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2017 Minerals Yearbook

TIN [ADVANCE RELEASE]

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Tin

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Tin has not been mined in the United States since 1993; thus, the United States is completely reliant on imports and recycling for its tin needs. In 2017, the reported amount of primary tin metal consumed domestically was 23,500 metric tons (t) worth an estimated $480 million (tables 1, 2, 3). Approximately 18,100 t was recovered from domestic scrap (table 5). Industry stocks were essentially unchanged from those at yearend 2016 (tables 1, 4).

World tin mine production was 313,000 t, a 4% increase from the revised production total in 2016 (table 9). Of the 18 countries in which tin was mined in 2017, 6 accounted for 90% of the total production. China was the leading producer (30% of world output), followed by Indonesia (27%), Burma (15%), and Bolivia, Brazil, and Peru (6% each). World primary tin smelter production was 355,000 t (table 10), a 4% increase from the revised total for 2016. According to CRU International Ltd., world refined tin consumption for 2017 was 357,000 t, a slight increase from the previous year (CRU Tin Monitor, 2018, p. 2).

The annual average New York dealer price for Grade A tin in 2017 was 12% more than that in 2016 at $9.37 per pound, and the annual average London Metal Exchange Ltd. (LME) cash price was $9.11 per pound, 12% more than that in 2016 (table 1). World tin reserves were estimated to be 4.8 million metric tons, about 15 times the estimated 2017 world primary tin production. The majority of global tin reserves were in Asia and South America.

Legislation and Government Programs

Conflict Minerals.—The U.S. Securities and Exchange Commission was responsible for implementing section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act, which is related to the use of minerals determined to be financing conflict in Congo (Kinshasa) or an adjoining country. Cassiterite, one of two principal minerals mined for tin, is included in the list of conflict minerals. A "conflict mineral" is defined as cassiterite, columbite-tantalite, gold, wolframite, or their derivatives. Section 1502 required companies for which conflict minerals or their derivatives were necessary to the functionality or manufacture of their products to annually disclose whether any of those minerals originated in Congo (Kinshasa) or an adjoining country (U.S. Securities and Exchange Commission, 2012, p. 56274–56275).

In 2017, 1,165 companies filed conflict minerals disclosures for 2016 (1,230 companies filed disclosures in 2016 for 2015, and 1,281 companies filed disclosures in 2015 for 2014). The ability of reporting companies to identify the country of origin of their conflict minerals was hindered in cases where there were multiple tiers of suppliers between the reporting company and the upstream concentrate-processing facility. After conducting due diligence on the source and chain of custody of the conflict minerals in their products, an estimated 47% of the companies reported that they could not confirm the source of the conflict minerals within their products and only four companies reported that they could determine the conflict minerals in their products were not either financing or benefiting armed groups. About 99% of companies reported that they could not determine whether the minerals financed or benefited armed groups. Although reporting companies were not required to identify which conflict minerals they used, of those that did, an estimated 69% reported using tin. Tin concentrate production from Congo (Kinshasa) and adjoining countries has been only 2% to 4% of world production in the past 5 years (table 9; U.S. Government Accountability Office, 2018, p. 2, 9).

Production

Tin has not been mined in the United States since 1993. In 2017, tin recovered from new and old scrap was 18,100 t, a decrease of 3% from the previous year's revised total of 18,700 t (table 5). A significant quantity of alloy tin scrap was generated during manufacturing processes and recycled within those same industries (new scrap).

Secondary tin recovered from obsolete fabricated parts (old scrap) was used in many types of products and was a particularly important source of tin for the manufacture of brass, bronze, and solder (table 3). In 2017, the total amount of tin recovered from lead-base scrap was 9,020 t, and the total amount of copper-base scrap was 2,410 t, a 24% decrease from the previous year's revised total of 3,160 t (table 5).

Consumption

Tin in the United States was used, in descending order by weight, in chemicals, 20%; tinplate, 20%; solder, 17%; alloys, 10%; babbitt, bronze or brass, and tinning, 9%; and other, 23% (table 3). Tin-based chemicals are commonly used in polyvinyl chloride (PVC) production and curing, biocides, and catalysts. Tinplate is a layer of tin adhered to steel or wrought iron substrate for corrosion protection. Tin is used in this case to inhibit rust and is commonly used in food-grade cans. Tin alloys are used in brass and bronze products, solders, and low-friction metals. Solder is commonly used in electronic devices for connections on circuit boards.

In 2017, U.S. reported tin consumption was 23,500 t of primary tin and 3,140 t of secondary tin (table 3). Domestic consumption data for tin were developed by the U.S. Geological Survey from a voluntary survey of tin consumers. Of the 115 firms to which a survey form was sent, 58 responded, accounting for 50% of estimated reported consumption. Data for the nonrespondents were estimated based on prior-year reporting.

Prices

The Platts Metals Week annual average New York dealer price for Grade A tin metal was $9.37 per pound in 2017, 12% more than that in 2016. The LME remained the principal commodity

exchange for trading tin and in 2017, the annual average LME cash price for tin was $9.11 per pound, an increase of 12% from the 2016 average LME price of $8.15 per pound (table 1).

Foreign Trade

In 2017, U.S. imports for consumption of all tin products were 944,000 t, a 9% increase from the previous year's imports of 868,000 t. The leading tin imports were tinplate and terneplate; in 2017, imports of these products increased by 6% to 854,000 t with a value of $820 million as compared with 805,000 t with a value of $726 million in 2016 (table 7). Refined tin imports, which supplied most domestic primary tin requirements, totaled 34,100 t valued at $674 million in 2017, a 6% increase in quantity from that of 2016 (tables 1, 8). Imports of tin alloys totaled 1,590 t in 2017, 17% less than the imports in 2016. Imports of tin waste and scrap, tin oxides, and tin foil increased by 92%, 46%, and 14%, respectively. Imports of tin flakes and powders; tin plates, sheet, and strip; and tin bars, rods, profiles, and wire decreased by 22%, 21%, and 6%, respectively (table 7). Imports of tin in all forms (ore and concentrate, tinplate, unwrought metal, and waste and scrap) remained duty free. United States imports of refined tin came from Indonesia (29%), Peru (22%), Malaysia (21%), Bolivia (18%), Brazil (5%), and others (5%) (table 8).

U.S. domestic exports of all tin products were 157,000 t, a 29% increase from the previous year's exports of 122,000 t. The leading tin exports were tinplate and terneplate; in 2017, exports of these products increased by 30% to 143,000 t valued at $96.2 million as compared with 110,000 t valued at $72.5 million in 2016. Refined tin exports in 2017 were 1,560 t valued at $32.5 million, a 35% increase in quantity from that of 2016. Exports of tin alloys were 965 t, a decrease of 7% from those in 2016. Exports of tin wrought products (tin bars, rods, profiles, and wire; tin foil; tin plates, sheet, and strip; and tin tubes, pipes, and tube and pipe fittings) increased by 17%, 132%, 268%, and 119%, respectively. Exports of tin waste and scrap and tin flakes and powders decreased in 2017 by 26% and 35% respectively (table 6).

World Review

According to a survey by the International Tin Association Ltd. (2018b), the world's 10 leading refined tin producers and their production in 2017 were Yunnan Tin Group Co. Ltd. (China), 74,500 t; PT Timah (Persero) Tbk. (Indonesia), 30,200 t; Malaysia Smelting Corp. (Malaysia), 27,200; Yunnan Chengfeng Co. Ltd. (China), 26,800 t; Minsur S.A. (Peru), 18,000 t; Empresa Metalúrgica Vinto S.A. (Bolivia), 12,600 t; Guangxi China Tin Group Co. Ltd. (China), 11,500 t; Thailand Smelting and Refining Co. Ltd. (Thailand), 10,600 t; Metallo Chimique International N.V. (Belgium), 9,700 t; and Gejiu Zi-Li Mining and Smelting Co. Ltd. (China), 8,700 t.

Australia.—In October, Aus Tin Mining Ltd. successfully completed its first sale of 5 t of tin in concentrate from the Granville tin-processing plant in Tasmania. The Granville plant had processed tailings that were assayed at about 1% tin. The plant initially re-treated the existing tailings at the site and then later in the year began processing stockpiled ore. In December, Aus Tin Mining received regulatory approval for a trial mine and pilot plant at the Taronga Stage 1 project. The Taronga project was expected to produce between 25,400 t and 39,800 t of tin in concentrate over the life of the project (Aus Tin Mining Ltd., 2017; Ford, 2017).

Brazil.—Minsur announced in its annual memo that the Pitinga Mine produced 6,983 t of tin in concentrate in 2017, essentially unchanged from the 6,875 t produced in 2016. All concentrates were sent to the company's Pirapora refinery in Sao Paulo, which produced 6,582 t of refined tin in 2017, 12% more than in 2016 (Minsur S.A., 2017, p. 14, 42; 2018, p. 14, 34).

Burma.—Burma accounted for most of China's tin concentrate imports in 2017, supplying tin ore and concentrates containing an industry-estimated 47,000 t of tin. Burma's ore continued to be produced predominantly in Wa County, or Wa Special Region 2 in northern Shan State, close to the border with China (International Tin Association Ltd., 2018a).

China.—In February, Yunnan Tin Group Co. Ltd. announced an expansion of the Wenshan Dulong zinc-indium-tin-copper mine. The expansion will increase ore capacity to 3.6 million metric tons per year (Mt/yr) from 2.1 Mt/yr. The mine was operated by Yunnan Hualian Zinc and Indium Co., Ltd., a subsidiary of Yunnan Tin Group Co. Ltd., and had increased production threefold since 2012, to 6,500 t of contained tin in 2017. The increased production was a result of technological upgrades and the construction of a new processing plant. An additional 8,000 metric tons per year (t/yr) of production during the next several years was planned (International Tin Association Ltd., 2017).

Indonesia.—PT Refined Bangka Tin restarted operations in late 2016, after closing in February 2016 because of low tin prices and more stringent environmental regulations. PT Refined Bangka Tin, which started operating in 2009, was one of the leading privately owned tin smelters in the world. PT Refined Bangka Tin typically exported about 5,000 t/yr of tin but reported producing between 2,400 and 3,600 t/yr of tin (Metal-Pages, 2016b; PT Refined Bangka Tin, 2017).

In August, the Governor of Bangka Belitung Island announced a moratorium on issuing new licenses for tin mining owing to the need to assess and inspect damage from illegal mining operations and illegal operations that exported tin concentrate. The moratorium was to last only until new regulations being drafted by the Government were put in place, which were expected to be completed within 3 months. Because the moratorium restricted only the issuance of new licenses, and not existing ones, supply was not expected to be affected in the short term (Metal-Pages, 2016a; International Tin Association Ltd., 2015, 2016).

Outlook

World tin reserves appeared to be adequate to meet short-term demand. Secondary sources of tin are likely to become an increasingly important component of supply, especially in the United States. Domestic tin requirements are expected to continue to be met primarily through imports.

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Waste Age.

TABLE 1
SALIENT TIN STATISTICS[1]

(Metric tons of contained tin, unless otherwise specified)

		2013	2014	2015	2016	2017
United States:						
Production, secondary, contained tin from old scrap[e]		10,600	10,600	10,500	10,300 r	10,300
Exports, refined tin		2,990	2,920	807	1,150	1,560
Imports for consumption, refined tin		34,900	35,600	33,600	32,200	34,100
Consumption, reported:						
Primary		25,700	24,200	23,900	22,500	23,500
Secondary		4,730	3,240	2,940	2,920	3,140
Stocks, yearend, U.S. industry[2]		6,520	6,970	7,090	6,370	6,390
Prices, average:[3]						
Platts Metals Week New York dealer, Grade A	cents per pound	1,041.43	1,023.05	756.43	839.10	936.65
Platts Metals Week composite	do.	1,352.43	NA	NA	NA	NA
London Metal Exchange Ltd., cash	do.	1,011.92	993.75	729.18	815.23	911.24
Kuala Lumpur, Malaysia	do.	1,011.85	992.53	NA	NA	NA
World, production:						
Mine		302,000 r	324,000 r	318,000 r	301,000 r	313,000
Smelter:						
Primary		326,000 r	381,000 r	347,000 r	341,000 r	355,000
Secondary		26,700 r	24,700 r	23,700 r	23,100 r	23,500
Total		353,000 r	405,000 r	370,000 r	364,000 r	378,000

[e]Estimated. [r]Revised. do. Ditto. NA Not available.
[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits, except prices; may not add to totals shown.
[2]Includes primary, secondary, in process, jobbers-importers, and pig tin afloat to the United States.
[3]Source: Platts Metals Week.

TABLE 2
U.S. CONSUMPTION OF PRIMARY AND SECONDARY TIN[1]

(Metric tons of contained tin)

	2016	2017
Stocks, January 1[2]	5,430	5,530
Net receipts during year:		
Primary	22,600	23,100
Secondary	1,140	1,230
Scrap	2,040	2,210
Total receipts	25,800	26,500
Total available	31,200	32,100
Tin consumed in manufactured products:		
Primary	22,500	23,500
Secondary	2,920	3,140
Total	25,400	26,700
Intercompany transactions in scrap	283	395
Total processed	25,700	27,100
Stocks, December 31 (total available less total processed)	5,480 r	5,320

[r]Revised.
[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes tin in transit in the United States.

TABLE 3
U.S. CONSUMPTION OF TIN, BY FINISHED PRODUCT[1]

(Metric tons of contained tin)

Product	2016			2017		
	Primary	Secondary	Total	Primary	Secondary	Total
Alloys, miscellaneous[2]	2,640	W	2,640	2,640	W	2,640
Babbitt	253	36	289	295	37	332
Bar tin	W	W	W	W	W	W
Bronze and brass	680 r	1,040	1,720 r	759	1,120	1,880
Chemicals	5,320	W	5,320	5,450	W	5,450
Solder	2,560	1,670	4,220	2,620	1,790	4,410
Tinning	405	--	405	337	--	337
Tinplate[3]	4,660	W	4,660	5,440	W	5,440
Other[4]	6,020	175	6,190	6,000	195	6,190
Total	22,500	2,920	25,400	23,500	3,140	26,700

rRevised. W Withheld to avoid disclosing company proprietary data; included with "Other." -- Zero.
[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes terne metal.
[3]Includes secondary pig tin and tin acquired in chemicals.
[4]Includes britannia metal, collapsible tubes and foil, jewelers' metal, pewter, tin powder, type metal, and white metal.

TABLE 4
U.S. INDUSTRY YEAREND TIN STOCKS[1]

(Metric tons)

	2016	2017
Plant raw materials:		
Pig tin:		
Primary[2]	4,720 r	4,350
Secondary	111	112
In process[3]	469	480
Total	5,300 r	4,950
Additional pig tin:		
Jobbers-importers	864	1,230
Afloat to United States	211	211
Total	1,080	1,440
Grand total	6,370	6,390

rRevised.
[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes tin in transit in the United States.
[3]Data only include tin content of scrap.

TABLE 5
U.S. STOCKS, RECEIPTS, AND CONSUMPTION OF NEW AND OLD SCRAP AND TIN RECOVERED, BY TYPE OF SCRAP[1]

(Metric tons)

	Gross weight of scrap								
	Stocks,		Consumption			Stocks,	Tin recovered[e]		
Type of scrap	January 1	Receipts	New	Old	Total	December 31	New	Old	Total
2016:									
Copper-base scrap:[e]									
Ingot makers	3,320 r	43,200	W	W	43,000	3,460	(2)	(2)	(2)
Brass mills[3]	W	W	W	W	W	W	(2)	(2)	(2)
Foundries and other plants	1,380	W	W	2,290	W	684 r	(2)	(2)	(2)
Total	XX	XX	XX	XX	XX	XX	(2)	(2)	(2)
Lead-base scrap	12,000 r	913,000 r	25,400 r	887,000 r	912,000 r	13,300 r	(2)	(2)	(2)
Tin-base scrap[4]	W	W	W	W	W	W	(2)	(2)	(2)
Grand total	XX	XX	XX	XX	XX	XX	8,770 r	9,960 r	18,700 r
2017:									
Copper-base scrap:[e]									
Ingot makers	3,460	43,400	W	W	43,400	3,370	(2)	(2)	(2)
Brass mills[3]	W	W	W	W	W	W	(2)	(2)	(2)
Foundries and other plants	684	3,410	W	W	3,410	685	(2)	(2)	(2)
Total	XX	XX	XX	XX	XX	XX	(2)	(2)	(2)
Lead-base scrap	22,300	960,000	W	W	963,000	19,600	(2)	(2)	(2)
Tin-base scrap[4]	W	W	W	W	W	W	(2)	(2)	(2)
Grand total	XX	XX	XX	XX	XX	XX	8,070	10,000	18,100

[e]Estimated. [r]Revised. W Withheld to avoid disclosing company proprietary data. XX Not applicable.
[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Withheld to avoid disclosing company proprietary data; included in totals.
[3]Consumption is assumed to be equal to receipts.
[4]Includes tinplate and other scrap recovered at detinning plants.

TABLE 6
U.S. EXPORTS OF TIN IN VARIOUS FORMS[1]

	2016		2017	
Form	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Unwrought:				
Refined tin	1,150	$21,600	1,560	$32,500
Tin alloys	1,040	17,400	965	17,900
Wrought:				
Tin bars, rods, profiles, and wire	4,620	39,700	5,420	40,400
Tin foil	41	622	95	446
Tin plates, sheet, and strip	725	2,950	2,670	3,400
Tin tubes, pipes, and tube and pipe fittings	141	2,120	309	2,670
Tin waste and scrap	4,570	11,200	3,360	8,500
Tin flakes and powders	124	2,290	81	1,850
Tinplate and terneplate	110,000	72,500	143,000	96,200

[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF TIN IN VARIOUS FORMS[1]

Form	2016		2017	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Unwrought:				
Refined tin	32,200	$540,000	34,100	$674,000
Tin alloys	1,910	30,000	1,590	30,200
Wrought:				
Tin bars, rods, profiles, and wire	1,200	63,800	1,130	64,600
Tin foil	86	2,150	98	3,170
Tin plates, sheet, and strip	94	500	74	438
Tin tubes, pipes, and tube and pipe fittings	1	32	11	89
Tin waste and scrap	27,200	5,460	52,100	15,800
Tin flakes and powders	219	5,160	171	4,330
Tin oxides	383	6,270	559	10,800
Tinplate and terneplate	805,000	726,000	854,000	820,000

[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF REFINED TIN, BY COUNTRY OR LOCALITY[1]

Country or locality	2016		2017	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	309	$4,740	25	$620
Bolivia	6,170	107,000	6,250	129,000
Brazil	2,120	37,800	1,720	35,100
Canada	48	877	17	293
China	229	3,800	510	10,200
Indonesia	8,580	128,000	9,910	174,000
Japan	4	55	8	182
Malaysia	7,560	130,000	7,050	144,000
Netherlands	33	450	(2)	8
Peru	6,590	118,000	7,350	154,000
Poland	--	--	567	12,100
Portugal	--	--	75	1,580
Singapore	176	3,160	40	811
Taiwan	--	--	98	2,100
Thailand	392	7,260	449	9,640
Other	1	26	4	30
Total	32,200	540,000	34,100	674,000

-- Zero.

[1]Table includes data available through April 29, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
TIN: WORLD MINE PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Metric tons, tin content)

Country or locality	2013	2014	2015	2016	2017
Australia	6,472	6,898	7,158	6,635	7,200 e
Bolivia	19,282 r	19,802 r	20,139 r	17,805 r	18,500 e
Brazil	16,830	25,534	18,824	18,000 r	18,000
Burma[e, 2]	20,000	35,000	50,000	54,000	47,000
Burundi[e]	13	21	30	67	50
China	101,200	102,100	110,156	92,000 e	93,000 e
Congo (Kinshasa)[e]	4,500	6,500	5,000 r	7,100 r	9,500
Indonesia	94,204 r	88,319 r	70,361 r	69,621 r	83,000
Laos	579	866	900	1,300	--
Malaysia	3,697	3,777	4,125 r	4,158 r	3,800 e
Nigeria[e, 3]	2,600	2,800	2,500	2,300 r	6,000
Peru	23,688	23,105	19,511	18,789	17,790
Portugal	84	75 e	42	45 e	50 e
Russia	156	321 e	578	1,100	1,300
Rwanda[e]	3,100	3,700	2,400 r	2,200	2,860
Tanzania	157	79	179	138	21
Thailand	132	156	72	92 r	100 e
Uganda, placer	18	31	135	62 r	75 e
Vietnam[e]	5,400	5,400	5,400	5,500	4,560
Total	302,000 r	324,000 r	318,000 r	301,000 r	313,000

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

[1]Table includes data available through June 7, 2018. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes content of tin-tungsten concentrate.

[3]Tin content estimated to be 62% of reported gross weight concentrate.

TABLE 10
TIN: WORLD SMELTER PRODUCTION, BY COUNTRY OR LOCALITY[1, 2]

(Metric tons, tin content)

Country or locality	2013	2014	2015	2016	2017
Australia, secondary[e]	400	400	400	400	400
Belgium, secondary	12,000	9,810	8,860	8,540	9,700
Bolivia, primary	14,862	15,439	15,700	16,810	16,288
Brazil:					
Primary	14,721	25,534	28,935 [r]	27,338 [r]	28,000 [e]
Secondary	-- [r]	-- [r]	-- [r]	--	--
Total	14,721 [r]	25,534 [r]	28,935 [r]	27,338 [r]	28,000 [e]
Burma, primary[e]	30	30	30	30	30
China, primary	159,000	187,000	166,900	166,000	168,500
Denmark, secondary[e]	50	50	50	50	50
Greece, secondary	-- [r]	-- [r]	-- [r]	--	50 [e]
India:					
Primary	33 [r]	30 [r]	17 [r]	9	10 [e]
Secondary	3,600	3,800	3,800	3,800 [e]	3,000 [e]
Total	3,633 [r]	3,830 [r]	3,817 [r]	3,809	3,010 [e]
Indonesia, primary	54,800 [r]	69,800 [r]	67,400 [r]	66,900 [r]	80,000
Japan, primary	1,786	1,746	1,688 [r]	1,620	1,570 [e]
Malaysia, primary	32,699 [r]	34,971 [r]	30,209 [r]	26,758 [r]	27,200
Norway, secondary[e]	50	50	50	50	50
Peru, primary	24,181	24,462	20,396	19,390	18,000
Rwanda, primary	--	--	400 [r, e]	-- [e]	-- [e]
Spain, secondary[e]	10	10	10	10	10
Thailand, primary	19,088	16,929	10,502 [r]	11,088 [r]	10,600
United States, secondary[e]	10,600	10,600	10,500	10,300 [r]	10,300
Vietnam, primary	4,961 [r]	4,688 [r]	4,382 [r]	4,919 [r]	4,700 [e]
Grand total	353,000 [r]	405,000 [r]	370,000 [r]	364,000 [r]	378,000
Of which:					
Primary	326,000 [r]	381,000 [r]	347,000 [r]	341,000 [r]	355,000
Secondary	26,700 [r]	24,700 [r]	23,700 [r]	23,100 [r]	23,500

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

[1]Table includes data available through June 12, 2018. All data are reported unless otherwise noted. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Whenever possible, total output has been separated into primary production (from ores and concentrates) and secondary production (tin metal recovered from old scrap). Data reflect metal production at the first measurable stage of metal output.