

ALUMINUM

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In 2003, 7 domestic companies operated 15 primary aluminum reduction plants in 12 States and produced more than 2.7 million metric tons (Mt) of metal. Smelters east of the Mississippi River accounted for about 75% of the production. The value of U.S. production was estimated to be \$4.1 billion. Three additional companies had plants that were idled during the year. The 10 domestic producers had a total of 7 smelters that were either temporarily or permanently idled in 2003. At yearend, about 1.5 million metric tons per year (Mt/yr) of domestic primary aluminum smelting capacity, including idled potlines at operating smelters, equivalent to about 35% of total capacity, was closed.

Aluminum recovered from purchased scrap decreased slightly to 2.82 Mt. Of this recovered metal, about 60% came from new (manufacturing) scrap, and 40% came from old (discarded aluminum products) scrap. Aluminum used beverage cans (UBCs) accounted for more than 55% of the reported old scrap consumption in 2003. According to the Aluminum Association Inc. (2004a), the recycling rate for aluminum UBCs was 50%.

The transportation and the container and packaging industries remained the leading markets for aluminum products in Canada and the United States in 2003. The transportation industry accounted for 36% of domestic metal consumption; containers and packaging, 23%; building and construction, 16%; consumer durables, 8%; electrical, 7%; and other uses, 10%.

U.S. imports for consumption increased slightly in 2003 compared with those of 2002. Canada remained the leading shipper of aluminum materials to the United States, followed by Russia. Total exports from the United States in 2003, however, were slightly lower than those of 2002.

The price of primary ingot on the domestic and the international markets fluctuated during the year. The 2003 annual average domestic price, however, increased by more than 3 cents per pound compared with that of the previous year.

At the end of 2003, total world inventories of aluminum, as reported by the International Aluminium Institute (IAI) (2004), increased slightly compared with those of 2002. Inventories of aluminum metal and alloys held by the London Metal Exchange Ltd. (LME) also increased. Primary aluminum was produced in 41 countries in 2003. China, Russia, Canada, and the United States, in decreasing order of metal produced, accounted for more than one-half of total world production. World primary metal production increased by more than 6% compared with that of 2002.

Production

Primary.—Domestic primary aluminum production, which totaled a reported 2,703,328 metric tons (t), decreased slightly compared with that of 2002. Production data were obtained from the 11 domestic producers, all of whom responded to the U.S. Geological Survey (USGS) request for production data.

Increases in energy and alumina costs and the relative weakness in aluminum prices were among the reasons cited by several aluminum companies for their decisions to curtail aluminum production.

In March, Columbia Falls Aluminum Co. closed two of the three operating potlines at its 168,000-metric-ton-per-year (t/yr) Columbia Falls, MT, smelter. Each of the five potlines at Columbia Falls had a capacity of about 33,500 t/yr. The Montana smelter was one of the few operating smelters in the Pacific Northwest (Brooks, 2003a).

At the end of March, Goldendale Aluminum Co. (a subsidiary of Golden Northwest Aluminum Co.) closed the remaining 12,000 t/yr of operating capacity at its 160,000-t/yr Goldendale, WA, primary aluminum smelter. At the beginning of the year, the smelter was operating at the rate of 50,000 t/yr. At the beginning of March, 38,000 t/yr of capacity was idled before the decision to close all capacity was made at the end of the month (Brooks, 2003b). At the end of the year, Golden Northwest Aluminum and three subsidiaries (Goldendale Aluminum Co., Goldendale Holding Co., and Northwest Aluminum Technologies) filed a voluntary petition under Chapter 11 to restructure their debt. The filing was limited to Golden Northwest's aluminum operations and did not include its power development companies, Northwest Energy Development and its subsidiaries (Platts Metals Week, 2003b).

On April 23, Alcoa Inc. announced the temporary closure of 60,000 t/yr of production capacity at its two Massena, NY, smelters. The reduction affected approximately 24% of the smelters' combined capacity of 255,000 t/yr (Alcoa Inc., 2003n).

On November 1, Alcoa reduced operating capacity at its 278,000-t/yr Ferndale, WA, smelter to 90,000 t/yr. Prior to this reduction, the smelter had been operating two of its three potlines at a rate of 180,000 t/yr (Alcoa Inc., 2003m).

Citing the imbalance between alumina and aluminum prices, Ormet Corp. announced the temporary closure of two of the six potlines (88,000 t/yr) at its 265,000-t/yr Hannibal, OH, smelter at yearend. The company hoped to minimize the impact of low aluminum prices by curtailing some aluminum production and selling the alumina that would have been consumed making the primary metal. Alumina shortages worldwide caused alumina prices to soar in 2003 (Ormet Corp., 2003a).

In March, Longview Aluminum L.L.C. filed for Chapter 11 bankruptcy protection in Federal Court in Delaware. In July, the court appointed a Chapter 11 trustee to manage the company's assets. Longview operated a 240,000-t/yr smelter in Longview, WA (Brooks, 2003c).

In January, Kaiser announced the indefinite curtailment of its Mead, WA, aluminum smelter. The 200,000-t/yr smelter has been closed since January 2001 (Kaiser Aluminum & Chemical Corp., 2003a).

Alcoa formalized a plan and process for site restoration at its Troutdale, OR, smelter that was permanently closed in July 2002. The plan included the complete dismantling and demolition of plant structures, removal of process materials and wastes from discrete locations, restoration of Company Lake, and preparation of the site for redevelopment within 3 to 4 years of the start of the project (Alcoa Inc., 2003b).

Century Aluminum Co. purchased Glencore International AG's 20% interest in the Hawesville, KY, primary aluminum smelter to become the sole owner of the 244,000-t/yr facility (Century Aluminum Co., 2003b). Century also signed a new supply contract with Kaiser Aluminum and Chemical Corp. that covered all of the alumina requirements for the smelter from January 1, 2006, through December 31, 2008. The price of the alumina was to be indexed to the price of primary metal on the LME. The existing supply contract with Kaiser was to expire at the end of 2005 (Century Aluminum Co., 2003a).

Santee Cooper, South Carolina's state-owned electricity company, signed a 10-year contract to continue to supply electric power to the Mount Holly, SC, primary aluminum smelter until 2015. The jointly owned smelter (Alcoa, 50.33%; Century Aluminum, 49.67%) had the capacity to produce 222,000-t/yr of aluminum (Century Aluminum Co., 2003c).

Noranda Inc. signed a new power supply contract with Brascan Energy Marketing Inc. to provide Noranda's 250,000-t/yr, New Madrid, MO, smelter up to 490 megawatt hours (MWh) of electricity per year for a 2-year period commencing June 1. Noranda's contract with Associated Electric Cooperative expired on May 31 (Noranda Inc., 2004, p. 54).

Alcoa approved an \$83 million investment to develop the Three Oaks Mine, in central Texas, that reportedly will produce lignite coal for Alcoa's nearby Rockdale, TX, powerplant for the next 35 years. Electricity from the plant powered Alcoa's 264,000-t/yr Rockdale aluminum smelter (Alcoa Inc., 2003i).

Walter Industries Inc. announced the sale of its subsidiary (JW Aluminum Co.) to Wellspring Capital Management LLC. JW Aluminum operated a 100,000-t/yr rolling mill in Mount Holly that produced aluminum finstock and building products sheet (Platts Metals Week, 2003d).

Alcoa relocated two welded tube production lines and supporting equipment to its Texarkana, TX, plant. The equipment was purchased from the former Scottsboro Aluminum LLC rolling mill in Alabama. Welded tube lines transform coiled aluminum sheet into a tube or other cylindrical shape, longitudinally welding the product that can be found in a variety of furniture, medical-aid, and recreational applications (Alcoa Inc., 2003k).

Commonwealth Industries Inc., Louisville, KY, and Wise Alloys LLC, Muscle Shoals, AL, announced a 5-year strategic alliance under which Commonwealth will market Commonwealth Aluminum-branded, wide-width coil products manufactured by Wise Alloys. Wise manufactured sheet 72 to 108 inches wide (Commonwealth Industries Inc., 2003a).

Commonwealth signed new labor agreements with workers at three of its facilities. On April 10, members of the United Steelworkers of America ratified a new 5-year agreement that covered employees of Commonwealth's Lewisport, KY, rolling mill. The agreement replaced the old contract that expired on July 31 (Commonwealth Industries Inc., 2003c). On December 22,

employees represented by the Glass, Molders, Pottery Workers International Union ratified a 3-year agreement that covered workers at the Uhrichsville, OH, rolling mill and the Bedford, OH, coil coating facility. The new agreement extends through December 31, 2006 (Commonwealth Industries Inc., 2003b).

Secondary.—Metal recovered from new and old scrap decreased slightly to 2.82 Mt in 2003 (table 3), according to data derived by the USGS from its "Aluminum Scrap" survey. Of the 69 companies and/or plants to which monthly or annual survey requests were sent, 35 responded; they represented 76% of the total scrap consumed, as listed in table 4.

According to figures released by the Aluminum Association Inc., the Can Manufacturers Institute, and the Institute of Scrap Recycling Industries, 49.9 billion aluminum UBCs were recycled in the United States in 2003, for a beverage can recycling rate of 50%. For 22 of the past 23 years, the rate has equaled or exceeded 50% (Aluminum Association Inc., 2004a).

Hydro Aluminium announced an \$11 million upgrade at its remelt facility in Ellenville, NY. The upgrade included improvements in the scrap handling facility and the casting unit. Upon completion in 2004, the facility would have a remelt capacity of more than 60,000 t/yr (Hydro Aluminium, 2003a).

IMCO Recycling Inc. closed its Rockwood, TN, smelter and transferred the plant's remaining business to IMCO's Loudon, TN, and Morgantown, KY, facilities (Platts Metals Week, 2003c).

IMCO reached a 5-year tolling agreement with Metal Conversions Limited, a privately owned metal trading company that operated several scrap yards. IMCO planned to recycle Metal Conversions' aluminum materials and produce ingot, molten metal, and deoxidation products for the steel industry. As part of the agreement, IMCO purchased several casting lines located at Metals Conversions' Painesville, OH, plant resulting in an increase of more than 180,000 t (400 million pounds) of processing volume during the following 5 years (IMCO Recycling Inc., 2003).

Consumption

The end-use shipment data reported by the Aluminum Association includes aluminum product shipments in both the United States and Canada. In 2003, the combined United States and Canadian shipments of aluminum products to the transportation industry totaled 3.52 Mt. Shipments to the container and packaging industry, which was the second largest end-use market, was 2.24 Mt. Total shipments, excluding exports, of aluminum products in 2003 increased marginally compared with those of 2002 (table 6).

Alcoa was selected to supply Canadian aircraft manufacturer Bombardier Aerospace with aluminum flat-rolled products for its regional and business jets. As part of a multiyear agreement, Alcoa was to supply Bombardier with structural components and wing and fuselage skins for all Bombardier aircraft, including its Bombardier CRJ series and its Learjet, Challenger, and Global Express families of aircraft (Alcoa Inc., 2003j). Alcoa Howmet Castings was selected to provide components for the Joint Strike Fighter (JSF) aircraft and the European Airbus 380. Howmet was to manufacture a hydraulic vessel and cover that will fit into a contoured space in the wing of the Airbus 380 (Alcoa Inc., 2003h). Howmet was awarded contracts

by Honeywell International to develop seven new castings that will support Honeywell's Thermal Power Management System for the JSF. In addition, Howmet was awarded sole-source contracts by Pratt and Whitney Aircraft for all six of the turbine airfoils in the JSF main engine (Alcoa Inc., 2003g).

Universal Alloy Corp. purchased the extrusion press assets of Spectrulite Consortium Inc. in St. Louis, MO. The equipment would allow Universal to enter a new sector of the aerospace aluminum extrusion market. Universal's existing presses produced extrusions for fuselage applications, whereas the Spectrulite presses will produce the much larger extrusions for wing applications (Haflich, 2003).

Not all of the news from the aerospace industry, however, was good. Boeing Co. announced that its new 7E7 twin-engine commercial jet, named the Dreamliner, would use nonmetallic composite material in the construction of both the wing and fuselage rather than aluminum alloys. Aluminum use in the Dreamliner was expected to be 20% of the aircraft's weight as compared with 70% for Boeing's last new airliner, the 777. Composites, mainly within the vertical and horizontal tail structures, contributed 12% to the weight of the 777 compared with an expected 50% in the 7E7. Although the Dreamliner had been approved for sale, it could be more than 5 years before the 7E7 carries its first passenger (Ahmadzadeh, 2003).

Preliminary reports indicated that aluminum and other lightweight materials increased their use in the 2004-model cars and trucks. Aluminum picked up new production parts applications to boost the content of casting, extruding, sheet, and forging alloys by an estimated 4.3% to an average of 131 kilograms (289.5 pounds) per vehicle in automobiles, sport utility vehicles, trucks, vans, wagons, and cross-over vehicles built by automakers in North America. New powertrain parts applications, particularly engine cylinder blocks, heads, covers, bedplates, and oil pans, led the list of additional aluminum uses in the 2004 models. There were some modest increases for aluminum sheet, extrusion, and forging alloys in body, driveline, structural, and suspensions system applications (Wrigley, 2003b).

Alcoa was awarded a contract to supply aluminum for the hoods of Ford Motor Company's redesigned F-150 pickup trucks (Alcoa Inc., 2003a). Alcan began construction of a new manufacturing facility for the production of aluminum structural assemblies for the automotive industry. The new plant in Saguenay, Quebec, Canada, along with the newly completed facility in Novi, MI, was expected to manufacture aluminum bumper beams (Alcan Inc., 2003e). Superior Industries International Inc. signed a multiyear contract to supply Ford with five different wheel styles for the F-150. Superior could need as much as 11,800 t/yr (26 million pounds per year) of aluminum alloy A356 to produce these wheels. Aluminum wheels were expected to be purchased on 45% or more of these vehicles each year (Wrigley, 2003c). Toyota Motor Manufacturing North America chose Jackson, TN, as the location for a new diecasting plant that will produce V-6 and V-8 engine blocks. The plant will be operated by Bodine Aluminum Inc., a subsidiary of Toyota. The plant was expected to begin production in 2005, expand during several years, and eventually turn out 1 million blocks per year. This level of production could require about 22,700 t/yr (50 million pounds per year) of A380 alloy (Wrigley, 2003a).

Ball Corp., and Daiwa Can Co. and Mitsui & Co. Ltd. of Japan agreed to sell and distribute Daiwa's New Bottle Can[®] aluminum beverage container in North America. The reclosable can comes in three sizes ranging from 350 to 500 milliliters. More than three billion New Bottle Cans[®] have been sold worldwide since 2000 (Metal Bulletin Monthly, 2003).

Rexam PLC announced the planned closure of its aluminum can end manufacturing plant in San Leandro, CA, in 2004 to bring its beverage can- and end-making capacity into line with market demand. The plant manufactured 5.5 billion can ends per year (Platts Metals Week, 2003f).

Ormet Corp. announced the sale of its Iuka Lamination Division to Packaging Dynamics Corporation as part of its plan to concentrate on its core business areas of primary aluminum and fabricated mill products. Iuka produced laminated foil for the insulation, food packaging, gift wrap, and label stocks markets (Ormet Corp., 2003b).

Alcoa sold its polyethylene terephthalate (PET) packaging business in South America to Michigan-based Amcor PET Packaging for \$75 million. The sale was part of Alcoa's previously announced divestiture program to sell certain noncore businesses. Alcoa planned to continue to serve customers in the packaging and beverage industry throughout Latin America through its other packaging businesses (Alcoa Inc., 2003e).

Stocks

Producer inventory data reported by the Aluminum Association were revised to include inventories held by both United States and Canadian producers. The combined United States and Canadian producers inventories of aluminum ingot, mill products, and scrap totaled 1.4 Mt at yearend 2003 (Aluminum Association Inc., 2004b). The LME reported that primary aluminum metal ingot at its U.S. warehouses increased dramatically to more than 107,000 t at yearend 2003 from 650 t at yearend 2002. At yearend, U.S. LME warehouses also held more than 99,300 t of North American Special Aluminium Alloy Contract (NASAAC) metal ingot, a significant increase from the 44,200 t held at the end of 2002. These warehouses also held an additional 700 t of aluminum alloy ingot, the first time U.S. warehouses have held yearend inventories of alloy ingot since 1999 (London Metal Exchange Ltd., 2003).

Prices

The monthly average U.S. market price of primary aluminum metal, as reported by Platts Metals Week, fluctuated throughout the year. The monthly average price began the year at 66.3 cents per pound, reached a low for the year of 64.5 cents per pound in April, and, by December, had risen to 73.9 cents per pound. The average price in 2003 increased to 68.1 cents per pound, up from 64.9 cents per pound in 2002.

The LME average monthly cash price for high-grade primary aluminum ingot and the average monthly spot settlement price for primary aluminum ingot on the COMEX division of the New York Commodity Exchange, Inc. followed the same general trend as the U.S. market price. The 2003 average annual LME cash price increased to 64.9 cents per pound from 61.2 cents per pound in 2002. The COMEX monthly average spot settlement price

increased from 65.6 cents per pound in January to 73.5 cents per pound in December and averaged 67.0 cents per pound for the year.

Purchase prices for aluminum scrap, as quoted by American Metal Market, also fluctuated but closed at higher levels than those at the beginning of the year. The 2003 yearend price ranges for selected types of aluminum scrap were as follows: mixed low-copper-content aluminum clips, 57 to 58 cents per pound; old sheet and cast aluminum, 54 to 55 cents per pound; and clean, dry aluminum turnings, 53 to 54 cents per pound.

Aluminum producers' buying price range for processed and delivered UBCs, as quoted by American Metal Market, also closed higher at yearend. The price range began the year at 49 to 51 cents per pound and closed the year at 53.5 to 55 cents per pound. The annual average American Metal Market price for aluminum UBCs increased to 50.5 cents per pound in 2003 from 47.4 cents per pound in 2002.

The yearend indicator prices for selected secondary aluminum ingots, as published in American Metal Market, also increased compared with those at the beginning of the year. The closing prices for 2003 were as follows: alloy A380 (3% zinc content), 84 cents per pound; alloy B380 (1% zinc content), 85.3 cents per pound; alloy A360 (0.6% copper content), 88.2 cents per pound; alloy A413 (0.6% copper content), 88.1 cents per pound; and alloy 319, 87.6 cents per pound. Platts Metals Week published an annual average U.S. price of 70.2 cents per pound for A380 alloy (3% zinc content). The average annual LME cash price for a similar A380 alloy was 63.5 cents per pound and the annual average LME NASAAC cash price was 63 cents per pound.

Trade

Total exports of aluminum materials from the United States in 2003 were slightly lower than those of 2002 (table 8). An increase in exports of crude metal and alloys was overshadowed by decreases in exports of semifabricated material and aluminum scrap (table 9). About two-thirds of total U.S. exports in 2003 was shipped to Canada and Mexico. Shipments to China, 90% of which were in the form of aluminum scrap, accounted for an additional 17% of total exports.

Imports for consumption, however, increased slightly compared with those of the previous year (table 10). Canada remained the major source country, supplying 60% of the total imports in 2003 (table 11), and Russia continued to be the second leading supplier.

World Review

World production of primary aluminum metal increased 6% in 2003 compared with that of 2002 (table 12). China, Russia, Canada, and the United States, in decreasing order of metal produced, accounted for more than one-half of total world production.

Unwrought aluminum inventories held by members of the IAI decreased to 1.63 Mt at yearend 2003 from 1.66 Mt at yearend 2002. Unwrought aluminum is defined by the IAI as aluminum in its basic form made from primary metal or from scrap that is unworked in the metallurgical sense. IAI total aluminum inventories increased slightly to 2.97 Mt at yearend 2003 from 2.93 Mt at yearend 2002. Total aluminum is unwrought aluminum plus

unprocessed scrap, metal in process, and finished semifabricated (mill) products (International Aluminium Institute, 2004).

Yearend 2003 inventories of primary aluminum metal held by the LME increased to 1.42 Mt from 1.24 Mt at yearend 2002. Aluminum alloy inventories also increased to 62,600 t at yearend 2003 from 34,700 t at yearend 2002; and NASAAC ingot inventories increased to 99,300 t from 44,200 t at yearend 2002 (London Metal Exchange Ltd., 2003).

Industry Mergers.—On July 7, Alcan Inc. announced an unsolicited offer to acquire Pechiney securities. In August, Alcan received clearance from the French Government to proceed with the purchase. In September, the European Commission granted acquisition clearance subject to certain commitments and conditions. To meet the Commission's regulatory concerns in relation to aluminum flat-rolled products, Alcan undertook to divest either a 50% share in the AluNorf rolling mill and its Göttingen and Nachterstedt rolling mills or Pechiney's rolling mills at Neuf-Brisach, Rugles, and if necessary, the Annecy rolling mill. Alcan's Latchford recycling/casting operations also could be added to either the Alunorf or Neuf-Brisach packages. In addition, Alcan agreed to undertakings with the European Commission for the licensing of alumina refining technology, aluminum smelter cell technology, and anode baking furnace designs. Alcan also would eliminate the overlap arising from Alcan's and Pechiney's activities in aluminum aerosol cans and aluminum cartridges. The U.S. Department of Justice granted clearance for the acquisition upon the condition that Alcan divest itself of Pechiney's aluminum rolling mill located in Ravenswood, WV, to meet the Department's concerns involving the concentration of suppliers in the North American market for aluminum brazing sheet. By the beginning of 2004, Alcan had completed the purchase of all outstanding Pechiney securities, and Pechiney became an Alcan subsidiary (Alcan Inc., 2004, p. 10-16).

Australia.—Non-ferrous Metal Industry Foreign Engineering and Construction Company (NFC) of China signed an engineering and supply contract with Aldoga Aluminium Smelter Ltd. for the construction of a 420,000-t/yr smelter near Gladstone in Queensland. Construction was expected to begin in 2004 and the first metal poured in 2006. A planned third potline that would increase capacity to 630,000 t/yr would require additional environmental approvals since existing agreements limited total capacity at the smelter to 560,000 t/yr. Aldoga and NFC also reportedly signed a cooperation agreement to develop a bauxite mine and associated 4-Mt/yr alumina refinery in Australia (Clarke, 2003).

Azerbaijan.—Fondel Metal Participation B.V. announced plans to build a new, more energy efficient 100,000-t/yr primary aluminum smelter near the Gyandzha alumina refinery. The first 50,000 t/yr was expected to come online in 2005. Fondel was also modernizing the Sumgait smelter and upgrading the Gyandzha refinery (Interfax Mining & Metals Report, 2003a).

Bahrain.—Aluminium Bahrain (Alba) began construction of a fifth 307,000-t/yr potline at its primary aluminum smelter in Knuff. The line would use AP30S technology from Pechiney, similar to Alba's fourth potline, have 336 cells, and extend more than 1 kilometer in length. A new 650-megawatt (MW) power complex would service the new potline. Upon completion, scheduled for February 2005, capacity would increase to more than 800,000 t/yr, making it the world's largest aluminum smelter outside Eastern Europe (Henry, 2003).

In September, the Government of Bahrain and Alcoa signed a memorandum of understanding (MOU) that paved the way for Alcoa to acquire up to 26% equity in Alba and included a long-term alumina supply arrangement for the smelter. The MOU was also designed to accelerate plans for an additional 307,000-t/yr (sixth) potline that would increase smelter capacity to more than 1.1 Mt/yr. Final agreements on the equity stake were expected to be concluded in mid-2004 and become effective upon completion of the fifth potline in early 2005 (Alcoa Inc., 2003l).

Brazil.—Alcoa acquired the Camargo Correa Group's 40.9% interest in Alcoa's South American operations, comprising businesses in Argentina, Brazil, Chile, Colombia, Peru, Uruguay, and Venezuela. The largest subsidiary in the Group is Alcoa Aluminio S.A. that operated mining, refining, smelting, and fabrication facilities at various locations in Brazil. These assets included the 300,000-t/yr Pocos de Caldas alumina refinery and 91,000-t/yr aluminum smelter along with a 35.1% interest in the 1.33-Mt/yr Alumar refinery and a 53.7% interest in the 370,000-t/yr Alumar smelter in Sao Luis (Alcoa Inc., 2003d).

Companhia Brasileira de Alumínio (CBA) completed a \$370 million, 100,000-t/yr expansion at its smelter in Sao Paulo. The expansion increased the smelter's capacity to 340,000 t/yr (American Metal Market, 2003c).

Alcoa sold its 37% interest in Latas de Alumínio, S.A. (Latasa), an aluminum can business in Sao Paulo, to Rexam, a global beverage canmaker. Latasa operated six facilities in Brazil, and one each in Argentina and Chile (Alcoa Inc., 2003q).

Brunei.—The Brunei Economic Development Board and Alcoa signed an MOU to undertake a feasibility study on the establishment of an aluminum smelter and its associated infrastructure in Brunei. Alcoa would carry out the study in two phases during a period of 24 months beginning in the fourth quarter of 2003 (Alcoa Inc., 2003o).

Canada.—Alcan announced an \$18 million investment for a new facility in Saguenay, Quebec, for the production of aluminum structural assemblies for the automotive industry. Initially, the facility was expected to produce 600,000 aluminum bumpers per year but could eventually expand its product range to include side-impact beams, instrument panel supports, and other weight-saving structural subsystems. Production was scheduled to start in the fourth quarter of 2004 (Alcan Inc., 2003e).

Alcan completed the acquisition of VAW Flexible Packaging from Norsk Hydro. The purchase included 14 flexible packaging plants in 8 countries that manufactured a wide variety of products for the food, dairy, and pharmaceutical industries (Alcan Inc., 2003c).

Alcan developed a new treatment for spent potliners and announced plans to build an 80,000-t/yr treatment facility in Saguenay, Quebec, in the Lac-Saint-Jean region. It would use Alcan's Low Caustic Leaching & Liming (LCLL) Process. The new treatment plant was expected to reduce Alcan's treatment costs and provide the opportunity to treat spent potliners from other aluminum producers in the area. Construction was scheduled to begin in 2004 (Alcan Inc., 2003b).

Chile.—Noranda Inc. announced the temporary suspension of some of the developmental activities related to the 440,000-t/yr Alumysa aluminum smelter (Noranda Inc., 2003).

China.—Alcan announced the signing of a definitive joint-venture agreement with the Qingtongxia Aluminum Company

and the Ningxia Electric Power Development and Investment Co. Ltd. that gives Alcan 50% participation in an existing 150,000-t/yr smelter. Alcan also obtained the option to acquire up to 80% of a new 250,000-t/yr potline already under construction (Alcan Inc., 2003a).

Baotou Aluminum Co. and Pechiney reached an agreement for the construction of a new production unit for high-purity aluminum to be used in the manufacture of electronic components and capacitors. Initial production capacity of 5,000 t/yr of 99.99%-pure aluminum was expected to come online by the end of 2004 (Pechiney, 2003b).

Hydro Aluminium announced plans to construct a precision aluminum tubing plant in Suzhou, north of Shanghai. The plant was to produce precision drawn tubing, multiport extrusions, and extruded tubular profiles used in automotive heat transfer applications. The extrusion press was expected to be installed in July 2004 and production scheduled to begin by yearend 2004 (Hydro Aluminium, 2003b).

France.—Pechiney announced the closure of its 48,000-t/yr Auzat primary aluminum smelter in Ariege. Obsolete technology and poor economics were cited as reasons for the closure (Pechiney, 2003a).

Pechiney became the sole owner of the 250,000-t/yr Aluminium Dunkerque smelter by agreeing to purchase the remaining 65% of the plant from its financial partners (Pechiney, 2003c).

Ghana.—Kaiser announced the temporary closure of its 90%-owned Volta Aluminium Company Limited (Valco) primary aluminum smelter. Valco has five potlines, each with a capacity of 40,000 t/yr. During the last few years, Kaiser was forced to slowly reduce production levels in response to power allocation cuts owing to drought conditions that affected output at the Volta River Authority hydroelectric powerplant at Lake Akosombo. Valco operated four potlines in 2000, 2001, and early 2002, but was forced to close one of these potlines in March and another in December 2002. A third was closed in January 2003 (Kaiser Aluminum & Chemical Corp., 2003c).

In December, Kaiser signed an MOU to sell its interest in Valco to the Republic of Ghana. The transaction is subject to number of approvals, including 10%-owner Alcoa's right of first refusal pursuant to Valco's corporate governance requirements (Kaiser Aluminum & Chemical Corp., 2003b).

Iceland.—Alcoa finalized agreements with the Government of Iceland and Landsvirkjun, Iceland's National Power Company, to build the 322,000-t/yr Fjarðaál aluminum smelter in Eastern Iceland. The \$1.1 billion facility was expected to begin production in 2007 (Alcoa Inc., 2003f). Bechtel and an Icelandic engineering consortium (Honnon, Rafhonnun, VST) were chosen to design and build the new smelter (Alcoa Inc., 2003c).

Nordic Aluminium Oyj (Nordural) secured electricity supply contracts that would provide the power required to double capacity at its smelter to 180,000 t/yr. Sudurnes Heating Service and Reykjavik Energy were each to construct an 80-megawatt (MW) plant to provide the 150 MW of power that expansion would require. Nordural was owned by U.S.-based Columbia Ventures Corp. (Mining Journal, 2003b).

India.—Bharat Aluminium Corp. initiated plans to increase capacity at its 103,000-t/yr Korba smelter by an additional 250,000 t/yr. The \$850 million project was scheduled for

completion by yearend 2005. Increasing generating capacity at the captive powerplant and expanding alumina capacity were also being considered (CRU Aluminium Monitor, 2003b).

Hindalco Industries Ltd. completed the expansion of its facilities at Renukoot that increased capacity of the complex to 660,000 t/yr of alumina and 345,000 t/yr of aluminum. Hindalco also announced plans to further increase the capacity of the plants by removing process bottlenecks, with final targets of 700,000 t/yr of alumina and 360,000 t/yr of aluminum by yearend 2005 (Mining Journal, 2003a).

Indian Aluminium idled its 14,000-t/yr Alupuram smelter (CRU Aluminium Monitor, 2003a).

Japan.—Furukawa Electric and Sky Aluminium integrated their aluminum facilities to form the country's leading aluminum fabricator Furukawa-Sky Aluminium Corp. Of the two partners, Furukawa was the major, contributing four main plants and 70% of the new company's capital. Sky, with its five shareholders—Showa Denko K.K., Marubeni Corp., Nippon Steel, Mitsui & Co., and Mizuho Bank, brought one factory and 30% of the capital. In 2002, Furukawa produced 200,000 t of aluminum sheet and plate and 40,000 t of extrusions, while Sky produced 145,000 t of sheet and plate (McCulloch, 2003).

Kobe Steel Ltd. and Alcoa announced the termination of their can stock joint ventures and the expansion of their alliance to develop aluminum products for the automotive market. The companies intended to expand their existing cooperation in aluminum sheet for global automotive customers by adding research and development efforts on aluminum extrusions, castings, and forgings. As for their can stock ventures, Kobe would acquire control of KSL Alcoa Aluminum Company Ltd. in Japan, and Alcoa would receive Kobe's interest in KAAL Australia Pty. Ltd. (Alcoa Inc., 2003p).

Kazakhstan.—Corica AG, part of the Swiss-based J&W Investment Group, purchased a 31.8% interest in Alyumini Kazakhstan, which owned the 1.35-Mt/yr Pavlodar alumina refinery. Under terms of the agreement, Corica was obligated to build a 240,000-t/yr smelter in Kazakhstan. The interest was expected to be transferred upon completion of the first 60,000 t/yr of smelter capacity that had to be finished by yearend 2007 (CRU Alumina Monitor, 2003).

Malaysia.—Alcan increased its share in Aluminium Company of Malaysia, a manufacturer of light gauge aluminum products, to 60% from 36%. Alcan acquired the additional shares from Nippon Light Metal in exchange for its ownership in Alcan Nikkei Siam Limited in Rangsit, Thailand (Alcan Inc., 2003d).

Mozambique.—In October, phase two expansion of the Mozal aluminum smelter reached its full production capacity about 7 months ahead of its original schedule. The 253,000-t/yr potline doubled the smelter's nameplate capacity to 506,000 t/yr. Shareholders in Mozal were BHP Billiton (47% and the smelter operator), Mitsubishi Corporation of Japan (25%), Industrial Development Corporation (IDC) of South Africa (24%), and the Government of Mozambique (4%) (BHP Billiton, 2003b).

Nigeria.—Prior to the privatization sale of the Aluminum Smelter Co. of Nigeria (Alscon), the Government proposed a restructuring of smelter ownership to better reflect what the Government claimed was the partners' respective debt liabilities. Under the proposal, the Government share would increase to

90% from 70%, whereas Ferrostaal AG's stake would decrease to 7.5% from 20% and Alcoa's share would drop to 2.5% from 10% (Platts Metals Week, 2003e).

Norway.—Elkem ASA completed the potline expansion at its Mosjøen smelter that increased capacity to 185,000 t/yr (Alcoa Inc., 2004, p. 8).

Hydro Aluminium AS announced its intention to close 70,000 t/yr of aluminum production capacity at two of its Norwegian smelters by 2006. Soderberg lines at the Hoyanger and Ardal smelters were to be closed in order to meet tighter environmental requirements. Upon closure, capacity at the Hoyanger smelter would be reduced by 21,000 t/yr to 54,000 t/yr, and capacity at the Ardal smelter would decrease by 40,000 t/yr to a total of 172,000 t/yr (Metal Bulletin, 2003b).

Romania.—Marco International Inc. announced plans to increase capacity at its 215,000-t/yr Alro Slatina SA aluminum smelter to 300,000 t/yr. In January 2003, Marco International and its Romanian and British subsidiaries (Conef SA and Marco Acquisitions Ltd.) increased their stake in Alro to 78% from 52% (American Metal Market, 2003d).

Russia.—Shareholders of Nadvoitsy Aluminium approved plans to formally merge with the Siberian-Urals Aluminum Company (SUAL). Prior to the merger, SUAL held or controlled more than 90% of the 75,000-t/yr smelter (CRU Aluminium Monitor, 2003c).

SUAL announced the completion of a \$40 million upgrade of its Ural Aluminium smelter. The addition of a new 162-cell prebaked potline increased capacity to 135,000 t/yr (American Metal Market, 2003e).

Rostar, Russia's leading aluminum beverage can manufacturer, opened the first of two can lines at its new can manufacturing facility in Vsevolozhsk near Leningrad. The initial capacity of 800 to 850 million cans per year will double with the start of the plant's second line scheduled for 2004. Rostar also signed a deal with Baltika, Russia's leading brewing company, to supply one-half of its can demand (Interfax Mining & Metals Report, 2003b).

Saudi Arabia.—The Government's state-owned mining company, Ma'aden, announced that Bechtel had undertaken a feasibility study for the development of an integrated aluminum project centered around the Al-Zabirah bauxite deposit. The \$3.1 billion project called for ore from the open pit mine in the country's northern desert region to be transported by rail to a 1.4-Mt/yr alumina refinery and 600,000-t/yr smelter on the eastern coast of the country. The project also included a 1,400-MW powerplant and a desalination plant. Ma'aden hoped to begin production of alumina and aluminum in 2007 (Metal Bulletin, 2003c).

Slovakia.—Slovalco, a.s. completed its expansion project that added 54 new cells to its existing 172-cell potline, which increased capacity at the smelter to more than 150,000 t/yr (Slovalco, a.s., 2003).

Slovenia.—Hydro entered into a long-term purchase agreement, commencing January 1, 2004, with Talum, the Slovenian aluminum producer, for foundry-alloy casthouse products. In addition to the ongoing agreement for 50,000 t/yr of extrusions ingots, Talum was to supply Hydro with an average of 70,000 t/yr of foundry alloy products during the following 7 years (Hydro Aluminium, 2003c).

South Africa.—BHP Billiton announced the completion of its Hillside aluminum smelter expansion project at Richards Bay several months ahead of schedule. The 132,000-t/yr expansion increased Hillside's capacity to 670,000 t/yr, making it the largest smelter in the Southern Hemisphere and the Western World (BHP Billiton, 2003a).

United Kingdom.—Alcoa announced the closures of its Swansea, Wales, aluminum extrusion and end products plant, which produced 16,000 t/yr of aluminum extrusions for the construction, general engineering, and road transport markets (American Metal Market, 2003b). Alcoa planned to transfer production to its other plant at Banbury, Oxfordshire. Alcoa commissioned a new casting table and homogenizing furnace at the Banbury facility that increased billet production by 15% to 20%. Plant production, which used a combination of aluminum ingot and high-quality scrap as feedstock, was estimated to be about 38,000 t/yr of extruded products for the automotive and construction industries (Metal Bulletin, 2003a).

Venezuela.—Aluminio del Caroni SA (Alcasa) signed an MOU with a consortium headed by Glencore International AG for the construction of a fifth potline at its 210,000-t/yr primary aluminum smelter. Pechiney was expected to provide the technology for the 240,000-t/yr potline, and Fluor Daniel would handle the engineering and construction of the \$650 million project (American Metal Market, 2003a). Alcasa also announced that it had begun to reactivate the 148 cells in potline 2. The line, which was closed at yearend 1998, was undergoing a \$12 million renovation that would eventually bring the smelter back to full capacity (Platts Metals Week, 2003a). Corporacion Venezolana de Guayana (CVG) announced that it intended to add a sixth potline to its CVG Industria Venezolana de Aluminio CA (Venalum) smelter. The \$683 million project was expected to increase capacity at the 430,000-t/yr smelter to 640,000 t/yr (Platts Metals Week, 2003g).

Outlook

As the world economies continued to recover, world demand for aluminum was expected to increase. In the short term, demand could outstrip supply. The uncertainty for aluminum, as well as many other commodities, is China. Chinese demand for aluminum, in recent years, grew at double digit rates. There have been some signs, however, that demand may be slowing slightly. Reported shortages in power generation could also lead to a decrease in Chinese aluminum metal production. In the near term, announced expansions in worldwide smelter production should be adequate to meet the anticipated demand growth.

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TABLE 1
SALIENT ALUMINUM STATISTICS¹

		1999	2000	2001	2002	2003
United States:						
Primary production						
Quantity	thousand metric tons	3,779	3,668	2,637	2,707	2,703
Value	millions	\$5,470	\$6,030	\$4,000	\$3,870	\$4,060
Price, average, U.S. market, spot	cents per pound	65.7	74.6	68.8	64.9	68.1
Inventories (December 31):						
Aluminum industry ²	thousand metric tons	1,870	1,550	1,300	1,320	1,400
LME stocks in U.S. warehouses ³	do.	14	(4)	28	45	207
Secondary recovery: ⁵	do.	3,700	3,450	2,970	2,930	2,820
New scrap	do.	2,120	2,080	1,760	1,750	1,750
Old scrap	do.	1,570	1,370	1,210	1,170	1,070
Exports, crude and semicrude	do.	1,650	1,760	1,590	1,590	1,540
Imports for consumption, crude and semicrude	do.	4,000	3,910	3,740	4,060	4,130
Supply, apparent ⁶	do.	9,890	9,610	7,990	8,070 ^r	7,880
Consumption, apparent ⁷	do.	7,770	7,530	6,230	6,320 ^r	6,130
World, production	do.	23,600	24,300 ^r	24,300	26,000 ^r	27,700 ^e

^eEstimated. ^rRevised.

¹Data are rounded to no more than three significant digits except "United States, primary production, quantity."

²Data from the Aluminum Association Inc.; includes ingot, semifabricated material, and scrap. In 2003, data series revised to include inventory levels for both United States and Canadian producers.

³Includes aluminum alloyed material.

⁴Less than 1/2 unit.

⁵Metallic recovery from purchased, tolled, or imported new and old scrap expanded for full industry coverage.

⁶Defined as domestic primary metal production plus secondary recovery plus imports minus exports plus adjustments for Government and industry stock changes.

⁷Apparent supply less recovery from purchased new scrap.

TABLE 2
PRIMARY ANNUAL ALUMINUM PRODUCTION CAPACITY IN THE UNITED STATES, BY COMPANY¹

Company	Yearend capacity (thousand metric tons)		2003 ownership
	2002	2003	
Alcan Aluminum Corp., Sebree, KY	196	196	Alcan Inc., 100%.
Alcoa Inc.:			
Alcoa, TN	210	210	Alcoa Inc., 100%.
Badin, NC	120	120	Do.
Evansville, IN (Warrick)	309	309	Do.
Ferndale, WA (Intalco)	278	278	Alcoa Inc., 61%; Mitsui & Co. Ltd., 32%; YKK Corp., 7%.
Frederick, MD (Eastalco)	192	195	Do.
Massena, NY (St. Lawrence)	125	125	Alcoa Inc., 100%.
Massena, NY	130	130	Do.
Mount Holly, SC	212	224	Alcoa Inc., 50.3%; Century Aluminum Co., 49.7%.
Rockdale, TX	264	264	Alcoa Inc., 100%.
Wenatchee, WA	227	227	Do.
Total	2,070	2,080	
Century Aluminum Co.:			
Hawesville, KY	237	244	Century Aluminum Co., 100%.
Ravenswood, WV	170	170	Do.
Total	407	414	
Columbia Falls Aluminum Co., Columbia Falls, MT	168	168	Glencore International AG, 100%.
Goldendale Aluminum Co., Goldendale, WA	168	160	Private interest, 60%; employees, 40%.
Kaiser Aluminum & Chemical Corp., Mead (Spokane), WA	200	200	MAXXAM Inc., 100%.
Longview Aluminum, L.L.C., Longview, WA	204	204	Michigan Avenue Partners, 100%.
Noranda Aluminum Inc., New Madrid, MO	250	250	Noranda Mines Ltd., 100%.
Northwest Aluminum Corp., The Dalles, OR	82	82	Private interest, 100%.
Ormet Primary Aluminum Corp., Hannibal, OH	257	265	Ormet Corp., 100%.
Vanalco Inc., Vancouver, WA	116	116	Glencore International AG, 100%.
Grand total	4,120	4,140	

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

TABLE 3
U.S. CONSUMPTION OF AND RECOVERY FROM PURCHASED
NEW AND OLD ALUMINUM SCRAP, BY CLASS^{1,2}

(Metric tons)

Class	Calculated recovery		
	Consumption	Aluminum	Metallic
2002:			
Secondary smelters	1,680,000	1,130,000	1,220,000
Integrated aluminum companies	869,000	707,000	752,000
Independent mill fabricators	698,000	607,000	648,000
Foundries	112,000	95,300	102,000
Other consumers	8,320	8,250	8,250
Total	3,370,000	2,550,000	2,730,000
Estimated full industry coverage	3,620,000	2,730,000	2,930,000
2003:			
Secondary smelters	1,520,000	1,030,000	1,110,000
Integrated aluminum companies	852,000	691,000	736,000
Independent mill fabricators	746,000	651,000	696,000
Foundries	93,600	78,100	83,400
Other consumers	7,940	7,860	7,870
Total	3,220,000	2,460,000	2,630,000
Estimated full industry coverage	3,460,000	2,630,000	2,820,000

¹Excludes recovery from other than aluminum-base scrap.

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 4
U.S. STOCKS, RECEIPTS, AND CONSUMPTION OF PURCHASED NEW AND OLD ALUMINUM SCRAP AND SWEATED PIG IN 2003^{1,2}

(Metric tons)

Class of consumer and type of scrap	Stocks, January 1	Net receipts ³	Consumption	Stocks, December 31
Secondary smelters:				
New scrap:				
Solids	11,600	223,000	223,000	12,200
Borings and turnings	4,930	198,000	199,000	4,300
Dross and skimmings	5,020	455,000	456,000	4,640
Other ⁴	616	209,000	209,000	751
Total	22,100	1,090,000	1,090,000	21,900
Old scrap:				
Castings, sheet, clippings	8,870	246,000	247,000	7,630
Aluminum-copper radiators	1,550	15,400	15,500	1,400
Aluminum cans ⁵	838	62,800	62,600	1,070
Other ⁶	1,310	105,000	104,000	3,230
Total	12,600	430,000	429,000	13,300
Sweated pig	694 ^r	9,240	9,750	190
Total secondary smelters	35,400 ^r	1,520,000	1,520,000	35,400
Integrated aluminum companies, foundries, independent mill fabricators, other consumers:				
New scrap:				
Solids	18,200 ^r	732,000	742,000	8,190
Borings and turnings	465	17,300	17,300	465
Dross and skimmings	177 ^r	6,560	6,570	170
Other ⁴	6,150	174,000	175,000	5,390
Total	24,900 ^r	930,000	941,000	14,200
Old scrap:				
Castings, sheet, clippings	3,240 ^r	109,000	109,000	3,240
Aluminum-copper radiators	361	5,720	5,920	165
Aluminum cans ⁵	27,900	600,000	615,000	13,100
Other ⁶	22	29,800	29,800	22
Total	31,500 ^r	744,000	759,000	16,600

See footnotes at end of table.

TABLE 4--Continued
U.S. STOCKS, RECEIPTS, AND CONSUMPTION OF PURCHASED NEW AND OLD ALUMINUM SCRAP AND SWEATED PIG IN 2003^{1,2}

(Metric tons)

Class of consumer and type of scrap	Stocks, January 1	Net receipts ³	Consumption	Stocks, December 31
Integrated aluminum companies, foundries, independent mill fabricators, other consumers--Continued:				
Sweated pig	22	196	217	1
Total integrated aluminum companies, foundries, independent mill fabricators, other consumers	56,500 ^r	1,670,000	1,700,000	30,800
All scrap consumed:				
New scrap:				
Solids	29,700 ^r	955,000	964,000	20,400
Borings and turnings	5,400	215,000	216,000	4,770
Dross and skimmings	5,200 ^r	462,000	462,000	4,810
Other ⁴	6,760	384,000	384,000	6,140
Total	47,100 ^r	2,020,000	2,030,000	36,100
Old scrap:				
Castings, sheet, clippings	12,100 ^r	355,000	356,000	10,900
Aluminum-copper radiators	1,910	21,100	21,400	1,570
Aluminum cans	28,700	663,000	677,000	14,200
Other ⁶	1,330	135,000	133,000	3,250
Total	44,100 ^r	1,170,000	1,190,000	29,900
Sweated pig	716 ^r	9,440	9,970	191
Total of all scrap consumed	91,800 ^r	3,200,000	3,220,000	66,200

^rRevised.

¹Includes imported scrap. According to reporting companies, 8.08% of total receipts of aluminum-base scrap (278,000 metric tons) was received on toll arrangements.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Includes inventory adjustment.

⁴Includes data on foil, can stock clippings, and other miscellaneous.

⁵Used beverage cans toll treated for primary producers are included in secondary smelter tabulation.

⁶Includes municipal wastes (including litter) and fragmented scrap (auto shredder).

TABLE 5
PRODUCTION AND SHIPMENTS OF SECONDARY ALUMINUM ALLOYS BY INDEPENDENT SMELTERS IN THE UNITED STATES¹

(Metric tons)

	2002		2003	
	Production	Net shipments ²	Production	Net shipments ²
Diecast alloys:				
13% Si, 360, etc. (0.6% Cu, maximum)	24,300	25,200	21,100	21,200
380 and variations	384,000	379,000	317,000	318,000
Sand and permanent mold:				
95/5 Al-Si, 356, etc. (0.6% Cu, maximum)	49,100	61,800	49,200	48,700
No. 319 and variations	128,000	134,000	97,000	96,800
F-132 alloy and variations	27,700	27,300	25,800	26,600
Al-Mg alloys	1,190	1,180	2,360	2,310
Al-Zn alloys	2,080	3,020	1,760	1,620
Al-Si alloys (0.6% to 2.0% Cu)	634	614	37	56
Al-Cu alloys (1.5% Si, maximum)	3,460	3,590	4,570	4,620
Al-Si-Cu-Ni alloys	45	38	63	65
Other	938	975	390	363
Miscellaneous:				
Steel deoxidation	W	W	W	W
Pure (97.0% Al)	W	W	W	W
Aluminum-base hardeners	3,380	3,380	3,380	3,330
Other ³	88,000	87,800	100,000	102,000
Wrought alloys, extrusion billets				
Total	240,000	240,000	236,000	235,000
Consumption of materials other than scrap:				
Primary aluminum	97,700	XX	121,000	XX
Primary silicon	43,400	XX	39,600	XX
Other	9,040	XX	8,030	XX

See footnotes at end of table.

TABLE 5--Continued
 PRODUCTION AND SHIPMENTS OF SECONDARY ALUMINUM ALLOYS BY INDEPENDENT SMELTERS IN THE UNITED STATES¹

(Metric tons)

	2002		2003	
	Production	Net shipments ²	Production	Net shipments ²
Net metallic recovery from aluminum scrap and sweated pig consumed in production of secondary aluminum ingot ⁴	804,000	XX	691,000	XX

W Withheld to avoid disclosing company proprietary data; included with "Miscellaneous, other." XX Not applicable.

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

²Includes inventory adjustment.

³Includes other diecast alloys.

⁴No allowance made for meltloss of primary aluminum and alloying ingredients.

TABLE 6
 DISTRIBUTION OF END-USE SHIPMENTS OF ALUMINUM PRODUCTS IN THE UNITED STATES AND CANADA, BY INDUSTRY^{1,2}

Industry	2002		2003	
	Quantity (thousand metric tons)	Percentage of grand total	Quantity (thousand metric tons)	Percentage of grand total
Containers and packaging	2,260	21.1	2,240	21.2
Building and construction	1,560	14.6	1,560	14.8
Transportation	3,410	31.8	3,520	33.3
Electrical	677	6.3	655	6.2
Consumer durables	722	6.8	719	6.8
Machinery and equipment	616	5.8	621	5.9
Other markets	390	3.6	385	3.6
Total to domestic users	9,640	90.0	9,700	91.9
Exports ^c	1,070	10.0	857	8.1
Grand total	10,700	100.0	10,600	100.0

^cEstimated.

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

²Data series revised to include shipments in both the United States and Canada.

Source: The Aluminum Association Inc.

TABLE 7
 U.S. NET SHIPMENTS OF ALUMINUM WROUGHT AND CAST PRODUCTS, BY PRODUCERS^{1,2}

(Thousand metric tons)

	2001	2002	2003
Wrought products: ³			
Sheet, plate, foil	4,370 ^r	4,450 ^r	4,390
Pipe, tube, extruded shapes	1,550 ^r	1,550 ^r	1,530
Rod, bar, wire, cable	512 ^r	559 ^r	514
Forgings (including impacts)	92 ^r	94 ^r	89
Powder, flake, paste	56	57 ^r	56
Total	6,580 ^r	6,710 ^r	6,580
Castings:			
Sand	251 ^r	244	NA
Permanent and semipermanent mold	484 ^r	536	NA
Die	873 ^r	953	NA
Other	155 ^r	154	NA
Total	1,760 ^r	1,890	NA
Grand total	8,340 ^r	8,600	NA

¹Revised. NA Not available.

²Net shipments derived by subtracting the sum of producers' domestic receipts of each mill shape from the domestic industry's gross shipments of that shape.

³Data are rounded to no more than three significant digits; may not add to totals shown.

⁴For years 2002 and 2003, wrought products data series revised to include net shipments in the United States and Canada.

Sources: Wrought products, The Aluminum Association Inc.; Castings, U.S. Department of Commerce.

TABLE 8
U.S. EXPORTS OF ALUMINUM, BY COUNTRY¹

Country	Metals and alloys, crude		Plates, sheets, bars, etc. ²		Scrap		Total	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2002:								
Brazil	116	\$328	29,300	\$79,700	18	\$18	29,500	\$80,000
Canada	97,800	158,000	471,000	1,180,000	202,000	193,000	771,000	1,530,000
China	114	551	32,300	75,100	206,000	170,000	238,000	245,000
France	113	272	5,120	30,400	8	110	5,240	30,700
Germany	1,410	9,440	2,810	23,300	264	965	4,480	33,700
Hong Kong	162	1,200	4,060	13,600	8,190	10,500	12,400	25,400
Italy	14	90	1,960	9,600	39	55	2,010	9,740
Japan	3,350	10,100	9,060	64,000	27,100	31,100	39,600	105,000
Kazakhstan	--	--	181	431	--	--	181	431
Korea, Republic of	725	1,970	7,540	35,100	43,900	48,200	52,200	85,300
Mexico	98,800	143,000	114,000	367,000	85,300	107,000	299,000	617,000
Netherlands	129	791	800	4,930	314	961	1,240	6,680
Philippines	1	15	560	2,510	--	--	560	2,520
Russia	19	53	30	387	9	5	58	445
Saudi Arabia	(3)	4	14,500	32,800	--	--	14,500	32,800
Singapore	239	897	2,040	9,630	194	236	2,470	10,800
South Africa	61	282	142	810	--	--	204	1,090
Taiwan	233	1,280	6,430	17,200	27,200	28,300	33,800	46,700
Thailand	1	34	8,940	23,800	831	680	9,780	24,600
United Kingdom	647	3,110	8,890	64,800	661	941	10,200	68,800
Venezuela	6	54	7,900	19,700	1	6	7,900	19,800
Other	1,630	5,920	38,600 [†]	161,000	11,600	11,500	51,800 [†]	178,000
Total	206,000	337,000	766,000	2,220,000	613,000	603,000	1,590,000	3,160,000
2003:								
Azerbaijan	--	--	4	29	--	--	4	29
Brazil	88	272	16,400	54,100	(3)	3	16,500	54,400
Canada	120,000	197,000	476,000	1,170,000	141,000	165,000	737,000	1,530,000
China	183	680	24,700	68,100	244,000	234,000	269,000	303,000
France	107	302	4,600	33,900	5	102	4,720	34,300
Germany	949	7,620	5,080	43,800	372	985	6,400	52,400
Hong Kong	110	552	4,960	16,800	22,500	29,800	27,600	47,200
Italy	9	67	2,290	13,900	3	7	2,310	14,000
Japan	3,790	10,500	6,950	64,200	27,100	33,400	37,800	108,000
Kazakhstan	--	--	237	553	--	--	237	553
Korea, Republic of	317	1,300	16,100	61,700	45,000	54,000	61,400	117,000
Mexico	85,800	122,000	116,000	388,000	51,700	66,000	254,000	576,000
Netherlands	291	1,190	672	4,690	55	597	1,020	6,480
Philippines	2	3	572	2,740	--	--	573	2,740
Russia	64	146	114	656	--	--	178	802
Saudi Arabia	2	8	11,500	25,300	--	--	11,500	25,300
Singapore	163	1,100	1,440	13,900	85	152	1,690	15,100
South Africa	4	16	169	1,430	--	--	174	1,450
Taiwan	190	505	10,300	28,400	27,800	31,200	38,300	60,200
Thailand	41	149	5,730	19,200	1,900	1,690	7,670	21,000
Ukraine	(3)	10	31	103	--	--	31	113
United Kingdom	479	2,490	9,920	75,400	464	721	10,900	78,700
Venezuela	7	30	2,340	6,280	42	51	2,390	6,360
Other	1,460	5,200	29,500	147,000	14,700	14,700	45,600	167,000
Total	214,000	351,000	746,000	2,240,000	577,000	633,000	1,540,000	3,220,000

[†]Revised. -- Zero.

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

²Includes castings, forgings, and unclassified semifabricated forms.

³Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS OF ALUMINUM, BY CLASS¹

Class	2002		2003	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Crude and semicrude:				
Metals and alloys, crude	206,000	\$337,000	214,000	\$351,000
Scrap	613,000	603,000	577,000	633,000
Plates, sheets, bars, strip, etc.	706,000	1,880,000	690,000	1,900,000
Castings and forgings	19,200	132,000	20,000	142,000
Semifabricated forms, n.e.c.	41,500	205,000	36,800	198,000
Total	1,590,000	3,160,000	1,540,000	3,220,000
Manufactures:				
Foil and leaf	60,800	213,000	72,900	235,000
Powders and flakes	8,850	40,100	12,000	50,400
Wire and cable	30,800	76,700	30,400	80,000
Total	100,000	330,000	115,000	365,000
Grand total	1,690,000	3,490,000	1,650,000	3,590,000

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

Source: U.S. Census Bureau.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF ALUMINUM, BY CLASS¹

Class	2002		2003	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Crude and semicrude:				
Metals and alloys, crude	2,790,000	\$4,040,000	2,870,000	\$4,270,000
Plates, sheets, strip, etc., n.e.c. ²	637,000 ^r	1,430,000 ^r	653,000	1,510,000
Pipes, tubes, etc.	17,000	94,900	26,900	134,000
Rods and bars	149,000	417,000	142,000	435,000
Scrap	466,000	502,000	440,000	496,000
Total	4,060,000	6,490,000^r	4,130,000	6,840,000
Manufactures:				
Foil and leaf ³	105,000	337,000	110,000	354,000
Powders and flakes	3,570	14,200	5,570	18,500
Wire	118,000	190,000	156,000	269,000
Total	227,000	541,000	271,000	642,000
Grand total	4,290,000^r	7,030,000^r	4,400,000	7,480,000

^rRevised.

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

²Includes plates, sheets, circles, and disks.

³Excludes etched capacitor foil.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF ALUMINUM, BY COUNTRY¹

Country	Metals and alloys, crude		Plates, sheets, bars, etc. ²		Scrap		Total	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2002:								
Argentina	82,300	\$118,000	794 ^r	\$1,510 ^r	479	\$579	83,500	\$120,000
Australia	95,500	139,000	108	785	125	130	95,700	140,000
Bahrain	18,200	26,500	19,100	36,800	--	--	37,200	63,300
Belgium	(3)	5	8,680 ^r	21,000 ^r	450	691	9,130 ^r	21,700 ^r
Brazil	41,000	61,600	2,910	5,390	14,800	19,400	58,700	86,300
Canada	1,580,000	2,320,000	454,000 ^r	999,000 ^r	293,000	312,000	2,330,000	3,630,000
China	562	1,130	16,500	46,000 ^r	1,220	820	18,300	48,000 ^r
France	1,160	5,900	6,400 ^r	25,000 ^r	3,520	3,100	11,100 ^r	34,000 ^r
Germany	2,360	8,260	61,000	205,000	4,970	4,830	68,300	218,000
Italy	80	122	2,520	9,820	42	45	2,640	9,990 ^r
Japan	548	1,150	9,160 ^r	39,800	249	769	9,950	41,700
Kazakhstan	--	--	--	--	110	100	110	100
Korea, Republic of	3,510	5,160	5,450	14,500	99	135	9,060	19,800
Mexico	4,690	8,670	15,200 ^r	63,900 ^r	62,000	61,300	81,900 ^r	134,000
Netherlands	440	1,460	2,710	8,310	1,570	2,080	4,730	11,900
Norway	3,810	6,170	125	433	--	--	3,930	6,600
Panama	--	--	801	2,560	3,710	3,670	4,510	6,230
Russia	634,000	863,000	60,800	110,000	25,400	33,600	720,000	1,010,000
Slovakia	43	46	1	6	--	--	45	52
Slovenia	1	16	3,390	8,860	--	--	3,390	8,870
South Africa	15,900	21,300	31,900	72,300	8	4	47,800	93,600
Spain	624	1,450	244	1,300	--	--	868	2,750
Ukraine	--	--	20	30	--	--	20	30
United Arab Emirates	61,200	95,400	--	--	777	841	61,900	96,300
United Kingdom	1,230	1,930	8,410 ^r	31,900 ^r	4,490	4,860	14,100 ^r	38,700 ^r
Venezuela	203,000	294,000	21,800	36,000	7,330	6,580	232,000	337,000
Other	39,800	56,900	72,000 ^r	204,000 ^r	41,700 ^r	46,200 ^r	153,000 ^r	307,000 ^r
Total	2,790,000	4,040,000	804,000 ^r	1,940,000 ^r	466,000	502,000	4,060,000	6,490,000 ^r
2003:								
Argentina	70,300	110,000	1,000	2,450	495	592	71,800	113,000
Australia	78,100	70,300	116	671	9	10	78,200	71,000
Azerbaijan	--	--	1	3	--	--	1	3
Bahrain	3,010	4,630	15,500	31,200	--	--	18,500	35,800
Belgium	7	42	10,300	25,800	(3)	2	10,300	25,800
Brazil	72,100	108,000	16,500	38,500	3,880	6,290	92,500	153,000
Canada	1,730,000	2,640,000	439,000	1,010,000	306,000	352,000	2,480,000	4,000,000
China	559	1,040	25,200	71,500	328	536	26,100	73,100
France	714	5,810	6,020	25,000	497	492	7,230	31,300
Germany	10,400	22,100	67,300	231,000	721	701	78,500	254,000
Italy	(3)	2	2,260	9,660	--	--	2,260	9,670
Japan	294	656	8,240	39,800	1,070	1,550	9,600	42,000
Korea, Republic of	12	55	6,380	17,000	--	--	6,390	17,100
Mexico	3,680	7,160	17,200	62,400	71,200	75,000	92,100	145,000
Netherlands	670	1,830	2,600	11,200	289	401	3,560	13,400
Norway	502	1,110	160	598	--	--	662	1,710
Panama	--	--	836	2,350	2,300	2,520	3,130	4,870
Russia	627,000	910,000	45,200	90,800	5,160	6,880	677,000	1,010,000
Slovenia	--	--	4,740	12,300	--	--	4,740	12,300
South Africa	9,380	13,500	36,700	81,900	--	--	46,100	95,400
Spain	128	410	764	2,900	21	28	913	3,340
United Arab Emirates	51,400	81,200	3	30	719	808	52,100	82,100
United Kingdom	4,040	6,240	3,050	21,900	3,820	3,310	10,900	31,500
Venezuela	182,000	253,000	23,800	41,900	7,970	8,940	214,000	304,000
Other	20,600	32,600	90,000	244,000	36,000	35,800	147,000	312,000
Total	2,870,000	4,270,000	823,000	2,080,000	440,000	496,000	4,130,000	6,840,000

¹Revised. -- Zero.

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

²Includes circles, disks, rods, pipes, tubes, etc.

³Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 12
ALUMINUM, PRIMARY: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	1999	2000	2001	2002	2003 ^c
Argentina	206	262	245 ^e	269 ^r	272 ^p
Australia	1,718	1,769	1,797 ^r	1,836	1,857 ³
Bahrain	503	509	523 ^r	519 ^r	525 ³
Bosnia and Herzegovina ^{e,4}	70	95	96	104	105
Brazil	1,250	1,277 ^r	1,140 ^r	1,318	1,381 ³
Cameroon	90	86 ^r	91 ^r	80 ^e	80
Canada	2,390	2,373	2,583	2,709	2,792 ³
China ^e	2,530	2,800	3,250	4,300	5,450
Croatia ⁴	14	15 ^r	16 ^r	-- ^r	--
Egypt	193	193	189 ^e	190 ^e	190
France	455	441	462	463 ^r	450
Germany	634	644	652	653 ^r	650
Ghana	104	137 ^r	144 ^r	117 ^r	13
Greece	170	168	166 ^r	165	165
Hungary	34	34	34 ^{r,e}	35 ^e	35
Iceland ⁵	220	224	243	264	260
India ⁶	614	644	624	671 ^r	790
Indonesia ^{e,6}	106	160	180	160	180
Iran	137	140 ^e	160 ^r	169 ^r	170
Italy	187	189	187	190 ^r	190
Japan ⁷	11	7	7	6 ^r	7
Mexico ⁶	63	61	52	39 ^r	--
Mozambique	--	54	266	273	408 ³
Netherlands	286	302	294	284 ^r	300
New Zealand	327	328	322	335 ^e	340
Nigeria ^e	16	--	--	--	--
Norway	1,020	1,026	1,068	1,096	1,150
Poland ⁸	51	47	45	51 ^{r,e}	50
Romania ⁹	174	179	182	187 ^r	190
Russia	3,146	3,245	3,300	3,347	3,478 ³
Serbia and Montenegro ⁴	73	88	100	112 ^r	115
Slovakia ⁶	109	110	110 ^e	112 ^e	115
Slovenia ⁴	77	84 ^r	77 ^r	88	85
South Africa	689	673	662	707 ^r	738 ³
Spain	364	366	376	380	385
Suriname ^e	6	--	--	--	--
Sweden	99	101	102	101	101
Switzerland	34	36 ^r	36 ^r	40 ^r	40
Tajikistan	229	269 ^r	289	308	319 ³
Turkey ^e	62	61	62 ^{r,3}	63 ^r	63
Ukraine ⁹	115	104 ^r	106	112	114 ³
United Arab Emirates, Dubai ^e	440	470	500	536	540
United Kingdom	272	305	341	344 ^r	325
United States	3,779	3,668	2,637	2,707	2,703 ³
Venezuela	570	571 ^r	571	605 ^r	601 ³
Total	23,600	24,300 ^r	24,300	26,000 ^r	27,700

^eEstimated. ^pPreliminary. ^rRevised. -- Zero.

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

²Primary aluminum is defined as "the weight of liquid aluminum as tapped from pots, excluding the weight of any alloying materials as well as that of any metal produced from either returned scrap or remelted materials." International reporting practices vary from country to country, some nations conforming to the foregoing definition and others using different definitions. For those countries for which a different definition is given specifically in the source publication, that definition is provided in this table by footnote. Table includes data available through May 10, 2004.

³Reported figure.

⁴Primary ingot plus secondary ingot.

⁵Ingot and rolling billet production.

⁶Primary ingot.

⁷Excludes high purity aluminum containing 99.995% or more as follows, in metric tons: 1999--34,893; 2000--40,956; 2001--26,586; 2002--40,443 (revised); and 2003--40,000 (estimated).

⁸Primary unalloyed ingot plus secondary unalloyed ingot.

⁹Primary unalloyed metal plus primary alloyed metal, thus including weight of alloying material.