# ALUMINUM 

By Patricia A. Plunkert

## Domestic survey data and tables were prepared by Micheal George, statistical assistant, and the world production table was prepared by Linder Roberts, international data coordinator.

In 1999, 12 domestic companies operated 23 primary aluminum reduction plants that produced almost 3.8 million metric tons (Mt) of metal. Montana, Oregon, and Washington accounted for $39 \%$ of the production; Maryland, New York, Ohio, and West Virginia, 22\%; and other States, 39\%. The value was estimated to be $\$ 5.5$ billion.

During the year, two proposed mergers that involved five major aluminum companies were announced-a two-way merger between Alcoa Inc. and Reynolds Metals Company and a three-way merger of Alcan Aluminium Limited, Pechiney, and algroup, which was the aluminum division of Alusuisse Lonza Group Inc.

Aluminum recovered from purchased scrap increased by $9 \%$ to about 3.75 Mt . Of this recovered metal, $59 \%$ came from new (manufacturing) scrap, and $41 \%$, from old (discarded aluminum products) scrap. Aluminum used beverage can (UBC) scrap accounted for more than one-half of the reported old scrap consumption in 1999. The recycling rate for aluminum UBC's remained relatively stable at $62.5 \%$.

The transportation and the container and packaging industries remained the largest domestic markets for aluminum products in 1999. The transportation industry accounted for $37 \%$ of domestic consumption; containers and packaging, $24 \%$; building and construction, $15 \%$; consumer durables, $8 \%$; electrical, $7 \%$; and other uses, $9 \%$.
U.S. imports for consumption continued to increase significantly in 1999. During the last 3 years, imports increased by $43 \%$. Canada remained the largest shipper of aluminum materials to the United States, and imports of crude metal and alloys from Russia reached an all-time high. Total exports from the United States increased slightly in 1999.

The price of primary ingot on the domestic and the international markets trended upward during the year, thus reversing the yearlong downward trend in 1998. The 1999 monthly average domestic price increased by almost 16 cents per pound from January to December. The annual average, however, was relatively stable compared with that of the previous year.

At the end of 1999, world inventories, as reported by the International Primary Aluminium Institute (IPAI), decreased compared with those of the previous year. Inventories of primary metal held by the London Metal Exchange Ltd. (LME) increased, whereas inventories of aluminum alloy decreased.

Primary aluminum was produced in 44 countries in 1999. The United States was the largest producer with $16 \%$ of the world total, followed by Russia with $14 \%$, China with an estimated $11 \%$, and Canada with $10 \%$. World primary metal production increased by about $3 \%$ compared with that of 1998.

## Industry Structure-Mergers

On August 19, Alcoa and Reynolds announced that they had reached a definitive merger agreement under which Alcoa would acquire all outstanding shares of Reynolds in a stock-forstock transaction. Alcoa, which was the world's leading producer of primary aluminum, fabricated aluminum, and alumina, had 215 operating locations in 31 countries. Revenues for all of 1999 were $\$ 16.3$ billion (Alcoa Inc, 2000b, p. 56). Reynolds, which was the third largest aluminum company in the world, employed approximately 18,000 people at more than 100 locations in 24 countries. Reynolds revenues in 1999 were $\$ 4.8$ billion (Reynolds Metals Company, 2000, p. 20). The merger was dependent upon the approval of Reynold's shareholders, the Antitrust Division of the U.S. Department of Justice (DOJ), and the European Union (EU) (Alcoa Inc., 1999e).

On May 3, 2000, Alcoa and Reynolds announced that the DOJ and the EU had approved their proposed merger and that the merger had been completed. Reynolds shareholders had approved the merger on February 11. Under the terms of the consent decree entered into with the DOJ and an undertaking agreement with the EU, Alcoa will sell a $25 \%$ interest in Reynolds' Longview, WA, smelter, as well as Reynolds' interests in three alumina refineries-Worsley, Australia ( $56 \%$ ); Stade, Germany ( $50 \%$ ); and Sherwin, TX ( $100 \%$ ). As a result of the merger, each outstanding share of Reynolds common stock was converted into 1.06 shares of Alcoa common stock (Alcoa Inc., 2000a).

On August 11, 1999, Alcan, Pechiney, and algroup announced that they had reached agreement on the principal terms of a proposed merger of the three companies. The combined company, if approved, would be called A.P.A. and would employ approximately 91,000 people in 59 countries. In 1999, Alcan, algroup, and Pechiney had combined sales and operating revenues of $\$ 18.9$ billion (Alcan Aluminium Limited, 2000c, p. 66; algroup, 2000, p. 34; Pechiney, 2000, p. 161). On completion of the proposed merger, Alcan shareholders would hold $44 \%$ of the share capital of A.P.A.; Pechiney, $29 \%$; and algroup, $27 \%$. The merger was subject to approval by the companies' shareholders, the DOJ, and the EU (Alcan Aluminium Limited, 1999d, p. 1).

On April 13, 2000, the three companies announced their decision to withdraw the previously announced three-way merger plan and to terminate their Combination Agreement insofar as Pechiney was concerned. The companies had been unable to receive regulatory approval from either the DOJ or the EU. According to the companies, the required divestments
for approval would have threatened the economic viability of the proposed three-way merger. The Combination Agreement between Alcan and algroup, however, remained in effect with respect to their proposed two-way merger (Alcan Aluminium Limited, 2000d).

On April 21, Alcan reported that the applicable waiting period under U.S. antitrust regulations had expired and, consequently, that there was no U.S. antitrust barrier to proceeding with the Alcan-algroup merger (Alcan Aluminium Limited, 2000a). The EU gave its approval subject to commitments made by the companies to alleviate the EU's competition concerns in the aluminum trihydrate (ATH) market. Among its commitments, Alcan proposed selling algroup's ATH facility in Martinswerk, Germany, and the algroup lithography operations in Bridgenorth, United Kingdom (Platt's Metals Week, 2000).

On June 1, the companies announced that they had reached agreement on their revised merger plan. Pending shareholder approval, the merger will involve the combination of a cash payment and the exchange of 17.1 Alcan common shares for every algroup share. The combined sales and operating revenues of the two companies in 1999 was $\$ 12.3$ billion (Alcan Aluminium Limited, 2000c, p. 66; algroup, 2000, p. 34). Alcan, which was a leading producer of primary metal and rolled products, had operations in more than 30 countries with some 30,000 employees. Algroup, which was one of Switzerland's largest corporations, employed more than 23,000 people who were engaged in aluminum and packaging activities in 18 countries (Alcan Aluminum Limited, 2000b).

## Production

Primary.-Domestic primary aluminum production, which totaled a reported $3,778,608$ metric tons ( t ), increased by $2 \%$ compared with that of 1998 (table 1). Production data were obtained from the 12 domestic producers, all of whom responded to the request from the U.S. Geological Survey (USGS) for data. There was also a slight increase in domestic production capacity (table 2 ).

Glencore AG acquired Columbia Falls Aluminum Co., which operated a 168,000 -metric-ton-per-year (t/yr) primary aluminum smelter in Columbia Falls, MT. Prior to the acquisition, Glencore and Pechiney split production (50-50) from the smelter under a 5 -year tolling agreement that will expire in October 2000 (Platt's Metals Week, 1999h). In October, members of the Aluminium Workers' Trades Council AFL-CIO at Columbia Falls signed a new 5 -year labor agreement, which replaced the previous agreement that expired on October 15. Under the new contract, improvements were made to the employees' health insurance and retirement programs, and hourly wages were increased (Metal Bulletin, 1999f).
Mitsui \& Co. Ltd. increased its share in the Ferndale, WA, and Frederick, MD, primary aluminum smelters with its purchase of TosTem Corp.'s $9 \%$ interest in the plants. After the purchase, ownership of the plants was Alcoa, $61 \%$; Mitsui, $32 \%$; and YKK Corp., $7 \%$ (CRU Aluminium Monitor, 1999).

Southwire Co. began producing metal from the new fifth
potline at its NSA primary aluminum smelter in Hawesville, KY. The $50,000-\mathrm{t} / \mathrm{yr}$ potline, which was expected to be fully operational by the end of the year, will increase the smelter's capacity to $237,000 \mathrm{t} / \mathrm{yr}$ (Metal Bulletin, 1999g).

Kaiser Aluminum \& Chemical Corp. announced the restart of $50,000 \mathrm{t} / \mathrm{yr}$ of capacity at its primary aluminum smelter in Mead, WA (Kaiser Aluminum \& Chemical Corp., 1999b). Half of the idled $20,000-\mathrm{t} / \mathrm{yr}$ potline at Kaiser's Tacoma, WA, smelter also was restarted to meet internal requirements.
Restart of the remaining portion of the Tacoma potline would depend upon market supply-and-demand considerations. The capacity at the two smelters had been temporarily idled since September 1998 (Kaiser Aluminum \& Chemical Corp., 2000, p. 6).

Improvements by Noranda Aluminum Inc. will increase production capacity at its New Madrid, MO, smelter to 253,000 $\mathrm{t} / \mathrm{yr}$ by 2003 from 230,000 t/yr in 1999 (Mining Journal, 1999b).
On July 2, Century Aluminum Co. and the United Steelworkers union (USW) announced the ratification of a new 4 -year labor contract that would cover workers at Century's 168,000-t/yr primary aluminum smelter in Ravenswood, WV. The previous contract expired on May 31 (Metal Bulletin, 1999d).
Alcan and the USW agreed to a 5 -year labor contract that would cover workers at Alcan's $186,000-\mathrm{t} / \mathrm{yr}$ Sebree, KY, primary aluminum smelter. The agreement reportedly included improvements in wages and benefits. The previous contract expired on October 28 (Metal Bulletin, 1999a).

Noranda sold its rolling mill in Scottsboro, AL, to Michigan Avenue Partners. The operation, which was renamed Scottsboro Aluminum, produced painted and bare aluminum sheet and welded aluminum tube and had a capacity of approximately $181,000 \mathrm{t} / \mathrm{yr}$ of aluminum products (Metal Bulletin, 19991).

Pechiney announced the purchase of Century's aluminum rolling mill and cast plate facility. The rolling mill at Ravenswood, WV, had the capacity to produce $270,000 \mathrm{t} / \mathrm{yr}$ of rolled aluminum products for the aerospace and transportation markets. The cast plate plant at Vernon, CA, had the capacity to produce $7,000 \mathrm{t} / \mathrm{yr}$ of cast aluminum plate for the machinery and equipment markets (Pechiney, 1999).
Caradon Inc., the U.S. subsidiary of the United Kingdom's Caradon Plc, merged with Easco Inc., the largest independent aluminum extruder in the United States. Easco operated 8 plants with a total of 21 soft-alloy extrusion presses, and Caradon ran 13 presses at 2 plants in the United States and 4 plants in Canada. The new company, Indalex Aluminum Solutions, became North America's second largest extruder. Alcoa, which had about 65 presses in North America, was the largest (Platt's Metals Week, 1999c).

Coastal Aluminum Rolling Mills Inc. announced a $\$ 12$ million expansion at its Williamsport, PA, rolling mill. The major component of the expansion is the addition of a new light-gauge foil mill capable of producing aluminum foil as thin as 0.006 millimeter $(\mathrm{mm})(0.00025 \mathrm{inch})$. The new mill will allow Coastal to enter the aluminum converter foil market and to produce flexible packaging for the pharmaceutical and
food and beverage markets (Light Metal Age, 1999).
Alcan and ARCO Aluminum Inc. announced a $\$ 22$ million expansion of their jointly owned Logan Aluminum Co. rolling mill in Kentucky. The expansion, which included a new $200,000-\mathrm{t} / \mathrm{yr}$ pusher furnace to replace older technology, should increase plant efficiency and, thereby, increase capacity by approximately $15,000 \mathrm{t} / \mathrm{yr}$ (Alcan Aluminium Limited, 1999b).

Reynolds sold its can complex in Muscle Shoals, AL, to Wise Alloys LLC, an affiliate of Wise Metals Group LLC. Included in the sale were a rolling mill, two reclamation plants, and a coil coating facility (Reynolds Metals Company, 1999c).

Kaiser was in the initial stages of a product mix enhancement program at its Trentwood, WA, rolling mill. The company expected to move its product mix away from beverage can body stock toward higher value-added product lines, such as beverage can lid and tab stock and products for the automotive and other niche markets (Kaiser Aluminum \& Chemical Corp., 1999d; Platt's Metals Week, 1999i).

Secondary.-Metal recovered from new and old scrap increased to 3.7 Mt in 1999 (table 3), according to data derived by the USGS from its "Aluminum Scrap" survey. Of the 83 companies and/or plants to which monthly or annual survey requests were sent, 57 responded, which represented $77 \%$ 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, 63.9 billion aluminum UBC's were recycled in the United States in 1999. The recycling rate was $62.5 \%$, which was a slight decrease from the $62.8 \%$ recycling rate reported in 1998; the rate is based on the number of cans shipped during the year. This was the 11th consecutive year in which the aluminum can recycling rate was greater than $60 \%$. According to the organizations' joint press release, aluminum beverage cans produced domestically in 1999 had an average $51.2 \%$ recycled content, the highest average recycled content percentage of all packaging materials (Aluminum Association Inc., 2000a).

Alcan announced plans to add a remelt furnace at its Sebree plant to process new scrap generated by the company's extrusion billet customers. The company also planned to use a blend of primary aluminum and remelt scrap in its extrusion billets. The new furnace will have the capacity to handle $50,000 \mathrm{t} / \mathrm{yr}$ of scrap. Target date for completion of the $\$ 5$ million project was the end of 2000 (Platt's Metals Week, 1999a).

Hydro Aluminum Metal Products, a division of Norsk Hydro ASA, announced plans to build an aluminum remelt plant in Henderson, KY, that will process aluminum scrap and produce aluminum billet. The new plant will have an initial capacity of $90,000 \mathrm{t} / \mathrm{yr}$ of "primary quality" billet and should be in operation in 2001. The state-of-the-art technology, which was being used in other Hydro remelt plants in Europe, reportedly ensured a product that would be interchangeable with primary aluminum billet produced from smelters (Metal Bulletin, 1999i).

Delta Group Inc. has installed a new 3,400-metric-ton-permonth ( $\mathrm{t} / \mathrm{mo}$ ) ( 7.5 -million-pound-per-month) furnace at its secondary aluminum plant in Muskego, WI. The new furnace
replaces the company's old $2,000-\mathrm{t} / \mathrm{mo}$ (4.5-million-pound-permonth) furnace at the same location (Platt's Metals Week, 1999f).

CM Metals, which purchased secondary aluminum producer Gettysburg Foundry and Alloys in November 1998, announced plans to move a large portion of that plant's 2,270-t/mo (5-million-pound-per-month) capacity to a Chicago location and to begin production of $1,360 \mathrm{t} / \mathrm{mo}$ ( 3 million pounds per month) of secondary aluminum alloys by the end of the year. The company planned to bring the remaining capacity at the Gettysburg plant online sometime in 2001 (Platt's Metals Week, 19991).

Superior Aluminum Alloys announced plans to add a third furnace at its New Haven, IN, plant. The expansion would add from 27,200 to $38,600 \mathrm{t} / \mathrm{yr}$ ( $60-85$ million pounds per year) to the smelter's output, which has been estimated to fall in the range of 54,400 to $68,000 \mathrm{t} / \mathrm{yr}$ (120-150 million pounds per year) of secondary aluminum (Platt's Metals Week, 1999m).

Resource LLC opened a new secondary aluminum smelter in Friendly, WV. The first of four planned furnaces was in operation and had a capacity to process more than $2,700 \mathrm{t} / \mathrm{mo}$ ( 6 million pounds per month) of dross concentrates, white dross, and scrap. The second of these tilting rotary furnaces was planned for startup by the end of the year. Resource was also installing a cold processing line capable of concentrating $7,300 \mathrm{t} / \mathrm{mo}$ ( 16 million pounds per month) of black dross and salt cake to be used as feed for its own furnaces or sold (Metal Bulletin, 1999m).

IMCO Recycling Inc. purchased Alcan's secondary aluminum alloys plant in Shelbyville, TN. The plant had the capacity to produce $54,400 \mathrm{t} / \mathrm{yr}$ ( 120 million pounds per year) of specification aluminum alloys. The facility was built in 1989 and is located near numerous producers of automobiles and auto and truck components (IMCO Recycling Inc., 1999a).

IMCO also announced that it had signed a contract to supply approximately 1.36 Mt ( 3 billion pounds) of recycled aluminum metal to Commonwealth Industries Inc. during a 10-year period. The metal will be produced at IMCO's Uhrichsville, OH , plant and will be delivered in molten form to Commonwealth's rolling mill, which is located nearby. To meet the terms of the new contract, IMCO began an $\$ 8.5$ million expansion project that included the installation of two new reverberatory furnaces and other improvements at the Uhrichsville plant. When completed in 2000, the expansion will increase the facility's rated capacity to $272,000 \mathrm{t} / \mathrm{yr}$ ( 600 million pounds per year) from $163,000 \mathrm{t} / \mathrm{yr}$ ( 360 million pounds per year) (IMCO Recycling Inc., 1999b).

IMCO also signed a long-term supply contract with General Motors Corp. (GM). IMCO agreed to supply GM with more than $907,000 \mathrm{t}$ of secondary aluminum specification alloys during the next 13 years. The metal will be produced at IMCO's plants at Coldwater, MI, and Shelbyville, TN, until a proposed new secondary smelter at Zilwaukee, MI, can be built (Platt's Metals Week, 1999p; Wrigley, 1999b).

Wise Alloys LLC announced plans to restart the Southern Reclamation aluminum scrap recycling facility in Muscle Shoals, AL, that it had purchased from Reynolds earlier in the year (Reynolds Metals Company, 1999c). The facility, which
had been idle for more than a year, is capable of processing 6,800 to $8,200 \mathrm{t} / \mathrm{mo}$ ( $15-18$ million pounds per month) of aluminum UBC's. The molten metal produced at the plant will be transported to the company's rolling mill, which is also located in Muscle Shoals (Platt's Metals Week, 1999n).

ACX Technologies Inc. sold Golden Aluminum Company, its subsidiary, to Alcoa (Alcoa Inc., 1999b). Golden ownership had reverted to ACX in August when Crown Cork \& Seal Company Inc. exercised its option to return the plants to ACX (Platt's Metals Week, 1999b). Golden's operations included a rolling facility in Ft. Lupton, CO, that produced up to 31,800 $\mathrm{t} / \mathrm{yr}$ ( 70 million pounds per year) of coated and mill finished sheet for food and beverage containers, as well as an idled rolling facility in San Antonio, TX. Under a consent decree with the DOJ, Alcoa agreed to sell the Ft. Lupton facility. Alcoa planned to retain the San Antonio plant for development work and non-can sheet production (Alcoa Inc., 1999b).

## Consumption

In 1999, the transportation industry accounted for 3.6 Mt of total U.S. shipments of aluminum products (table 6). The container and packaging industry, which was the second largest domestic end use market, consumed more than 2.3 Mt of aluminum products. Total shipments of aluminum products to domestic users increased by approximately $6 \%$ in 1999 compared with those of 1998.

Drucker Research Company Inc. released a report in which past trends and future growth potential of aluminum use in North American passenger cars and light trucks were analyzed. According to Drucker, the aluminum content has increased to approximately 115 kilograms ( kg ) ( 250 pounds) per vehicle in 1999 from 45 kg (100 pounds) per vehicle in the late 1970's, a compound growth rate of more than $4 \%$ per year during the 20 year period; in the past 8 years alone, aluminum usage has grown by almost 30 kg ( 65 pounds) per vehicle. Drucker predicted a $2.5 \%$ to $3.0 \%$ compound annual growth rate for average vehicle aluminum content during the next 10 years. The aluminum content by 2010 is projected to be about 147 kg ( 325 pounds) per vehicle, 104 kg of cast products and 43 kg of mill products (Schultz and Haupricht, 1999).

Ford Motor Co. signed a letter of intent to acquire Troy Design \& Manufacturing Co. (TDM), a designer of metal fabricating tools with special skills in aluminum parts-stamping dies. The unusual acquisition reportedly underscored Ford's plans to produce lightweight vehicles with aluminum bodies and structural components. TDM, which had engineering/design service facilities in Redford and Warren, MI, was regarded as one of the top companies in automotive draw die development work (Wrigley, 1999a).

Kaiser announced the sale of its $50 \%$ interest in AKW to Accuride Corporation, Kaiser's partner in the joint venture. AKW was formed in 1997 to design, manufacture, and sell heavy duty aluminum wheels (Kaiser Aluminum \& Chemical Corp., 1999a).

Alcoa acquired the remaining 50\% interest in A-CMI from Hayes Lemmerz International Inc. A-CMI was a joint venture formed in 1995 between Alcoa and CMI International to
produce cast aluminum products for the automotive industry. Hayes Lemmerz had purchased CMI International in February 1999. A-CMI's plants were located in Kentucky, Michigan, and Norway (Alcoa Inc., 1999a).

Despite an increase ( $0.2 \%$ ) in the number of aluminum cans shipped in the United States in 1999 (Aluminum Association Inc., 2000a), several packaging companies announced plans to close aluminum can manufacturing facilities. Crown Cork \& Seal announced plans to close its 1.2-billion-can-per-year Atlanta, GA, aluminum beverage can plant (Platt's Metals Week, 1999e). Ball Corporation announced that it would close one of its two beverage can manufacturing plants in Tampa, FL. The plant, which had been acquired from Reynolds in 1998, produced approximately 1.5 billion aluminum beverage cans per year (Ball Corporation, 1999). American National Can Group Inc. (ANC) announced that it would close its Piscataway, NJ, aluminum can plant. The reasons cited were overcapacity in the industry as a whole and in the ANC system, as well as the location of a comparable, slightly smaller ANC plant just 12 miles away in Monmouth Junction, NJ (Platt's Metals Week, 1999o).

## Stocks

Domestic inventories of aluminum ingot, mill products, and scrap decreased to 1.87 Mt at yearend 1999 from 1.93 Mt at yearend 1998 (Aluminum Association Inc., 2000b). The LME reported that its U.S. warehouses held $12,700 \mathrm{t}$ of primary aluminum metal ingot compared with approximately $11,300 \mathrm{t}$ at yearend 1998. It also reported that aluminum alloy ingot at its U.S. warehouses at yearend 1999 totaled 860 t , a significant decrease from the 1,500 t held at yearend 1998 (London Metal Exchange, 1999).

## Prices

The monthly average U.S. market price of primary aluminum metal, as reported by Platt's Metals Week, trended upward during the year. The monthly average price began the year at 58.8 cents per pound and by December, the monthly average had risen to 74.7 cents per pound, which was an increase of almost 16 cents per pound for the year. The average price for the year was 65.7 cents per pound, a very slight increase compared with the 1998 average annual price of 65.5 cents per pound (table 1).

The LME cash price for high-grade primary aluminum ingot followed the same general trend as the U.S. market price. The 1999 average annual LME cash price was 61.7 cents per pound.

Purchase prices for aluminum scrap, as quoted by American Metal Market, followed the general trend of primary ingot prices, and scrap prices, which closed the year at significantly higher levels than those at the beginning of the year, averaged more than 10 cents per pound higher than those at yearend 1998. The yearend price ranges for selected types of aluminum scrap were as follows: mixed low-copper-content aluminum clips, 53.5 to 54.5 cents per pound; old sheet and cast aluminum, 48.5 to 49.5 cents per pound; and clean, dry aluminum turnings, 48.5 to 49.5 cents per pound.

Aluminum producers' buying price range for processed and delivered UBC's, as quoted by American Metal Market, also trended upward during the year. The price range began the year at 44 to 45 cents per pound and closed the year at 57 to 59 cents per pound. Resource Recycling published a monthly transaction price for aluminum UBC's in its Container Recycling Report. During the year, the monthly average increased significantly from 44.4 cents per pound in January to 59.6 cents per pound in December. Similar to the U.S. market price trend of primary aluminum ingot, however, the annual average price for 1999 of 50.6 cents per pound was only marginally higher than the 1998 annual average of 50.0 cents per pound.

The yearend indicator prices for selected secondary aluminum ingots, as published in American Metal Market, also increased significantly compared with those of 1998. The closing prices for 1999 were as follows: alloy 380 ( $1 \%$ zinc content), 78.34 cents per pound; alloy 360 ( $0.6 \%$ copper content), 81.78 cents per pound; alloy 413 ( $0.6 \%$ copper content), 81.48 cents per pound; and alloy $319,81.06$ cents per pound. Platt's Metals Week published an annual average U.S. price of 65.05 cents per pound for A-380 alloy ( $3 \%$ zinc content). The average annual LME cash price for a similar 380 alloy was 54.03 cents per pound.

The New York Mercantile Exchange launched a new Commodity Exchange (COMEX) aluminum futures contract on May 14. The futures contract called for Midwest delivery with a minimum grade of P1020A, or $99.7 \%$ purity, in approximately 20-t (44,000-pound) lots. The first two COMEX warehouses were located at Owensboro, KY, and Clarksville, TN (Platt's Metals Week, 1999q).

## Foreign Trade

Total exports from the United States increased slightly in 1999 compared with those of 1998 (table 8). Exports of semifabricated materials and crude metals and alloys increased, but exports of aluminum scrap declined compared with those of 1998 (table 9). Almost three-fourths of total U.S. exports were accounted for, in decreasing order of shipments, by Canada, Mexico, and Japan.

Imports for consumption continued to increase significantly in 1999 compared with those of the previous year (table 10). During the past 3 years, imports have increased by $43 \%$. Canada remained the major source country by supplying 55\% of the total imports in 1999 (table 11). Russia continued to be the second largest supplier of aluminum materials. Imports of crude metal and alloys from Russia increased significantly (18\%) in 1999 and reached an all-time high of more than $711,000 \mathrm{t}$.

## World Review

To meet the increased worldwide demand for aluminum, production of primary aluminum metal increased by $3 \%$ in 1999 compared with that of 1998 (table 12). The U.S. demand remained strong, and demand in European and Asian markets improved during the course of the year.

In 1999, the IPAI revised the guidelines that govern the reporting of aluminum inventories and published dual sets of data for 1999. The switchover to the new guidelines became official with 2000 data. A full explanation of and reasons for the change can be obtained from IPAI directly. The contact information can be found on their web site at URL http://www.world-aluminium.org/.

From the end of January through the end of December 1999, inventories of unwrought aluminum, as reported by IPAI, decreased by approximately $180,000 \mathrm{t}$ (old inventory definition) or $100,000 \mathrm{t}$ (new definition). Dual data for the end of selected months, where available, are given below.

Using the old definition, unwrought aluminum inventories held by members of the IPAI were as follows: December 1998, 1.69 Mt; January 1999, 1.73 Mt; and December 1999, 1.55 Mt. Total metal inventories were as follows: December 1998, 3.16 Mt; January 1999, 3.18 Mt; and December 1999, 2.96 Mt (International Primary Aluminium Institute, 2000a).

Using the new definitions, yearend 1998 data were not available. Unwrought aluminum inventories were as follows: January 1999, 1.90 Mt, and December 1999, 1.80 Mt. Total inventories were as follows: January 1999, 3.34 Mt, and December 1999, 3.18 Mt (International Primary Aluminium Institute, 2000b).

Inventories of primary aluminum metal held by the LME, however, increased to 774,000 t at yearend 1999 from 636,000 t at yearend 1998, whereas aluminum alloy inventories followed the IPAI inventory trend and decreased to 78,000 t at yearend 1999 from 96,000 t at yearend 1998 (London Metal Exchange, 1999).

Argentina.-Aluar Aluminio SA completed the $\$ 349$ million expansion at its Puerto Madryn primary aluminum smelter in Argentina. The $72,000-\mathrm{t} / \mathrm{yr}$ expansion increased capacity at the smelter to 260,000 t/yr (Metal Bulletin, 1999c).

Australia.-Tomago Aluminium Company Pty Limited completed an upgrade of its primary aluminum smelter in New South Wales. Two of the plant's existing potlines were upgraded, and 80 new pots were added to the lines, which increased capacity at the smelter to $440,000 \mathrm{t} / \mathrm{yr}$. Participants in the smelter were Pechiney Pacific Pty Limited (36.05\%), Gove Aluminium Finance Limited (36.05\%), TOA Pty Limited (15.5\%), VAW Australia Pty Limited (6.2\%), and V.A.W. Tomago, Inc. (6.2\%) (Metal Bulletin, 1999n).

Brazil.-Norsk Hydro entered into a 10-year purchasing agreement with Vale do Rio Doce Alumínio S.A. (Aluvale) for approximately 1 Mt of primary aluminum metal from the Alumínio Brasileiro S.A. (Albras) smelter in Barcarena. The 345,000-t/yr Albras smelter was jointly owned by Aluvale ( $51 \%$ ), a wholly owned subsidiary of Companhia Vale do Rio Doce (CVRD), and the Japanese group Nippon Amazon Aluminium Co. Ltd. (NAAC) (49\%) (Burgert, 1999).

Alcoa Alumínio S.A., Alcoa’s Brazilian subsidiary, planned to build a 72,000 -unit-per-year aluminum wheel plant in Pernambuco. Initially, the plant will only finish wheels imported in unfinished form from Alcoa's wheel plant in Hungary. When the Brazilian market increases its need for aluminum wheels, Alcoa expects to build a $\$ 35$ million second stage that will produce unfinished wheels (Kepp, 1999).

Reynolds launched Reyco, a food service packaging and consumer products subsidiary that will operate a new manufacturing facility in Sao Paulo. The Reyco facility, which began operations on April 12, will produce food service packaging products, including aluminum foil containers and institutional aluminum foil and film wrap, under the Reynolds brand name. Consumer products will include aluminum foil, plastic wrap, aluminum foil containers, and plastic bags. Reyco will focus initially on the Brazilian market with plans to expand throughout South America in the near future (Reynolds Metals Company, 1999b).

Canada.-Alcan announced that it would invest an additional $\$ 136$ million at its $375,000-\mathrm{t} / \mathrm{yr}$ primary aluminum smelter under construction at Alma, Quebec. The additional funds will be spent on new equipment for the smelter's casting house to produce foundry ingot for the automotive industry and aluminum rod for the energy transmission market (Metal Bulletin, 1999b).

Alcan announced the permanent closure of its $75,000-\mathrm{t} / \mathrm{yr}$ primary aluminum smelter at Isle-Maligne Works, Quebec. The closure, originally scheduled for September 2000, was completed by yearend 1999 (Alcan Aluminium Limited, 1999a).

In July, Alcan and the Canadian Auto Workers union reached agreement on terms for a new 3-year labor contract that would cover workers at the primary aluminum smelter at Kitimat, British Columbia. The plan included a $1 \%$ basic pay raise and a performance bonus scheme that could pay out from $3 \%$ to as much as $6 \%$ per year. A committee was formed to review pension provisions (Metal Bulletin, 1999j).

Alcan also announced that it would invest $\$ 46$ million to expand production of aluminum rolled sheet for the automotive and distribution markets. The expansion, which was scheduled for completion by the end of 2000, will increase production at the Kingston, Ontario, plant by $40 \%$ during the next several years. Aluminum sheet produced at Kingston was used by automakers for exterior body panel applications, such as doors, fenders, hoods, and trunks (Alcan Aluminium Limited, 1999e).

China.-China Aluminium Corp. (Chalco), which was formally inaugurated at the beginning of August, took over the management of China's aluminum assets that were formerly controlled by the State Bureau of Nonferrous Metals Industry. Chalco's stated goals are to reduce production costs at smelters under its management and to attract foreign investment. Some of the major aluminum smelters and refineries managed by Chalco include Shanxi, Shandong, Great Wall Aluminium Co., Pingguo, and Qinghai. In all, approximately 1 Mt of aluminum smelter production capacity would be under its control (Metal Bulletin, 1999e).

Alcoa and Chalco signed a memorandum of understanding (MOU) to form a strategic partnership expected to involve the association of several aluminum production facilities of Chalco and Alcoa. This MOU, which was expected to be finalized by the end of June 2000, will supersede the MOU Alcoa entered into last year with the China State Nonferrous Metals Industry Administration (Alcoa Inc., 1999f).

Dubai.-Dubai Aluminium Co. (Dubal) completed its $\$ 725$ million Condor expansion project 3 months ahead of schedule.

The 240-cell expansion, which was energized in early October, increased capacity at the primary aluminum smelter to 536,000 $\mathrm{t} / \mathrm{yr}$ from $390,000 \mathrm{t} / \mathrm{yr}$, thus making it the largest stand-alone aluminum smelter in the Western world (Platt's Metals Week, 1999 g ).

Lucky Recycling Ltd. announced plans to double capacity at its $1,000-\mathrm{t} / \mathrm{mo}$ secondary aluminum smelter to $2,000 \mathrm{t} / \mathrm{mo}$ by mid-2000. A new reverberatory furnace will be installed alongside the old induction furnace. The old furnace produced high-grade diecasting alloys from clean, purer grades of scrap, whereas the new furnace will use more irony aluminum scrap to produce commodity grade ingots (Metal Bulletin, 1999k).

Egypt.-Alcoa signed a MOU with the Egyptian
Government's Holding Company for Metallurgical Industries and The Aluminium Co. of Egypt (Egyptalum), its subsidiary company, on the terms of an Alcoa majority-owned strategic partnership designed to modernize Egyptalum's operations and improve the company's competitiveness. Egyptalum's aluminum operations included a $180,000-\mathrm{t} / \mathrm{yr}$ primary aluminum smelter, a rolling mill, and a soft-alloy extrusion plant in Nag-Hammady. Negotiations for a definitive agreement were expected to be completed in 2000 (Alcoa Inc., 1999c).

Finland.-Foster Wheeler Service Oy has been awarded a contract by Corenso United Oy Ltd. to supply a bubbling-bed gasifier and gas boiler for a recycling project in Varkaus that would recover 2,200 t/yr of aluminum from food and drink packaging. The gasification plant and steam boiler were designed to burn the gas that results from the recycling of the coreboard in the packaging. The recovered aluminum would be cast into blocks and then further processed at an aluminum foil plant (Worden, 1999).

France.-Pechiney restarted a combined $18,000 \mathrm{t} / \mathrm{yr}$ of idled capacity at its Auzat and Lannemezan primary aluminum smelters in France. Auzat and Lannemezan were each capable of producing about $45,000 \mathrm{t} / \mathrm{yr}$ of aluminum ingot (Platt's Metals Week, 1999j, k).

Germany.-VAW Aluminium AG signed a letter of intent to purchase three aluminum foil rolling mills from the Swedish group Gränges AB. Gränges' Eurofoil group had annual sales of $\$ 170$ million and about 460 employees. Its production facilities in Belgium, Luxembourg, and Sweden made about $60,000 \mathrm{t} / \mathrm{yr}$ of thin aluminum foil. The purchase would increase VAW's output of rolled products to about 700,000 t/yr (Burgert and Köhl, 1999).

Ghana.-Volta Aluminium Co. (Valco) primary aluminum smelter, which was $90 \%$ owned by Kaiser, received a power allocation for 2000 and 2001 from the Volta River Authority that will allow it to reopen another potline; that is, Valco will be able to operate four of five potlines, which is equivalent to about $80 \%$ of its $200,000-\mathrm{t} / \mathrm{yr}$ capacity, during each of those 2 years (Kaiser Aluminum \& Chemical Corp., 1999c).

Iceland.-Hydro Aluminium A.S., a wholly owned subsidiary of Norsk Hydro, and Icelandic authorities have agreed to study the feasibility of building a primary aluminum smelter on the eastern coast of Iceland at Reydarfjördur. The smelter would have an initial capacity of $120,000 \mathrm{t} / \mathrm{yr}$. The studies were expected to take a year to complete (Norsk Hydro

ASA, 1999).
Expansion at Columbia Ventures Corp.'s 60,000-t/yr Nordic Aluminum Corp. (Nordural) primary aluminum smelter has been delayed. Plans had called for the smelter to expand by $30,000 \mathrm{t} / \mathrm{yr}$ at the beginning of 1999 , but the availability of additional power and the completion of financing for the project have fallen behind schedule. Once construction begins, it will take 13 to 15 months to complete the project (Platt's Metals Week, 1999d).

Korea, Republic of.-Alcan and Taihan Electric Wire Co., Ltd. (TEC) announced the formation of Alcan Taihan Aluminum Limited, a jointly owned company to serve the aluminum rolled products market throughout the Asia-Pacific region. Alcan, which held a $56 \%$ equity interest in the company, assumed management responsibility for all aspects of the business. The new company consisted of the rolling assets previously held by TEC, which included casting, hot and cold rolling, and finishing operations. The facility's output was anticipated to increase from the 1999 estimated output of $100,000 \mathrm{t} / \mathrm{yr}$ to a target capacity of $300,000 \mathrm{t} / \mathrm{yr}$ during the next 5 years (Alcan Aluminium Limited, 1999c).

Malaysia.-A Japanese-Malaysian joint-venture aluminum can manufacturing plant with an annual production capacity of 500 million can bodies and 700 million ends began operations. KJM Aluminum Can Sdn. Bhd., owned by Mitsubishi Materials Corp. (25\%), Mitsubishi Corp. (15\%), and Malaysia's Kian Joo Can Factory Berhad (60\%), is located about 50 kilometers south of Kuala Lumpur. Production from the plant will be marketed in Malaysia and other Asian countries (Furukawa, 1999).

Netherlands.-Koninkliijke Hoogovens N.V., parent company of Hoogovens Aluminium, merged with British Steel. Corus Group plc, the new company, will retain Hoogovens' aluminum smelters, extrusion plants, and rolling mills. Hoogovens' primary aluminum smelters included the 110,000$\mathrm{t} / \mathrm{yr}$ Delfzijl smelter in the Netherlands, the $85,000-\mathrm{t} / \mathrm{yr}$ Voerde smelter in Germany, and a $20 \%$ share of the $230,000-\mathrm{t} / \mathrm{yr}$ Alouette smelter in Canada (Metal Bulletin, 1999h).

Nigeria.-On June 9, the Aluminium Smelter Co. of Nigeria (Alscon) suspended operations at its 193,000-t/yr Ikot Abasi primary aluminum smelter because of a lack of working capital. The smelter, which was commissioned in 1997, has only managed a $29 \%$ production rate at best. The smelter was jointly owned by the Nigerian Government (70\%), Ferrostaal of Germany (20\%), and Reynolds (10\%) (Mining Journal, 1999a).

Norway.-Elkem ASA began reconstruction work on potlines 1 and 2 at its primary aluminum smelter in Lista. According to Elkem, the conversion of the lines to Elkem's new Soderberg technology will improve environmental conditions and cost efficiencies at the plant (Elkem ASA, 2000, p. 18).

Spain.-Alcoa completed the acquisition of Reynolds’ aluminum extrusion plant in Irurzun, as well as its distribution operation for architectural systems, which had warehouses in several cities in Spain. The Irurzun plant has the capacity to produce $22,000 \mathrm{t} / \mathrm{yr}$ of soft alloy extrusions for use primarily in industrial and residential building applications (Reynolds Metals Company, 1999a).

Suriname.-In the first half of the year, Alcoa shut down its $30,000-\mathrm{t} / \mathrm{yr}$ primary aluminum smelter for an indefinite period of time. The decision was based on high relative production costs and power supply problems caused by low rainfall (Alcoa Inc., 1999 g ).

Turkey.-Alcoa and Kibar Holding Company of Turkey signed a Letter of Intent to form a strategic alliance with respect to Assan Alüminyum, Kibar's Turkish aluminum business. Assan was the leading aluminum rolled products producer in Turkey. Its continuous casting operation had the capacity to produce $60,000 \mathrm{t} / \mathrm{yr}$ of aluminum castings. Expansion programs were expected to increase capacity to 90,000 t/yr by the end of 1999 (Alcoa Inc., 1999d).

Ukraine.-Zaporozhye Aluminum Works opened a wire rod mill capable of producing $15,000 \mathrm{t} / \mathrm{yr}$ of 9 - to $15-\mathrm{mm}$ diameter rod. The plant operated initially at $25 \%$ of capacity and was expected to reach $75 \%$ of capacity by the end of 1999 (Metal Bulletin, 1999o).

Zaporozhye also completed the first stage of a facility to produce aluminum foil and packaging materials. The second stage, a cold-rolled sheet mill, should be completed by the end of 2000, and the third stage, which will produce $36,000 \mathrm{t} / \mathrm{yr}$ of aluminum foil, was scheduled for completion in the first half of 2001 (Interfax Mining \& Metals Report, 1999).

## Outlook

Aluminum demand in the United States and the rest of the world should remain strong with the major growth area continuing to be the transportation industry, especially the automotive market. World production should also increase and keep pace with demand despite some short term idling of capacity in the United States during the first half of 2000 owing to increases in domestic energy costs. At yearend 1999, two major greenfield smelter projects under construction were nearing completion. One, a smelter in Mozambique, poured its first metal in June 2000, 6 months ahead of schedule (Mozambique Aluminium Co., 2000). To meet the anticipated increase in future demand, additional greenfield and brownfield expansions are being considered.

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TABLE 1
SALIENT ALUMINUM STATISTICS 1/
(Thousand metric tons, unless otherwise specified)

|  | 1995 | 1996 | 1997 | 1998 | 1999 |
| :--- | ---: | ---: | ---: | ---: | ---: |
| United States: |  |  |  |  |  |
| Primary production | 3,375 | 3,577 | 3,603 | 3,713 | 3,779 |
| Value (million dollars) | $\$ 6,390$ | $\$ 5,630$ | $\$ 6,120$ | $\$ 5,360$ | $\$ 5,470$ |
| Price (average cents per pound), U.S. market (spot) | 85.9 | 71.3 | 77.1 | 65.5 | 65.7 |
| Inventories (December 31): |  |  |  |  |  |
| Aluminum industry 2/ | 2,000 | 1,860 | 1,860 | 1,930 | 1,870 |
| LME stocks in U.S. warehouses 3/ | 45 | 33 | 8 | 13 | 14 |
| National Defense Stockpile | 57 | 57 | $(4 /)$ | -- | -- |
| Secondary recovery: $5 /$ | 3,190 | 3,310 | 3,550 | 3,440 | 3,750 |
| New scrap | 1,680 | 1,730 | 2,020 | 1,950 | 2,200 |
| $\quad$ Old scrap | 1,510 | 1,570 | 1,530 | 1,500 | 1,550 |
| Exports (crude and semicrude) | 1,610 | 1,500 | 1,570 | 1,590 | 1,640 |
| Imports for consumption (crude and semicrude) | 2,980 | 2,810 | 3,080 | 3,550 | 4,000 |
| Aluminum industry shipments $6 /$ | 8,260 | 8,330 | 8,880 | $9,260 \mathrm{r} /$ | 9,840 |
| Supply, apparent $7 /$ | 7,980 | 8,340 | 8,740 | 9,040 | 9,940 |
| Consumption, apparent $8 /$ | 6,300 | 6,610 | 6,720 | 7,090 | 7,740 |
| World: Production | 19,700 | $20,700 \mathrm{r} /$ | $21,600 \mathrm{r} /$ | $22,500 \mathrm{r} /$ | $23,100 \mathrm{e} /$ |

e/ Estimated. r/ Revised. -- Zero.
1/ Data are rounded to no more than three significant digits, except "Primary production" and "Prices."
2/ Includes ingot, semifabricated material, and scrap. 1995 through 1998 data from Current Industrial Reports, Series M33-D, U.S.
Department of Commerce, Bureau of the Census. 1999 data from the Aluminum Association Inc.
3/ Includes aluminum alloyed material.
4/ Less than $1 / 2$ unit.
5/ Metallic recovery from purchased, tolled, or imported new and old scrap expanded for full industry coverage.
6/ Shipped to domestic industry.
7/ Defined as domestic primary metal production plus secondary recovery plus imports minus exports plus adjustments for Government and industry stocks changes.
8/ Apparent supply less recovery from purchased new scrap.

TABLE 2
PRIMARY ANNUAL ALUMINUM PRODUCTION CAPACITY IN THE UNITED STATES, BY COMPANY 1/

| Company | Yearend capacity (thousand metric tons) |  | 1999 ownership |
| :---: | :---: | :---: | :---: |
|  | 1998 | 1999 |  |
| Alcan Aluminum Corp.: |  |  |  |
| Sebree, KY | 186 | 186 | Alcan Aluminium Limited, 100\%. |
| Alcoa Inc.: 2/ |  |  |  |
| Alcoa, TN | 210 | 210 | Alcoa Inc., 100\%. |
| Badin, NC | 115 | 115 | Do. |
| Evansville, IN (Warrick) | 300 | 300 | Do. |
| Ferndale, WA (Intalco) | 272 | 272 | Alcoa Inc., $61 \%$; Mitsui \& Co. Ltd., $32 \%$; YKK Corp., $7 \%$. |
| Frederick, MD (Eastalco) | 174 | 174 | Do. |
| Massena, NY | 125 | 125 | Alcoa Inc., 100\%. |
| Mount Holly, SC | 205 | 205 | Alcoa Inc., $50.3 \%$; Century Aluminum Co., $26.7 \%$; Glencore AG, $23 \%$. |
| Rockdale, TX | 315 | 315 | Alcoa Inc., 100\%. |
| Wenatchee, WA | 220 | 220 | Do. |
| Total | 1,940 | 1,940 |  |
| $\overline{\text { Century Aluminum Co.: }}$ |  |  |  |
| Ravenswood, WV | 168 | 173 | Century Aluminum Co., 100\%. |
| Columbia Falls Aluminum Co.: |  |  |  |
| Columbia Falls, MT | 168 | 168 | Glencore AG, 100\% |
| Goldendale Aluminum Co.: |  |  |  |
| Goldendale, WA | 168 | 168 | Private interest, $60 \%$; employees, $40 \%$. |
| Kaiser Aluminum \& Chemical Corp.: |  |  |  |
| Mead, WA (Spokane) | 200 | 200 | MAXXAM Inc., $100 \%$. |
| Tacoma, WA | 73 | 73 | Do. |
| Total | 273 | 273 |  |
| NSA: |  |  |  |
| Hawesville, KY | 186 | 237 | Southwire Co., 100\%. |
| Noranda Aluminum Inc.: |  |  |  |
| New Madrid, MO | 220 | 230 | Noranda Mines Ltd., 100\%. |
| Northwest Aluminum Corp.: |  |  |  |
| The Dalles, OR | 82 | 82 | Private interests, $100 \%$. |
| Ormet Primary Aluminum Corp.: |  |  |  |
| Hannibal, OH | 256 | 255 | Ormet Corp., 100\%. |
| Reynolds Metals Company: |  |  |  |
| Longview, WA | 204 | 204 | Reynolds Metals Company, 100\%. |
| Massena, NY | 123 | 123 | Do. |
| Troutdale, OR | 121 | 121 | Do. |
| Total | 448 | 448 |  |
| Vanalco Inc.: |  |  |  |
| Vancouver, WA | 116 | 116 | Vanalco Inc., 100\%. |
| Grand total | 4,210 | 4,270 |  |

1/ Data are rounded to no more three significant digits; may not add to totals shown.
2/ Individual plant capacities are U.S. Geological Survey estimates based on company reported total.

TABLE 3
U.S. CONSUMPTION OF AND RECOVERY FROM PURCHASED NEW AND OLD ALUMINUM SCRAP, BY CLASS 1/ $2 /$
(Metric tons)

| Class | Consumption | Calculated recovery |  |
| :---: | :---: | :---: | :---: |
|  |  | Aluminum | Metallic |
| 1998: |  |  |  |
| Secondary smelters | 2,080,000 | 1,410,000 | 1,520,000 |
| Integrated aluminum companies | 1,290,000 | 1,070,000 | 1,140,000 |
| Independent mill fabricators | 538,000 | 466,000 | 500,000 |
| Foundries | 72,500 | 59,200 | 63,500 |
| Other consumers | 15,000 | 15,000 | 15,000 |
| Total | 4,000,000 | 3,020,000 | 3,230,000 |
| Estimated full industry coverage | 4,270,000 | 3,210,000 | 3,440,000 |
| 1999: |  |  |  |
| Secondary smelters | 2,180,000 | 1,490,000 | 1,600,000 |
| Integrated aluminum companies | 1,230,000 | 1,010,000 | 1,080,000 |
| Independent mill fabricators | 787,000 | 674,000 | 720,000 |
| Foundries | 101,000 | 85,300 | 91,300 |
| Other consumers | 8,880 | 8,810 | 8,810 |
| Total | 4,300,000 | 3,270,000 | 3,500,000 |
| Estimated full industry coverage | 4,610,000 | 3,500,000 | 3,740,000 |

1/ Excludes recovery from other than aluminum-base scrap.
2/ Data 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 1999 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 | 10,500 r/ | 335,000 | 333,000 | 12,300 |
| Borings and turnings | 11,800 r/ | 317,000 | 322,000 | 6,230 |
| Dross and skimmings | 2,080 | 613,000 | 612,000 | 3,700 |
| Other 4/ | 2,920 r/ | 257,000 | 256,000 | 3,640 |
| Total | 27,300 r/ | 1,520,000 | 1,520,000 | 25,800 |
| Old scrap: |  |  |  |  |
| Castings, sheet, clippings | 8,440 r/ | 460,000 | 462,000 | 5,990 |
| Aluminum-copper radiators | 2,780 r/ | 21,700 | 22,100 | 2,380 |
| Aluminum cans 5/ | 1,110 | 119,000 | 119,000 | 897 |
| Other 6/ | 2,700 r/ | 39,200 | 39,900 | 1,930 |
| Total | 15,000 r/ | 639,000 | 643,000 | 11,200 |
| Sweated pig | 786 r/ | 8,780 | 9,100 | 465 |
| Total secondary smelters | 43,100 r/ | 2,170,000 | 2,180,000 | 37,500 |
| Integrated aluminum companies, foundries, independent mill fabricators, other consumers: |  |  |  |  |
| New scrap: |  |  |  |  |
| Solids | 22,100 r/ | 833,000 | 833,000 | 22,400 |
| Borings and turnings | 215 | 25,100 | 25,200 | 104 |
| Dross and skimmings | 173 | 8,280 | 8,320 | 131 |
| Other 4/ | 8,420 | 212,000 | 208,000 | 11,600 |
| Total | 30,900 r/ | 1,080,000 | 1,070,000 | 34,300 |
| Old scrap: |  |  |  |  |
| Castings, sheet, clippings | 5,600 | 151,000 | 154,000 | 3,060 |
| Aluminum-copper radiators | 517 | 6,920 | 7,000 | 439 |
| Aluminum cans | 19,700 | 852,000 | 857,000 | 15,100 |
| Other 6/ | 22 | 29,800 | 29,800 | 22 |
| Total | 25,900 | 1,040,000 | 1,050,000 | 18,700 |
| Sweated pig | 138 | 3,190 | 3,240 | 86 |
| Total integrated aluminum companies, etc. | 56,900 r/ | 2,120,000 | 2,130,000 | 53,000 |
| All scrap consumed: |  |  |  |  |
| New scrap: |  |  |  |  |
| Solids | 32,600 r/ | 1,170,000 | 1,170,000 | 34,700 |
| Borings and turnings | 12,000 r/ | 342,000 | 348,000 | 6,330 |
| Dross and skimmings | 2,260 | 622,000 | 620,000 | 3,830 |
| Other 4/ | 11,300 r/ | 468,000 | 464,000 | 15,200 |
| Total | 58,300 r/ | 2,600,000 | 2,600,000 | 60,100 |
| Old scrap: |  |  |  |  |
| Castings, sheet, clippings | 14,000 r/ | 611,000 | 616,000 | 9,050 |
| Aluminum-copper radiators | 3,290 r/ | 28,600 | 29,100 | 2,820 |
| Aluminum cans | 20,800 | 971,000 | 976,000 | 16,000 |
| Other 6/ | 2,720 r/ | 68,900 | 69,700 | 1,950 |
| Total | 40,900 r/ | 1,680,000 | 1,690,000 | 29,900 |
| Sweated pig | 924 r/ | 12,000 | 12,300 | 551 |
| Total of all scrap consumed | 100,000 r/ | 4,290,000 | 4,300,000 | 90,500 |

r/ Revised.
1 / Includes imported scrap. According to reporting companies, $27.80 \%$ of total receipts of aluminum-base scrap, or $1,200,000$ metric tons,
was received on toll arrangements.
2/ Data are rounded to no more than three significant digits; may not add to totals shown.
3/ Includes inventory adjustment.
4/ Includes data on foil, can stock clippings, and other miscellaneous.
5/ Used beverage cans toll treated for primary producers are included in secondary smelter tabulation.
6 / Includes municipal wastes (includes litter) and fragmentized scrap (auto shredder).

TABLE 5
PRODUCTION AND SHIPMENTS OF SECONDARY ALUMINUM ALLOYS BY INDEPENDENT SMELTERS IN THE UNITED STATES 1/
(Metric tons)

|  | 1998 |  | 1999 |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Production | $\begin{gathered} \text { Net } \\ \text { shipments 2/ } \end{gathered}$ | Production | $\begin{gathered} \text { Net } \\ \text { shipments 2/ } \end{gathered}$ |
| Diecast alloys: |  |  |  |  |
| $13 \% \mathrm{Si}, 360$, etc. ( $0.6 \% \mathrm{Cu}$, maximum) | 47,900 | 47,400 | 29,700 | 30,000 |
| 380 and variations | 497,000 | 495,000 | 599,000 | 594,000 |
| Sand and permanent mold: |  |  |  |  |
| $95 / 5 \mathrm{Al}-\mathrm{Si}, 356$, etc. ( $0.6 \% \mathrm{Cu}$, maximum) | 55,500 | 55,900 | 37,600 | 37,200 |
| No. 319 and variations | 164,000 | 161,000 | 188,000 | 187,000 |
| F-132 alloy and variations | 47,700 | 47,600 | 56,400 | 55,900 |
| Al-Mg alloys | 639 | 639 | 639 | 639 |
| Al-Zn alloys | 10,600 r/ | 9,780 r/ | 17,100 | 17,600 |
| Al-Si alloys ( $0.6 \%$ to $2.0 \% \mathrm{Cu}$ ) | 2,020 | 2,020 | 2,020 | 2,020 |
| Al-Cu alloys (1.5\% Si, maximum) | 924 | 924 | 924 | 924 |
| Al-Si-Cu-Ni alloys | 990 | 993 | 949 | 952 |
| Other | 905 | 861 | 712 | 761 |
| Wrought alloys, extrusion billets | 237,000 r/ | 238,000 r/ | 221,000 | 221,000 |
| Miscellaneous: |  |  |  |  |
| Steel deoxidation | W | W | W | W |
| Pure (97.0\% Al) | W | W | W | W |
| Aluminum-base hardeners | 3,600 | 4,290 | 3,470 | 3,480 |
| Other 3/ | 119,000 | 119,000 | 112,000 | 108,000 |
| Total | 1,190,000 | 1,180,000 | 1,270,000 | 1,260,000 |
| Less consumption of materials other than scrap: |  |  |  |  |
| Primary aluminum | 76,800 | XX | 81,500 | XX |
| Primary silicon | 44,800 | XX | 52,100 | XX |
| Other | 9,210 | XX | 9,340 | XX |
| Net metallic recovery from aluminum scrap and sweated pig consumed in production of secondary aluminum ingot 4/ | 1,060,000 | XX | 1,130,000 | XX |
| r/ Revised. W Withheld to avoid disclosing proprietary data; included with <br> 1/ Data are rounded to no more than three significant digits; may not add <br> 2/ Includes inventory adjustment. <br> 3/ Includes other die-cast alloys. <br> 4/ No allowance made for melt-loss of primary aluminum and alloying in | "Miscellaneous: totals shown. <br> edients. | her." XX Not app | cable. |  |

TABLE 6
DISTRIBUTION OF END-USE SHIPMENTS OF ALUMINUM PRODUCTS IN THE UNITED STATES, BY INDUSTRY 1/

| Industry | 1998 |  | 1999 |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Quantity (thousand metric tons) | $\begin{gathered} \text { Percent } \\ \text { of } \\ \text { grand total } \end{gathered}$ | Quantity (thousand metric tons) | $\begin{gathered} \text { Percent } \\ \text { of } \\ \text { grand total } \\ \hline \end{gathered}$ |
| Containers and packaging | 2,270 | 21.6 | 2,320 | 20.7 |
| Building and construction | 1,390 | 13.2 | 1,470 | 13.1 |
| Transportation | 3,250 | 30.8 | 3,600 | 32.2 |
| Electrical | 714 | 6.8 | 739 | 6.6 |
| Consumer durables | 725 | 6.9 | 760 | 6.8 |
| Machinery and equipment | 629 | 6.0 | 661 | 5.9 |
| Other markets | 273 r/ | 2.6 r/ | 293 | 2.6 |
| Total to domestic users | 9,260 r/ | 88.0 | 9,840 | 88.1 |
| Exports e/ | 1,260 | 12.0 | 1,330 | 11.9 |
| Grand total | 10,500 | 100.0 | 11,200 | 100.0 |

e/ Estimated. r/ Revised.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.

Source: The Aluminum Association Inc.

TABLE 7

## U.S. NET SHIPMENTS OF ALUMINUM WROUGHT

 AND CAST PRODUCTS, BY PRODUCERS $1 / 2 /$(Thousand metric tons)

|  | 1998 | 1999 |
| :---: | :---: | :---: |
| Wrought products: |  |  |
| Sheet, plate, foil | 4,760 r/ | 5,040 |
| Rod, bar, pipe, tube, shapes | 1,560 r/ | 1,620 |
| Rod, wire, cable | 551 r/ | 573 |
| Forgings (including impacts) | 110 r/ | 118 |
| Powder, flake, paste | $54 \mathrm{r} /$ | 54 |
| Total | 7,040 r/ | 7,410 |
| Castings: |  |  |
| Sand | 134 | NA |
| Permanent and semipermanent mold | 511 | NA |
| Die | 584 | NA |
| Other | 119 | NA |
| Total | 1,350 | NA |
| Grand total | 8,390 | NA |

r/ Revised. NA Not available.
1/ Net shipments derived by subtracting the sum of producers' domestic receipts of each mill shape from the domestic industry's gross shipments of that shape.
2/ Data are rounded to no more than three significant digits; may not add to totals shown.
Source: The Aluminum Assocation Inc. and U.S. Department of Commerce.

TABLE 8
U.S. EXPORTS OF ALUMINUM, BY COUNTRY 1/

| Country or territory | 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) |
| 1998: |  |  |  |  |  |  |  |  |
| Azerbaijan | -- | -- | 18 | \$90 | -- | -- | 18 | \$90 |
| Brazil | 374 | \$1,070 | 75,900 | 204,000 | 93 | \$62 | 76,400 | 205,000 |
| Canada | 118,000 | 192,000 | 427,000 | 1,110,000 | 149,000 | 154,000 | 695,000 | 1,460,000 |
| France | 185 | 707 | 6,170 | 27,600 | 51 | 71 | 6,410 | 28,300 |
| Germany | 794 | 2,190 | 7,150 | 40,200 | 830 | 1,240 | 8,770 | 43,600 |
| Hong Kong | 917 | 1,550 | 14,800 | 41,100 | 32,000 | 35,000 | 47,800 | 77,600 |
| Italy | 85 | 325 | 2,530 | 12,100 | 8 | 11 | 2,630 | 12,500 |
| Japan | 60,600 | 99,900 | 20,700 | 125,000 | 35,800 | 41,700 | 117,000 | 267,000 |
| Korea, Republic of | 1,230 | 3,520 | 21,200 | 77,000 | 31,800 | 33,800 | 54,300 | 114,000 |
| Mexico | 75,700 | 127,000 | 150,000 | 443,000 | 63,700 | 74,200 | 289,000 | 644,000 |
| Netherlands | 177 | 380 | 1,190 | 6,320 | 11 | 61 | 1,380 | 6,760 |
| Philippines | 1 | 14 | 1,640 | 5,250 | 114 | 91 | 1,760 | 5,360 |
| Russia | 14 | 53 | 10 | 126 | 184 | 408 | 208 | 587 |
| Saudi Arabia | -- | -- | 6,090 | 18,000 | -- | -- | 6,090 | 18,000 |
| Singapore | 128 | 325 | 2,330 | 58,900 | 402 | 551 | 2,860 | 59,800 |
| Slovakia | -- | -- | 56 | 273 | -- | -- | 56 | 273 |
| Slovenia | -- | -- | 130 | 321 | -- | -- | 130 | 321 |
| South Africa | 55 | 106 | 348 | 1,950 | -- | -- | 404 | 2,050 |
| Taiwan | 1,420 | 2,670 | 12,800 | 44,600 | 54,500 | 48,800 | 68,700 | 96,100 |
| Thailand | 5 | 23 | 8,620 | 23,800 | -- | -- | 8,620 | 23,900 |
| Ukraine | 9 | 13 | -- | -- | -- | -- | 9 | 13 |
| United Kingdom | 943 | 5,400 | 12,600 | 71,800 | 514 | 612 | 14,100 | 77,800 |
| Venezuela | 170 | 346 | 25,000 | 60,200 | 11 | 30 | 25,200 | 60,500 |
| Other | 4,290 r/ | 11,400 | 97,000 r/ | $345,000 \mathrm{r} /$ | 58,900 | 61,700 | 160,000 | 418,000 |
| Total | 265,000 | 449,000 | 893,000 | 2,720,000 | 428,000 | 453,000 | 1,590,000 | 3,620,000 |
| 1999: |  |  |  |  |  |  |  |  |
| Azerbaijan | -- | -- | 1 | 3 | -- | -- | 1 | 3 |
| Brazil | 110 | 714 | 60,200 | 172,000 | 17 | 96 | 60,300 | 173,000 |
| Canada | 145,000 | 225,000 | 489,000 | 1,180,000 | 162,000 | 149,000 | 795,000 | 1,560,000 |
| France | 143 | 541 | 6,990 | 30,900 | 85 | 129 | 7,220 | 31,500 |
| Germany | 1,610 | 6,900 | 5,640 | 32,200 | 90 | 279 | 7,340 | 39,400 |
| Hong Kong | 661 | 1,230 | 4,110 | 15,600 | 24,600 | 33,100 | 29,400 | 49,900 |
| Italy | 127 | 269 | 2,530 | 12,500 | 53 | 122 | 2,710 | 12,900 |
| Japan | 71,700 | 113,000 | 10,400 | 87,400 | 35,200 | 40,700 | 117,000 | 241,000 |
| Korea, Republic of | 798 | 2,440 | 16,700 | 53,100 | 29,300 | 29,100 | 46,800 | 84,600 |
| Mexico | 93,700 | 147,000 | 152,000 | 444,000 | 60,400 | 79,100 | 306,000 | 670,000 |
| Netherlands | 130 | 289 | 1,310 | 6,610 | 711 | 793 | 2,150 | 7,700 |
| Philippines | 14 | 65 | 536 | 2,460 | 296 | 98 | 847 | 2,620 |
| Russia | 5 | 73 | 9 | 85 | -- | -- | 14 | 158 |
| Saudi Arabia | 1 | 7 | 8,150 | 22,400 | 64 | 128 | 8,210 | 22,500 |
| Singapore | 111 | 575 | 1,850 | 13,200 | 1,290 | 1,750 | 3,250 | 15,500 |
| Slovakia | -- | -- | 9 | 54 | -- | -- | 9 | 54 |
| Slovenia | -- | -- | 55 | 128 | 3 | 12 | 58 | 140 |
| South Africa | (3/) | 8 | 327 | 1,930 | (3/) | 4 | 328 | 1,940 |
| Taiwan | 660 | 1,740 | 10,900 | 33,200 | 31,300 | 29,800 | 42,900 | 64,800 |
| Thailand | 106 | 205 | 3,900 | 14,400 | 92 | 135 | 4,100 | 14,700 |
| Ukraine | -- | -- | (3/) | 4 | -- | -- | (3/) | 4 |
| United Kingdom | 1,040 | 5,270 | 16,700 | 72,800 | 403 | 810 | 18,100 | 78,800 |
| Venezuela | 229 | 1,990 | 17,900 | 38,700 | -- | -- | 18,100 | 40,700 |
| Other | 2,640 | 7,610 | 98,500 | 330,000 | 73,500 | 80,000 | 175,000 | 418,000 |
| Total | 318,000 | 515,000 | 907,000 | 2,570,000 | 419,000 | 445,000 | 1,640,000 | 3,530,000 |

r/ Revised. -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes castings, forgings, and unclassified semifabricated forms.
3/ Less than $1 / 2$ unit.

[^1]TABLE 9
U.S. EXPORTS OF ALUMINUM, BY CLASS 1/

| Class | 1998 |  | 1999 |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Quantity (metric tons) | Value (thousands) | Quantity (metric tons) | Value (thousands) |
| Crude and semicrude: |  |  |  |  |
| Metals and alloys, crude | 265,000 | \$449,000 | 318,000 | \$515,000 |
| Scrap | 428,000 | 453,000 | 419,000 | 445,000 |
| Plates, sheets, bars, strip, etc. | 847,000 | 2,420,000 | 857,000 | 2,280,000 |
| Castings and forgings | 10,700 | 141,000 | 15,300 | 113,000 |
| Semifabricated forms, n.e.c. | 35,900 | 162,000 | 34,600 | 171,000 |
| Total | 1,590,000 | 3,620,000 | 1,640,000 | 3,530,000 |
| Manufactures: |  |  |  |  |
| Foil and leaf | 65,400 | 215,000 | 65,000 | 211,000 |
| Powders and flakes | 9,010 | 37,400 | 8,320 | 35,800 |
| Wire and cable | 31,600 | 117,000 | 33,100 | 127,000 |
| Total | 106,000 | 369,000 | 106,000 | 374,000 |
| Grand total | 1,690,000 | 3,990,000 | 1,750,000 | 3,900,000 |

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
Source: Bureau of the Census.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF ALUMINUM, BY CLASS 1/

| Class | 1998 |  | 1999 |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Quantity (metric tons) | Value (thousands) | Quantity (metric tons) | Value (thousands) |
| Crude and semicrude: |  |  |  |  |
| Metals and alloys, crude | 2,400,000 | \$3,660,000 | 2,650,000 | \$3,760,000 |
| Plates, sheets, strip, etc., n.e.c. 2/ | 525,000 | 1,300,000 | 593,000 | 1,330,000 |
| Pipes, tubes, etc. | 14,600 | 75,600 | 24,100 | 98,100 |
| Rods and bars | 110,000 | 339,000 | 118,000 | 349,000 |
| Scrap | 501,000 | 572,000 | 615,000 | 666,000 |
| Total | 3,550,000 | 5,950,000 | 4,000,000 | 6,200,000 |
| Manufactures: |  |  |  |  |
| Foil and leaf 3/ | 69,300 | 227,000 | 89,900 | 271,000 |
| Flakes and powders | 2,180 | 7,290 | 3,560 | 10,100 |
| Wire | 83,500 | 152,000 | 97,600 | 172,000 |
| Total | 155,000 | 387,000 | 191,000 | 452,000 |
| Grand total | 3,700,000 | 6,340,000 | 4,190,000 | 6,660,000 |

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes plates, sheets, circles, and disks.
3/ Excludes etched capacitor foil.
Source: Bureau of the Census.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF ALUMINUM, BY COUNTRY 1/

| 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) |
| 1998: |  |  |  |  |  |  |  |  |
| Argentina | 22,900 | \$36,500 | 453 | \$940 | 1,750 | \$2,100 | 25,100 | \$39,500 |
| Australia | 54,300 | 78,300 | 2,630 | 6,860 | 40 | 47 | 56,900 | 85,200 |
| Bahrain | 1,180 | 1,730 | 14,100 | 30,200 | 65 | 73 | 15,400 | 32,100 |
| Belgium | 1,310 | 2,180 | 6,070 | 17,500 | 556 | 588 | 7,940 | 20,200 |
| Brazil | 45,700 | 67,100 | 306 | 1,260 | 9,250 | 9,450 | 55,300 | 77,800 |
| Canada | 1,420,000 | 2,240,000 | 371,000 | 850,000 | 270,000 | 306,000 | 2,060,000 | 3,400,000 |
| Croatia | -- | -- | 441 | 1,520 | -- | -- | 441 | 1,520 |
| Czech Republic | -- | -- | 264 | 838 | -- | -- | 264 | 838 |
| France | 263 | 4,520 | 13,900 | 73,000 | 7,850 | 6,370 | 22,000 | 83,900 |
| Germany | 1,080 | 5,450 | 51,900 | 205,000 | 1,470 | 1,720 | 54,500 | 212,000 |
| Italy | 7 | 28 | 4,700 | 16,000 | 223 | 317 | 4,930 | 16,300 |
| Japan | 387 | 1,500 | 24,400 | 83,400 | 1,340 | 1,480 | 26,100 | 86,300 |
| Korea, Republic of | 661 | 863 | 11,300 | 22,700 | 2,760 | 3,720 | 14,700 | 27,300 |
| Mexico | 591 | 1,190 | 12,700 | 35,900 | 80,700 | 99,000 | 93,900 | 136,000 |
| Netherlands | 728 | 1,250 | 4,400 | 14,100 | 1,960 | 2,240 | 7,090 | 17,600 |
| Norway | 4,370 | 8,960 | 727 | 1,500 | 313 | 412 | 5,410 | 10,900 |
| Panama | 180 | 382 | 687 | 1,840 | 6,270 | 6,330 | 7,140 | 8,560 |
| Russia | 605,000 | 845,000 | 27,100 | 58,200 | 28,400 | 30,400 | 661,000 | 934,000 |
| Slovakia | 335 | 445 | 7 | 11 | -- | -- | 342 | 455 |
| Slovenia | -- | -- | 4,700 | 16,600 | -- | -- | 4,700 | 16,600 |
| South Africa | 15,300 | 21,900 | 3,400 | 7,090 | 469 | 583 | 19,100 | 29,600 |
| Spain | -- | -- | 8,430 | 19,400 | 1,560 | 1,810 | 9,990 | 21,200 |
| Tajikistan | 20,700 | 29,800 | -- | -- | -- | -- | 20,700 | 29,800 |
| Ukraine | 19,600 | 25,400 | -- | -- | 1,320 | 1,590 | 20,900 | 27,000 |
| United Arab Emirates | 22,700 | 35,500 | 60 | 129 | 5,040 | 6,320 | 27,800 | 41,900 |
| United Kingdom | 10,600 | 15,700 | 19,300 | 77,400 | 12,100 | 14,200 | 42,000 | 107,000 |
| Venezuela | 98,600 | 168,000 | 25,100 | 46,600 | 18,400 | 24,900 | 142,000 | 239,000 |
| Other | 46,600 | 66,200 | 41,700 | 130,000 | 48,900 | 51,700 | 137,000 | 248,000 r/ |
| Total | 2,400,000 | 3,660,000 | 649,000 | 1,720,000 | 501,000 | 572,000 | 3,550,000 | 5,950,000 |
| 1999: |  |  |  |  |  |  |  |  |
| Argentina | 22,400 | 32,200 | 1,330 | 2,330 | 3,990 | 5,110 | 27,700 | 39,700 |
| Australia | 60,900 | 89,700 | 2,050 | 4,220 | 9 | 14 | 63,000 | 94,000 |
| Bahrain | 22,700 | 32,300 | 26,600 | 48,400 | -- | -- | 49,200 | 80,700 |
| Belgium | 20 | 468 | 4,050 | 11,900 | 198 | 197 | 4,260 | 12,600 |
| Brazil | 56,700 | 74,100 | 1,720 | 3,450 | 33,100 | 37,800 | 91,500 | 115,000 |
| Canada | 1,500,000 | 2,210,000 | 427,000 | 943,000 | 287,000 | 314,000 | 2,210,000 | 3,460,000 |
| Croatia | -- | -- | 273 | 933 | -- | -- | 273 | 933 |
| Czech Republic | 83 | 106 | 591 | 1,740 | 40 | 45 | 714 | 1,890 |
| France | 492 | 4,960 | 11,800 | 53,500 | 11,500 | 10,400 | 23,900 | 68,900 |
| Germany | 813 | 4,490 | 38,900 | 146,000 | 6,810 | 10,100 | 46,500 | 161,000 |
| Italy | 2,130 | 2,530 | 3,030 | 9,780 | 518 | 581 | 5,670 | 12,900 |
| Japan | 429 | 942 | 23,600 | 80,100 | 816 | 929 | 24,800 | 82,000 |
| Korea, Republic of | -- | -- | 21,400 | 42,300 | -- | -- | 21,400 | 42,300 |
| Mexico | 2,460 | 4,280 | 17,700 | 56,100 | 86,100 | 90,700 | 106,000 | 151,000 |
| Netherlands | 1,280 | 2,070 | 3,490 | 10,400 | 10,700 | 13,100 | 15,400 | 25,600 |
| Norway | 3,280 | 6,270 | 1,610 | 2,830 | 140 | 142 | 5,030 | 9,240 |
| Panama | 367 | 650 | 1,230 | 3,340 | 5,820 | 6,390 | 7,420 | 10,400 |
| Russia | 711,000 | 939,000 | 54,700 | 96,800 | 65,300 | 68,600 | 831,000 | 1,100,000 |
| Slovakia | 203 | 216 | 1 | 2 | -- | -- | 204 | 218 |
| Slovenia | -- | -- | 4,000 | 11,800 | -- | -- | 4,000 | 11,800 |
| South Africa | 18,300 | 24,000 | 4,070 | 10,400 | 169 | 144 | 22,500 | 34,500 |
| Spain | 273 | 427 | 3,230 | 7,360 | 2,100 | 2,370 | 5,600 | 10,200 |
| Tajikistan | 17,200 | 20,600 | -- | -- | -- | -- | 17,200 | 20,600 |
| Ukraine | 26,600 | 30,600 | (3/) | 10 | 5,510 | 6,310 | 32,200 | 36,900 |
| United Arab Emirates | 17,800 | 25,100 | -- | -- | 3,240 | 3,130 | 21,000 | 28,300 |
| United Kingdom | 10,900 | 14,300 | 15,100 | 56,000 | 19,500 | 21,000 | 45,500 | 91,300 |
| Venezuela | 127,000 | 178,000 | 16,800 | 29,100 | 26,000 | 29,500 | 169,000 | 236,000 |
| Other | 53,000 | 69,700 | 51,200 | 143,000 | 46,500 | 45,300 | 151,000 | 258,000 |
| Total | 2,650,000 | 3,760,000 | 735,000 | 1,770,000 | 615,000 | 666,000 | 4,000,000 | 6,200,000 |

r/ Revised. -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes circles, disks, rods, pipes, tubes, etc.
3/ Less than $1 / 2$ unit.

TABLE 12
ALUMINUM, PRIMARY: WORLD PRODUCTION, BY COUNTRY 1/ $2 /$
(Thousand metric tons)

| Country | 1995 | 1996 | 1997 | 1998 | 1999 e/ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Argentina | 186 | 184 | 187 r/ | 187 r/ | 200 |
| Australia | 1,297 | 1,372 | 1,495 | 1,627 | 1,718 3/ |
| Azerbaijan | 4 | 1 | 5 | -- r/e/ | -- |
| Bahrain | 451 | 461 | 490 | 501 r/ | 503 3/ |
| Bosnia and Herzegovina e/ 4/ | 10 | 10 | 15 | 15 | 15 |
| Brazil | 1,188 | 1,195 | 1,200 | 1,208 r/ | 1,250 |
| Cameroon e/ | 79 | 82 | 91 r/ | $82 \mathrm{r} /$ | 92 |
| Canada | 2,172 | 2,283 | 2,327 | 2,374 | 2,390 3/ |
| China e/ | 1,680 | 1,770 | 1,960 | 2,340 r/ | 2,450 |
| Croatia 4/ | 31 | 38 | $35 \mathrm{e} /$ | $35 \mathrm{e} /$ | 35 |
| Egypt | 180 | 179 r/ | 178 r/ | 187 r/ | 187 |
| France | 372 | 380 | 399 e/ | 424 r/ | 400 |
| Germany | 575 | 576 | 572 | $612 \mathrm{r} /$ | 600 |
| Ghana | 135 | 137 | 152 | $56 \mathrm{e} /$ | 114 |
| Greece | 144 | 141 | 133 | 146 r/ | 140 |
| Hungary e/ | 25 | 30 3/ | 35 | 35 | 35 |
| Iceland 5/ | 100 | 104 | 123 | 163 | 160 |
| India 6/ | 537 | 531 | 484 | 542 | 550 |
| Indonesia e/ 6/ | 220 | 225 | 216 3/ | 130 | 100 |
| Iran | 119 | 70 r/ | 99 r/ | 109 r/ | 109 |
| Italy | 198 | 184 | 188 | 188 e/ | 190 |
| Japan 7/ | 18 | 17 | 17 | $16 \mathrm{r} /$ | $113 /$ |
| Mexico 6/ | 10 | 61 | 66 | 62 r/ | 62 |
| Netherlands | 216 | 227 | 232 | 264 e/ | 265 |
| New Zealand | 273 | 283 r/ | 310 | 307 e/ | 300 |
| Nigeria | -- | -- | $3 \mathrm{e} /$ | $20 \mathrm{e} /$ | 16 |
| Norway | 847 | 863 | 919 | 996 | 1,034 3/ |
| Poland 8/ | 56 | 52 | 54 r/ | 54 r/ | 55 |
| Romania 9/ | 141 | 141 | 163 | 150 e/ | 150 |
| Russia | 2,724 | 2,874 | 2,906 | 3,005 | 3,146 3/ |
| Serbia and Montenegro 4/ | 17 | 37 | 66 | $65 \mathrm{e} /$ | 65 |
| Slovakia e/ 6/ | 31 | 35 | 35 | 35 | 35 |
| Slovenia e/ 4/ | 58 3/ | 60 | 60 | 50 | 50 |
| South Africa | 229 r/ | 570 | 673 | 693 r/ | 687 |
| Spain | 361 | 362 | 360 | 362 | 360 |
| Suriname | 28 | 32 | $32 \mathrm{e} /$ | 29 | 10 |
| Sweden | 95 | 98 | 98 | $96 \mathrm{e} /$ | 96 |
| Switzerland | 21 | 27 | 27 | 32 | 30 |
| Tajikistan | 232 | 198 | 189 e/ | 196 | 229 3/ |
| Turkey | 62 | 60 r/ | 62 | 62 r/ | 62 3/ |
| Ukraine | 98 | $90 \mathrm{e} /$ | 101 | 107 | 112 3/ |
| United Arab Emirates: Dubai | 247 r/ | 259 r/ | 378 r/ | 387 r/ | 440 |
| United Kingdom | 238 | 240 | 248 e/ | 258 r/ | 272 3/ |
| United States | 3,375 | 3,577 | 3,603 | 3,713 | 3,779 3/ |
| Venezuela | 630 | 629 | 634 r/ | $585 \mathrm{r} /$ | 570 |
| Total | 19,700 | 20,700 r/ | 21,600 r/ | 22,500 r/ | 23,100 |

e/ Estimated. r/ Revised. -- Zero.
1/ World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.
2/ Primary 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 11, 2000.
3/ Reported figure.
4/ Primary ingot plus secondary ingot.
5/ Ingot and rolling billet production.
6/ Primary ingot.
7/ Excludes high-purity aluminum containing 99.995\% or more as follows, in metric tons: ; 1995--28,411; 1996--29,351; 1997--36,136; and 1998--35,063 (revised); and 1999--34,000 (estimated).
8/ Primary unalloyed ingot plus secondary unalloyed ingot.
9/ Primary unalloyed metal plus primary alloyed metal, thus including weight of alloying material.


[^0]:    ${ }^{1}$ Prior to January 1996, published by the U.S. Bureau of Mines.

[^1]:    Source: Bureau of the Census.

