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2005 Minerals Yearbook

MICA

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Mica

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In 2005, about 78,100 metric tons (t) of scrap and flake mica was produced in the United States; this was 21% less than that of 2004 (tables 1, 3). Ground mica sales totaled 120,000 t valued at $47.2 million, an increase in quantity and value compared with 2004 (tables 1, 4). Essentially all sheet mica used in the United States was imported, and India was the major supplier (table 10). Consumption of muscovite block mica decreased to 1.10 t and the value increased to $134,000 in 2005 from 1.81 t valued at $114,000 in 2004 (tables 1, 5). Consumption of mica splittings decreased to 665 t in 2005 from 668 t in 2004 (tables 1, 6). Worked and unworked sheet mica exports increased to 1,420 t in 2005 from 965 t in 2004, and the value increased to $14.2 million in 2005 from $11.2 million in 2004 (table 13). U.S. imports of worked and unworked sheet mica decreased to 1,390 t in 2005 from 1,400 t in 2004, and the value increased to $13.1 million in 2005 from $12.2 million in 2004.

The mica group represents 37 phyllosilicate minerals that have a layered or platy texture (Rieder and others, 1998). Phyllo is derived from the Greek word "phyllon," which means leaf. The commercially important micas are muscovite and phlogopite, which are used in a variety of applications.

Mica's value is based on several of its unique physical properties. The crystalline structure of mica forms layers that can be split or delaminated into thin sheets. These sheets are chemically inert, dielectric, elastic, flexible, hydrophilic, insulating, lightweight, platy, reflective, refractive, resilient, and transparent to opaque. Mica is stable when exposed to electricity, light, moisture, and extreme temperatures. Based on its abundance and superior electrical properties, muscovite is the principal mica used by industry. Phlogopite mica remains stable at higher temperatures and is used in applications in which a combination of high-heat stability and electrical properties is required. Muscovite and phlogopite are used in sheet and ground forms.

Legislation and Government Programs

The Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (Public Law 108-375) was enacted on October 28, 2004. The Annual Material Plan for Fiscal Year 2005 authorized the disposal of the remaining inventory of mica (all types) from the National Defense Stockpile (NDS) classified as excess to goal. Stocks of mica classified as excess to goal at the end of fiscal year 2004 were all subject to no disposal limits. At the end of fiscal year 2004, NDS mica stocks were 883 kilograms (kg) (1,947 pounds) of muscovite block (stained and better), and 1,508 kg (3,325 pounds) of phlogopite splittings, and stocks of muscovite film (first and second qualities) were sold out. The inventory of mica in the NDS that was sold but not shipped at the end of fiscal year 2004 was 7,195 kg (15,863 pounds) of muscovite block, 120,519 kg (265,700 pounds) of muscovite splittings, and 16,991 kg (37,459 pounds) of phlogopite block.

The National Defense Authorization Act for Fiscal Year 2006 (Public Law 109-163) was enacted on January 6, 2006. Stocks of mica classified as excess to goal at the end of fiscal year 2005 were all subject to no disposal limits. Excess fiscal year 2005 NDS mica stocks authorized for disposal were 97 kg (214 pounds) of muscovite block (stained and better); 7,195 kg (15,863 pounds) of condenser quality muscovite block, which has all been sold (committed inventory); 203 kg (448 pounds) of electronic quality muscovite block, which has been sold (committed inventory); 6,815 kg (15,025 pounds) of muscovite splittings; and 2,723 kg (6,004 pounds) of muscovite splittings, which has been sold (committed inventory). Mica held for goal in the NDS at the end of fiscal year 2005 was 136 kg (300 pounds) of condenser quality muscovite block. Yearend stocks of mica in the NDS as of December 31, 2005, are listed in table 2.

Production

Domestic mine production data for mica are developed by the U.S. Geological Survey from four separate voluntary surveys. Of the 17 operations to which the "Crude Scrap and Flake Mica Production" (including sericite production) survey form was sent, 14 operations responded. Of the 18 operations to which the "Ground Mica" (excluding low-grade ground sericite production) form was sent, 11 operations responded. Of the seven surveyed operations to which the "Mica Block and Film Consumption" form was sent, six operations responded. Of the eight surveyed operations to which the "Mica Splittings Consumption" form was sent, four operations responded. Consumption for the nonrespondents was estimated by using prior-year production data. Individual company production and consumption data are withheld to avoid disclosing company proprietary data.

Georgia Industrial Minerals, Inc. in Sandersville, GA, continued to operate its mine in Deepstep, GA.

A new venture, Deepstep Mineral Products, was under development by David Avant, who was previously the general manager at Georgia Industrial Minerals. The new mine will be located in the area around Deepstep and will be a placer mica operation (David Avant, Deepstep Mineral Products, oral commun., 2006).

Oglebay Norton Company, a Cleveland, OH-based company, announced on April 6 that its Oglebay Norton Specialty Minerals, Inc. subsidiary had completed the sale of the Kings Mountain, NC, mica operation to Kings Mountain Mining LLC (an affiliate of Zemex U.S. Corporation) for $15 million. Zemex U.S. Corporation is based in Atlanta, GA, and is a wholly owned subsidiary of Cementos Pacasmayo SAA of Peru (Olglebay Norton Co., 2005).

On August 22, Zemex Industrial Minerals (ZIM) announced that it had expanded the distribution area of its sales agent Fitz

Chem Corporation based in Itasca, IL. Fitz acquired the mineral distribution areas of southern Indiana, Kansas, Missouri, and Nebraska. The midwestern distribution and sales area handled by Fitz for ZIM included the States of Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin (Zemex Industrial Minerals, 2005).

Scrap and Flake Mica.—In 2005, eight domestic companies with ten mines in five States produced scrap and flake mica, excluding low-grade sericite. The United States was one of the world's primary producers with production of 78,100 t (tables 1, 3, 14). North Carolina remained the major producing State with 40% of domestic production, and the remainder was produced in Alabama, Georgia, South Carolina, and South Dakota. Mica was recovered from mica schist, high-quality sericite schist, weathered pegmatites, a gemstone pegmatite, and as a coproduct of feldspar and kaolin mining and processing operations. Mining was suspended at Velarde in 2004, which remained on care and maintenance throughout 2005.

The scrap and flake mica producers in 2005 were Engelhard Corp., Hartwell, GA; The Feldspar Corporation (a ZIM company) (two mines), Spruce Pine, NC; Georgia Industrial Minerals, Deepstep, GA; JMays LLC, Micaville, AL; K-T Feldspar Corp., Spruce Pine, NC; Kings Mountain Mining LLC, Kings Mountain, NC; The Mineral Mining Co., Inc., Kershaw, SC; Pacer Corp., Custer, SD; and Unimin Corp., Spruce Pine, NC.

Ground Mica.—In 2005, 8 companies operated 14 grinding plants in 5 States; nine plants produced dry-ground mica, and three, wet-ground mica. The four leading ground mica companies, which included one company with four plants, accounted for 42% of the total of 120,000 t of ground mica produced in the United States (table 4).

Dry-ground mica producers were Asheville Mica Co., Asheville, NC; Engelhard Corp., Hartwell, GA; Georgia Industrial Minerals, Deepstep, GA; JMays LLC, Micaville, AL; K-T Feldspar, Spruce Pine, NC; Kings Mountain Mining LLC, Kings Mountain, NC; The Mineral Mining Co., Inc., Kershaw, SC; Pacer, Custer, SD; Piedmont Minerals Corp., Hillsborough, NC; and United States Gypsum Co. (a subsidiary of USG Corp.), Spruce Pine, NC.

Wet-ground mica producers were Engelhard, Hartwell, GA; Georgia Industrial Minerals, Sandersville, GA; JMays LLC, Micaville, AL; and Kings Mountain Mining LLC, Kings Mountain, NC.

Sheet Mica.—Sheet mica was produced as a byproduct from two mines in 2005. A new mine opened during the year in Alabama.

Small quantities of muscovite sheet and scrap mica were produced as a byproduct by Morefield Gem Mine, Inc. in Amelia County, VA. The pegmatite was mined primarily for gemstones and mineral specimens using underground methods. The mine also produced biotite and zinnwaldite mica.

The Micaville #1 Mine in Micaville was owned and operated by JMays. The mine produced small amounts of muscovite sheet mica as a byproduct of scrap and flake mica for dry- and wet-grinding.

Consumption

Ground Mica.—The leading domestic use of dry-ground mica was in joint compound for filling and finishing seams and blemishes in gypsum wallboard (drywall) (table 4). The mica acts as a filler and extender, provides a smooth consistency, improves the workability of the compound, and provides resistance to cracking. In 2005, joint compound accounted for 52% of dry-ground mica consumption.

In the paint industry, ground mica is used as a pigment extender that also facilitates suspension, reduces chalking, prevents shrinking and shearing of the paint film, increases resistance of the paint film to water penetration and weathering, and brightens the tone of colored pigments. Mica also promotes paint adhesion in aqueous and oleoresinous formulations. Consumption of dry-ground mica in paint, the second ranked use, accounted for 12% of the dry-ground mica used in 2005.

Ground mica is used in the well-drilling industry as an additive to drilling muds. The coarsely ground mica flakes help prevent the loss of circulation by sealing porous sections of the drill hole. Well drilling muds accounted for less than 4% of dry-ground mica use.

The plastics industry used dry-ground mica as an extender and filler, especially in parts for automobiles for lightweight insulation to suppress sound and vibration. Mica is used in plastic automobile fascia and fenders as a reinforcing material, providing improved mechanical properties and increased dimensional stability, stiffness, and strength. Mica-reinforced plastics also have high-heat dimensional stability, reduced warpage, and the best surface properties of any filled plastic composite. In 2005, consumption of dry-ground mica in plastic applications accounted for 3.1% of the market.

The rubber industry used ground mica as an inert filler and a mold release compound in the manufacture of molded rubber products, such as tires and roofing. The platy texture acts as an antiblocking, antisticking agent. Rubber mold lubricant accounted for 1.2% of the dry-ground mica used in 2005.

Dry-ground mica is used in the production of rolled roofing and asphalt shingles where it serves as a surface coating to prevent sticking of adjacent surfaces. The coating is not absorbed by freshly manufactured roofing because mica's platy structure is unaffected by the acid in asphalt or by weathering conditions. As a rubber additive, mica reduces gas permeation and improves resiliency.

Mica is used in decorative coatings on wallpaper, concrete, stucco, and tile surfaces. It also is used as an ingredient in flux coatings on welding rods, in some special greases, and as coatings for core and mold release compounds, facing agents, and mold washes in foundry applications.

Dry-ground phlogopite mica is used in automotive brake linings and clutch plates to reduce noise and vibrations (asbestos substitute); as sound-absorbing insulation for coatings and polymer systems; reinforcing additives for polymers to increase strength and stiffness and to improve stability to heat, chemicals, and ultraviolet (UV) radiation; heat shields and temperature insulation; industrial coating additive to decrease the permeability of moisture and hydrocarbons; and in polar polymer formulations to increase the strength of epoxies, nylons, and polyesters.

Wet-ground mica, which retains the brilliancy of its cleavage faces, is used primarily in pearlescent paints by the automotive industry. In the cosmetics industry, its reflective and refractive properties made mica an important ingredient in blushes, eyeliner, eyeshadow, foundation, hair and body glitter, lipstick, lip gloss, mascara, moisturizing lotions, and nail polish. Mica is added to latex balloons to provide a colored shiny surface.

Natural mica is used by Taos and Picuris Pueblos in north-central New Mexico in making pottery. The pottery is made from weathered pre-Cambrian mica schist and has flecks of mica throughout the vessels. The Tewa Pueblo pottery is made by coating the clay with mica to provide a dense-glittery micaceous finish over the entire object.

Built-Up Mica.—Muscovite and phlogopite splittings were fabricated into various built-up mica products by nine companies that operated nine plants in seven States. Produced by mechanized or hand setting of overlapping splittings and alternate layers of binders and splittings, built-up mica is used primarily as an electrical insulation material. Mica insulation is used in high-temperature and fire-resistant power cable used in aluminum plants, blast furnaces, critical wiring circuits (for example, defense systems, fire and security alarm systems, and surveillance systems), heaters and boilers, lumber kilns, and metal smelters, and tanks and furnace wiring. Specific high-temperature mica-insulated wire and cable is rated to work for up to 15 minutes in molten aluminum, glass, and steel. Major products are bonding materials; flexible, heater, molding, and segment plates; mica paper; and tape (table 7).

Flexible plate (cold) is used in electric motor and generator armatures, field coil insulation, and magnet and commutator core insulation. Mica consumption in flexible plate in 2005 was 73 t, essentially unchanged from 2004.

Heater plate is used where high-temperature insulation is required. Consumption data for mica in heater plate are withheld to avoid disclosing company proprietary information. Consumption of heater plate mica decreased in 2005 compared with that of 2004.

Molding plate is sheet mica from which V-rings are cut and stamped for use in insulating the copper segments from the steel shaft ends at the end of a commutator. Molding plate is also fabricated into tubes and rings for insulation in armatures, motor starters, and transformers. Consumption of molding plate in 2005 was 185 t, unchanged from the previous year.

Segment plate acts as insulation between the copper commutator segments of direct-current universal motors and generators. Phlogopite built-up mica is preferred because it will wear at the same rate as the copper segments. Although muscovite has a greater resistance to wear, it causes uneven ridges that may interfere with the operation of a motor or generator. Consumption of segment plate was 220 t in 2005.

Some types of built-up mica have the bonded splittings reinforced with cloth, glass, linen, muslin, plastic, silk, or special paper. These products are very flexible and are produced in wide, continuous sheets that are either shipped rolled or cut into ribbons, tapes, or trimmed to specified dimensions. Built-up mica products may also be corrugated or reinforced by multiple layering.

In 2005, the total amount of built-up mica that was consumed or shipped was 558 t, essentially the same level as the amount for 2004 (559 t). Molding plate and segment plate were the major end products and accounted for 33% and 39% of the total, respectively.

Mica Paper (Reconstituted Mica).—Primary uses for mica paper are the same as those for built-up mica. Three companies consumed scrap mica to produce mica paper for electrical applications. The principal source of the scrap was India. In 2005, the manufacturing companies were Asheville-Schoonmaker Mica Co., Newport News, VA; Corona Films Inc., West Townsend, MA; and Isovolta Inc./US Samica Corp., Rutland, VT.

Sheet Mica.—Sheet mica is used principally in the electronic and electrical industries. Its usefulness in these applications is derived from its unique electrical and thermal insulating properties and its mechanical properties, which allow it to be cut, punched, stamped, and machined to close tolerances.

The leading use of block mica is as an electrical insulator in electronic equipment. High-quality block mica is processed to line the gauge glasses of high-pressure steam boilers because of its flexibility, transparency, and resistance to heat and chemical attack. Other uses include diaphragms for oxygen-breathing equipment, marker dials for navigation compasses, optical filters, pyrometers, retardation plates in helium-neon lasers, thermal regulators, and stove and kerosene heater windows. Specialized applications for sheet mica are found in aerospace components in ground- and air-launched missile systems, laser devices, medical electronics, optical instrumentation, radar systems, radiation detector windows that are transparent to alpha emissions (Geiger-Mueller tubes), and for radiation treatment.

Only high-quality muscovite film mica, which is variously called India ruby mica or ruby muscovite mica, is used as a dielectric in capacitors. The highest quality film is used to manufacture capacitors for calibration standards. The next lower grade is used in transmitting capacitors. Receiving capacitors use a slightly lower grade of high-quality muscovite.

In 2005, consumption of ruby and nonruby muscovite block totaled 1.10 t, a decrease from the 1.81 t consumed in 2004 (table 5). Stained and lower-than-stained quality remained in greatest demand and accounted for about 59% of consumption of ruby and nonruby mica block. Consumption of nonruby mica block was 56.4% for stained and lower-than-stained quality and 43.6% for good quality.

In 2005, five companies consumed muscovite block and film at five plants in four States—two in North Carolina and one each in New Jersey, Ohio, and Virginia.

In 2005, mica splittings represented the largest part of the sheet mica industry in the United States. Consumption of muscovite and phlogopite splittings was 665 t in 2005 compared with 668 t in 2004 (table 6). Muscovite splittings from India accounted for essentially all domestic consumption. The remainder was primarily imported from Madagascar.

Stocks

Reported yearend industry stocks of muscovite mica block (ruby and nonruby) increased to 19.6 t in 2005 from 17.3 t in 2004. Industry stocks of muscovite and phlogopite mica splittings decreased to 408 t at yearend 2005 from 416 t at yearend 2004 (table 6).

Prices

Sheet mica prices vary with grade and can range from less than $1 per kilogram for low-quality mica to more than $2,000 per kilogram for the highest quality. The average values of mica block and splittings consumed in the United States in 2005 compared with those of 2004 were as follows: muscovite block (ruby and nonruby)

increased to $125 per kilogram from $63 per kilogram, muscovite and phlogopite splittings were unchanged at $1.73 per kilogram, and muscovite and phlogopite block increased by $5 per kilogram to $72 per kilogram (tables 1, 6). Phlogopite block increased to $142 per kilogram from $98 per kilogram, and phlogopite splittings increased slightly to $4.66 per kilogram from $4.63 per kilogram.

In 2005, the average U.S. value of scrap and flake mica, which included high-quality sericite, increased to $247 per metric ton (table 3). The average value for North Carolina flake mica increased to $265 per ton. The average value of dry-ground mica decreased to $205 per ton, and the average value of wet-ground mica was $704 per ton (table 1).

Foreign Trade

The value of U.S. exports of mica increased by 17.7% to $19.7 million, and the quantity decreased by 1.2% to 10,800 t (tables 1, 13). U.S. exports of mica excluding unworked mica scrap increased by 18.8% in value from those of 2004 to $19.4 million, and the quantity increased by 4.6% to 10,000 t.

Domestic ground mica (powder) exports decreased to 7,140 t, a decrease of 60 t from that of 2004 (tables 8, 13). Exports of crude and rifted mica decreased by 40.1% to 787 t from 1,310 t exported in 2004, and their value increased by 23.4% to $541,000 in 2005 from $438,000 in 2004 (tables 9, 13).

The value of U.S. imports of all mica decreased by 3.8% to $26.3 million, and the quantity decreased by 11.6% to 38,800 t. U.S. imports of mica excluding unworked mica scrap (less than $1.00 per kilogram) decreased by 0.3% in value from those of 2004 to $23.5 million and by 5.6% in quantity to 23,700 t.

India continued to supply the United States with essentially all its supply of sheet and paper-quality scrap micas. Total imports for consumption of unworked split block, film, splittings, and mica sheet categorized as "Other" totaled about 15,100 t in 2005 (table 10). Imports of unworked low-value scrap mica (less than $1.00 per kilogram) decreased to 15,000 t in 2005 compared with 18,700 t in 2004 (table 10). Demand weakened for the low-value mica for use as a dry-ground additive for drywall compound, fillers, and paints.

In 2005, 21,400 t of powder mica was imported, mostly from Canada, about 900 t less than in 2004 (table 11). Worked mica imports were 1,340 t; this was 4.7% higher than those of 2004 (table 12).

Outlook

The outlook for ground mica is for production growth of 1% to 3% per year for the next decade. The major markets for ground mica—drywall joint compounds and paints—are mature and relatively stable with growth tied to new housing starts and interest rates. To a lesser extent, widespread natural disasters, such as hurricanes and flooding, also affect the market by creating immediate demand for residential building materials. Demand is also affected by automobile production because interior and exterior parts typically contain dry-ground mica or engineered mica composites and exterior surfaces are painted with wet-ground pearlescent pigments and mica-containing coatings.

Domestic demand for crude and ground mica in 2006 and 2007 was expected to increase slowly. Demand for wet-ground mica used in pearlescent automotive coatings and dry-ground mica used in automotive fillers and plastics was also expected to increase slowly. Demand for ground mica in such smaller specialty markets as coated micas, cosmetics, nylon and polyester resins, and polypropylene composites was expected to increase at a rate slightly higher than the 1% to 3% production rate. Consumption of dry-ground mica was expected to increase by as much as 2% to 3% per year through 2007 unless higher interest rates and significantly higher home prices slow the increase in demand for new housing. Increasing fuel prices were expected to reduce demand for automobiles. Wet-ground mica was expected to show a moderate 2% to 3% growth through 2020 as demand from the automotive industry increases in response to population growth and as use of pearlescent paints and engineered mica-bearing plastics and composites increases.

Demand for block mica was expected to increase slowly at about 1% per year during the next several years as demand increases in a few specialty markets, such as electronics. A shortage of high-quality block mica was expected to continue because of the generally low percentage of high-quality mica in currently mined deposits, mostly pegmatites.

Consumption of mica splittings, which is the principal type of sheet mica consumed in the United States, has been in the range of 700 to 1,000 metric tons per year (t/yr). With no potential new uses apparent and many substitute materials being used, no substantial growth is expected. Consumption of mica splittings was expected to remain in the range of 500 to 900 t/yr in the near future.

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TABLE 1
SALIENT MICA STATISTICS[1]

		2001	2002	2003	2004	2005
United States:						
Production, sold or used by producers:						
Scrap and flake mica:						
Quantity	thousand metric tons	98	81	79	99	78
Value	thousands	$7,990	$7,370	$16,700	$15,400	$19,300
Ground mica:						
Quantity	thousand metric tons	89	99	94	98	120
Value	thousands	$28,100	$29,600	$28,600	$27,200	$47,200
Prices:						
Scrap and flake mica	dollars per metric ton	82	90	213	155	247
Ground:						
Wet	do.	771	960	938	NA	704
Dry	do.	147	180	205	269	205
Sheet, muscovite and phlogopite:						
Block	dollars per kilogram	55	67	67	67	72
Splittings	do.	1.67	1.82	1.74	1.73	1.73
Consumption:						
Block, muscovite:						
Quantity	metric tons	3	2	2	2	1
Value	thousands	$129	$134	$120	$114	$134
Splittings, all types						
Quantity	metric tons	742	573	669	668	665
Value	thousands	$1,240	$1,040	$1,160	$1,150	$1,150
Exports	metric tons	10,500	10,500	11,200	10,900	10,800
Imports	do.	36,600	36,400	36,000	43,800	38,800
World, production	do.	368,000	269,000	271,000 r	319,000 r, e	294,000 e

eEstimated. rRevised. NA Not available.

[1]Data are rounded to no more than three significant digits.

TABLE 2
STOCKPILE STATUS AND GOVERNMENT INVENTORIES FOR MICA, DECEMBER 31, 2005

(Metric tons)

	Inventory, uncommitted			
Material	Stockpile grade	Nonstockpile grade	Available for disposal	Fiscal year 2005 sales
Block:				
Muscovite:				
Stained and better	(1) [4]	--	(2) [4]	(3) [4]
Stained and lower	-- [4]	--	(2) [4]	(3) [4]
Phlogopite	--	--	(2) [4]	--
Film, muscovite (first and second qualities)	--	--	(2) [4]	--
Splittings:				
Muscovite	7 [4]	--	(2) [4]	7
Phlogopite	-- [4]	--	(2) [4]	2

-- Zero.

[1]Less than ½ unit.

[2]The total disposal plan for all categories of mica in the national stockpile is undifferentiated at 453.592 metric tons (1 million pounds).

[3]Fiscal year 2005 sales for muscovite block is undiffentiated at 35.687 metric tons (78,676 pounds).

[4]Corrections posted September 18, 2004.

Source: Defense National Stockpile Center.

TABLE 3
SCRAP AND FLAKE MICA SOLD OR USED BY
PRODUCERS IN THE UNITED STATES, BY STATE[1, 2]

(Thousand metric tons and thousand dollars)

	2004		2005	
State	Quantity	Value	Quantity	Value
North Carolina	40	9,600	39	10,200
Other[3]	59	5,750	40	9,070
Total	99	15,400	78	19,300

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

[2]Includes finely divided mica recovered from mica schist and high-quality sericite schist, and mica that is a byproduct of feldspar and kaolin beneficiation.

[3]Includes Alabama, Georgia, South Carolina, and South Dakota.

TABLE 4
GROUND MICA SOLD OR USED BY PRODUCERS IN THE UNITED STATES, BY END USE AND METHOD OF GRINDING[1, 2]

	2004			2005		
	Quantity (thousand metric tons)	Value (thousands)	Unit value	Quantity (thousand metric tons)	Value (thousands)	Unit value
End use:						
Joint cement	53	$11,600	$219	63	$15,000	$238
Paint	18	8,370	453	14	4,550	328
Plastics	5	2,470	463	4	2,070	518
Well-drilling mud	(3)	(3)	413	(3)	(3)	148
Other[4]	21	4,720	220	39	25,600	654
Total	98	27,200	276	120	47,200	393
Method of grinding:						
Dry	W	W	269	W	W	205
Wet	W	W	NA	W	W	704

NA Not available. W Withheld to avoid disclosing company proprietary data.

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

[2]Domestic and some imported scrap. Low-quality sericite is not included.

[3]Withheld to avoid disclosing company proprietary data; included in "Other."

[4]Includes mica used for molded electrical insulation, roofing, rubber, textile and decorative coatings, welding rods, and miscellaneous.

TABLE 5
FABRICATION OF MUSCOVITE BLOCK MICA
IN THE UNITED STATES, BY QUALITY[1]

(Metric tons)

	2004	2005
Good stained or better	0.48	0.44
Stained or lower than stained[2]	1.33	0.65
Total	1.81	1.10

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

TABLE 6
CONSUMPTION AND STOCKS OF MICA SPLITTINGS
IN THE UNITED STATES[1]

	Consumption		Stocks on
	Quantity	Value	December 31
Year	(metric tons)	(thousands)	(metric tons)
2004	668	$1,150	416
2005	665	1,150	408

[1]Data are rounded to no more than three significant digits.

TABLE 7
BUILT-UP MICA SOLD OR USED IN THE UNITED STATES, BY PRODUCT[1, 2]

	2004		2005	
	Quantity	Value	Quantity	Value
	(metric tons)	(thousands)	(metric tons)	(thousands)
Flexible plate (cold)	73	$354	73	$354
Heater plate	W	W	W	W
Molding plate	185	1,330	185	1,330
Segment plate	220	1,140	220	1,140
Tape	W	W	W	W
Other	81	557	80	555
Total	559	3,380	558	3,390

W Withheld to avoid disclosing company proprietary data; included in "Other."
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Consists of alternating layers of binder and irregularly arranged and partly overlapped splittings.

TABLE 8

U.S. EXPORTS OF CRUDE AND RIFTED MICA, MICA POWDER, AND WASTE IN 2005, BY COUNTRY[1]

	Crude and rifted							
	Less than $1 per kilogram		More than $1 per kilogram		Powder		Waste	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Argentina	8	$13	--	--	6	$21	--	--
Australia	--	--	--	--	4	5	--	--
Bahamas, The	--	--	41	$116	--	--	--	--
Barbados	--	--	--	--	5	3	--	--
Belgium	--	--	2	10	284	203	--	--
Brazil	11	4	(2)	4	263	158	--	--
Canada	33	11	--	--	3,450	1,870	1,410	$328
Chile	--	--	6	6	--	--	--	--
China	9	3	--	--	317	153	--	--
Colombia	22	6	--	--	97	55	--	--
Ecuador	--	--	--	--	3	15	--	--
El Salvador	10	4	--	--	17	9	--	--
France	--	--	--	--	102	186	62	13
Germany	34	12	--	--	244	146	--	--
Guatemala	--	--	2	7	--	--	--	--
Honduras	--	--	(2)	3	--	--	--	--
Hong Kong	--	--	--	--	26	100	--	--
India	169	41	--	--	44	8	--	--
Indonesia	--	--	--	--	11	10	--	--
Ireland	8	3	--	--	16	4	--	--
Israel	--	--	1	8	--	--	--	--
Italy	--	--	--	--	99	25	--	--
Japan	--	--	1	9	453	310	--	--
Korea, Republic of	--	--	--	--	356	299	--	--
Mexico	197	69	--	--	465	300	--	--
Netherlands	184	98	9	17	650	716	--	--
Pakistan	--	--	--	--	14	22	--	--
Panama	--	--	2	10	--	--	--	--
Peru	--	--	--	--	(2)	3	--	--
Philippines	--	--	--	--	16	20	--	--
Poland	--	--	--	--	9	4	--	--
Saudi Arabia	--	--	--	--	35	16	--	--
Singapore	--	--	11	79	4	4	7	3
South Africa	--	--	--	--	10	3	--	--
St. Lucia	--	--	--	--	16	20	--	--
Switzerland	--	--	--	--	(2)	7	--	--
Taiwan	--	--	--	--	6	27	--	--
Thailand	39	24	--	--	4	18	--	--
Trinidad and Tobago	--	--	--	--	(2)	9	--	--
United Arab Emirites	--	--	--	--	14	16	--	--
United Kingdom	--	--	--	--	100	100	--	--
Venezuela	--	--	--	--	4	6	--	--
Total	713	272	74	269	7,140	4,860	1,480	343

-- Zero.

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

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS OF WORKED MICA IN 2005, BY COUNTRY[1]

Country	Plates, sheets		Other	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Argentina	21	$305	(2)	$7
Australia	87	530	12	34
Austria	(2)	3	205	1,410
Bahamas, The	(2)	3	4	28
Barbados	--	--	6	26
Belgium	2	26	1	16
Brazil	28	594	1	37
Canada	97	2,440	117	1,860
Cayman Islands	1	12	(2)	11
Chile	(2)	3	--	--
China	10	159	9	181
Colombia	2	60	(2)	12
Costa Rica	1	8	--	--
Czech Republic	(2)	3	--	--
Ecuador	--	--	2	18
El Salvador	1	4	--	--
France	68	363	(2)	3
Germany	15	139	1	58
Honduras	3	11	--	--
Hong Kong	2	18	--	--
Iceland	2	12	--	--
India	--	--	(2)	3
Ireland	38	122	--	--
Israel	6	42	--	--
Italy	8	151	3	47
Japan	9	88	50	350
Kazakhstan	--	--	(2)	3
Korea, Republic of	27	562	--	--
Malaysia	2	41	--	--
Mexico	17	402	16	483
Namibia	--	--	(2)	4
Netherlands	9	72	--	--
New Zealand	(2)	11	--	--
Pakistan	--	--	(2)	3
Panama	--	--	1	3
Poland	--	--	(2)	8
Romania	--	--	(2)	3
Singapore	1	81	(2)	28
South Africa	(2)	12	--	--
Sri Lanka	4	11	--	--
Switzerland	1	27	(2)	7
Taiwan	92	599	18	562
Trinidad and Tabago	1	18	--	--
United Arab Emirates	--	--	3	19
United Kingdom	20	316	(2)	8
Venezuela	318	1,410	--	--
Vietnam	7	27	--	--
Total	901	8,680	450	5,230

-- Zero.

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

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF CRUDE AND RIFTED MICA IN 2005, BY COUNTRY[1]

	Split block		Splittings		Other			
					Less than $1 per kilogram		More than $1 per kilogram	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Canada	--	--	--	--	58	$10	--	--
China	--	--	--	--	6,290	784	8	$99
Finland	--	--	--	--	340	107	--	--
Germany	--	--	--	--	151	43	--	--
Hong Kong	--	--	--	--	--	--	4	39
India	(2)	$13	40	$26	8,190	1,830	1	22
Korea, Republic of	--	--	--	--	--	--	(2)	4
Total	(2)	13	40	26	15,000	2,770	13	163

-- Zero.

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

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF MICA POWDER AND WASTE IN 2005, BY COUNTRY[1]

	Powder		Waste	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Argentina	521	$437	--	--
Australia	1	7	--	--
Canada	15,300	5,480	253	$55
China	4,600	827	--	--
France	16	92	--	--
Germany	13	93	--	--
India	291	106	646	310
Italy	8	13	--	--
Japan	499	2,850	--	--
Malaysia	12	26	--	--
Norway	208	126	--	--
United Kingdom	2	21	--	--
Total	21,400	10,100	900	365

-- Zero.

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

Source: U.S. Census Bureau.

TABLE 12

U.S. IMPORTS FOR CONSUMPTION OF WORKED MICA IN 2005, BY COUNTRY[1]

Country	Plates, sheets		Other	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Austria	128	$2,820	7	$178
Belgium	292	3,870	--	--
Brazil	332	939	--	--
Canada	3	57	(2)	5
China	125	347	36	258
Czech Republic	(2)	4	(2)	4
France	26	213	3	133
Germany	27	625	19	72
Hong Kong	--	--	11	88
India	28	528	169	861
Indonesia	(2)	3	--	--
Japan	8	228	20	218
Korea, Republic of	3	45	40	62
Netherlands	1	15	--	--
Romania	(2)	4	--	--
Singapore	--	--	(2)	8
Switzerland	40	668	(2)	8
Taiwan	--	--	1	7
United Kingdom	2	116	16	485
Total	1,020	10,500	321	2,380

-- Zero.

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

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 13

SUMMATION OF U.S. MICA TRADE DATA[1]

	Scrap and flake mica				Sheet mica			
	Powder		Waste		Unworked		Worked	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Exports:								
2004	7,200	$4,780	2,730	$731	29	$58	935	$11,100
2005	7,140	4,860	2,190	615	74	269	1,350	13,900
Imports for consumption:								
2004	22,300	10,800	20,100	4,410	124 [2]	358 [2]	1,280	11,800
2005	21,400	10,100	15,900	3,140	53 [2]	175 [2]	1,340	12,900

[1]Data are rounded to no more than three significant digits.

[2]Excludes unworked sheet mica valued at less than $1 per kilogram.

Source: U.S. Census Bureau.

TABLE 14
MICA: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country[3]	2001	2002	2003	2004[e]	2005[e]
Argentina, all grades	2,120	1,770	1,894	2,178 [r, 4]	2,200
Brazil[e]	4,000	4,000	5,000 [r]	5,000 [r]	5,000
Canada[e]	17,500	17,500	17,500	17,500	17,500
France[e]	10,000	10,000	10,000	10,000	10,000
India:					
Crude	1,300	1,500	1,600 [e]	1,600	1,600
Scrap and waste	1,100	2,000	2,000 [e]	2,100 [r]	2,100
Total	2,400	3,500	2,600 [e]	3,700 [r]	3,700
Iran[5]	3,255	2,845	5,500 [r]	7,032 [r, 4]	7,000
Korea, Republic of, all grades	109,339	29,870	33,645	59,238 [r, 4]	50,000
Madagascar, phlogopite	90	60	70 [e]	70	70
Malaysia	4,107	3,669	3,609	3,544 [r, 4]	3,600
Mexico, all grades	648	456	506	424 [r]	450
Norway, flake[e]	2,500	2,600	2,600	2,600	2,700
Russia[e]	100,000	100,000	100,000	100,000	100,000
Serbia and Montenegro[e]	100	100	100	100	100
South Africa, ground and scrap	937	821	1,003	901 [4]	941 [4]
Spain[e]	2,500	2,500	2,500	2,500	2,500
Sri Lanka, scrap	1,161	1,161	1,674 [r]	1,700 [r]	1,700
Taiwan	9,733	6,595	3,237	2,979 [4]	8,608 [4]
United States, scrap and flake[6]	97,800	81,100	78,600	99,200 [4]	78,100 [4]
Grand total	368,000	269,000	271,000 [r]	319,000 [r]	294,000

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

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

[2]Table includes data available through May 30, 2006.

[3]In addition to the countries listed, China, Pakistan, Romania, and Sweden are known to produce mica, but available information is inadequate to make reliable estimates of output levels.

[4]Reported figure.

[5]Year beginning March 21 of that stated.

[6]Excludes, if any, U.S. production of low-quality sercite and sheet mica.