



2011 Minerals Yearbook

TIN

TIN

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Tin has not been mined in the United States since 1993; consequently, the country was reliant on imports and recycling for its tin needs. In 2011, 25 firms consumed 90% of the primary tin used domestically. The estimated value of primary tin metal consumed domestically was \$875 million. Industry stocks decreased by 10% compared with those at yearend 2010.

In 2011, approximately 13,600 metric tons (t) of tin was recovered from scrap, most of it from old scrap (table 5). About 7% of the tin used in the United States was recycled metal.

World tin mine output was essentially unchanged from that in 2010, and world primary tin smelter production decreased slightly from that in 2010 (tables 9, 10). Of the 19 countries in which tin was mined, the top 5 accounted for 91% of the total world tin production of 244,000 t. China was the leading producer (49% of world output), followed by Indonesia (17%), Peru (12%), Bolivia (8%), and Brazil (5%).

In 2011, the world tin market was estimated to have a moderate deficit of production relative to consumption, and the composite tin price increased by 27% from that in 2010. World tin reserves were estimated to be 4.9 million metric tons (Mt), about 14 times the estimated 2011 world primary tin consumption of 360,000 t. Most tin reserves were in Asia and South America.

Legislation and Government Programs

In fiscal year 2008, the Defense Logistics Agency (DLA) suspended sales of tin pending an additional study. The DLA has not sold any tin since then. The Annual Materials Plan (AMP) for fiscal year 2011 sales was set at zero. The AMP for fiscal year 2012 was 804 t. As of December 31, 2011, the National Defense Stockpile (NDS) tin inventory was 4,020 t, which was stored at the DLA's depot in Hammond, IN (Juned J. Refai, DLA Strategic Materials, written commun., November 27, 2011).

The "Reduction of Lead in Drinking Water Act" (Public Law No. 111-380) was signed into law on January 4, 2011. The law, which becomes effective January 4, 2014, lowers the national standard for lead in faucets, pipe fittings, and pipes to 0.25%. The previous national standard was 8.0%. Industry sources noted that the bill harmonizes lead standards across the country. The lower lead standard may promote greater use of tin in plumbing fixtures because many fixtures contain alloys of lead and tin, especially in solders (Plumbing Manufacturers International, 2011).

Production

Mine.—Tin was not mined in the United States in 2011. Until 1993, a few small tin mines had operated sporadically in the United States; no mine production data have been reported to the U.S. Geological Survey (USGS) since that year.

Secondary.—A significant quantity of alloy tin scrap was generated during manufacturing processes and recycled in those same industries. Secondary tin recovered from obsolete fabricated parts was used in many kinds of products and was a particularly important source of tin for the manufacture of brass, bronze, and solder.

The Steel Recycling Institute (Pittsburgh, PA), funded by the North American steel industry, continued to promote the collection, preparation, and transportation of steel can scrap. The domestic recycling rate for steel cans, most of which are made from tinplate, was 71% in 2011, up from 67% in 2010. This percentage has generally increased each year since 1990 (Steel Recycling Institute, 2012).

Consumption

In 2011, domestic consumption of new and old scrap was estimated to be 13,600 t, slightly less than that in 2010 (table 5). Domestic consumption data for tin were developed by the USGS from a voluntary survey of tin consumers. Of the 130 firms to which a survey form was sent, 56 responded, accounting for 38% of reported consumption. Data for the nonrespondents were estimated based on prior-year reporting.

The total number of metal cans shipped domestically was 124 billion in 2011 compared with 130 billion in 2010. Steel (essentially tinplate and tin-free steel) dominated in the food, pet, and general line can markets, and aluminum accounted for 100% of the beverage can market (Can Manufacturers Institute, 2012, p. 20).

Severstal North America Inc. (Dearborn, MI) [a subsidiary of OAO Severstal (Moscow, Russia)] sold its still-producing plants in Sparrows Point, MD, Wheeling, WV, and Warren, OH, to The Renco Group, Inc. (New York, NY). Severstal North America, the fourth leading flat-rolled steelmaker in the United States with about 13 million metric tons per year (Mt/yr) of capacity, received \$125 million cash, a \$100 million secured note, and the repayment of \$317 million of third-party debt at closing. Renco also assumed various Severstal North America financial liabilities, including employee-related and environmental liabilities totaling \$650 million. Renco formed a wholly owned subsidiary, RG Steel LLC (Sparrows Point, MD), which signed a stock purchase agreement to acquire the three steel operations. After the sale, Severstal North America was left with about

¹Deceased.

6 Mt/yr of flat-rolled steelmaking capacity at its Dearborn, MI, integrated steel plant and its minimill in Columbus, MS. The deal made RG Steel the fourth leading flat-rolled steel producer in the United States with about 7.5 Mt/yr of capacity. Both the Sparrows Point and the Wheeling steel plants were leading users of tin for making tinplate (Platts Metals Week, 2011).

Prices

The 2011 Platts Metals Week average composite price for tin metal increased by 27% from that in 2010. The London Metal Exchange Ltd. (LME) remained the principal global trading forum for tin. The LME average tin price for 2011 was \$11.84 per pound.

According to an official at Malaysia Smelting Corp. BHD (MSC) (Kuala Lumpur, Malaysia), the high tin prices were the result of supply-demand fundamentals rather than speculation. There were two basic factors that have been restricting the world tin supply—low tin ore grades and selected government restrictions on tin mining in Indonesia (the world's leading tin exporter).

Foreign Trade

U.S. imports of refined tin, which supplied most domestic tin requirements, decreased by 3% compared with those of 2010 (table 8). Imports of tin in all forms (metal, ore and concentrate, scrap, and waste) remained duty free. Foreign-owned trading firms tended to dominate the marketing of imports. U.S. imports of tin came mostly from Peru, Bolivia, Indonesia, and Malaysia, in descending order of quantity imported. Refined tin exports were significantly less than imports (tables 6, 8).

World Review

According to a survey conducted by the tin industry organization, ITRI Ltd. (Frogmore, United Kingdom), global refined tin consumption was estimated to have increased by almost 13% in 2010 to 360,000 t from that in 2009, and preliminary estimates for 2011 indicate a marginal decline in usage from 2010. Industrial and electronic solders together accounted for almost 54% of refined tin demand in 2010, having increased by an estimated 22,300 t from that in 2009. Solder, primarily for electronic applications, has consistently accounted for more than 50% of the tin end-use market since 2005. The 2010 estimated world tin consumption figure suggests that tin consumption has been higher than previously expected following the recent global financial crisis, with consumption in 2010 approximately the same as that in 2006. The study indicated that China's tin usage reached a new record level of 147,000 t, although consumption in the rest of the world was about 25,000 t less than at its 2006 peak. ITRI estimated that the world's tin consumers used about 59,000 t of secondary (scrap) tin in 2009 and an estimated 60,000 t in 2010, with China accounting for more than 75% of the world total in 2010. ITRI's data were compiled from 171 companies worldwide and accounted for more than 47% of estimated refined tin usage (Metal-Pages, 2011).

World production of refined tin has been fairly stable at about 350,000 metric tons per year (t/yr) in recent years,

decreasing slightly in 2008–09 in response to the decline in world consumption following the 2008 global financial crisis. Meanwhile, mine production, which peaked in 2007 at about 300,000 t, has been declining. The growing gap between mine and refined tin production, especially in China, has been filled by increased secondary refined tin production. Two-thirds or more of tin mine production was from China and Indonesia and production from Indonesia and production from China has essentially stabilized below its peak in 2009 (ITRI Ltd., 2011e).

ITRI and Greenfields Research Ltd. (London, United Kingdom) completed a 2-year project to build a "Tin Production Costs Model," which was intended to help to quantify the parameters of the future tin price range. The floor price of tin, identified by marginal cash operating costs, was rising rapidly, owing mainly to falling grades at Indonesian alluvial operations, while the high capital costs of replacement hard-rock mining capacity would also raise the long-term industry average price. The report identified about 60 new mine projects with a combined potential capacity of more than 100,000 t/yr of tin-in-concentrates, which could come onstream in the next 5 to 10 years. These were mainly low-grade deposits where tin was the principal product, including a number of polymetallic projects whose economics were helped by the recovery of coproducts. Also included were several large tailings retreatment projects. These potential new projects, if they come to fruition, could produce enough new tin to tilt the supply-demand balance toward an excess of supply (ITRI Ltd., 2011e).

According to the Association of European Producers of Steel for Packaging (APEAL), 71% of steel packaging (primarily tinplate) in Europe was recycled in 2010. According to APEAL, steel was still the most recycled packaging material in Europe, where plastics, beverage cartons, and glass had rates of 30%, 34%, and 68% respectively. APEAL has a long-term objective of achieving an 80% recycling rate in Europe for steel packaging and zero metal cans in landfills by 2020. The recycling rate for Germany was 93.8% in 2010, and the country had not dropped below a 90% recycling rate since 1997 (Association of European Producers of Steel for Packaging, 2012).

Bolivia.—Sinchi Wayra [owned by a subsidiary of Glencore International AG (Baar, Switzerland)] operated five tin mines in Bolivia that produced about 6,000 t/yr of tin concentrate. In 2009, the Bolivian Government passed a new law requiring mining entities to form joint ventures with the Government. Glencore was engaged in negotiations regarding this, with one of its mines already operating as a joint venture. Glencore also planned to expand production by 2013, which was expected to include a project to reprocess old tailings containing significant levels of tin and zinc at the Colquiri Mine. The project was expected to cost about \$65 million (ITRI Ltd., 2011b).

China.—Nippon Steel Corp. (Tokyo, Japan) announced a new joint venture in China, which would boost its global tinplate production capacity to 2 Mt/yr. The new 50-50 joint venture with Wuhan Iron and Steel Corp. (Wuhan, Hubei Province) would construct a \$293 million plant in Hubei Province with an annual capacity of 200,000 t/yr that was expected to start production in the summer of 2013. Nippon Steel already had one tinplate venture in Guangdong Province as well as others in Indonesia and Thailand. With the new facility, Nippon Steel's

overseas tinplate capacity would increase by one-third to 800,000 t/yr. The production capacity of Nippon Steel's three domestic tin mills was 1.2 Mt/yr. Nippon Steel forecast that China's demand for tinplate would increase to about 3.3 to 3.7 Mt by 2015, compared with 2.3 to 3.0 Mt in 2009 (ITRI Ltd., 2011d).

China Tin Group Co. Ltd. (Guangxi City, Hunan Province) and joint-venture partner Unionmet (Singapore) Ltd. entered into an agreement to acquire a 65% stake in PT Yinchenindo Mining Industry for \$10 million. China Tin was China's second leading integrated tin company and produced 14,300 t of refined tin in 2010. PT Yinchenindo operated a tin smelter and held 11 mining permits on Indonesia's Belitung Island. Unionmet produced indium ingots (ITRI Ltd., 2011a).

Congo (Kinshasa).—Government officials in Congo (Kinshasa) reportedly were discussing a joint venture with MSC to build a tin smelter in eastern Congo (Kinshasa). The smelter would be built in Kalima, Maniema Province, about 1,200 kilometers (km) east of Kinshasa. The Congolese Government expected that the project would initially rehabilitate existing structures for an output of 500 t in the startup year. Part of the plan was to collect between 5,000 and 7,000 t/yr of tin-in-concentrate from small-scale miners in Maniema Province to use as feedstock for the smelter (CRU Tin Monitor, 2011a, p. 9–10).

Egypt.—Gippsland Ltd. (Claremont, Western Australia, Australia) completed a program of sampling and size analysis of alluvial material as a prelude to trial mining at its Abu Dabbab tin-tantalum-feldspar deposit in Egypt, which it planned to start in 2011. Based on these evaluations and current higher tin and tantalum prices, the company planned to redesign the open pits and increase the production rate to 3 Mt/yr of ore and the tin-in-concentrate average to 2,340 t/yr. The new expected mine life would be 13.8 years, and the total tin contained in ore increased by nearly 12% to 46,800 t (Gippsland Ltd., 2011a, b).

Germany.—Deutsche Rohstoff AG (Heidelberg) spun off its tin assets into a new company, Tin International Ltd. (TIN), and planned an initial public stock offering on the Australian Stock Exchange in 2012. The tin assets, the Geyer and Gottesberg deposits, in the Ergzgebirge region of Saxony, near the German-Czech border, were explored by the German Democratic Republic in the 1970s and the 1980s and were estimated to contain about 180,000 t of tin. TIN began a drilling program in late 2011 to confirm the size of the deposits (CRU Tin Monitor, 2011a, p. 10).

Indonesia.—PT Timah (Jakarta), one of the world's leading tin producers, announced that it planned to produce 50,000 t of refined tin in 2012, an increase of 19% from its output of 42,000 t in 2011. The production was expected to come mostly from offshore mining. Illegal mining has hampered Timah's tin mining activity onshore (Nugraha, 2011).

Tin producers on Indonesia's Bangka Island announced plans to establish a tin market to gain greater control of supply and prices. The tin producers felt that the existing tin markets, the Kuala Lumpur Tin Market in Malaysia and the LME, failed to support the welfare of tin producers in Bangka. Plans called for the new physical market to be based in Bangka and dedicated solely to tin produced on the island (Wijaya, 2011).

Malaysia.—MSC launched an initial public stock offering for a listing on the Singapore Stock Exchange in order to raise \$34 million. MSC earmarked the bulk of expected proceeds to develop new tin mines in Indonesia and Malaysia. MSC and its 75%-owned Indonesian subsidiary (PT Koba Tin) produced 45,400 t of refined tin in 2010, an increase of 3.5% from that in 2009 (ITRI Ltd., 2011c).

Morocco.—Kasbah Resources Ltd. (South Perth, Western Australia, Australia) announced it had signed an agreement with the Moroccan Government to assign 100% of two mining permits for the Achmmach Tin Project to Kasbah's wholly owned Moroccan subsidiary. The Achmmach project was expected to start up in 2013, with a planned annual capacity of about 5,600 t/yr of tin-in-concentrate (Kasbah Resources Ltd., 2011).

Peru.—Based on current reserve estimates, the remaining life of Minsur SA's (Lima) San Rafael Mine in Puno Province may be only 6 or 7 years, although an exploration program may extend the time. Tin mine output reached a peak of slightly more than 42,000 t in 2005 and production has been declining slowly since then. Beginning in 2013, depletion of the mine reserves may be partially offset by the retreatment of tailings, which contain more than 100,000 t of tin at an average grade of more than 1%. Production from the tailings could be about 7,000 to 8,000 t/yr. Following large-scale pilot-plant trials, the company was confident that there would be no technical problems in treating this material and obtaining satisfactory recoveries. Meanwhile, high production capacity utilization of Minsur's Funsur tin smelter near Pisco was being maintained by increased treatment of slag that had been a byproduct of years of smelting. It was possible that Funsur would eventually import concentrates and other raw materials from elsewhere in South America (CRU Tin Monitor, 2011b).

Spain.—In April, Eurotin Inc. (Toronto, Ontario, Canada) acquired Stannico Resources Inc. (Toronto), and planned to develop Stannico's Oropresa project in southwest Spain. Eurotin determined that it has drilled a sufficient number of holes to define the surface extent of the tin mineralization and that the results obtained during the past year justified commencing a drill program to define the resource. In the short term, Eurotin's focus would be on developing the top 200 to 250 meters of the Oropesa deposit to resource status by mid-2012. The firm also received conditional approval of applications for two new investigation permits for nearby targets and planned to start exploration drilling at its Santa Maria tin project 40 km north of Caceres in central Spain. The company announced that it intended to seek the source of the tin once contained in the estimated 2 to 3 billion metric tons of colluvials eroded away during the past 10 to 15 million years. It was thought that these colluvials were reconcentrated and redeposited as higher-grade alluvial deposits in the northern sector of the Santa Maria pits (Eurotin Inc., 2011).

Outlook

Worldwide demand for primary tin was expected to increase at moderate annual rates. The rate of increase, however, could increase in a few years if new applications continue to find

acceptance in the marketplace, especially in the electronics (solder) field. Higher tin prices that have prevailed in recent years, however, discourage use in new applications.

World tin reserves appeared to be adequate to meet foreseeable demand. Secondary sources of tin were likely to become an even more important component of supply, especially in the United States. Domestic tin requirements were expected to continue to be met primarily through imports.

ITRI estimated that global tin demand in 2015 would be about 400,000 t/yr. World refined tin usage increased to an alltime high of more than 370,000 t in 2007, powered mainly by the rapid industrialization of China, a global boom in consumer electronics, and a rapid transition to the use of lead-free solders. During the next decade, technological changes likely would affect tin consumption in its main applications of electronics, solder, and tinplate. Miniaturization, new assembly technologies, and lower coating weights could reduce consumption. Offsetting this were prospects for new applications in tin chemicals, energy-related technologies such as lithium-ion batteries, and steel alloys. ITRI expected that these changes would increase world tin consumption by 15,000 t/yr from a 2010 base level during the next 5 to 10 years (ITRI Ltd., 2011e).

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TABLE 1
SALIENT TIN STATISTICS¹

| | | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| United States: | | | | | | |
| Production, secondary, tin recovered from old alloy scrap ^e | metric tons | 12,200 | 11,700 | 11,100 | 11,100 ^r | 11,000 |
| Exports, refined tin | do. | 6,410 | 9,800 | 3,170 | 5,630 | 5,450 |
| Imports for consumption, refined tin | do. | 34,600 | 36,300 | 33,000 | 35,300 | 34,200 |
| Consumption, contained tin: | | | | | | |
| Primary | do. | 23,800 ^r | 23,100 | 24,800 | 25,300 | 25,200 |
| Secondary | do. | 7,490 | 6,250 | 7,750 | 4,820 | 1,830 |
| Stocks, yearend, U.S. industry, contained tin | do. | 9,100 | 8,560 | 7,070 | 6,410 | 5,780 |
| Prices, average, contained tin: | | | | | | |
| New York, NY, market | cents per pound | 679.50 | 864.53 | 641.62 | 954.13 | 1,215.90 |
| Platts Metals Week composite | do. | 899.48 | 1,128.97 | 837.08 | 1,239.64 | 1,574.67 |
| London, United Kingdom | do. | 659.05 | 836.76 | 615.15 | 925.15 | 1,184.05 |
| Kuala Lumpur, Malaysia | do. | 658.42 | 837.70 | 609.34 | 922.17 | 1,187.54 |
| World, production, contained tin: | | | | | | |
| Mine | metric tons | 301,000 ^r | 257,000 | 252,000 ^r | 247,000 ^r | 244,000 ^e |
| Smelter: | | | | | | |
| Primary | do. | 178,000 ^r | 176,000 ^r | 178,000 ^r | 170,000 ^r | 166,000 ^e |
| Secondary | do. | 18,500 | 17,900 | 17,200 | 17,200 ^r | 17,200 ^e |
| Undifferentiated | do. | 149,000 ^r | 140,000 ^r | 140,000 ^r | 150,000 ^r | 156,000 ^e |

^eEstimated. ^rRevised. do. Ditto.

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

TABLE 2
U.S. CONSUMPTION OF PRIMARY AND SECONDARY TIN¹

(Metric tons, contained tin)

| | 2010 | 2011 |
|--|--------|--------|
| Stocks, January 1 ² | 6,210 | 5,360 |
| Net receipts during year: | | |
| Primary | 25,100 | 25,200 |
| Secondary | 2,910 | 1,370 |
| Scrap | 1,920 | 916 |
| Total receipts | 29,900 | 27,500 |
| Total available | 36,100 | 32,900 |
| Tin consumed in manufactured products: | | |
| Primary | 25,300 | 25,200 |
| Secondary | 4,820 | 1,830 |
| Total | 30,100 | 27,000 |
| Intercompany transactions in scrap | 1 | 462 |
| Total processed | 30,100 | 27,500 |
| Stocks, December 31 (total available less total processed) | 6,000 | 5,390 |

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

²Includes tin in transit in the United States.

TABLE 3
U.S. CONSUMPTION OF TIN, BY FINISHED PRODUCT¹

(Metric tons, contained tin)

| Product | 2010 | | | 2011 | | |
|------------------------------------|---------|-----------|--------|---------|-----------|--------|
| | Primary | Secondary | Total | Primary | Secondary | Total |
| Alloys, miscellaneous ² | 2,460 | W | 2,460 | 2,700 | W | 2,700 |
| Babbitt | 288 | W | 288 | 281 | 34 | 315 |
| Bar tin | W | W | W | W | W | W |
| Bronze and brass | 1,230 | 1,240 | 2,460 | 2,600 | 1,210 | 3,810 |
| Chemicals | 9,470 | W | 9,470 | 9,990 | W | 9,990 |
| Solder | 3,880 | 3,460 | 7,340 | 2,180 | 463 | 2,640 |
| Tinning | 387 | -- | 387 | 552 | -- | 552 |
| Tinplate ³ | 6,920 | W | 6,920 | 6,230 | W | 6,230 |
| Other ⁴ | 684 | 127 | 811 | 632 | 125 | 757 |
| Total | 25,300 | 4,820 | 30,100 | 25,200 | 1,830 | 27,000 |

W Withheld to avoid disclosing company proprietary data; included with "Other." -- Zero.

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

²Includes terne metal.

³Includes secondary pig tin and tin acquired in chemicals.

⁴Includes britannia metal, collapsible tubes and foil, jewelers' metal, pewter, tin powder, type metal, and white metal.

TABLE 4
U.S. INDUSTRY YEAREND TIN STOCKS¹

(Metric tons)

| | 2010 | 2011 |
|-------------------------|-------|-------|
| Plant raw materials: | | |
| Pig tin: | | |
| Virgin ² | 4,880 | 5,060 |
| Secondary | 164 | 130 |
| In process ³ | 857 | 107 |
| Total | 5,900 | 5,290 |
| Additional pig tin: | | |
| Jobbers-importers | 319 | 299 |
| Afloat to United States | 190 | 193 |
| Total | 509 | 492 |
| Grand total | 6,410 | 5,780 |

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

²Includes tin in transit in the United States.

³Data represent scrap only, tin content.

TABLE 5
U.S. STOCKS, RECEIPTS, AND CONSUMPTION OF NEW AND OLD SCRAP AND TIN RECOVERED, BY TYPE OF SCRAP¹

(Metric tons)

| Type of scrap | Gross weight of scrap | | | | | | Tin recovered ^c | | |
|-----------------------------|-----------------------|---------------------|-------------|---------------------|---------------------|------------------------|----------------------------|---------------------|---------------------|
| | Stocks, January 1 | Receipts | Consumption | | | Stocks, December 31 | New | Old | Total |
| | | | New | Old | Total | | | | |
| 2010: | | | | | | | | | |
| Copper-base scrap: | | | | | | | | | |
| Ingot makers | 3,640 | 66,100 ^r | 12,500 | 52,400 ^r | 64,900 ^r | 4,840 ^r | 433 | 2,340 ^r | 2,780 ^r |
| Brass mills ² | -- | W | W | W | W | -- | 1,400 | W | 1,400 |
| Foundries and other plants | 1,940 | 17,500 | 15,300 | 2,690 | 18,000 | 1,500 ^r | W | 98 | 98 |
| Total | XX | XX | XX | XX | XX | XX | 1,830 | 2,440 ^r | 4,270 ^r |
| Lead-base scrap | 11,700 | 1,130,000 | 32,600 | 1,090,000 | 1,120,000 | 19,000 | 855 | 8,640 | 9,500 |
| Tin-base scrap ³ | W | W | W | W | W | W | W | W | W |
| Grand total | XX | XX | XX | XX | XX | XX | 2,680 | 11,100 ^r | 13,800 ^r |
| 2011: | | | | | | | | | |
| Copper-base scrap: | | | | | | | | | |
| Ingot makers | 4,840 | 63,800 | 12,300 | 51,600 | 64,000 | 4,700 | 428 | 2,340 | 2,760 |
| Brass mills ² | -- | W | W | W | W | W | 1,340 | W | 1,340 |
| Foundries and other plants | 1,500 | 17,400 | 14,900 | 2,630 | 17,500 | 1,410 | W | 94 | 94 |
| Total | XX | XX | XX | XX | XX | XX | 1,770 | 2,430 | 4,200 |
| Lead-base scrap | 19,000 | 1,120,000 | 29,000 | 1,070,000 | 1,100,000 | 40,100 | 761 | 8,590 | 9,350 |
| Tin-base scrap ³ | W | W | W | W | W | W | W | W | W |
| Grand total | XX | XX | XX | XX | XX | XX | 2,530 | 11,000 | 13,600 |

^aEstimated. ^rRevised. W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

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

²Consumption is assumed to be equal to receipts.

³Includes tinplate and other scrap recovered at detinning plants.

TABLE 6
U.S. EXPORTS OF TIN IN VARIOUS FORMS¹

| | 2010 | | 2011 | |
|---|---------------------------|----------------------|---------------------------|----------------------|
| | Quantity (metric tons) | Value (thousands) | Quantity (metric tons) | Value (thousands) |
| Ingots and pigs | 5,630 | \$35,900 | 5,450 | \$33,300 |
| Tin scrap and other tin-bearing material except tinplate scrap (gross weight) ² | 15,600 | 70,300 | 21,900 | 88,200 |
| Tinplate and terneplate (gross weight) ² | 209,000 | 171,000 | 216,000 | 183,000 |

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

²Includes rods, profiles, flakes, tubes, and pipes.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF TIN IN VARIOUS FORMS¹

| | 2010 | | 2011 | |
|---|--|----------------------|--|----------------------|
| | Quantity (metric tons, gross weight) | Value (thousands) | Quantity (metric tons, gross weight) | Value (thousands) |
| Dross, skimmings, scrap residues, tin alloys, n.s.p.f. ² | 58,000 | \$30,700 | 58,600 | \$39,400 |
| Miscellaneous ³ | XX | 53,200 | XX | 60,800 |
| Tin compounds | 753 | 13,300 | 769 | 20,200 |
| Tinplate and terneplate | 464,000 | 500,000 | 367,000 | 431,000 |
| Tinplate scrap | 68,000 | 14,300 | 97,100 | 28,500 |

XX Not applicable.

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

²Not specifically provided for.

³Includes tin foil, tin powder, flitters, metallics, and other manufactures n.s.p.f.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF UNWROUGHT TIN METAL,
BY COUNTRY¹

| Country | 2010 | | 2011 | |
|----------------|---------------------------|----------------------|---------------------------|----------------------|
| | Quantity (metric tons) | Value (thousands) | Quantity (metric tons) | Value (thousands) |
| Belgium | 11 | \$241 | 261 | \$7,100 |
| Bolivia | 6,060 | 120,000 | 5,680 | 153,000 |
| Brazil | 75 | 1,260 | 676 | 16,400 |
| Canada | 89 | 1,630 | 35 | 891 |
| Chile | 641 | 13,100 | 60 | 231 |
| China | 887 | 17,900 | 1,490 | 41,400 |
| India | (2) | 5 | -- | -- |
| Indonesia | 3,970 | 37,900 | 4,930 | 89,000 |
| Japan | 1 | 52 | -- | -- |
| Malaysia | 4,500 | 90,100 | 3,980 | 105,000 |
| Peru | 16,500 | 322,000 | 14,000 | 368,000 |
| Singapore | 996 | 18,100 | 645 | 17,200 |
| Switzerland | 1 | 11 | (2) | 6 |
| Thailand | 1,310 | 30,900 | 2,310 | 55,600 |
| United Kingdom | (2) | 11 | 18 | 423 |
| Vietnam | 225 | 4,020 | -- | -- |
| Other | (2) | 5 | 121 | 2,680 |
| Total | 35,300 | 658,000 | 34,200 | 857,000 |

-- Zero.

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

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
TIN: WORLD MINE PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

| Country | 2007 | 2008 | 2009 | 2010 | 2011 ^e |
|-------------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|
| Australia | 2,071 | 1,783 | 5,630 | 6,600 ^r | 6,500 |
| Bolivia | 15,972 | 17,318 | 19,575 | 20,190 | 20,373 ³ |
| Brazil | 11,835 | 13,899 ^r | 9,500 ^r | 10,400 ^r | 11,000 |
| Burma ⁴ | 830 | 741 | 672 | 672 | 675 |
| Burundi | 2 | 40 ^r | 8 ^r | 12 ^r | 12 |
| China ^e | 146,000 | 110,000 | 115,000 | 115,000 ^r | 120,000 |
| Congo (Kinshasa) ^e | 7,600 ^r | 9,900 ^r | 7,800 ^r | 6,800 ^r | 2,900 |
| Indonesia | 66,137 | 53,228 | 46,078 ^e | 43,258 ^r | 42,000 |
| Laos | 570 | 690 | 350 | 550 ^r | 550 |
| Malaysia | 2,263 | 2,605 | 2,412 | 2,668 ^r | 3,346 ³ |
| Mexico | 25 | 15 | -- | -- | -- |
| Niger ^e | 11 | 10 | -- | 12 | 12 |
| Nigeria ^{e,5} | 180 | 185 | 183 | 180 ^e | 500 |
| Peru | 39,019 | 39,037 | 37,503 | 33,848 | 28,882 ³ |
| Portugal | 41 | 29 | 30 ^e | 30 ^e | 30 |
| Russia ^e | 2,500 | 1,500 | 1,200 | 160 ^r | 160 |
| Rwanda | 650 ^r | 850 ^r | 960 ^r | 1,400 ^r | 1,400 |
| Thailand | 122 | 215 | 166 ^r | 291 ^r | 200 |
| Uganda | 2 | 2 | 2 ^e | 2 ^e | 1 |
| Vietnam ^e | 5,400 | 5,400 | 5,400 | 5,400 | 5,400 |
| Total | 301,000 ^r | 257,000 | 252,000 ^r | 247,000 ^r | 244,000 |

^eEstimated. ^rRevised. -- Zero.

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

²Table includes data available through June 8, 2012.

³Reported figure.

⁴Includes content of tin-tungsten concentrate.

⁵Concentrate gross weight reported, estimated 62% tin content.

TABLE 10
TIN: WORLD SMELTER PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

| Country | 2007 | 2008 | 2009 | 2010 | 2011 ^e |
|--------------------------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| Australia: | | | | | |
| Primary | 118 | 170 | 7,637 | 3,000 | 3,000 |
| Secondary ^c | 400 | 400 | 400 | 400 | 400 |
| Total ^c | 518 | 570 | 8,037 | 3,400 | 3,400 |
| Belgium, secondary ^c | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Bolivia, primary | 12,251 | 12,666 ^r | 14,995 ^r | 14,975 ^r | 14,518 ³ |
| Brazil: | | | | | |
| Primary | 9,384 | 11,020 ^r | 8,311 ^r | 9,098 ^r | 9,100 ^p |
| Secondary ^c | 250 | 250 | 250 | 250 | 250 |
| Total | 9,634 | 11,270 ^r | 8,561 ^r | 9,348 ^r | 9,350 |
| Bulgaria, secondary ^c | 10 | 10 | 10 | 10 | 10 |
| Burma, primary ^c | 30 | 30 | 30 | 30 | 30 |
| China, undifferentiated ^c | 149,000 | 140,000 | 140,000 | 150,000 | 156,000 |
| Denmark, secondary ^c | 100 | 75 | 75 | 75 | 60 |
| Greece, secondary ^c | 100 | 75 | 75 | 60 | 50 |
| Indonesia, primary | 64,127 | 53,417 ^r | 51,418 ^r | 43,832 ^r | 43,000 |
| Japan, primary | 879 | 956 ^r | 757 | 841 ^r | 850 |
| Malaysia, primary | 25,263 | 31,630 ^r | 36,407 ^r | 38,737 ^r | 40,267 ³ |
| Mexico, primary | 25 | 15 | 15 | -- | -- |
| Norway, secondary ^c | 50 | 50 | 50 | 50 | 50 |
| Peru, primary | 36,004 | 38,865 ^r | 34,503 ^r | 36,451 ^r | 32,290 ³ |
| Russia: ^c | | | | | |
| Primary | 3,800 | 2,000 | 1,700 | 100 ^r | 100 |
| Secondary | 400 | 300 | 300 | 300 | 300 |
| Total | 4,200 | 2,300 | 2,000 | 400 ^r | 400 |
| Spain, secondary ^c | 10 | 10 | 10 | 10 | 10 |
| Thailand, primary | 23,104 ^r | 21,860 ^r | 19,423 ^r | 20,000 ^r | 20,000 |
| United States, secondary | 12,200 | 11,700 | 11,100 | 11,100 ^r | 11,000 ³ |
| Vietnam, primary | 3,369 | 3,583 | 2,747 ^r | 3,042 ^r | 3,000 |
| Grand total | 346,000 | 334,000 ^r | 335,000 ^r | 337,000 ^r | 339,000 |
| Of which: | | | | | |
| Primary | 178,000 ^r | 176,000 ^r | 178,000 ^r | 170,000 ^r | 166,000 |
| Secondary | 18,500 | 17,900 | 17,200 | 17,200 ^r | 17,200 |
| Undifferentiated ^c | 149,000 ^r | 140,000 ^r | 140,000 ^r | 150,000 ^r | 156,000 |

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

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

²Whenever possible, total output has been separated into primary (from ores and concentrates) and secondary (tin metal recovered from old scrap). This table reflects metal production at the first measurable stage of metal output. Table includes data available through June 11, 2012.

³Reported figure.