Chrysotile

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SUMMARY

Since the closure of the Baie Verte, Newfoundland, operation in 1994, the Canadian chrysotile industry is concentrated in Quebec. Production comes from three mines: the Black Lake open pit and Bell underground mines operated by LAB Chrysotile, Inc. near Thetford Mines and the Jeffrey mine operated by Jeffrey Mine Inc. located on the outskirts of the town of Asbestos. This industry provides nearly 4000 direct and indirect jobs to these two communities. The asbestos product manufacturing industry (friction materials, gaskets, roofing products and textiles) is the source of 1000 jobs in 15 businesses. Some of these businesses are found in Ontario and Manitoba, but the majority are located in Quebec.

As a result of fierce competition for market shares by other world producers and a contraction in demand in a number of client countries following their adoption of regulatory restrictions, Canadian chrysotile shipments decreased again in 2003 compared to the previous year. Canadian exports of chrysotile-based products in 2003 were valued at $188.4 million, which represents a 23.7% decrease from the previous year.

The world's production of chrysotile is believed to have increased by about 5.4% in 2003 compared to the previous year. This hike is mostly attributable to increased production in Russia, Brazil and Zimbabwe and follows a hike in demand in Asian countries whose economies further recovered in 2003 from the impact of the Asian financial crisis of the late 1990s.

As a consequence of the European ban movement, related regulatory changes in other countries, and the impact of the Asian financial crisis where economies are still recovering, particularly in Indonesia, worldwide chrysotile asbestos use will remain low in coming years compared to that of the mid-1990s. However, the general strengthening of the global economy in 2004 and the gradual recognition by regulatory bodies of the potential toxicity of the main substitute fibres may help stabilize worldwide chrysotile use in the medium term.

CHRYSOTILE AND ITS USES

Asbestos is a generic name for naturally occurring minerals with the common characteristic of fibrous form. Included under this designation are minerals from the serpentine group, namely chrysotile, and from the amphibole group, which includes crocidolite, amosite, anthophyllite, actinolite and tremolite. Of all these minerals, chrysotile is the least hazardous to human health and is the only form extracted in Canada. Chrysotile, which is sensitive to acid, tends to dissolve in the lungs, unless these are overburdened from exposure to excessive levels in the occupational environment. All fibres (asbestos or substitutes) that enter the lungs cause mechanical irritation.

In the past, most of the diseases and mortalities caused by asbestos exposure in the workplace have been due to the poor health and safety practices in the workplace that existed then in both the handling and use of chrysotile, to inappropriate uses, such as sprayed insulation and other low-density products, and to the use of amphibole asbestos, the more toxic forms of asbestos. With the marked improvements in today's work practices and the increased protection of workers, the occupational risks associated with chrysotile have been tremendously reduced and are controllable with existing technology. Low-density and friable products are no longer marketed and have been prohibited in Canada under the *Hazardous Products Act* since the 1970s.

Because of their chemical and physical properties, chrysotile fibres are an extremely useful material that has been, and still is being, widely used throughout the world. In Canada, chrysotile fibres are classified into seven groups, each one with its own sub-categories, with the longest fibres assigned to Group 1 and the shortest to Group 7. In decreasing length, chrysotile has been used in textiles, clothing, packings, woven brake linings, clutch

facings, electrical insulation materials, high-pressure and marine insulation, asbestos-cement pipe, other asbestos-cement products (e.g., sheets and mouldings, shingles, extrusions), gaskets, paper products, vinyl sheet backings, and millboards. The shortest fibres (Group 7) are used in moulded brake linings and as a filler in cement, plastics, roof coatings and caulking compounds. Some 90% of all chrysotile produced globally is used in asbestos-cement products such as pipes, plates and corrugated sheets while 7% is used in friction products such as brake linings and clutch facings, and 3% is used in textiles, clothing and various other uses.

CANADIAN DEVELOPMENTS

Production

The Canadian chrysotile industry, the world's third largest producer and a major exporter, is concentrated in the province of Quebec in eastern Canada. Production comes from three mines: the Black Lake open-pit and Bell underground mines operated by LAB Chrysotile, Inc. and the Jeffrey open-pit mine operated by Jeffrey Mine Inc.

In 2003, as a result of fierce competition for market share by other world producers and a contraction in demand following the adoption of regulatory restrictions by a number of client countries, Canadian chrysotile producers had to scale down their production substantially. LAB Chrysotile Inc. proceeded to reduce its output by operating its two mines alternately throughout the year. Meanwhile, Jeffrey Mine Inc. pursued its restructuring under the protection of the *Companies' Creditors Arrangement Act*. Jeffrey Mine Inc. was forced to file for bankruptcy protection on October 7, 2002, as a result of financial pressure put on it by plummeting market demand and the costs associated with the development of an underground operation to extend the life of its mine. During 2003, the company was nonetheless allowed to run its operation for three-month stints to treat ore stockpiled at the mine and to fill specific client orders.

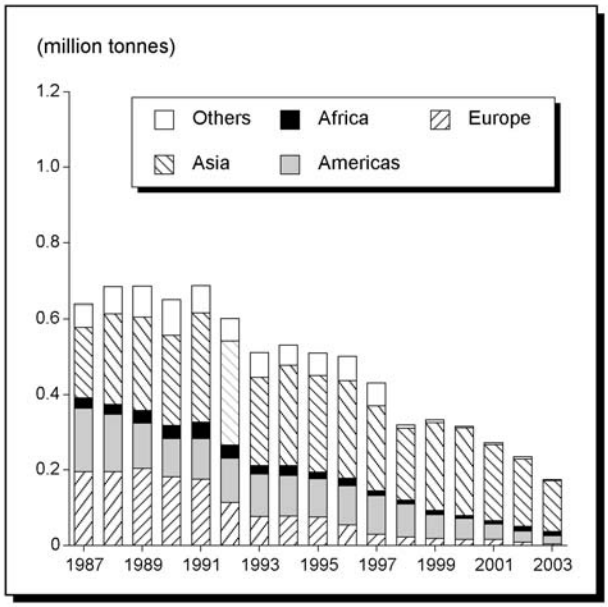
Trade

As most of the asbestos is used in the manufacturing of cement products for the construction industry, global use is largely concentrated in developing countries with large infrastructure projects. Other than Russia, which uses about 60% of its production, Asian countries in general are the world's most important users, accounting for about 45% of global demand and, more importantly, for about 77% of Canadian exports (Figure 1). However, influenced by the European asbestos ban and price considerations, use of Canadian chyrsotile in Asian countries has decreased in recent years, dropping by 24.7% in 2003 compared to 2002. India remained Canada's preferred export destination during 2003 although its imports were 28.7% lower than in 2002. Use in India is expected to remain strong in the short and medium term mainly due to increased demand for infrastructure development, but fierce competition from India's iron and steel industry may limit the growth in demand for chrysotile cement products. Pursuing the trend started in 1998, demand from Japan decreased further as a result of the depressed state of its economy and the Japanese manufacturing industry's gradual switch to substitute materials. Moving in the opposite direction, demand from China, South Korea and Pakistan increased while that from other Asian countries either remained stable or declined slightly. For that matter, demand from the fibrocement product manufacturing industries in Indonesia, Thailand and Malaysia remained strong as these products are still considered the best cost-benefit construction material in hot and humid climates.

Chrysotile use in the Middle East (mostly in the United Arab Emirates, Iran and Egypt) and in Africa (essentially in Algeria, Angola, Morocco and Senegal) accounts for about 20% of world demand. However, export levels to these regions have varied in recent years as a result of social unrest and the influence of European policy changes. Canadian exports in those two regions fell by 18.0% in 2003 and reached 14 434 t.

Also influenced by tendencies in Europe and under corporate pressure to substitute chrysotile asbestos – as an important percentage of Latin American companies are subsidiaries of companies headquartered in Europe – the

Figure 1
Canadian Chrysotile Exports, 1987-2003



Sources: Natural Resources Canada; Statistics Canada.

Americas decreased its relative position but remained an important user of chrysotile, accounting for about 13.0% of Canadian exports. Brazil, the world's fourth largest producer of chrysotile, is the area's main supplier and user, while Colombia, Cuba, Ecuador, El Salvador, Mexico, Panama and Venezuela each have a dynamic chrysotile asbestos manufacturing industry. Of these countries, Canadian exports to Venezuela, El Salvador and Mexico improved whereas that to the other countries either fell slightly or remained at 2002 levels. Use in the United States during the year fell to about 6000 t, compared to around 7000 t in 2002, due to further substituting. However, demand is expected to stabilize at this lower level for the coming years as the remaining uses for chrysotile are more difficult to substitute.

In Europe, which accounts for less than 1% of global demand, the gradual compliance of countries to the European Union ban decision on chrysotile use led to a further drop in imports in 2003 compared to 2002. The change in demand registered during the year stems from the end of Spain's imports and Portugal's gradual switch to substitute fibres. Further decreases are still expected in the coming years as Portugal, the last remaining European Union using country, reluctantly complies with the EU ban directive by the year 2005 and other European countries, such as Turkey, align their policies dealing with asbestos with that of the European Union.

INTERNATIONAL AND REGULATORY DEVELOPMENTS

Despite continued controversy surrounding the use of chrysotile asbestos, global chrysotile asbestos demand appears to have expanded in 2003, enabling world production to move up to 2.078 Mt (see table below), an increase of about 5.4% over 2002. Pursuing the trend of recent years, Kazakhstan, Russia, Brazil and Zimbabwe took advantage of the devaluation of their respective currencies and/or their low production costs to increase their market shares by further edging out Canada. The production increase is therefore attributable to significant production hikes in Russia, Brazil and Zimbabwe, whereas production in countries such as Kazakhstan, Canada and India is believed to have decreased. Production in the People's Republic of China is thought to have remained stable at 2002 levels.

CHRYSOTILE, WORLD PRODUCTION BY COUNTRY, 2003

Country	Tonnes (e)
Russia	870 000
China	360 000
Brazil	209 000
Kazakhstan	200 000
Zimbabwe	170 000
Others (1)	269 000
Total	2 078 000

Sources: Natural Resources Canada; U.S. Geological Survey.
(e) Estimated.
(1) Includes Canada.

The Americas

Brazil

Brazil's sole chrysotile asbestos producer, Sociedade Anonima Mineraçao do Amianto (SAMA), produced approximately 209 000 t in 2003, about 16.1% more than in 2002. A large portion of this production is used by Brazil's chrysotile cement manufacturing industry, which in turn exports a fair amount of its output mostly to Latin American countries. A rough estimate puts Brazil's domestic use of chrysotile-based products at about 32% of total production. SAMA's mine is located at Minaçu in the state of Goiás.

United States

Despite the closure in 2002 of its only domestic chrysotile asbestos producer, King City Asbestos Corp.'s New Idria mine near Coalinga, California, the United States exported 2821 t of chrysotile in 2003, essentially to Japan and Mexico. U.S. consumption of chrysotile asbestos fibre based on 2003 imports of about 6000 t and from domestic stockpiles was split among roofing products (71%), gaskets (18%), friction products (5%), and other products (6%). The United States' main import based on tonnage is asbestos-cement sheets, panels and tiles while, based on value, its main import is friction products such as brake linings and pads. Total imports of asbestos products in 2003 were valued at US$576 million, up 3.6% over that in 2002. U.S. exports of asbestos-containing products (mostly brake linings, mounted brake linings and other friction products) amounted to about US$291 million, up 42% from 2002.

Asbestos litigation – affecting some 8400 companies – pursued its damaging effect on the U.S. economy during the year by forcing additional companies into bankruptcy. The failings of the U.S. judicial system were made apparent by the fact that most of the claimants involve people that were exposed to asbestos in one way or another, but that have not developed a related illness, because such claims must be filed before statutory deadlines are reached. The U.S. Congress is under mounting pressure to address the situation, such as having medical criteria established for non-malignant asbestos-related illnesses and exempting potential claimants from statutory deadlines for filing such claims until their condition meets the criteria. The legislation contemplated would remove asbestos claims from the tort system and provide a no-fault compensation system through the creation of a privately

funded trust fund to pay for medical care and compensation for persons suffering from asbestos-related illnesses. However, at year's end, the Senate Judiciary Committee was still at work to reach an agreement on key elements of an asbestos reform bill, such as the amount of fair compensation to asbestos victims and adequate and secure funding to ensure payment of that compensation.

Europe

European Commission

During 2003 the European Commission (EC) pursued the phase-in of its asbestos ban directive (1999/77/EC) whereby member states of the European Union must phase out the placing on the market and use of chrysotile asbestos and of products containing this fibre no later than January 1, 2005. At the end of 2003, Portugal was the only European Union country still using chrysotile extensively, but was proceeding to comply with the new directive by the 2005 deadline.

United Kingdom

In the United Kingdom, the implementation on November 24, 1999, of Commission Directive 1999/77/EC prohibiting the use, import and manufacture of chrysotile asbestos brought to the fore the issue of potential health risks associated with in-place asbestos products. To address this issue, the U.K.'s Health and Safety Executive developed a law in 2002 to force commercial property owners to have an inspection done to identify all asbestos-containing material – even asbestos-cement products such as roof tiles – and to put into force a written management plan to deal with it. However, mounting negative publicity highlighting the significant costs of removing asbestos products compared to the trivial benefits derived forced the U.K. government to review its policy on the matter and to postpone its entry into force. The law was still under review at the end of 2003.

Other Producers

China

Chrysotile asbestos production in China is estimated at 360 000 t in 2003, the same level as was produced the year before. It emanates mostly from the country's western provinces of Xinjiang and Qinghai, and from the eastern provinces of Liaoning and Hebei. This production is intended primarily for domestic use in the manufacturing of asbestos-cement products used in the development of the country's infrastructure. Asbestos use in China is expected to keep pace with the increasing construction activity, which may result in an increase in imports.

India

In India, small-scale mining occurs in a number of states, notably in Rajasthan and Bihar, which results in an annual production of about 15 000 t of asbestos. Other than from Canada and domestic mines, India's asbestos requirements are sourced mostly from Zimbabwe and Russia. India's asbestos use is nearly exclusively for the manufacture of asbestos-cement products used by the construction industry, such as roofing sheets and pressure pipes for the transport of drinking water. Currently, there are about 75 plants engaged in the production of asbestos products across India. These are mainly located in the states of Gujarat, Karnataka, Madhya Pradesh and Andhra Pradesh.

In November 2003, the Indian Asbestos Information Center, a member of the Asbestos International Association, in cooperation with the Canadian Asbestos Institute, organized an International Conference on Chrysotile Asbestos Cement Products under the theme "Scientific Review on Health & Environment Aspects and Economic Relevance." The conference essentially provided an update to participants on the state of knowledge on asbestos and substitute fibres and served to disseminate information on the safe and responsible use of chrysotile asbestos.

Kazakhstan

Chrysotile asbestos production in Kazakhstan, the fourth largest world producer, comes from the Kostanai region where the JSC Kostanaiasbest operates the Dzhetygarinsk open-pit mine. Production in 2003 is estimated at 200 000 t, down from about 235 000 t in the previous year. Taking advantage of its lower cost base, the combine has significantly increased its production since 1998 and is planning additional investments by 2005 to modernize its operations further.

Russia

Russia, the world's largest asbestos producer, is estimated to have produced 870 000 t of chrysotile asbestos in 2003, an increase of 16.0% from 2002. The Russian chrysotile mining industry consists of three companies: Joint Stock Combine (JSC) Uralasbest, JSC Orenburgasbest, and JSC Tuvaasbest, who operate four open-pit mines located in the Urals (3) and in the Tuva region (1) north of Mongolia. An important portion of the country's production is for domestic use or is transformed before being exported. About 40% is exported as fibre concentrates while the rest is used to manufacture asbestos-cement products (80%) and technical products (20%) such as friction material products, thermal and electric insulation materials, etc.

South Africa

Production of chrysotile fibres in the Republic of South Africa stopped in 2002 as a result of the closure of the country's mining operations. However, as a result of drawdowns from stockpiles, sales of about 13 000 t were recorded in 2003, including about 5600 t for export. Production was provided in recent years by Msauli Asbes Beperk, which operated an underground mine and processing plant in the Barberton area of Mpumalanga, and by Kaapsehoop Asbestos and Stella Asbestos, who both operated smaller mines in the same area as above and supplied the local markets.

Zimbabwe

In Zimbabwe, despite political and economical instability during the year, chrysotile production at the Shabanie and Mashaba mines reached about 170 000 t, an increase of about 26% compared to 2002. The company was also able to increase its sales on account of the devaluation of the country's currency. Domestic use is estimated at 6% of production and is used for the manufacturing of asbestos-cement sheets.

Other Developments

Rotterdam Convention

Adopted on September 10, 1998, *the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* is a multilateral environmental agreement jointly administered by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) of the United Nations. The objectives of the Convention are:

- to promote shared responsibility and cooperative efforts among participating countries in the international trade of certain hazardous chemicals and pesticides in order to protect human health and the environment from potential harm; and

- to contribute to the environmentally sound use of those hazardous chemicals and pesticides by facilitating information exchange, providing for a national decision-making process on their import and export, and disseminating these decisions to participating countries.

This new tool will assist developing countries and countries with economies in transition to better understand and manage the risks associated with the use of toxic chemicals and pesticides. The PIC procedure covers a total of 37 chemicals currently subject to the interim PIC procedure. Among these chemicals are 22 pesticides, 9 industrial chemicals and 6 severely hazardous pesticide formulations, referred to as PIC substances. In February 2002, a decision was made to initiate the addition of all forms of asbestos to the PIC procedure. A committee proceeded to draft a Decision Guidance Document (DGD) on asbestos. This document will provide a summary of toxicological and environmental characteristics, known usage, possible exposure routes, measures to reduce exposure, and regulatory actions taken by countries to ban or restrict the use of asbestos. Chrysotile will be described in a separate chapter to distinguish it from other more toxic forms of asbestos. The DGD for asbestos was submitted for approval to the governing body of the Convention at its meeting in November 2003. Countries supported the listing of the four amphibole forms of asbestos to the Convention. However, a decision about the listing of chrysotile was deferred until the next meeting of the parties, which is expected in September 2004, due to concerns raised by a number of countries.

Scientific Development

Among new scientific studies released in 2003 that may alter views on the issue was the publication of a study on the *Biopersistence of Canadian Chrysotile Asbestos Following Inhalation.* This study documented the very low persistence of chrysotile in human lungs (it is dissolved by acids in the lungs), one of the criteria used by scientists to identify the toxicity of a substance. In comparison, cellulose – one of the main substitutes for asbestos in cement applications – is documented as being more biopersistent than chrysotile, which may result in more scarring of the lungs, hence its potential toxicity.

U.S. Environmental Protection Agency Review of its Risk Assessment of Asbestos

During 2003, the U.S. Environmental Protection Agency (EPA) pursued the development of a revised methodology for conducting risk assessments of asbestos to take into account the substantial improvements that have occurred since 1986 in asbestos measurement techniques and in the understanding of how asbestos exposure contributes to disease. The EPA's current assessment of asbestos toxicity, based primarily on an assessment completed in 1986, considers all mineral forms of asbestos and all asbestos fibre sizes to be of equal carcinogenic potency. However, the proposed risk assessment methodology distinguishes between fibre sizes and fibre types in estimating the potential health risks related to asbestos exposure. It incorporates the knowledge gained over the past 17 years into the Agency's toxicity assessment for asbestos.

The EPA convened a peer consultation workshop to seek input on the scientific merit of the proposed methodology. This workshop included the participation of 11 expert panelists and took place in a meeting open to the public on February 25-27, 2003, in San Francisco, California. The panel strongly endorsed the conceptual approach of

developing an updated cancer risk assessment methodology that takes into account fibre type and fibre dimension. It also recommended that the EPA proceed in an expeditious manner to consider the panelists' conclusions and recommendations with a goal of having an updated asbestos risk assessment methodology. A report summarizing the technical discussions among the expert panelists and listing comments provided by observers can be consulted at www.epa.gov/superfund/programs/risk/asbestos/pdfs/asbestos_report.pdf. Additional research recommended by the peer-review panel is ongoing and should enable the protocol to be completed in 2005. The United States Integrated Risk Information System will likely integrate all studies and draft recommendations in 2006 in order to update its database in 2007 to reflect the revised methodology.

Responsible Use Policy

To demonstrate its support for the promotion and implementation of the responsible use policy adopted by the chrysotile producers and exporters of six countries (Brazil, Canada, South Africa, Swaziland, Zimbabwe and Russia, the latter of which signed on February 3, 2000), the Canadian government signed, on March 3, 1997, a memorandum of understanding (MOU) in support of the responsible use policy with Canadian chrysotile producers. This MOU commits the government to assist the industry in encouraging the governments of asbestos-consuming countries to endorse the responsible use policy and to develop appropriate regulations where they do not already exist.

The responsible use policy, a voluntary industry policy aimed at increasing workers' protection worldwide, resulted from a 1994 meeting and was signed in late 1995/early 1996. The ultimate objective of this new policy, to be known as the "Responsible Use of Chrysotile," is to supply chrysotile only to those users that are in compliance with their respective national regulations or that have submitted a written commitment with an action plan in order to be in full compliance with their national regulations. The responsible use policy is based on the recognition and acceptance of the principles of the 1986 International Labour Organization Convention 162 and Code of Practice on Safety in the Use of Asbestos.

Acting on a conclusion of The International Conference on the Safe and Responsible Use of Chrysotile Fibres held in Montréal on September 16-19, 1997, that "chrysotile producers should export their technology and their expertise with their fibre," The Asbestos Institute in 2003 met with or travelled to half a dozen countries to either: 1) hold information seminars and/or training sessions; 2) meet government and industry officials; or 3) visit manufacturing plants to promote the safe use of chrysotile.

Developed by The Asbestos Institute (now called The Chrysotile Institute) in cooperation with labour and the governments of Canada and Quebec, the program, which began in October 1997, is aimed at providing Canadian expertise to train workers in targeted consuming countries in order to increase their knowledge of safe and responsible chrysotile asbestos manufacturing techniques. Supported by Natural Resources Canada, this training program promotes the International Labour Organization's Convention 162 on Safety in the Use of Asbestos.

Activities for the promotion of the safe use of chrysotile planned for 2004 include visits to half a dozen consuming countries.

OUTLOOK

Battling a negative image it started acquiring in the 1960s that was linked to the demonstrated cancer risk associated with exposure to high concentrations of asbestos dust in the workplace, the industry suffered further negative publicity in 2003 from ongoing asbestos litigation in the United States and from bad press related to past work practices and past inappropriate uses such as sprayed insulation. However, the ongoing debate concerning the absence of cancer risk at low-level exposure to chrysotile and the growing evidence of the potential toxicity of the main substitute fibres may eventually change the industry's outlook.

Markets should stabilize at the 2-Mt consumption level experienced in recent years as increased demand for infrastructure development in Asia and Latin America offsets the loss in demand brought about by the switch to substitute materials in certain countries. A significant increase in use is expected to occur in the short and medium term in a number of Asian countries such as Indonesia, Thailand, The Philippines, and Vietnam as their economies continue to strengthen. However, India, South Korea, and particularly China, appear to be the leading forces of the growth in demand in Asia as these three countries are involved in large infrastructure development programs. A further decrease in use is still expected in the coming years in Europe as Portugal complies with the EU ban directive by the year 2005 and in Japan as its manufacturing industry gradually turns to substitute materials. Meanwhile, demand from the Americas should be stable overall at the 2003 level as slightly lower U.S. use is counterbalanced by increases in Argentina, Brazil and Cuba. Similarly, use on the African subcontinent should remain at current levels in the short term.

In developing countries, the benefits of chrysotile-cement products continue to be recognized despite increasing competition from substitute fibres, PVC and galvanized steel. In particular, chrysotile-cement pipes are essential

to the distribution of potable water and irrigation in many countries where aggressive soils and economic conditions are not appropriate for substitute products.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 64. (2) Information in this review was current as of January 1, 2004. (3) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/mms/cmy/com_e.html.

NOTE TO READERS

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TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2524.00.10	Crude asbestos	Free	Free	Free	Free
2524.00.90	Other asbestos	Free	Free	Free	Free
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement or the like	5%	Free	Free	Free
6811.20	Sheets, panels, tiles and similar articles of asbestos-cement, cellulose fibre-cement, or the like	5%	Free	Free	Free
6811.30	Tubes, pipes, and tube or pipe fittings of asbestos-cement, of cellulose fibre-cement, or the like	5%	Free	Free	Free
6811.90	Other articles of asbestos-cement, of cellulose fibre-cement, or the like	5%	Free	Free	Free
68.12	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate				
6812.50	Asbestos clothing, clothing accessories, footwear and headgear	15.5%	Free	Free	Free
6812.60	Asbestos paper, millboard and felt	Free	Free	Free	Free
6812.70	Compressed asbestos fibre jointing, in sheets or rolls	Free	Free	Free	Free
6812.90	Other				
6812.90.10	Gaskets	Free	Free	Free	Free
6812.90.20	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate	Free	Free	Free	Free
6812.90.30	Yarn and thread	Free	Free	Free	Free
6812.90.40	Cords and string, whether or not plaited	Free	Free	Free	Free
6812.90.50	Woven or knitted fabric	Free	Free	Free	Free
6812.90.90	Other	Free	Free	Free	Free
6813.10	Asbestos brake linings and pads				
6813.10.10	For motor vehicles of heading 87.02, 87.03, 87.04 or 87.05	7%	Free	Free	Free
6813.10.90	Other asbestos brake linings and pads	5%	5%	Free	Free
6813.90.10	Clutch facings for motor vehicles of headings 87.02, 87.03, 87.04 or 87.05	Free	Free	Free	Free
6813.90.90	Other asbestos friction material and articles thereof	Free	Free	Free	Free

Sources: Canadian *Customs Tariff*, effective January 2004, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States,* 2004.

TABLE 1. CANADA, ASBESTOS PRODUCTION (CHRYSOTILE) AND TRADE, 2001-03

		2001		2002		2003	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
PRODUCTION (Shipments)							
	By type						
	Group 3, spinning	4 173	4 176	3 814	3 791	x	x
	Group 4, shingle	57 020	42 505	41 203	29 579	x	x
	Group 5, paper	54 646	26 132	61 268	27 454	x	x
	Group 6, stucco	100 808	32 986	84 969	25 609	x	x
	Group 7, refuse	60 143	12 942	50 987	11 737	x	x
	Total	276 790	118 741	242 241	98 170	x	x
	By province						
	Quebec	276 790	118 741	242 241	98 170	x	x
EXPORTS							
2524.00.10	Crude asbestos						
	India	–	–	393	175	x	x
	United States	2 298	542	1 554	317	x	x
	Total	2 298	542	1 947	492	x	x
2524.00.21	Asbestos milled fibres, group 3 grades						
	Mexico	1 214	1 579	1 196	1 551	x	x
	United Arab Emirates	684	889	840	1 092	x	x
	India	781	1 022	650	853	x	x
	Algeria	130	169	250	325	x	x
	Turkey	90	118	45	59	x	x
	Indonesia	150	195	105	137	x	x
	Brazil	155	210	112	153	x	x
	China	163	220	150	202	x	x
	Hungary	162	211	138	181	x	x
	Peru	–	–	18	23	x	x
	Macedonia	–	–	75	101	x	x
	Other countries	307	359	181	202	x	x
	Total	3 836	4 972	3 760	4 879	x	x
2524.00.22	Asbestos milled fibres, groups 4 and 5 grade						
	Thailand	14 147	9 268	33 001	21 037	x	x
	India	24 334	17 892	30 951	20 038	x	x
	Indonesia	10 523	7 209	15 959	10 270	x	x
	Algeria	3 160	2 643	8 130	7 404	x	x
	South Korea	2 578	1 756	2 858	2 006	x	x
	Japan	19 118	18 877	12 452	10 210	x	x
	Sri Lanka	5 010	4 402	3 032	2 632	x	x
	Malaysia	3 955	3 199	4 193	3 431	x	x
	El Salvador	1 552	1 270	1 814	1 542	x	x
	Mexico	4 909	4 061	2 607	1 900	x	x
	Pakistan	92	65	1 316	941	x	x
	Turkey	596	439	1 492	1 000	x	x
	United Arab Emirates	958	748	2 226	1 672	x	x
	Bangladesh	726	558	1 414	900	x	x
	Philippines	1 240	976	1 529	1 168	x	x
	Angola	200	177	420	262	x	x
	Senegal	500	481	530	507	x	x
	Colombia	2 584	2 405	1 267	1 044	x	x
	Ecuador	1 964	1 820	1 760	1 595	x	x
	Portugal	2 086	2 034	3 664	3 412	x	x
	Other countries	15 294	12 149	9 142	6 410	x	x
	Total	115 526	92 429	139 757	99 381	x	x
2524.00.29	Asbestos shorts, groups 6, 7, 8 and 9 grades						
	United States	8 137	2 075	4 988	1 792	x	x
	South Korea	16 821	5 837	12 426	4 654	x	x
	India	30 445	11 336	19 824	8 466	x	x
	Japan	24 079	9 909	11 774	5 634	x	x
	Thailand	19 388	7 308	7 931	3 386	x	x
	Malaysia	5 159	1 942	3 051	1 213	x	x
	Colombia	3 995	1 550	4 702	1 665	x	x
	Indonesia	11 805	4 292	3 802	1 420	x	x
	Sri Lanka	1 720	888	1 780	923	x	x
	Mexico	5 855	1 760	3 497	919	x	x
	Other countries	23 252	8 445	15 899	5 377	x	x
	Total	150 656	55 342	89 674	35 449	x	x

TABLE 1 (cont'd)

		2001		2002		2003	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
EXPORTS (cont'd)							
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement, or the like						
	United States	–	–	..	8	..	10
	Cuba	–	–	–	–	..	8
	Total	–	–	..	8	..	18
6811.20	Sheets n.e.s., panels/tiles, etc., of abestos-cement, cellulose fibre-cement, etc.						
	United States	..	17 401	..	15 403	..	12 859
	South Korea	–	–	..	840	..	666
	Other countries	..	..	..	46	..	100
	Total	..	17 401	..	16 289	..	13 625
6811.30	Tubes, pipes and tube or pipe fittings of abestos-cement, of cellulose fibre-cement, etc.						
	Cuba	..	...	–	–	..	249
	United States	–	–	..	17	–	–
	Total	..	...	..	17	..	249
6811.90	Articles n.e.s. of asbestos-cement, of cellulose fibre-cement, or the like						
	United States	..	43	..	91	..	113
	Poland	–	–	–	–	..	...
	China	..	15	..	12	–	–
	Jamaica	–	–	..	19	–	–
	Total	..	58	..	122	..	113
6812.20	Asbestos yarn and thread						
	Brazil	26	270	–	–	–	–
	Morocco	13	70	–	–	–	–
	United Kingdom	11	72	–	–	–	–
	Venezuela	14	58	–	–	–	–
	Other countries	...	14				
	Total	64	484	–	–	–	–
6812.30	Asbestos cords and string, whether or not plaited						
	Cuba	..	8	–	–	–	–
	Mexico	..	1	–	–	–	–
	Total	..	9	–	–	–	–
6812.40	Asbestos woven or knitted fabric						
	Cuba	1	5	–	–	–	–
	Morocco	26	143	–	–	–	–
	United Kingdom	61	590	–	–	–	–
	United States	16	364	–	–	–	–
	Venezuela	8	38	–	–	–	–
	Total	112	1 140	–	–	–	–
6812.50	Asbestos clothing, clothing accessories, footwear and headgear						
	Saudi Arabia	–	–	..	110	..	254
	United Arab Emirates	–	–	–	–	..	107
	Jordan	–	–	–	–	..	29
	Other countries	–	41	..	63	..	12
	Total	..	41	..	173	..	402
6812.60	Asbestos paper, millboard and felt						
	Australia	..	1	–	–	–	–
	Saint Vincent and the Grenadines	..	1	–	–	–	–
	United States	..	9	–	–	–	–
	Fiji	–	–	..	1	–	–
	Total	..	11	..	1	..	...

TABLE 1 (cont'd)

		2001		2002		2003	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
EXPORTS (cont'd)							
6812.70	Compressed asbestos fibre jointing, in sheets or rolls						
	United States	..	1 141	..	964	..	596
	Other countries		342		86		21
	Total	..	1 483	..	1 050	..	617
6812.90.10	Asbestos building material, n.e.s.						
	Japan	..	102	..	497	..	1 024
	Saudi Arabia	–	–	–	–	..	100
	Hong Kong	..	249	..	355	..	82
	Ukraine	–	–	–	–	..	62
	Other countries	–	486	..	710	–	112
	Total	..	837	..	1 562	..	1 380
6812.90.90	Other asbestos fabricated products n.e.s.						
	United States	..	389	..	311	..	123
	Other countries	..	16	..	25	..	21
	Total	..	405	..	336	..	144
6813.10	Asbestos brake linings and pads						
	United States	..	71 500	..	87 145	..	64 436
	Other countries	..	133	..	213	..	567
	Total	..	71 633	..	87 358	..	65 003
6813.90	Asbestos friction material and articles n.e.s.						
	United States	..	22	..	21	..	8
	Germany	..	55	..	66	..	...
	Other countries	..	9	..	9	..	..
	Total	..	86	..	96	..	8
	Total exports	..	246 873	..	247 213	x	x
IMPORTS							
2524.00.00.10	Crude asbestos	99	80	12	9	–	–
2524.00.00.90	Other asbestos	12	2	3	1	209	44
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement, or the like	60	48	91	116	2	5
6811.20	Sheets n.e.s., panels/tiles, etc., of asbestos-cement, cellulose-fibre cement, etc.	10 772	10 140	17 782	16 220	30 469	24 168
6811.30	Tubes, pipes, and tube or pipe fittings of asbestos-cement, cellulose fibre-cement, etc.	1 039	1 047	1 273	941	771	524
6811.90	Articles n.e.s., of asbestos-cement, cellulose fibre-cement or the like	199	803	267	806	381	1 063
6812.10	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate	114	553	–	–	–	–
6812.20	Asbestos yarn and thread	1	6	–	–	–	–
6812.30	Asbestos cords and string, whether or not plaited	17	138	–	–	–	–
6812.40	Asbestos woven or knitted fabric	24	207	–	–	–	–
6812.50	Asbestos clothing, clothing accessories, footwear and headgear	198	9	210	4	96	–
6812.60	Asbestos paper, millboard and felt	..	89	..	79	..	168
6812.70	Compressed asbestos fibre jointing, in sheets or rolls	60	949	58	1 111	49	869
6812.90.00.10	Asbestos belting	359	1 955	334	1 567	482	1 992
6812.90.00.90	Other asbestos fabricated products n.e.s.	..	439	..	762	..	617
6813.10	Asbestos brake linings and pads	..	71 467	..	77 095	..	70 584
6813.90	Asbestos friction material and articles n.e.s.	..	5 876	..	7 263	..	4 180
	Total imports	..	93 997	..	106 180	..	104 310

Sources: Natural Resources Canada; Statistics Canada.
– Nil; **. .** Not available; **. . .** Amount too small to be expressed; x Confidential.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADIAN CHRYSOTILE PRODUCERS, 2003

Producers	Mine Location	Normal Mill Capacity Ore/Day	Normal Mill Capacity Fibre/Year	Remarks
		(tonnes)		
LAB Chrysotile, Inc. (1)				Partnership owned 55% by LAQ and 45% by Mazarin Mining Corporation Inc.
Lac d'Amiante du Québec, Ltée (LAQ)	Black Lake, Que.	9 000	185 000	Open-pit. Since September 1989, LAQ has been owned by Jean Dupéré (President of LAB Chrysotile) and Connell Bros. Company, Ltd. of the United States.
Bell Asbestos Mines, Ltd.	Thetford Mines, Que.	2 700	100 000	Sold to Mazarin Mining Exploration Inc. on September 2, 1992. Underground. Mine re-opened January 1989.
Jeffrey Mine Inc. Jeffrey mine	Asbestos, Que.	15 000	250 000	Open-pit (effective capacity reduced by one half since 1982).
Total of three producers at year-end			535 000	

Sources: Natural Resources Canada; The Chrysotile Institute; U.S. Geological Survey; South Africa Department of Minerals and Energy.
(1) A partnership involving two operating companies.

TABLE 3. CANADA, CHRYSOTILE PRODUCTION AND EXPORTS, 1987-2003

	Crude Chrysotile	Milled Fibres	Short Fibres	Total
		(tonnes)		
PRODUCTION (1)				
1987	–	365 144	299 402	664 546
1988	14	399 550	310 793	710 357
1989	–	410 588	303 448	714 036
1990	–	379 047	306 580	685 627
1991	–	335 506	350 502	686 008
1992	–	259 819	327 175	586 994
1993	–	235 908	287 059	522 967
1994	–	249 862	280 995	530 857
1995	–	255 621	259 932	515 553
1996	..	241 188	265 088	506 276
1997	..	..	..	420 278
1998	..	..	..	321 330
1999	..	..	..	337 367
2000	..	..	..	309 719
2001	..	..	..	276 790
2002	..	..	..	240 500
2003	x	x	x	x
EXPORTS				
1987	1 696	353 321	293 808	648 825
1988	11 288	381 561	292 236	685 085
1989	17 198	379 601	312 915	709 714
1990	1 469	378 074	269 942	649 485
1991	2 302	353 391	330 360	686 053
1992	1 489	272 013	327 075	600 577
1993	1 739	229 000	279 695	510 434
1994	2 155	248 804	280 394	531 353
1995	968	251 251	257 356	509 575
1996	911	239 111	263 985	504 007
1997	2 793	196 967	230 482	430 242
1998	3 485	157 621	158 324	319 430
1999	2 503	145 471	184 432	332 406
2000	3 557	133 529	178 240	315 326
2001	2 298	119 362	150 656	272 316
2002	1 947	143 517	89 674	235 138
2003	x	x	x	x

Sources: Natural Resources Canada; Statistics Canada.
– Nil; .. Not available; x Confidential.
(1) Producers' shipments.