warehouses. It has also been used as a lining for waterways, such as water slides in amusement parks and bulkheads in canals, or to keep water away from coastal homes, and for special applications in cooling towers (EPA 1989).
Plastic Cement	**Ongoing (Manufacturing)** **Ongoing (Use)**	Commercial, Industrial	DISSCO (2002d); Fields Coatings & Mastics (2003a)
Plastic Asphalt Cement	**Ongoing (Manufacturing)** **Ongoing (Use)**	Commercial, Industrial	Fields Coatings & Mastics (2003b)
Plastic Tile Cement	**Ongoing (Manufacturing)** **Ongoing (Use)**	Commercial, Industrial	Fields Coatings & Mastics (2003c)
Asbestos Paints, Coatings, Sealants, and Adhesives The main uses of asbestos-containing paints, coatings, sealants, and adhesives were in the building construction, automobile, and aerospace industries (EPA 1989). Block filler paints containing asbestos were used as a coating on stone surfaces, and texture paints containing asbestos were used for patterned or textured surfaces on interior walls and ceilings. Coatings containing asbestos were used in construction to prevent corrosion in underground pipes and structural steel. Asbestos-containing sealants were used in construction for water and sound-proofing, and in the automobile industry for corrosion protection on welds. Asbestos-containing adhesives functioned to bond materials, such as brick, lumber, and glass in the construction industry, and specialized applications, such as bonding hood braces in automobiles (EPA 1989).			
Paints and Enamels	**Unknown (Manufacturing)** **Unknown (Use)** There were reported emissions of asbestos in the paints and enamels sector in the 2014 NEI (EPA 2014a). Many companies that previously manufactured asbestos-containing patching compounds (banned in 1977 by the Consumer Product Safety Commission) had also produced asbestos-containing paints. It is likely that these companies removed asbestos from all products at once, and that most asbestos paints have been phased out (EPA 1989).	Consumer, Commercial, Industrial	EPA (2014a) Dow Texas Chemicals and Texas Operations chemical plants were primary reporters of this use in the 2014 NEI (EPA 2014a), however, it is possible that releases were due to removal of asbestos. Therefore, it is unclear whether paints and enamels containing asbestos are still being used or manufactured.

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Automotive Paints	**Unknown (Manufacturing)** **Unknown (Use)** Many companies that previously manufactured asbestos-containing patching compounds (banned in 1977 by the Consumer Product Safety Commission) had also produced asbestos-containing paints. It is likely that these companies removed asbestos from all products at once, and that most asbestos paints have been phased out (EPA 1989).	Industrial	Dionisio et al. (2015) According to the CPCat (Dionisio et al. 2015), tremolite asbestos (CAS 14567-73-8) has been used in automotive paint.
Home Paints	**Unknown (Manufacturing)** **Unknown (Use)** Many companies that previously manufactured asbestos-containing patching compounds (banned in 1977 by the Consumer Product Safety Commission) had also produced asbestos-containing paints. It is likely that these companies removed asbestos from all products at once, and that most asbestos paints have been phased out (EPA 1989).	Consumer	Dionisio et al. (2015) According to the CPCat (Dionisio et al. 2015), tremolite asbestos (CAS 14567-73-8) and anthophyllite asbestos (17068-78-9) have been used in consumer paints and primers.

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Other Paints, Lacquers, Stains, and Varnishes	**Unknown (Manufacturing)** **Unknown (Use)** Many companies that previously manufactured asbestos-containing patching compounds (banned in 1977 by the Consumer Product Safety Commission) had also produced asbestos-containing paints. It is likely that these companies removed asbestos from all products at once, and that most asbestos paints have been phased out (EPA 1989).	Consumer, Commercial, Industrial	Dionisio et al. (2015) According to the CPCat (Dionisio et al. 2015), tremolite asbestos (CAS 14567-73-8) and anthophyllite asbestos (CAS 17068-78-9) have been used in paints, lacquers, and varnishes. This may have been or continue to be a use outside the U.S., as the source given for the data is the Substances Prepared in Nordic Countries (SPIN) database.
Asphalt Coating and Adhesive	**Ongoing (Manufacturing)** **Ongoing (Use)** According to Flanagan (2016b), in 2015 coatings and compounds represented part of U.S. asbestos consumption. The specific amount of asphalt coating is not indicated.	Commercial, Industrial	Fields Coatings & Mastics (2003a); Flanagan (2016b)
Culvert Coating	**Ongoing (Manufacturing)** **Ongoing (Use)** According to Flanagan (2016b), in 2015 coatings represented part of U.S. asbestos consumption. The specific amount of culvert coating is not indicated.	Commercial, Industrial	DISSCO (2002e); Flanagan (2016b)
Fibered Foundation Coating	**Ongoing (Manufacturing)** **Ongoing (Use)** According to Flanagan (2016b), in 2015 coatings represented part of U.S. asbestos consumption. The specific amount of fibered foundation coating is not indicated.	Commercial, Industrial	DISSCO (2002a); Flanagan (2016b); Mid America International Trading (2016a)

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Fibered Roof Coating	**Ongoing (Manufacturing)** **Ongoing (Use)** According to Flanagan (2016b), in 2015, roof products represented part of U.S. asbestos consumption. The specific amount of fibered roof coating is not indicated.	Commercial, Industrial	DISSCO (2002c); EPA (1989) Roof coatings are cold-applied liquids which may be brushed or sprayed on roofs or foundations to perform a variety of functions such as waterproofing, weather resistance, and surface rejuvenation (EPA 1989).
Non-roofing Adhesives, Sealants and Coatings	**Unknown (Manufacturing)** **Ongoing (Use)** According to Flanagan (2016b), in 2015 coatings and compounds represented part of U.S. asbestos consumption. The specific amount of non-roofing adhesive, sealants, and coatings is not indicated.	Industrial, Commercial	EPA (1989); JACO Areospace & Industrial (2017) The construction and automobile industries were at one time the largest consumers of asbestos containing adhesives, sealants, and coatings. However, the automobile industry has found substitutes for most uses, and the potential remaining uses of asbestos in this industry are limited to specialized products (EPA 1989).
Extruded Sealant Tape	**Unknown (Manufacturing)** **Unknown (Use)**	Consumer, Commercial, Industrial	EPA (1989) Asbestos tape can act as a gasket for sealing building windows, automotive windshields, and mobile home windows. It has also been also used in the manufacture of parts for the aerospace industry and in the manufacture of insulated glass (EPA 1989).
Firewall Sealant	**Unknown (Manufacturing)** **Unknown (Use)**	Consumer, Commercial, Industrial	3M (2016); D Aircraft Products Inc. (2004); Dionisio et al. (2015); Stabond Corporation (1985) Firewall sealants maintain a fireproof seal in interior building applications, as well as construction and repair of aircraft (3M 2016; D Aircraft Products Inc. 2004).
Consumer Patching Compounds	**Historic (Manufacturing)** **Historic (Use)** Consumer patching compounds containing asbestos were banned in 1977 by the Consumer Product Safety Commission.	Consumer	CPSC (1977) Consumer patching compounds were available in dry form (to be mixed with water by the user) or in a ready-mix paste form and were used to cover, seal or mask cracks, joints, holes and similar openings in the trim, walls and ceilings of building interiors (CPSC 1977).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Potting Compound	**Unknown (Manufacturing)** **Unknown (Use)**	Commercial, Industrial	Hercules Inc. (1990); MG Chemicals (2016) Potting compounds are used in electronic devices to protect interior components from water and other chemicals, and hold them in place, preventing physical damage. Potting compounds generally seek to maximize thermal conductivity while meeting flame retardant requirements (MG Chemicals 2016).
Waterproofing Compound	**Ongoing (Manufacturing)** **Ongoing (Use)** According to Flanagan (2016b), in 2015 coatings and compounds represented part of U.S. asbestos consumption.	Commercial, Industrial	DISSCO (2002b); Flanagan (2016b)
Asbestos Gaskets, Pipeline Wraps, Fillers, Packing, and other Industrial Process Components Asbestos-containing materials have been used in many industrial processes. Gaskets are materials used to seal different components in movable applications, such as engines (EPA 1989). Asbestos gaskets were used mainly to seal connections and prevent fluid leakage. Asbestos packings had a variety of applications including valves and pumps in the electric power, petrochemical, and pulp and paper industries. Other industrial process components identified include clamps for jet engines and electrical brush holders used in motors.			
Beater-Add Gaskets	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos gaskets, packing and/or seals (HTS code 6812990020) were imported from Japan, Israel, Mexico, China, Germany, Taiwan, Spain, Finland, Italy, the UK, France, Greece, Ireland, Singapore, Korea, and/or Canada from 2011 to 2015 (USDOC and USITC 2016). The quantity of beater-add gaskets cannot be determined.	Commercial, Industrial	EPA (1989) Gasketing paper is used to fabricate gaskets of customer-specified sizes and dimensions (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Gaskets and Bearing Linings	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos gaskets, packing and/or seals (HTS code 6812990020) were imported from Japan, Israel, Mexico, China, Germany, Taiwan, Spain, Finland, Italy, the UK, France, Greece, Ireland, Singapore, Korea, and/or Canada from 2011 to 2015 (USDOC and USITC 2016). The quantity of gaskets and bearing linings cannot be determined.	Commercial, Industrial	Dionisio et al. (2015) According to the CPCat (Dionisio et al. 2015), chrysotile (CAS 12001-29-5) is used as an automotive component in gaskets and bearing linings. This may have been or continue to be a use outside the U.S., as the source given for the use is the Substances Prepared in Nordic Countries (SPIN) database.
Gaskets for Fuel Engines	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos gaskets, packing and/or seals (HTS code 6812990020) were imported from Japan, Israel, Mexico, China, Germany, Taiwan, Spain, Finland, Italy, the UK, France, Greece, Ireland, Singapore, Korea, and/or Canada from 2011 to 2015 (USDOC and USITC 2016). The quantity of gaskets for fuel engines cannot be determined.	Commercial, Industrial	Dionisio et al. (2015) According to the CPCat (Dionisio et al. 2015), chrysotile (CAS 12001-29-5) is used as an automotive component in gaskets for fuel engines. This may have been or continue to be a use outside the U.S., as the source given for the use is the Substances Prepared in Nordic Countries (SPIN) database.
Sheet Gaskets	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos gaskets, packing and/or seals (HTS code 6812990020) were imported from Japan, Israel, Mexico, China, Germany, Taiwan, Spain, Finland, Italy, the UK, France, Greece, Ireland, Singapore, Korea, and/or Canada from 2011 to 2015 (USDOC and USITC 2016). The quantity of sheet gaskets cannot be determined.	Commercial, Industrial	Dionisio et al. (2015); EPA (1989); USDOC and USITC (2016); Virta (2006) Asbestos gaskets were used to seal and prevent the leakage of fluids between solid non-moving surfaces (EPA 1989). Latex asbestos paper can be densified and used for gasketing, but most sheet-packing material is made through a calendaring process on a sheeter machine (Virta 2006).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Spiral Wound Gaskets	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos gaskets, packing and/or seals (HTS code 6812990020) were imported from Japan, Israel, Mexico, China, Germany, Taiwan, Spain, Finland, Italy, the UK, France, Greece, Ireland, Singapore, Korea, and/or Canada from 2011 to 2015 (USDOC and USITC 2016). The quantity of spiral wound gaskets cannot be determined.	Commercial, Industrial	Dionisio et al. (2015); Mercer Gasket & Shim (2017) Spiral wound gaskets are composed of a steel outer ring, a spiral wound sealing strip, and an inner ring also made of steel (Mercer Gasket & Shim 2017).
Asbestos Pipeline Wrap	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	EPA (1989) Pipeline wrap is used by the oil and gas industry for coating its pipelines. The chemical industry uses it for underground hot water and steam piping. Pipeline wrap is occasionally used in above-ground applications, such as for special piping in cooling towers (EPA 1989).
Filler for Acetylene Cylinders	**Unknown (Manufacturing)** **Unknown (Use)**	Consumer, Commercial, Industrial	EPA (1989) Asbestos was used to produce filler that is placed in acetylene cylinders. The filler holds the liquefied acetylene gas (acetone) in suspension in the steel cylinder and pulls the acetone up through the tank as the gas is released through the oxyacetylene torch (EPA 1989).
Asbestos Packings	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos gaskets, packing and/or seals (HTS code 6812990020) were imported from Japan, Israel, Mexico, China, Germany, Taiwan, Spain, Finland, Italy, the UK, France, Greece, Ireland, Singapore, Korea, and/or Canada from 2011 to 2015 (USDOC and USITC 2016). The quantity of asbestos packings cannot be determined.	Industrial	EPA (1989); USDOC and USITC (2016); Virta (2006) Asbestos packings differ from asbestos gaskets in that they are designated to be dynamic. These packings are used to seal fluids in devices where motion is necessary. Example instances where these have been used are in pumps, valves, compressors, mixers, and hydraulic (piston-type) cylinders. Some of the major areas in which asbestos-containing packing materials have been used are valves and pumps employed in the electric power, petroleum refinery, petrochemical, chemical, nuclear power, and pulp and paper industries (EPA 1989). Packings can be made with loose fibers, which are made of asbestos and binders and then woven into braided products, and made using asbestos yarns (Virta 2006).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Transportation Equipment Manufacturing	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	Dionisio et al. (2015) According to the CPCat (Dionisio et al. 2015), tremolite (CAS 14567-73-8) and anthophyllite (CAS 17068-78-9) are used in the manufacture of transportation equipment. This may have been or continue to be a use outside the U.S., as the source given for the use is the Substances Prepared in Nordic Countries (SPIN) database.
Clamps for Jet Engines	**Unknown (Manufacturing)** **Unknown (Use)**	Commercial, Industrial	Calport Aviation Co. (2016); Mlynarek and Van Orden (2012); Morgan Advanced Materials (2013) Jet engines have historically contained various components, such as gaskets, clamps, o-rings, and insulation that contain asbestos (Mlynarek & Van Orden 2012).
Electrical Brush Holder	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	Crestwood Technology Group (2015); Dionisio et al. (2015); Morgan Advanced Materials (2013) A carbon brush is used in a rotating machine to transfer an electrical current from a moving device to a stationary point. A carbon brush sits in a brush holder that keeps it in position and allows the brush to run on the surface of the commutator in a motor (Morgan Advanced Materials 2013).
Inorganic Chemical Manufacturing Industry			
Asbestos Diaphragm Manufacturing	**Ongoing (Manufacturing)** **Ongoing (Use)[3]** According to Flanagan (2016a), the chloralkali industry – which manufactures asbestos diaphragms – accounted for 95% of U.S. asbestos consumption in 2015. CDR 2012 reported use for CAS 1332-21-4 (EPA 2012).	Industrial	American Chemistry Council (2017); EPA (1989); EPA (2012); EPA (2015b); Flanagan (2017) Asbestos Diaphragms (semipermeable membranes) are employed in the chloralkali industry for the production of chlorine and other primary products such as caustic soda (EPA 1989). Westlake Chemical/Axiall Corporation, formerly known as Georgia Gulf Corporation (Business Wire 2013; Axiall Corporation 2016) in Plaquemine, LA reported importing asbestos (CAS RN 1332-21-4) in the 2012 CDR. Since about 100% of asbestos consumption in 2016 was in the chloralkali industry, the company is most likely involved in asbestos diaphragm manufacturing. Occidental Petroleum Corporation and Olin Corporation are also consumers of asbestos for this use (EPA 2015b).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Asbestos Fibers (Crude, Textiles, Clothing, and Accessories) Asbestos textiles have been used in a wide range of products, but many of the traditional products are no longer in production due to various substitute fibers out-competing them. The products that continued to be made in significant quantities using asbestos textiles until at least the 1980s were: woven friction materials, packings and gaskets, and specialty products (EPA 1989).			
Crudes	**Unknown (Manufacturing)** **Unknown (Use)** Virta (2006) notes that by the late 1980s demand for crude fibers had begun to diminish, and relatively little crude asbestos is currently sold. Crude chrysotile asbestos fibers were imported from Brazil, China, and/or Hong Kong as recently as 2015 (USITC 2015).	Industrial	USITC (2015); Virta (2006) Crude asbestos fibers were used to produce long fibers for textile work. These fibers, which are flexible and soft, were used as felts in laminates, with resins, to form strong molded sheets that could be used in airplanes and boats (Virta 2006).
Asbestos Clothing/Accessories	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing and distribution of clothing containing asbestos are allowed in the U.S. (EPA 2016). Asbestos clothing and accessories were imported from China, Taiwan, the Netherlands, Austria, Brazil, and/or Germany from 2011 to 2015 (USDOC and USITC 2016).	Commercial, Industrial	USDOC and USITC (2016)
Asbestos Protective Clothing	**Unknown (Manufacturing)** **Unknown (Use)** Manufacture, import, processing and distribution of clothing containing asbestos are allowed in the U.S. (EPA 2016).	Commercial, Industrial	EPA (1989) Asbestos protective clothing, such as gloves, mittens, coats and overalls, has been widespread in laboratories, steel mills, and glass blowing and welding shops. Fully covering asbestos suits have been used to protect workers in very hazardous environments, such as oilwell firemen, steel furnace workers, race car drivers, military aircraft pilots, and astronauts (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Asbestos Footwear	**Unknown (Manufacturing)** **Unknown (Use)** Asbestos footwear was imported from Italy, China, and/or Hong Kong from 2013 to 2014 (USDOC and USITC 2016).	Commercial, Industrial	USDOC and USITC (2016)
Miscellaneous Applications			
Artificial Ash	**Historic (Manufacturing)** **Historic (Use)** Artificial ash containing asbestos was banned in 1977 by the Consumer Product Safety Commission.	Consumer	CPSC (1977) Decorative components of household artificial gas-powered fireplaces (CPSC 1977).
Asbestos Arc Chutes	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	EPA (1989) Ceramic arc chutes containing asbestos were produced by General Electric and were used to guide electric arcs in motor starter units in electric generating plants (EPA 1989).
Asbestos Reinforced Plastics	**Unknown (Manufacturing)** **Unknown (Use)** According to Flanagan (2016b) in 2015 plastics represented part of U.S. asbestos consumption.	Industrial	EPA (1989); Virta (2006) Asbestos-reinforced plastics were used for electro-mechanical parts in the automotive and appliance industries and as high-performance plastics for the aerospace industry. More recently, asbestos was only used in plastics when the presence of the asbestos-imparted reinforcing properties is critical to the performance of the plastic (EPA 1989). Asbestos can be in the form of a mat, paper or cloth, to form laminates with resins like polyesters, phenolics, thermosetting silicones, melamines, and furanes (Virta 2006).
Asbestos Separators in Fuel Cells and Batteries	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	EPA (1989) In very specialized aerospace applications, asbestos functioned as an insulator and separator between the negative and positive terminals of a fuel cell/battery (EPA 1989).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Thermal Batteries	**Unknown (Manufacturing)** **Unknown (Use)**	Military	Diem (1987) Thermal (heat-activated) batteries are used in various weapons and other military-related items. Some thermal batteries with calcium/calcium chromate electrochemistry contained asbestos in the form of a tight, nonfriable paper (Diem 1987).
Vinyl-Asbestos Floor Tile	**Unknown (Manufacturing)** **Unknown (Use)**	Consumer, Commercial, Industrial	EPA (1989) Vinyl-asbestos floor tile was used in commercial, residential, and institutional buildings. It was often used in heavy traffic areas such as supermarkets, department stores, commercial plants, and kitchens (EPA 1989).
Ceramics Additive	**Unknown (Manufacturing)** **Unknown (Use)**	Commercial, Industrial	Trademarks 411 (1984) Additive for ceramic mixtures (Trademarks 411 1984)
Crayons	**Historic (Manufacturing)** **Historic (Use)** Voluntarily removed from market; not formally banned (CPSC 2000).	Consumer	CPSC (2000) Wax-based drawing implement (CPSC 2000).
Papier Mache	**Historic (Manufacturing)** **Historic (Use)** Voluntarily removed from market; not formally banned (CPSC 1983).	Consumer	CPSC (1983) Modeling clay meant for school art programs (CPSC 1983).
Food Additive	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	ASTDR (2001); Dionisio et al. (2015); FDA (2014); IARC (2012) According to the CPCat (Dionisio et al. 2015), crocidolite asbestos (CAS 12001-28-4), chrysotile (CAS 12001-29-5), and asbestos (CAS 1332-21-4) have been used in food additives. FDA allows for asbestos use in indirect food additives such as adhesives and components of coatings, polymers, and phenolic resins in molded articles (ASTDR 2001). In addition, asbestos may be listed as a food additive due to its mineral deposit proximity, and therefore potential to contaminate talc, which is an intentional additive to foods such as rice and chewing gum (FDA 2014; IARC 2012).

Table 2-2: Known Applications of Asbestos			
Use or Process	**Use or Process Status[1]**	**Expected Users[2]**	**Description of Use or Process and References**
Hair Dryers	**Historic (Manufacturing)** **Historic (Use)** Voluntarily removed from market; not formally banned (CPSC 1979).	Consumer, Commercial	CPSC (1979) Both household and salon quality hair dryers (CPSC 1979).
Heat Guns	**Unknown (Manufacturing)** **Unknown (Use)** Heat guns containing asbestos were recalled by the (CPSC 1980).	Consumer	CPSC (1980) Primarily used by model aircraft enthusiasts (CPSC 1980).
Missile Liner	**Unknown (Manufacturing)** **Unknown (Use)**	Industrial	EPA (1989) Missile liner is an asbestos-rubber compound which was used to coat the interior of rocket motors (EPA 1989).
Pesticide	**Historic (Manufacturing)** **Historic (Use)** Not formally banned, but no federally registered pesticide products contain asbestos CAS RNs in Table 1-1 (National Pesticide Information Retrieval System 2016; EPA 2017).	Consumer	Dionisio et al. (2015); National Pesticide Information Retrieval System (2016) According to the CPCat (Dionisio et al. 2015), tremolite asbestos (CAS 14567-73-8) and anthophyllite asbestos (CAS 17068-78-9) were used in pesticides related to pet flea and tick removal, and asbestos (CAS 1332-21-4) was a pesticide inert ingredient. No federally registered pesticide products currently contain asbestos as an active ingredient (National Pesticide Information Retrieval System 2016) or inert ingredient (EPA 2017).
Tent Grommet	**Unknown (Manufacturing)** **Unknown (Use)** The U.S. Defense Logistics Agency procured an asbestos grommet product from Kidde Technologies, Inc. as recently as 2009 (GovTribe Inc. 2017).	Military	Jones (1897); R M Engineered Products Inc. (1992) Asbestos grommets were invented for use in military tents. The grommet is inserted in the roof of the tent, and the stove pipe passes through it. Asbestos was used in this context due to its fire resistance and flexibility (Jones 1897).

Note(s):

[1] For manufacturing status: *Historic* means the manufacturing of products for this use is either banned or phased out; *Ongoing* means there is a current product in Table 2-3 and the manufacturer is located in the U.S.; *Unknown* means there is some evidence that the manufacturing status is ongoing or historic, but not enough to confirm. For use status: *Historic* means the manufacture, import, processing and/or distribution of products for this use is either banned or phased out; *Ongoing* means there is a current product in Table 2-3; *Unknown* means there is some evidence that the use is ongoing or historic, but not enough to confirm.

[2] Determination of the *Expected Users* associated with a use or process is based on EPA's best judgement if the users are not explicitly defined in the resource(s) cited.

[3] Although the study team did not find an SDS for the asbestos diaphragms use category, EPA designated this use as "ongoing" because the American Chemistry Council submitted a public comment to the Asbestos TSCA Review and Scoping docket (Docket ID: EPA-HQ-OPPT-2016-0736) indicating this use to be ongoing (American Chemistry Council 2017).

Table 2-3: Sample of Products that Contain Asbestos						
Use	**Expected Users**	**Product**	**Percent Concentration**	**Location/ Ownership[1]**	**Manufacturer and Distributor Information**	**Details**
Brake Blocks	Consumer, Commercial, Industrial	Silverline "SP" Brake Blocks	Unknown	U.S./ U.S.	Manufacturer: Stewart and Stevenson http://www.stewartandstevenson.com/ Distributor: Howard Supply Company https://www.howard-supply.com/	EPA (1989) Brake blocks are brake linings used on the drum brakes of heavy vehicles - heavy trucks, buses, and heavy off-road vehicles (EPA 1989)
Asbestos-cement (aka Transite or Fibrocement) Pipes and Fittings	Commercial, Industrial	Type 1 Asbestos-cement pipe	15-25% (Virta 2006)	Mexico/Canada (distributor)	Manufacturer: Unknown Distributor for Canadian Sales: Tuyaux Logard Inc. http://www.logard.com/	Grant (2014); Tuyaux Logard Inc. (2005) Pipes are used in hospitals, high-rise buildings and condos (Grant 2014).
Plastic Cement	Commercial Industrial	DISSCO 560 Plastic Cement	10-15% (DISSCO 2002d)	U.S./ U.S. (DISSCO 2016)	Manufacturer: Denver Industrial Sales & Service Company http://www.dissco.net/ Distributor: Unknown	
Plastic Asphalt Cement	Commercial Industrial	C200 RoofBond Plastic Asphalt Cement	4-12% (Fields Coatings & Mastics 2003b)	U.S./U.S. (Fields Coatings & Mastics 2016)	Manufacturer: Fields Coatings & Mastics http://fieldscorp.com/ Distributor: Unknown	
Plastic Tile Cement	Commercial Industrial	C240 TileBond Plastic Tile Cement	4-12% (Fields Coatings & Mastics 2003c)	U.S./U.S. (Fields Coatings & Mastics 2016)	Manufacturer: Fields Coatings & Mastics http://fieldscorp.com/ Distributor: Unknown	
Cement Color	Consumer, Commercial, Industrial	Cement Color Color-Paks Kolor Enhancer	<30.1%[8]	U.S./U.S.	Manufacturer: Ash Grove Cement Company[7] Distributor: Brock White Construction https://www.brockwhite.com/	
Asphalt Coating & Adhesive	Commercial Industrial	C100 RoofCoat Asphalt Coating & Adhesive	1-5% (Fields Coatings & Mastics 2003a)	U.S./U.S. (Fields Coatings & Mastics 2016)	Manufacturer: Fields Coatings & Mastics http://fieldscorp.com/ Distributor: Unknown	

Table 2-3: Sample of Products that Contain Asbestos						
Use	**Expected Users**	**Product**	**Percent Concentration**	**Location/ Ownership[1]**	**Manufacturer and Distributor Information**	**Details**
Culvert Coating	Commercial Industrial	DISSCO 590 Culvert Coating	5-12% (DISSCO 2002e)	U.S./ U.S. (DISSCO 2016)	Manufacturer: Denver Industrial Sales & Service Company http://www.dissco.net/ Distributor: Unknown	
Fibered Foundation Coating	Commercial, Industrial	DISSCO 520 Fibered Foundation Coating	5 – 10% (DISSCO 2002a)	U.S./ U.S. (DISSCO 2016)	Manufacturer: Denver Industrial Sales & Service Company http://www.dissco.net/ Distributor: Unknown	
Fibered Roof Coating	Commercial Industrial	DISSCO 550 Fibered Roof Coating	8-15% (DISSCO 2002c)	U.S./ U.S. (DISSCO 2016)	Manufacturer: Denver Industrial Sales & Service Company http://www.dissco.net/ Distributor: Unknown	
Non-roofing Adhesives, Sealants and Coatings	Commercial, Industrial	Reliabond r-398	3.5% (CIBA GEIGY Composite Materials 1985)	U.S./ U.S.[2]	Manufacturer: Hexcel (formerly CIBA GEIGY Composite Materials) http://www.hexcel.com/Resources/DataSheets/Adhesive Distributor: JACO Aerospace & Industrial http://www.e-aircraftsupply.com/	CIBA GEIGY Composite Materials (1985); Mid America International Trading (2016a) Asbestos composite adhesive (Mid America International Trading 2016a)
Waterproofing Compound	Commercial, Industrial	DISSCO 540 Mastic Waterproofing Compound	5-12% (DISSCO 2002b)	U.S./ U.S. (DISSCO 2016)	Manufacturer: Denver Industrial Sales & Service Company http://www.dissco.net/ Distributor: Unknown	

Table 2-3: Sample of Products that Contain Asbestos						
Use	**Expected Users**	**Product**	**Percent Concentration**	**Location/ Ownership[1]**	**Manufacturer and Distributor Information**	**Details**
Gaskets[6]	Commercial, Industrial	DURA GEN II	"Asbestos content varies depending on the use, with higher fiber levels associated with higher-temperature applications" (Virta 2006).	Not found[4]	Manufacturer: Unknown Distributor: Mid America International Trading http://midamericainternationaltrading.com/	Mid America International Trading (2016b) DURA GEN II is a compressed gasket material made of chrysotile fibers with synthetic and natural elastomers acting as the binders (Mid America International Trading 2016b).
Thermal Batteries	Military[5]	Thermal (THR) Battery	<1%	Unknown[3]	Manufacturer and date unidentified	

Note(s):

[1] Unless otherwise specified, Hoover's database of proprietary business information is the source for the Location/Ownership determination (Dun & Bradstreet 2016)**.**

[2] According to Hexcel company website, Ciba Geigy was acquired by Hexcel in 1996 (Hexcel 2016). Hexcel is based in the U.S. However, Reliabond r-398 is not on their website. The product is available through an industrial distributor: JACO Aerospace & Industrial (JACO Areospace & Industrial 2017).

[3] The information found on the thermal battery indicates that the military is the main user. The SDS, which is distributed by the military, does not include the manufacturer's name or an SDS publishing date. The study team has found no additional information concerning the location and ownership of the manufacturer. The study team could not confirm the current use of this product because there is not enough publically available information to determine if this product's use by the military is current or historic. Because the SDS is missing information and is distributed by the military, it is possible that its use is confidential.

[4] Since capturing pdfs of this product website, the website has been inaccessible. Additional research has not helped to determine the location and ownership of this product's manufacturer.

[5] The study team only found SDS and use descriptions for this product by the military. While SDS and descriptions of this use were old, the study team was not able to find publically available data concerning the military's current use of asbestos thermal batteries. However, the study team did not find thermal batteries containing asbestos available for purchase online.

[6] Based on the limited product information, the study team was not able to determine which specific use category applied to this product. The manufacturer's website is no longer available.

[7] Precision Packaging Inc. (located in Little Rock, AR) is the preparer of this SDS. Precisions Packaging Inc. does not have an independent website; they are a branch of Ash Grove Materials Corporation, which is a subsidiary of Ash Grove Cement Company (Dun & Bradstreet 2016)**.**. However, Kolor Enhancer is not on their website. The SDS for the product is available on the website of an industrial distributor: Brock White Construction.

3. Imports

Asbestos is imported to the U.S. as a raw material and as part of various articles. These import categories are represented by HTS codes that provide broad categories for different types of articles that contain asbestos. HTS codes also define certain product types that are similar to asbestos-containing articles, but without the asbestos.

U.S. imports for consumption of products composed largely of asbestos have been included in Table 3-1. Only asbestos articles are included in this table. Raw asbestos imports are not included.

Table 3-1. U.S. Imports for Consumption of Products with Basis of Asbestos in 2016

HTS Code	Category	Value1	Quantity (kilograms)	Major sources	Percent of category total
6812.80.10.00	Crocidolite footwear	$2,825	12	Italy[3]	100% of weight
6812.80.90.00	Articles of crocidolite not elsewhere specified	$89,384	178,240	China	100% of weight
6812.91.90.00	Asbestos clothing, accessories and headgear exc. footwear	$15,814	250	Mexico	100% of weight
6812.92.00.00	Asbestos paper, millboard and felt	$75,024	N/A	Japan[3]	90% of value
6812.93.00.00	Compressed asbestos fiber jointing, in sheets or rolls	$51,830	N/A	China	76% of value
6812.99.00.02	Asbestos yarn and thread	$18,945	266	Spain[3]	96% of weight
6812.99.00.03	Asbestos cords and string, including plaited	$12,287	213	China	100% of weight
6812.99.00.04	Asbestos woven or knitted fabric	$19,064	183	Italy[3], United Kingdom[3]	100% of weight
6812.99.00.10	Asbestos articles for use in civil aircraft	$8,531	N/A	China	76% of value
6812.99.00.20	Asbestos gaskets, packing and seals	$258,202	15,868	China, Israel[3], Japan[3]	85% of weight
6812.99.00.55	Asbestos articles not elsewhere specified	$93,877	N/A	Canada	70% of value
6813.20.00.10	Brake linings and pads for use in civil aircraft	$144,983	N/A	France	48% of value
6813.20.00.15	Brake linings and pads of asbestos	$1,661,074	N/A	China, Germany[3]	44% of value
6813.20.00.20	Friction material and articles for use in civil aircraft	$4,602,813	N/A	Japan[3]	99.5% of value
6813.20.00.25	Friction materials and articles	$857,251	N/A	China	71% of value

Source(s):

United States International Trade Commission 2017

Note(s):

[1] U.S. customs declared value

[2] Percentage contribution of major import sources, by weight or value

[3] Country has imposed ban on asbestos. Material may have been misclassified as asbestos or transshipped.

Using HTS data, a number of non-asbestos products were found that have an equivalent HTS code for asbestos-containing products. The HTS code equivalencies are listed in Table 3-2 below.

Table 3-2. Non-Asbestos HTS Code Equivalencies		
HTS Code	**Category**	**Non-Asbestos Equivalent HTS Code/Category**
6811.40.00.00	Asbestos-cement products	6811.81.00.00 Corrugated sheets 6811.82.00.00 Other sheets, panels, tiles and similar articles 6811.89.10.00 Tubes, pipes and tube or pipe fittings 6811.89.90.00 Other articles
6812.93.90.00[a]	Compressed asbestos fiber jointing, in sheets or rolls	4823.90.60.00 Gaskets, washers and other seals of coated paper or cardboard 4823.90.80.00 Gaskets, washers and other seals of uncoated paper or paperboard or of webs of cellulose fiber 5911.90.00.40 Cords, braids and the like of a kind used in industry as packing or lubricating material 8484.00.00.00 Gaskets and similar joints of metal sheeting combined with other material or of two or more layers of metal; sets or assortments of gaskets and similar joints, dissimilar in composition, put up in pouches, envelopes or similar packings; mechanical seals
6812.99.00.20[a]	Gaskets, packing, and seals	Same list as for 6812.93.90.00
6813.20.00.10	Brake linings and pads, civil aircraft	6813.81.10.00 Brake linings and pads (civil aircraft)
6813.20.00.15	Brake lining sand pads, other	6813.81.50.00 Brake linings and pads (other)
6813.20.00.20	Other friction materials, civil aircraft	6813.89.10.00 Other friction materials (civil aircraft)
6813.20.00.25	Other friction materials	6813.89.50.00 Other friction materials

Source(s):

United States International Trade Commission (2017)

Note(s):

[a] Non-asbestos equivalent HTS codes for this category are speculative, and not explicitly defined as being related within the HTS codex.

In addition to the HTS codes above, there are numerous other HTS codes related to asbestos, outlined in Table 3-1. However, those codes not included in Table 3-2 do not have readily apparent non-asbestos equivalencies, making an assessment of asbestos to non-asbestos imports ratios impractical.

Table 3-3 presents the dollar import values for the above HTS codes, the corresponding non-asbestos HTS codes, and the percent value of asbestos products compared to the combined value of the asbestos HTS code imports and corresponding non-asbestos HTS codes(s) imports. Note that the HTS codes for asbestos-cement and gaskets, washers and seals each have four corresponding non-asbestos HTS codes. A breakdown of the non-asbestos import values for these codes is presented in Table 3-4 and Table 3-5.

Table 3-3: Asbestos and Non-Asbestos Equivalent Articles' Import Values: 2012-2016 (USD)[a]							
Asbestos HTS Code (Non-asbestos)	**Category**	**Data description**	**2012**	**2013**	**2014**	**2015**	**2016**
6811.40.00.00[b] (6811.81.00.00; 6811.82.00.00; 6811.89.10.00; 6811.89.90.00)	Cement products	Asbestos imports	$582,413	$990,532	$689,187	$122,787	$0
		Non-asbestos imports	$60,560,242	$71,822,753	$88,395,161	$82,946,285	$112,250,053
		% asbestos of combined imports	0.96%	1.38%	0.78%	0.15%	0.00%
6812.93.00.00[c] (4823.90.60.00; 4823.90.80.00; 5911.90.00.40; 8484.00.00.00)	Compressed asbestos fiber jointing, in sheets or rolls	Asbestos imports	$365,023	$46,286	$40,785	$59,401	$51,830
		Non-asbestos imports	$267,196,823	$279,214,863	$298,477,269	$291,480,270	$271,342,038
		% asbestos of combined imports	0.14%	0.02%	0.01%	0.02%	0.02%
6812.99.00.20[c] (Same as 6812.93.00.00)	Gaskets, packing, and seals	Asbestos imports	$154,800	$140,290	$285,039	$191,152	$258,202
		Non-asbestos imports	$267,196,823	$279,214,863	$298,477,269	$291,480,270	$271,342,038
		% asbestos of combined imports	0.06%	0.05%	0.10%	0.07%	0.10%
6813.20.00.10 (6813.81.00.10)	Brake Linings and pads, civil aircraft	Asbestos imports	$306,563	$410,292	$495,845	$105,750	$144,983
		Non-asbestos imports	$6,061,675	$8,855,562	$6,905,782	$12,438,425	$10,141,886
		% asbestos of combined imports	4.81%	4.43%	6.70%	0.84%	1.41%
6813.20.00.15 (6813.81.00.50)	Brake lining sand pads, other	Asbestos imports	$1,709,638	$1,378,664	$1,796,951	$1,413,008	$1,618,527
		Non-asbestos imports	$150,089,133	$148,781,560	$161,988,695	$206,360,035	$193,455,888
		% asbestos of combined imports	1.13%	0.92%	1.10%	0.68%	0.83%
6813.20.00.20 (6813.89.00.10)	Other friction materials, civil aircraft	Asbestos imports	$25,919	$106,524	$160,475	$317,416	$4,602,813
		Non-asbestos imports	$251,078	$166,356	$910,217	$5,486,011	$5,720,129
		% asbestos of combined imports	9.36%	39.04%	14.99%	5.47%	44.59%
6813.20.00.25 (6813.89.00.50)	Other friction materials	Asbestos imports	$1,155,834	$663,120	$811,560	$1,757,114	$857,251
		Non-asbestos imports	$31,162,024	$31,012,797	$31,668,491	$21,050,092	$14,533,184
		% asbestos of combined imports	3.58%	2.09%	2.50%	7.70%	5.57%
TOTAL			**$4,300,190** **$515,320,975** **0.83%**	**$3,735,708** **$539,853,891** **0.69%**	**$4,279,842** **$588,345,615** **0.72%**	**$3,966,628[d]** **$619,761,118** **0.64%**	**$7,533,606** **$607,443,178** **1.23%**

Source(s):

United States International Trade Commission (2017)

Note(s):

[a] Actual dollars

[b] The asbestos code 6811.40.00.00 has four non-asbestos equivalent HTS codes. The breakdown of the non-asbestos imports is presented in Table 3-4.

[c] The asbestos codes 6812.93.00.00 and 6812.99.00.20 have four non-asbestos equivalent HTS codes. The breakdown of the non-asbestos imports is presented in Table 3-5. Since the same equivalent codes are listed for both of these codes, they are only considered once when calculating the totals for non-asbestos codes.

[d] The value presented in this table of total asbestos imports for 2015 is $3.7 million. While Flanagan (2016a), (quoted in Section 1.1) estimates the total value of imported products that contain asbestos in 2015 to be $4.63 million. This discrepancy is due to that fact that Flanagan (2016a) presents the imports of all of the products containing asbestos while this table does not include the value of products containing asbestos that are classified in an HTS code for which it was ambiguous which non-asbestos HTS code(s) were equivalent. Thus, for example, the table does not include categories such as products for use in civil aircraft; woven or knitted fabric; paper, millboard and felt; yarn and thread; and cord and string.

Table 3-4: Non-Asbestos HTS Code Import Values for Cement Products (USD)[a]					
Non-Asbestos HTS Code	**2012**	**2013**	**2014**	**2015**	**2016**
6811.81.00.00 – Corrugated sheets	$177,873	$246,888	$67,932	$64,988	$205,482
6811.82.00.00 – Other sheets, panels, tiles and similar articles	$52,307,338	$63,688,459	$77,913,646	$71,060,900	$102,970,038
6811.89.10.00 – Tube, pipes and tube or pipe fittings	$462,813	$123,970	$137,065	$702,998	$920,624
6811.89.90.00 – Other articles	$7,612,218	$7,763,436	$10,276,518	$11,117,399	$8,153,909
TOTAL	**$60,560,242**	**$71,822,753**	**$88,395,161**	**$82,946,285**	**$112,250,053**

Source(s):

United States International Trade Commission (2017)

Note(s):

[a] Actual dollars

Table 3-5: Non-Asbestos HTS Code Import Values for Gaskets, Washers, Seals, and Compressed Fiber Jointing (USD)[a]					
Non-Asbestos HTS Code	**2012**	**2013**	**2014**	**2015**	**2016**
4823.90.60.00 – Gaskets, washers and other seals of coated paper or cardboard	$2,230,393	$1,791,569	$2,215,572	$1,682,719	$2,028,114
4823.90.80.00 – Gaskets, washers and other seals of uncoated paper or paperboard or of webs of cellulose fiber	$2,831,082	$3,131,945	$3,233,295	$2,917,152	$2,938,005
5911.90.00.40 – Cords, braids and the like of a kind used in industry as packing or lubricating material	$3,428,277	$4,629,037	$4,866,892	$5,292,020	$6,020,012
8484.00.00.00 – Gaskets and similar joints of metal sheeting combined with other material or of two or more layers of metal; sets or assortments of gaskets and similar joints, dissimilar in composition, put up in pouches, envelopes or similar packings; mechanical seals	$258,707,071	$269,662,312	$288,161,510	$281,588,379	$260,355,907
TOTAL	**$267,196,823**	**$279,214,863**	**$298,477,269**	**$291,480,270**	**$271,342,038**

Source(s):

United States International Trade Commission (2017)

Note(s):

[a] Actual dollars

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