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MICA

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Mica

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Mica production increased in 2010 compared with that of 2009. In 2010, production of scrap and flake mica in the United States increased to 53,000 metric tons (t); this was more than 3% higher than that of 2009 (tables 1, 2). The quantity of ground mica sold or used by producers decreased slightly to about 75,600 t valued at $22.8 million (tables 1, 3). Essentially all sheet mica used in the United States was imported, and China, Brazil, Belgium, Austria, and Germany, in decreasing order by quantity, were the major suppliers (table 11). In 2010, consumption of muscovite block mica in the United States was 0.91 t, a decrease of 16% compared with that of 2009 (tables 1, 4). Consumption of mica splittings increased to 275 t in 2010 from 266 t (revised) in 2009 (tables 1, 5). Worked and unworked sheet mica exports decreased to 933 t in 2010 from 1,120 t in 2009, and the value increased to $16.1 million in 2010 from $15.7 million in 2009 (table 12). U.S. imports of worked and unworked sheet mica increased to 1,980 t in 2010 from 1,500 t in 2009, and the value increased to $16.4 million in 2010 from $14.5 million in 2009 (table 12).

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 millimeter) 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 are required. Muscovite and phlogopite are used in sheet and ground forms.

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, 6 operations responded and 1 was closed. Of the 11 operations to which the "Ground Mica" (excluding low-grade ground sericite production) form was sent, 2 operations responded and 1 was closed. Of the five surveyed operations to which the "Mica Block and Film Consumption" form was sent, two operations responded. Of the nine surveyed operations to which the "Mica Splittings Consumption" form was sent, three operations responded. 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 2010, eight companies with eight mines in four States produced scrap and flake mica, excluding low-grade sericite. The United States was one of the world's principal producers, with production of about 53,000 t (tables 1, 2, 13). The producing States were, in descending order, South Dakota, North Carolina, Georgia, and Alabama. 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.

Ground Mica.—In 2010, six companies operated nine grinding plants in three States; six plants produced dry-ground mica, and three produced wet-ground mica.

Dry-ground mica producers were Georgia Industrial Minerals, Inc. in Georgia, Pacer Corp. in South Dakota, and Kings Mountain Mining LLC, Piedmont Minerals Corp., and United States Gypsum Co. (a subsidiary of USG Corp.) in North Carolina.

Wet-ground mica producers were BASF Corp and Georgia Industrial Minerals, Inc. in Georgia and Kings Mountain Mining LLC in North Carolina.

Sheet Mica.—Sheet mica was produced as a byproduct from one mine in 2010. 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 smooth consistency, improves the workability of the compound, and provides resistance to cracking. In 2010, joint compound accounted for 75% 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 in paint accounted for 3% of the dry-ground mica used in 2010.

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. The monthly U.S. drill rig count has increased every month since July 2009. The average monthly drill rig count for 2010 was 1,541 or 455 operating rigs more than the average of 2009 but 339 less than the average of 2008 (Baker Hughes, 2011). Well drilling muds accounted for 11% of dry-ground mica use in 2010, a 31% increase compared with that of the previous year (table 3).

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 2010, consumption of dry-ground mica in plastic applications accounted for 3% 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. 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. In 2010, mica consumption in flexible plate was an estimated 16 t, or a decrease of 7% compared with that of 2009 (table 6).

Heater plate is used where high-temperature insulation is required. Consumption of heater plate mica increased by 3% in 2010 compared with that of 2009 (table 6).

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 increased by 5% to an estimated 45 t in 2010 (table 6).

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 147 t in 2010 (table 6).

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 2010, the total amount of built-up mica that was consumed or shipped was estimated to be about 283 t. Segment plate and molding plate were the major end products and accounted for 52% and 16% of the total, respectively (table 6).

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 2010, 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 electronics 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 electronics 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 2010, fabrication of ruby and nonruby muscovite block consumed 0.91 t, about a 16% decrease from that consumed in 2009 (table 4). Stained and lower-than-stained quality muscovite remained in greatest demand and accounted for about 59% of consumption of ruby and nonruby mica block. Consumption of nonruby mica block was 63% for stained and lower-than-stained quality and 37% for good quality.

In 2010, mica splittings represented the largest part of the sheet mica industry in the United States. Consumption of muscovite and phlogopite splittings increased slightly to an estimated 275 t in 2010 (table 5). Muscovite splittings from India accounted for essentially all domestic consumption. The remainder was imported from China, Romania, and Japan.

Stocks

In 2010, reported yearend industry stocks of muscovite mica block (ruby and nonruby) were unchanged at 12.8 t. Industry stocks of muscovite and phlogopite mica splittings at an estimated 79 t were about 7% less than 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 estimated average values of mica block and splittings consumed in the United States in 2010 were as follows—muscovite block (ruby and nonruby) was $130 per kilogram and muscovite and phlogopite splittings were $1.53 per kilogram (tables 1, 5). Phlogopite block was $117 per kilogram and phlogopite splittings were $15 per kilogram.

In 2010, the average U.S. value of scrap and flake mica, which included high-quality sericite, was estimated to be $137 per metric ton (table 2). The average value for North Carolina flake mica was estimated to be $184 per ton. The average value of dry-ground mica was estimated to be $285 per ton, and the average value of wet-ground mica was estimated to be $700 per ton (table 1).

Foreign Trade

The value of U.S. exports of mica decreased by 6% to $24.7 million, and the quantity decreased by 19% to 7,410 t (table 12). Domestic ground mica (powder) exports decreased to 5,550 t, a decrease of 7% from that of 2009 (table 12). Ground mica exports decreased in value to $8.2 million in 2010 from $8.9 million in 2009. Exports of crude and rifted mica decreased by 58% to 291 t in 2010 from 688 t in 2009 (table 7). The value of crude and rifted mica exports decreased by 76% in 2010 compared with that of 2009.

U.S. imports of all mica totaled 28,400 t and were valued at $35.7 million, increases of 32% and 38%, respectively, compared with those of 2009. In 2010, total imports for consumption of unworked split block, film, splittings, and mica sheet categorized as "Other" doubled to about 3,830 t, almost all of which was comprised of unworked low-value scrap mica (less than $1.00 per kilogram) (table 9). Demand increased for the low-value mica used as a dry-ground additive for drywall compound, fillers, and paints. In 2010, 22,000 t of powder mica was imported, mostly from Canada, China, and Finland, about 6,100 t more than in 2009, or an increase of 30% (table 10). Worked mica imports were 1,930 t, a 30% increase from those of 2009 (table 11).

World Review

World production of mica was estimated to have increased to 1.07 million metric tons (Mt) in 2010 from 1.02 Mt in 2009. Most countries for which reported data were available reported increases in production in 2010 compared with that of 2009. All previous world production totals were revised and have increased significantly because of the inclusion of production data from China (table 13).

Outlook

The early production estimates for 2011 show an increase in crude mica production. Some other construction materials producers are reporting slight increases in production during the first 9 months of 2011. 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. When the housing market recovers, the long-term outlook for ground mica is for an expected production growth of 1% to 3% per year. 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. The North American automobile industry rebounded much quicker than housing, and vehicle production was forecast to increase by about 7% in 2011 (Thomson Reuters, 2011).

As the economy recovers, demand for ground mica in smaller specialty markets such as coated micas, cosmetics, nylon and polyester resins, and polypropylene composites was expected to resume annual growth at a rate slightly higher than the rate for the entire ground mica industry during the next decade.

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 400 metric tons per year (t/yr) in recent years, although it was estimated to have dipped below 300 t/yr to 275 t/yr in 2010. With no potential new uses apparent and many substitute materials being used, substantial growth is not expected.

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TABLE 1
SALIENT MICA STATISTICS[1]

		2006	2007	2008	2009	2010
United States:						
Production, sold or used by producers:						
Scrap and flake mica:						
Quantity	thousand metric tons	110	97	85 r	51 r	53
Value	thousands	$22,400	$14,400	$10,200 r	$6,530 r	$7,240
Ground mica:						
Quantity	thousand metric tons	123	99	98	77	76
Value	thousands	$49,000	$26,400	$26,500	$23,200	$22,800
Prices:						
Scrap and flake mica	dollars per metric ton	204	149	120 r	128 r	137
Ground:						
Dry	do.	237	243	251	284	285
Wet	do.	784	683	651	651	700
Sheet, muscovite and phlogopite:						
Block	dollars per kilogram	130	132	122	121 r	130
Splittings	do.	1.53	1.57	1.53	1.66 r	1.53
Consumption:						
Block, muscovite:						
Quantity	metric tons	1	1	1	1	1
Value	thousands	$146	$139	$127	$131	$117
Splittings, all types						
Quantity	metric tons	310	310	308	266 r	275
Value	thousands	$475	$475	$471	$440 r	$421
Exports	metric tons	8,620	9,010	11,100	9,150	7,410
Imports	do.	46,900	43,000	28,800	21,400	28,400
World, production e	do.	1,090,000 r	1,120,000 r	1,140,000 r	1,020,000 r	1,070,000

eEstimated. rRevised. do. Ditto.

[1]Data 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	2008		2009		2010	
	Quantity	Value[r]	Quantity	Value[r]	Quantity	Value
North Carolina	22	4,460	17 [r]	3,400	20	3,590
Other[3]	64 [r]	5,780	34	3,130	33	3,650
Total	85 [r]	10,200	51 [r]	6,530	53	7,240

[r]Revised.

[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, 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]

	2008			2009			2010		
	Quantity (thousand metric tons)	Value (thousands)	Unit value	Quantity (thousand metric tons)	Value (thousands)	Unit value	Quantity (thousand metric tons)	Value (thousands)	Unit value
End use:									
Joint compound	53	$12,800	$246	47	$12,200	$256	44	$11,200	$256
Paint	22	7,180	324	17	6,440	384	17	6,440	384
Plastics	2	1,390	697	2	1,360	642	2	1,370	660
Well-drilling mud	15	2,790	181	5	943	191	7	1,160	176
Other[3]	6	2,320	386	6	2,290	381	6	2,660	419
Total	98	26,500	271	77	23,200	301	76	22,800	302
Method of grinding:									
Dry	W	W	251	W	W	284	W	W	285
Wet	W	W	651	W	W	651	W	W	700

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]Includes 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 QUALITY[1]

(Kilograms)

	2008	2009	2010
Good stained or better	420	416	370
Stained or lower than stained[2]	624	665	536
Total	1,040	1,080	906

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

[2]Includes punch mica.

TABLE 5
ESTIMATED CONSUMPTION AND STOCKS OF MICA SPLITTINGS
IN THE UNITED STATES

Year	Consumption		Stocks on December 31
	Quantity (metric tons)	Value (thousands)	(metric tons)
2008	308	$471	110 r
2009r	266	440	84
2010	275	421	79

rRevised.

TABLE 6
ESTIMATED BUILT-UP MICA SOLD OR USED IN THE UNITED STATES, BY PRODUCT[1, 2]

	2008		2009		2010	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Flexible plate (cold)	21	$154 r	17 r	$131 r	16	$132
Heater plate	9	55	1	24	1	35
Molding plate	65	431	44 r	313	45	333
Segment plate	149	288	147	278	147	279
Tape	W	W	W	W	W	W
Other	107 r	503 r	69 r	240 r	72	314
Total	351	1,430	278	985 r	283	1,090

rRevised. 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 7

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

Country	Crude and rifted				Powder		Waste	
	Less than $1 per kilogram		More than $1 per kilogram					
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2009	369	$105	319	$1,370	5,940	$8,850	1,500	$569
2010:								
Algeria	--	--	--	--	233	164	--	--
Argentina	--	--	18	33	25	140	--	--
Bahamas, The	97	21	24	92	--	--	--	--
Belgium	--	--	--	--	96	405	--	--
Brazil	--	--	--	--	382	651	--	--
Canada	15	5	--	--	948	1,170	690	257
Chile	6	6	--	--	2	7	--	--
China	--	--	--	--	41	233	--	--
Colombia	--	--	--	--	273	252	--	--
Dominican Republic	--	--	2	10	17	8	--	--
France	--	--	--	--	43	253	--	--
Germany	--	--	--	--	260	860	--	--
Hong Kong	--	--	--	--	21	56	--	--
Hungary	--	--	1	4	--	--	--	--
India	--	--	--	--	14	38	--	--
Israel	--	--	1	4	--	--	--	--
Italy	16	10	--	--	54	52	--	--
Japan	--	--	5	15	349	683	--	--
Korea, Republic of	--	--	--	--	474	369	--	--
Mexico	--	--	2	4	1,570	1,200	--	--
Netherlands	--	--	7	11	285	717	--	--
New Zealand	--	--	--	--	(2)	12	7	13
Nigeria	--	--	--	--	53	20	--	--
Peru	--	--	--	--	49	76	--	--
Philippines	--	--	--	--	37	32	--	--
Saint Lucia	--	--	--	--	--	--	--	--
Singapore	--	--	--	--	26	88	--	--
Spain	--	--	--	--	35	114	--	--
Taiwan	--	--	3	12	23	34	--	--
Thailand	80	64	--	--	9	30	--	--
United Arab Emirates	--	--	--	--	20	9	--	--
United Kingdom	--	--	13	60	35	47	--	--
Venezuela	--	--	--	--	48	79	--	--
Other	--	--	1	12	124	395	--	--
Total	214	107	77	255	5,550	8,190	697	270

-- 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 8

U.S. EXPORTS OF WORKED MICA, BY COUNTRY[1]

Country	Plates, sheets		Other	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2009	601	$9,000	417	$6,310
2010:				
Aruba	4	43	1	43
Austria	2	49	237	1,500
Bahamas, The	--	--	6	46
Brazil	25	556	6	182
Canada	114	2,700	78	2,500
China	14	440	51	412
Colombia	12	644	4	95
France	17	598	4	173
French Polynesia	3	18	--	--
Germany	9	195	(2)	9
India	2	130	--	--
Israel	11	24	--	--
Jamaica	4	16	--	--
Japan	3	111	32	268
Korea, Republic of	19	321	--	--
Lithuania	4	112	--	--
Mexico	51	1,140	19	738
Netherlands	7	124	--	--
Peru	4	101	--	--
Switzerland	23	448	--	--
Taiwan	28	483	14	369
Trinidad and Tobago	9	171	--	--
United Arab Emirates	15	137	(2)	6
United Kingdom	20	170	(2)	11
Other	19	540	6	311
Total	419	9,270	460	6,660

-- 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. IMPORTS FOR CONSUMPTION OF CRUDE AND RIFTED MICA, BY COUNTRY[1]

Country	Split block		Splittings		Other			
					Less than $1 per kilogram		More than $1 per kilogram	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2009	(2)	$17	20	$67	1,900	$1,030	2	$33
2010:								
Belgium	--	--	--	--	--	--	1	39
Canada	--	--	--	--	20	4	--	--
China	--	--	1	10	--	--	11	52
India	--	--	36	67	3,750	1,790	5	67
Japan	--	--	(2)	6	--	--	--	--
Romania	--	--	1	5	--	--	--	--
Total	--	--	39	89	3,770	1,790	16	158

-- 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 MICA POWDER AND WASTE, BY COUNTRY[1]

	Powder		Waste	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2009	16,900	$9,540	1,090	$662
2010:				
Canada	10,200	4,410	17	9
China	6,860	1,650	--	--
Finland	3,600	976	--	--
Germany	122	228	--	--
India	83	4,980	583	476
Japan	762	4,260	--	--
Korea, Republic of	60	10	--	--
Netherlands	79	25	23	39
Norway	64	69	--	--
United Kingdom	61	104	--	--
Other	92	199	--	--
Total	22,000	16,900	623	525

-- Zero.

[1]Data 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, BY COUNTRY[1]

	Plates, sheets		Other	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2009	1,100	$12,000	385	$2,450
2010:				
Austria	139	3,300	17	570
Belgium	290	2,970	--	--
Brazil	350	1,910	356	720
Canada	24	100	--	--
China	411	2,090	64	313
France	31	452	(2)	30
Germany	34	530	1	52
India	24	413	102	715
Japan	6	401	(2)	70
Switzerland	9	165	(2)	10
United Kingdom	32	617	27	622
Other	6	127	3	49
Total	1,360	13,100	572	3,150

-- 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 12

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:								
2009	5,940	$8,850	2,090	$1,600	96	$437	1,020	$15,300
2010	5,550	8,190	935	468	53	163	879	15,900
Imports for consumption:								
2009	16,900	9,540	2,990	1,670	23	142	1,480	14,400
2010	22,000	16,900	4,400	2,390	51	180	1,930	16,200

[1]Data 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]	2006	2007	2008	2009	2010[e]
Argentina, all grades	6,233	10,171	8,790	8,668	9,000
Brazil[e]	4,000	4,000	4,000	4,000	4,000
Canada[e]	17,500	18,000	17,000	15,000	15,000
China	700,000	720,000	750,000	700,000	750,000
Finland					
Concentrate	8,097	11,449 [r]	10,706 [r]	10,000 [r]	10,000
Biotite	62,959	60,000	60,000	60,000	60,000
Total	71,056	71,449 [r]	70,706 [r]	70,000 [r]	70,000
France[e]	20,000	20,000	20,000	20,000	20,000
India:[e]					
Crude	1,590 [r]	3,790 [r]	2,050 [r]	2,000 [r]	2,100
Scrap and waste	3,570 [r]	3,420 [r]	4,470 [r]	4,500 [r]	4,700
Total	5,150 [r]	7,210 [r]	6,520 [r]	6,500 [r]	6,800
Iran[e, 4]	--	1,800	1,510 [r, 5]	1,500 [r]	1,500
Korea, Republic of, all grades	30,356	42,385	49,474	27,078	27,000
Madagascar, phlogopite	1,071	1,349	1,233	358	800
Malaysia	5,152	6,118	5,593	4,323	4,500
Mexico, all grades	150	9,600 [r]	5,000 [r]	5,000 [r]	160 [p]
Norway, flake[e]	2,600	2,600	2,600	2,600	2,500
Peru[e]	61	60	91 [5]	84 [5]	85
Russia[e]	100,000	100,000	100,000	100,000	100,000
Serbia[e]	200	200	200	200	200
South Africa, ground and scrap	828	437	393	299	442 [5]
Spain	4,496	5,569 [r]	4,254 [r]	4,000 [r, e]	4,500
Sri Lanka, scrap	2,600	3,224	2,364 [r]	2,800 [r]	2,900
Taiwan	4,841	3,387	3,179	557	-- [5]
United States, scrap and flake[6]	110,000	96,600	85,300 [r]	51,200 [r]	52,800 [5]
Grand total	1,090,000 [r]	1,120,000 [r]	1,140,000 [r]	1,020,000 [r]	1,070,000

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

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

[2]Table includes data available through June 21, 2011.

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

[4]Year beginning March 21 of that stated.

[5]Reported figure.

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