



2008 Minerals Yearbook

MICA

MICA

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Mica production decreased in 2008 compared with that of 2007. In 2008, production of scrap and flake mica in the United States decreased to 84,000 metric tons (t); this was 13% lower than that of 2007 (tables 1, 2). Ground mica sales totaled 98,000 t valued at \$26.5 million, a slight decrease in quantity and a slight increase in value compared with that of 2007 (tables 1, 3). Essentially all sheet mica used in the United States was imported, and Brazil, China, Belgium, Austria, and India, in decreasing order by quantity, were the major suppliers (tables 9, 11). Consumption of muscovite block mica in 2008 remained unchanged at 1.0 t from 2007, and the value decreased to \$127,000 in 2008 from \$139,000 in 2007 (tables 1, 4). Consumption of mica splittings decreased to an estimated 308 t in 2008 from 310 t in 2007 (tables 1, 5). Worked and unworked sheet mica exports increased to 2,020 t in 2008 from 1,300 t in 2007, and the value decreased to \$18.8 million in 2008 from \$19.2 million in 2007 (table 12). U.S. imports of worked and unworked sheet mica decreased to 1,880 t in 2008 from 1,950 t in 2007, and the value increased to \$17.9 million in 2008 from \$14.8 million in 2007. By yearend 2008, Imerys SA, (Paris, France) purchased the North American muscovite and phlogopite mica assets of Zemex Minerals Group Inc. (East Hanover, NJ)—Kings Mountain Minerals Inc. (NC), and Suzorite Mica Inc. (Quebec, Canada) (Industrial Minerals, 2008).

The mica group represents 37 phyllosilicate minerals that have a layered or platy texture (Rieder and others, 1998, p. 43–45). 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 range in opacity from transparent to opaque. Mica is stable when exposed to electricity, light, moisture, and extreme temperatures. Mica has superior electrical properties as an insulator and as a dielectric. It can support an electrostatic field while dissipating minimal energy in the form of heat, can be split very thin (0.025 to 0.125 millimeters or thinner) while maintaining its electrical properties, has a high dielectric breakdown, is thermally stable to 500° C, and has corona resistance. Muscovite is the principal mica used by the electrical industry and is used in capacitors that are ideal for high frequency and radio frequency. Phlogopite mica remains stable at higher temperatures (to 900° C) 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 mica remaining in the National Defense Stockpile (NDS) was shipped in 2008. All remaining uncommitted stocks of mica, 239 kilograms of muscovite block, were sold in April 2008. Stocks of muscovite film in the NDS were depleted by the end of fiscal year 2004. Stocks of phlogopite splittings were sold out in fiscal year 2005. The remaining stocks of muscovite splittings were sold in fiscal year 2007. The remaining stocks of mica in the NDS (muscovite block) were sold and shipped in fiscal year 2008.

Production

Domestic mine production data for mica are developed by the U.S. Geological Survey from four separate voluntary surveys. Of the 12 operations to which the “Crude Scrap and Flake Mica Production” (including sericite production) survey form was sent, eight operations responded. Of the 11 operations to which the “Ground Mica” (excluding low-grade ground sericite production) form was sent, five operations responded. Of the five surveyed operations to which the “Mica Block and Film Consumption” form was sent, three operations responded. Of the nine surveyed operations to which the “Mica Splittings Consumption” form was sent, three operations responded, which included one operation that was closed and one that did not use mica during the year. Consumption for the nonrespondents was estimated using prior-year production data. Individual company production and consumption data are withheld to avoid disclosing company proprietary data.

Scrap and Flake Mica.—In 2008, 9 domestic companies with 10 mines in 4 States produced scrap and flake mica, excluding low-grade sericite. The United States was one of the world's primary producers with production of 84,000 t (tables 1, 2, 13). North Carolina was a major producing State with 26% of domestic production, and the remainder was produced in Georgia, South Carolina, and South Dakota. Mica was recovered from mica schist, high-quality sericite schist, weathered pegmatites, gemstone pegmatite (sheet only), and as a coproduct of feldspar and kaolin mining and processing operations.

In 2008, the scrap and flake mica producers were BASF Corp., Hartwell, GA; The Feldspar Corp. (an Imerys S.A. company) (two mines), Spruce Pine, NC; Georgia Industrial Minerals, Inc., Deepstep, GA; K-T Feldspar Corp., Spruce Pine, NC; Kings Mountain Mining LLC (an Imerys S.A. company), Kings Mountain, NC; The Mineral Mining Co., Inc., Kershaw, SC; Pacer Corp., Custer, SD; Tinton Enterprises, Ltd., Spearfish, SD; and Unimin Corp., Spruce Pine, NC.

Ground Mica.—In 2008, 6 companies operated 10 grinding plants in 5 States; 7 plants produced dry-ground mica, and 3 produced wet-ground mica. The four leading ground mica companies, which included one company with three plants, accounted for 40% of the total of 98,000 t of ground mica produced in the United States (table 3).

Dry-ground mica producers were BASF Corp.; Georgia Industrial Minerals, Inc., Deepstep, GA; K-T Feldspar; Kings Mountain Mining LLC; The Mineral Mining Co., Inc.; Pacer Corp.; Piedmont Minerals Corp., Hillsborough, NC; Tinton Enterprises, Ltd.; and United States Gypsum Co. (a subsidiary of USG Corp.), Spruce Pine, NC.

Wet-ground mica producers were BASF Corp; Georgia Industrial Minerals, Inc., Sandersville, GA; and Kings Mountain Mining LLC.

Sheet Mica.—Sheet mica was produced as a byproduct from one mine in 2008. 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 for collectors.

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 3). The mica acts as a filler and extender, provides a smooth consistency, improves the workability of the compound, and provides resistance to cracking. In 2008, joint compound accounted for 54% 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 22% of the dry-ground mica used in 2008.

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 15% of dry-ground mica use in 2008, an increase from 13% the previous year.

The plastics industry used dry-ground mica as an extender and filler, especially in parts for automobiles as 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 2008, consumption of dry-ground mica in plastic applications accounted for 2% of the market.

The rubber industry used ground mica as an inert filler and 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 1.5% of the dry-ground mica used in 2008. As a rubber additive, mica reduces gas permeation and improves resiliency.

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 weather conditions. 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 vibration (asbestos substitute); as sound-absorbing insulation for coatings and polymer systems; in reinforcing additives for polymers to increase strength and stiffness and to improve stability to heat, chemicals, and ultraviolet (UV) radiation; in heat shields and temperature insulation; in 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 make 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 the Taos and Picuris Pueblos Indians in north-central New Mexico to make pottery. The pottery is made from weathered pre-Cambrian mica schist and has flecks of mica throughout the vessels. 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 seven companies that operated seven plants in five 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 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, 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 6).

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 2008 was estimated to be about 21 t, essentially the same as in 2007.

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 was unchanged in 2008 compared with that of 2007.

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 of a commutator. Molding plate is also fabricated into tubes and rings for insulation in armatures, motor starters, and transformers. Consumption for molding plate in 2008 was estimated to be about 65 t, similar to that of 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 wears 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 estimated to be about 149 t in 2008, unchanged from that of 2007.

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 or tapes, or trimmed to specified dimensions. Built-up mica products may also be corrugated or reinforced by multiple layering.

In 2008, the total amount of built-up mica that was consumed or shipped was estimated to be about 351 t. Molding plate and segment plate were the major end products and accounted for 19% and 42% of the total, respectively.

Mica Paper (Reconstituted Mica).—Primary uses for mica paper are the same as those for built-up mica. Five companies consumed scrap mica to produce mica paper for electrical and insulation applications. The principal source of the scrap was India. In 2008, the manufacturing companies were Asheville-Schoonmaker Mica Co., Newport News, VA; Corona Films Inc., West Townsend, MA; Isovolta Inc./US Samica Corp., Rutland, VT; Spruce Pine Mica Co., Spruce Pine, NC; and Tar Heel Mica Co., Inc., Plumtree, NC.

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 air-, ground-, and sea-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 mica 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 2008, fabrication of ruby and nonruby muscovite block consumed 1.04 t, a reduction from 1.06 t consumed in 2007 (table 4). Stained and lower-than-stained quality remained in greatest demand and accounted for about 60% of consumption of ruby and nonruby mica block. Consumption of nonruby mica block was 59% for stained and lower-than-stained quality and 41% for good quality.

In 2008, 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 2008, mica splittings represented the largest part of the sheet mica industry in the United States. Consumption of muscovite and phlogopite splittings was an estimated 308 t in 2008 (table 5). 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) decreased to 14.3 t in 2008 from 14.7 t in 2007. In 2008, industry stocks of muscovite and phlogopite mica splittings at an estimated 86 t remained unchanged from the previous year's level (table 5).

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 2008 compared with those of 2007 were as follows—muscovite block (ruby and nonruby) was 8% lower in 2008 at \$122 per kilogram compared with the 2007 price of \$132 per kilogram, and muscovite and phlogopite splittings were slightly lower at \$1.53 per kilogram compared with the previous year's price of \$1.57 per kilogram (tables 1, 5). Phlogopite block decreased slightly to \$134 per kilogram from \$135 per kilogram, and phlogopite splittings increased to \$45.79 per kilogram from \$31.73 per kilogram.

In 2008, the average U.S. value of scrap and flake mica, which included high-quality sericite, decreased to \$131 per metric ton from \$149 per metric ton in 2007 (table 2). The average value for North Carolina flake mica decreased to \$208 per metric ton from \$239 per metric ton in 2007. The average value of dry-ground mica increased to \$251 per metric ton, and the average value of wet-ground mica decreased to \$651 per metric ton (table 1).

Foreign Trade

The value of U.S. exports of mica increased by 5% to \$27.4 million, and the quantity increased by 23% to 11,100 t (table 12). U.S. exports of mica excluding unworked sheet mica increased by 6% in value from those of 2007 to \$27 million, while the quantity increased by 24% to 11,000 t.

Domestic ground mica (powder) exports increased to 6,630 t, an increase of 1,460 t from that of 2007 (tables 7, 12). Ground

mica exports increased in value to \$7.81 million in 2008 from \$6.04 million in 2007. Exports of crude and rifted mica decreased to 490 t; this was down 21% from the 621 t exported in 2007, and their value decreased by 34% to \$436,000 in 2008 from \$655,000 in 2007 (table 7).

The value of U.S. imports of all mica increased by 8% to \$32 million, and the quantity decreased by 33% to 29,000 t. U.S. imports of mica excluding unworked mica scrap (less than \$1.00 per kilogram) increased by 19% in value from those of 2007 to \$31.4 million and decreased by 10% in quantity to 26,500 t.

Canada, China, Turkey, and India supplied the United States with most of its worked sheet and paper-quality scrap micas. Total imports for consumption of unworked split block, film, splittings, and mica sheet categorized as "Other" totaled about 2,300 t in 2008 (table 9). Imports of unworked low-value scrap mica (less than \$1.00 per kilogram) decreased to 2,250 t in 2008 compared with 13,600 t in 2007 (table 9). Demand weakened for the low-value mica used as a dry-ground additive for drywall compound, fillers, and paints.

In 2008, 23,400 t of powder mica was imported, mostly from Canada and China, about 3,100 t less than in 2007 (table 10). Worked mica imports, mostly from Belgium, Brazil, India, and China, were 1,800 t; a 5% decrease from those of 2007 (table 11).

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 2009 was expected to decrease as the domestic economy continued to slow and consumption was expected to decline with the continued decline in demand for automobiles and new homes. Demand for wet-ground mica used in pearlescent automotive coatings and dry-ground mica used in automotive fillers and plastics was also expected to decline. Demand for ground mica in smaller specialty markets such as coated micas, cosmetics, nylon and polyester resins, and polypropylene composites was expected to decrease during the next few years and then resume growth at a rate slightly higher than 1% to 3% during

the next decade. Consumption of dry-ground mica was expected to decrease by as much as 5% to 10% in 2009 unless new jobs are created and significantly lower home prices slow the decline in demand for new housing. Increasing fuel prices were expected to reduce demand for automobiles as disposable income decreased. Wet-ground mica was expected to show a slow 1% to 2% annual growth through 2020 as demand from the automotive industry increases in response to population growth and the associated increase in the use of pearlescent paints and engineered mica-bearing plastics and composites.

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 deposits currently being mined, 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 300 to 1,000 metric tons per year (t/yr). With no potential new uses apparent and many substitute materials being used, substantial growth is not expected. Consumption of mica splittings was expected to remain in the range of 300 to 900 t/yr in the near future.

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TABLE 1
SALIENT MICA STATISTICS¹

		2004	2005	2006	2007	2008
United States:						
Production, sold or used by producers:						
Scrap and flake mica:						
Quantity	thousand metric tons	99	78	110	97	84
Value	thousands	\$15,400	\$19,300	\$22,400	\$14,400	\$11,000
Ground mica:						
Quantity	thousand metric tons	98	120	123	99	98
Value	thousands	\$27,200	\$47,200	\$49,000	\$26,400	\$26,500
Prices:						
Scrap and flake mica	dollars per metric ton	155	248	204	149 ^r	143
Ground:						
Dry	do.	269	226	237	243 ^r	251
Wet	do.	NA	776	784	683 ^r	651
Sheet, muscovite and phlogopite:						
Block	dollars per kilogram	67	125	130	132	122
Splittings	do.	1.73	1.56	1.53	1.57	1.53 ^e
Consumption:						
Block, muscovite:						
Quantity	metric tons	2	1	1	1	1
Value	thousands	\$114	\$134	\$146	\$139	\$127
Splittings, all types						
Quantity	metric tons	668	402	310	310 ^r	308 ^e
Value	thousands	\$1,150	\$626	\$475	\$475 ^r	\$471 ^e
Exports	metric tons	10,900	10,800	8,620	9,010 ^r	11,100
Imports	do.	43,800	38,800	46,900	43,000 ^r	28,800
World, production	do.	400,000 ^r	359,000 ^r	390,000 ^r	389,000 ^r	374,000 ^e

^eEstimated. ^rRevised. do. Ditto.

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

TABLE 2
SCRAP AND FLAKE MICA SOLD OR USED BY
PRODUCERS IN THE UNITED STATES, BY STATE^{1, 2}

(Thousand metric tons and thousand dollars)

State	2007		2008	
	Quantity	Value	Quantity	Value
North Carolina	43	10,300	22	4,580
Other ³	54	4,090	62	6,430
Total	97	14,400	84	11,000

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

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

³Includes Alabama (2008), Georgia, South Carolina, and South Dakota.

TABLE 3
GROUND MICA SOLD OR USED BY PRODUCERS IN THE UNITED STATES, BY END USE
AND METHOD OF GRINDING^{1,2}

	2007			2008		
	Quantity (thousand metric tons)	Value (thousands)	Unit value	Quantity (thousand metric tons)	Value (thousands)	Unit value
End use:						
Joint compound	49	\$10,600 ^r	\$217 ^r	53	\$12,800	\$246
Paint	24 ^r	7,770 ^r	319 ^r	22	7,180	324
Plastics	6	3,210 ^r	522 ^r	2	1,390	697
Well-drilling mud	13 ^r	2,100 ^r	169	15	2,790	181
Other ³	7 ^r	2,760 ^r	388 ^r	6	2,320	386
Total	99	26,400	267	98	26,500	271
Method of grinding:						
Dry	W	W	243 ^r	W	W	251
Wet	W	W	683 ^r	W	W	651

^rRevised. W Withheld to avoid disclosing company proprietary data.

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

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

³Includes mica used for molded electrical insulation, roofing, rubber, textile and decorative coatings, welding rods, and miscellaneous.

TABLE 4
FABRICATION OF MUSCOVITE BLOCK MICA
IN THE UNITED STATES, BY QUALITY¹

(Kilograms)

	2007	2008
Good stained or better	449	420
Stained or lower than stained ²	608	624
Total	1,060	1,040

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

²Includes punch mica.

TABLE 5
CONSUMPTION AND STOCKS OF MICA SPLITTINGS
IN THE UNITED STATES¹

Year	Consumption		Stocks on December 31 (metric tons)
	Quantity (metric tons)	Value (thousands)	
2007 ^e	310 ^r	\$475 ^r	86
2008 ^e	308	471	86

^eEstimated. ^rRevised.

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

TABLE 6
BUILT-UP MICA SOLD OR USED IN THE UNITED STATES, BY PRODUCT^{1,2}

	2007 ^e		2008 ^e	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Flexible plate (cold)	21	\$157	21	\$173
Heater plate	W	W	W	W
Molding plate	65	432	65	431
Segment plate	149	294	149	288
Tape	W	W	W	W
Other	116 ^r	539	116	539
Total	352 ^r	1,420	351	1,430

^eEstimated. ^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Other."

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

²Consists of alternating layers of binder and irregularly arranged and partly overlapped splittings.

TABLE 7
U.S. EXPORTS OF CRUDE AND RIFTED MICA, MICA POWDER, AND WASTE IN 2008, BY COUNTRY¹

Country	Crude and rifted							
	Less than \$1 per kilogram		More than \$1 per kilogram		Powder		Waste	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Algeria	--	--	--	--	163	\$96	--	--
Angola	--	--	--	--	41	18	--	--
Argentina	--	--	--	--	33	36	--	--
Australia	--	--	--	--	18	9	--	--
Bahamas, The	--	--	47	\$20	--	--	--	--
Belgium	--	--	--	--	335	1,130	20	\$4
Brazil	--	--	(2)	6	19	55	--	--
British Virgin Islands	--	--	(2)	9	--	--	--	--
Canada	72	\$27	--	--	1,940	1,970	1,920	481
Chile	37	15	--	--	--	--	--	--
China	--	--	7	23	67	140	--	--
Colombia	--	--	(2)	6	112	253	2	3
Dominica	--	--	--	--	4	4	--	--
Ecuador	--	--	--	--	7	10	--	--
El Salvador	6	3	--	--	11	5	--	--
Finland	3	5	--	--	6	29	--	--
France	--	--	--	--	11	75	102	22
Germany	--	--	9	24	351	869	--	--
Guatemala	--	--	--	--	22	11	--	--
Honduras	--	--	14	39	--	--	--	--
Hong Kong	--	--	(2)	12	1	4	--	--
India	--	--	(2)	4	111	244	--	--
Indonesia	--	--	--	--	37	70	--	--
Ireland	--	--	--	--	14	4	--	--
Italy	60	28	--	--	59	55	--	--
Japan	--	--	--	--	564	622	--	--
Kenya	16	15	--	--	--	--	--	--
Korea, Republic of	--	--	11	12	614	504	--	--
Malaysia	--	--	--	--	--	--	(2)	7
Mexico	--	--	57	84	1,460	837	--	--
Netherlands	38	36	--	--	59	35	--	--
Netherlands Antilles	15	7	--	--	(2)	3	--	--
Nigeria	--	--	--	--	14	5	--	--
Oman	--	--	--	--	11	10	--	--
Pakistan	--	--	--	--	23	90	--	--
Panama	--	--	--	--	111	37	--	--
Peru	--	--	--	--	4	65	--	--
Philippines	19	13	--	--	57	67	1	18
Poland	--	--	--	--	3	73	--	--
Saudi Arabia	--	--	--	--	55	55	--	--
Singapore	--	--	--	--	6	40	--	--
South Africa	--	--	--	--	50	30	--	--
Spain	--	--	--	--	38	61	--	--
Sweden	--	--	--	--	15	21	--	--
Taiwan	--	--	--	--	39	4	--	--
Thailand	--	--	--	--	1	8	--	--
Trinidad and Tobago	18	14	--	--	--	--	--	--
United Arab Emirates	--	--	--	--	19	9	--	--
United Kingdom	61	34	--	--	7	23	--	--
Uruguay	--	--	--	--	3	8	--	--
Venezuela	--	--	--	--	119	118	--	--
Total	345	197	145	239	6,630	7,810	2,050	535

-- Zero.

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

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
U.S. EXPORTS OF WORKED MICA IN 2008, BY COUNTRY¹

Country	Plates, sheets		Other	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Argentina	39	\$109	(2)	\$4
Australia	4	104	1	21
Austria	41	459	190	1,210
Bahamas, The	2	32	16	62
Barbados	16	63	--	--
Belgium	(2)	3	--	--
Brazil	26	535	4	135
Canada	110	3,430	63	1,860
Cayman Islands	--	--	(2)	3
Chile	(2)	18	--	--
China	144	575	14	507
Colombia	131	1,050	4	104
Costa Rica	8	34	--	--
Czech Republic	--	--	6	27
Ecuador	3	28	--	--
El Salvador	2	12	--	--
France	16	497	(2)	28
Germany	30	361	1	84
Greece	4	59	--	--
Guatemala	1	11	--	--
Honduras	2	14	--	--
Hong Kong	67	166	5	96
Hungary	2	48	(2)	4
India	6	202	1	33
Indonesia	2	7	--	--
Israel	25	136	(2)	6
Italy	9	179	1	153
Jamaica	19	84	(2)	7
Japan	1	34	79	597
Korea, Republic of	499	1,690	5	164
Kuwait	(2)	14	(2)	3
Malaysia	(2)	12	(2)	3
Mexico	25	565	3	188
Netherlands	(2)	8	(2)	27
Nicaragua	1	15	--	--
Nigeria	(2)	5	--	--
Pakistan	(2)	11	--	--
Panama	12	88	--	--
Peru	6	117	--	--
Poland	--	--	(2)	23
Qatar	(2)	4	--	--
Russia	8	18	--	--
Saudi Arabia	100	347	1	17
Singapore	4	96	--	--
South Africa	2	128	--	--
Spain	(2)	20	--	--
Sri Lanka	6	18	--	--
Sweden	(2)	20	--	--
Switzerland	9	177	3	85
Taiwan	30	309	20	484
Thailand	1	17	--	--
Trinidad and Tobago	15	132	--	--
Tunisia	(2)	39	--	--
Turks and Caicos Islands	2	3	2	97
Ukraine	17	101	--	--
United Kingdom	17	145	4	105
Uruguay	1	5	--	--

See footnotes at end of table.

TABLE 8—Continued
U.S. EXPORTS OF WORKED MICA IN 2008, BY COUNTRY¹

Country	Plates, sheets		Other	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Venezuela	18	\$87	--	--
Vietnam	--	--	1	\$8
Other	7	17	3	4
Total	1,490	12,500	427	6,140

-- Zero.

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

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. IMPORTS FOR CONSUMPTION OF CRUDE AND RIFTED MICA IN 2008, BY COUNTRY¹

Country	Split block		Splittings		Other			
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Less than \$1 per kilogram		More than \$1 per kilogram	
					Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	--	--	--	--	--	--	(2)	\$18
Canada	20	\$34	--	--	14	\$4	--	--
China	--	--	--	--	--	--	39	119
Hong Kong	--	--	--	--	--	--	3	48
India	--	--	85	\$203	2,180	689	(2)	24
Japan	--	--	--	--	--	--	1	25
Turkey	--	--	--	--	58	34	--	--
Total	20	34	85	203	2,250	727	43	234

-- Zero.

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

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF MICA POWDER AND WASTE
IN 2008, BY COUNTRY¹

Country	Powder		Waste	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Argentina	36	\$15	--	--
Australia	6	10	--	--
Austria	7	11	3	\$5
Canada	10,700	4,940	81	31
China	9,990	2,370	--	--
Finland	1,480	366	--	--
France	4	16	--	--
Germany	162	349	--	--
India	266	166	1,210	726
Italy	20	20	--	--
Japan	575	3,910	--	--
Malaysia	32	69	--	--
Mexico	2	3	--	--
Norway	48	38	--	--
United Kingdom	16	36	--	--
Total	23,400	12,300	1,290	762

-- Zero.

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

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF WORKED MICA IN 2008, BY COUNTRY¹

Country	Plates, sheets		Other	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Austria	140	\$2,960	28	\$876
Belgium	345	3,760	--	--
Brazil	391	1,960	--	--
Canada	2	162	--	--
China	383	2,030	49	343
France	42	366	4	167
Germany	40	898	1	38
Hong Kong	(2)	7	3	18
India	68	665	147	923
Japan	10	297	1	58
Korea, Republic of	1	20	14	35
Sweden	--	--	(2)	17
Switzerland	36	1,070	--	--
Thailand	1	17	--	--
United Kingdom	16	506	24	678
Vietnam	--	--	3	5
Total	1,480	14,700	274	3,160

-- Zero.

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

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12
SUMMATION OF U.S. MICA TRADE DATA¹

	Scrap and flake mica				Sheet mica			
	Powder		Waste		Unworked		Worked	
	Quantity (metric tons)	Value (thousands)						
Exports:								
2007	5,170	\$6,040 ^r	2,530 ^r	\$799 ^r	122	\$397	1,180 ^r	\$18,800 ^r
2008	6,630	7,810	2,430	731	105	238	1,920	18,600
Imports for consumption:								
2007	26,500 ^r	11,300	14,500 ^r	3,830 ^r	114	217	1,840	14,500
2008	23,400	12,300	3,560	1,470	130	465	1,750	17,900

^rRevised.

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

Source: U.S. Census Bureau.

TABLE 13
MICA: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country ³	2004	2005	2006	2007 ^c	2008 ^c
Argentina, all grades	2,158	4,101 ^r	6,233	10,171 ^{r,4}	9,000
Brazil ^e	4,000	4,000	4,000	4,000	4,000
Canada ^e	17,500	17,500	17,500	18,000	17,000
Finland:					
Concentrate	9,225	9,473	8,097	8,000	8,000
Biotite	59,577	59,381	62,959	60,000	60,000
Total	68,802	68,854	71,056	68,000	68,000
France ^e	19,000 ^r	10,000	20,000 ^r	20,000	20,000
India: ^e					
Crude	1,600	1,600	1,700	1,700	1,700
Scrap and waste	2,100	2,100	2,200	2,200	2,300
Total	3,700	3,700	3,900	3,900	4,000
Iran ⁵	7,032	7,000 ^c	7,000 ^c	7,000 ^r	7,000
Korea, Republic of, all grades	59,238	36,623	30,356	42,385 ⁴	42,000
Madagascar, phlogopite ^e	90	90	90	90	90
Malaysia	3,544	4,542	5,152	6,118 ^{r,4}	6,000
Mexico, all grades	424	120	150	150	150
Norway, flake ^e	2,600	2,700	2,600	2,600	2,600
Peru	50 ^e	51	61	60	91 ⁴
Russia ^e	100,000	100,000	100,000	100,000	100,000
Serbia	200 ⁶	200 ⁶	200 ^e	200	200
South Africa, ground and scrap	285	922 ^r	828 ^r	437 ^{r,4}	400
Spain	7,825	10,000 ^r	4,496 ^r	4,500 ^r	4,500
Sri Lanka, scrap ^e	1,700	1,700	1,800	1,800	1,900
Taiwan	2,979	8,608	4,841 ^r	3,387 ⁴	3,179 ⁴
United States, scrap and flake ⁷	99,200	78,100	110,000	96,600 ⁴	84,000 ⁴
Grand total	400,000 ^r	359,000 ^r	390,000 ^r	389,000 ^r	374,000

^cEstimated. ^rRevised.

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

²Table includes data available through June 25, 2009.

³In 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.

⁴Reported figure.

⁵Year beginning March 21 of that stated.

⁶Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

⁷Excludes, if any, U.S. production of low-quality sercite and sheet mica.