



# 2021 Minerals Yearbook

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**TIN [ADVANCE RELEASE]**

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# TIN

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Tin has not been mined in the United States since 1993, and primary tin metal has not been produced since the last smelter closed in 1989. Accordingly, the United States was completely reliant on imports and recycling for its tin needs, importing 38,100 metric tons (t) of refined tin during 2021, a 20% increase from that in 2020 (tables 1, 7). In 2021, the reported amount of primary tin consumed domestically was 26,300 t (tables 1, 3) worth an estimated \$917 million, and the reported amount of secondary tin consumed domestically was 2,740 t. Approximately 9,030 t of tin metal was produced from domestic old scrap (tables 1, 5). Industry stocks at yearend 2021 were 8,910 t, a 14% decrease compared with the revised amount in 2020 (tables 1, 4).

World tin mine production in 2021 was 305,000 t, a 10% increase from the revised production total in 2020 owing to production increases in Bolivia, Indonesia, Malaysia, and Peru (tables 1, 9). Of the 21 countries in which tin was mined in 2021, 7 countries accounted for more than 90% of total production. China was the leading producer (30% of world output), followed by Indonesia (23%), Burma (12%), Peru (9%), Bolivia (6%), Brazil (5%), and Congo (Kinshasa) (5%) (table 9). Primary tin world smelter production was 343,000 t (table 10), unchanged from the primary tin smelter total in 2020. Total tin world smelter production was 362,000 t in 2021, unchanged compared with the amount in 2020 (table 1). According to CRU International Ltd., world refined tin consumption for 2021 was 388,000 t, a 7% increase from the revised consumption total in 2020 (CRU International Ltd., 2022, p. 17).

The S&P Global Platts Metals Week annual average New York dealer price of \$15.80 per pound for Grade A tin in 2021 increased by 98% from that in 2020, and the annual average London Metal Exchange Ltd. (LME) cash price of \$14.78 per pound increased by 90% from that in 2020 (table 1). World tin reserves were estimated to be 4.9 million metric tons, about 16 times the estimated 2021 world mine production of tin (Merrill, 2022).

## Government Actions and Legislation

In 2021, the Defense Logistics Agency Strategic Materials (DLA Strategic Materials) reportedly sold 433 t of stockpiled tin for \$14.06 million. The tin sold throughout the year was reported to be weathered, suffering from tin disease or tin pest. Tin disease, also known as tin pest, is a phenomenon where pure tin transforms from its metallic form to a nonmetallic form at temperatures below 13.2 degrees Celsius (°C) [55.8 degrees Fahrenheit (°F)], which may lead to the material crumbling into powder and could require additional refining or supplementation with pure tin for manufactured use (Cornelius and others, 2017; Defense Logistics Agency Strategic Materials, 2021a–g; O’Sullivan, 2021).

**Conflict Minerals.**—The U.S. Securities and Exchange Commission (SEC) is responsible for implementing section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act, which focused on the use of minerals determined to be financing conflict in Congo (Kinshasa) or adjoining countries. A “conflict mineral” is defined as cassiterite, columbite-tantalite, gold, wolframite, or their derivatives. Cassiterite is one of two principal minerals mined for tin. Section 1502 requires companies for which conflict minerals or their derivatives are necessary to the functionality or manufacture of their products to disclose annually whether those minerals originated in Congo (Kinshasa) or an adjoining country, also known as “covered countries” (U.S. Securities and Exchange Commission, 2012, p. 56274–56275).

In 2021, 1,021 companies filed conflict minerals disclosures (1,057 companies filed disclosures in 2020). In 2021, 66% of companies were able to determine the originating country for minerals used in their products. Among the companies reporting in 2021, 41% determined that minerals in their products may have originated from a covered country, whereas 24% determined that their minerals did not originate from a covered country. The remaining 35% of companies were either unable to make a determination or did not clearly indicate results of their determination. Based on a generalized sampling of company filings, an estimated 68% of companies reported using tin (U.S. Government Accountability Office, 2022, p. 33–34). Tin concentrate production from Congo (Kinshasa) and adjoining countries has constituted 3% to 6% of world production during the previous 5 years (table 9).

**Foreign Trade.**—In 2020, steel and derivative product imports from all countries except Argentina, Australia, Brazil, Canada, the Republic of Korea, and Mexico remained subject to a 25% ad valorem tariff (Executive Office of the President, 2022, p. 13). In October 2021, the United States and the European Union agreed to replace the 10% and 25% ad valorem tariffs on aluminum and steel imports, respectively, with an import quota system starting in January 2022. The tariffs would only apply to imports from European Union countries exceeding specified quotas (Executive Office of the President, 2022, p. 12–15). Steel products affected by these tariffs included varieties of tinplate with Harmonized Tariff Schedule of the United States codes 7210.11.00, 7210.12.00, and 7212.10.00 (U.S. Department of Commerce, 2021, p. 9, 13). In 2021, the United States imported 797,000 t of tinplate, a 14% increase compared with imports in 2020 (table 7). Imports of tin in the form of ore and concentrate, unwrought metal, and waste and scrap, remained duty free (U.S. International Trade Commission, 2021a, b).

## Production

Tin has not been mined in the United States since 1993. In 2021, tin output recovered from old scrap totaled 9,030 t, a 5% decrease from the total in 2020 (tables 1, 5). A significant quantity of alloy tin scrap was generated during manufacturing processes and was recycled within those same industries as new scrap; however, these data were withheld to avoid disclosing company proprietary data. Secondary tin recovered from post-consumer (old scrap) was used in many types of products and was a particularly important source of tin for the manufacture of brass and bronze (table 3). In 2021, the total amount of tin recovered from new scrap was 7,570 t, a 5% decrease from that in 2020. Total tin recovered in 2021 was 16,600 t, a 5% decrease from that in 2020 (table 5).

## Consumption

During 2021, tin in the United States was used in chemicals (23%), tinplate (22%), alloys (11%), solder (10%), bronze and brass (5%), babbitt, bar tin, and tinning (4%), and other (25%) (table 3). Tin-based chemicals commonly were used in polyvinyl chloride production and biocides, catalysts, curing, and electroplating. Tinplate is a layer of tin adhered to a steel or wrought iron substrate for corrosion protection; tin was used to inhibit rust and was commonly used in food-grade cans. Tin alloys were used in brass and bronze products, solders, and low-friction metals. Solder was commonly used in electronic devices for connections on circuit boards.

Domestic consumption data for tin were developed by the U.S. Geological Survey from a voluntary survey of companies that consumed tin. In 2021, about 80 operations were canvassed, and about 30% responded to the tin consumption survey. The amount of tin consumed by nonrespondents was estimated based on prior reports or on information from other sources. In 2021, reported consumption of primary tin was 26,300 t, a 7% decrease from the revised primary consumption total in 2020. Reported secondary tin consumption in 2021 was 2,740 t, a 3% decrease from the revised secondary consumption total in 2020 (table 1).

In November, Aurubis AG announced plans to construct a metals recycling plant in the United States within Richmond County, GA. The facility would recover multiple metals, including tin, from 90,000 t of recyclable materials. Construction was to begin in mid-2022 with commissioning scheduled for the first half of 2024 (Aurubis AG, 2021b, c).

In November, Samsung Electronics Co. Ltd. (Republic of Korea) announced a \$17 billion investment to build a new semiconductor manufacturing facility in Taylor, TX. The facility was expected to increase production capabilities of its semiconductor products for applications in mobile products, fifth generation (5G) technology, high-performance computing, and artificial intelligence. The Taylor facility was expected to generate more than 2,000 high-tech jobs, with Samsung receiving a \$27 million grant from the Texas Enterprise Fund in recognition of the job creation effort. Tin is used for a variety of purposes in electronics, such as solder used in electronic devices for connections on circuit boards. More-recent tin applications in the semiconductor industry use extreme ultraviolet lithography (EUV) to create circuit patterns on microchips.

EUV technology involves vaporizing ultra-high-purity tin droplets with lasers to generate ultraviolet radiation essential for this process (Office of the Texas Governor, 2021; Samsung Electronics Co. Ltd., 2021).

## Prices

The S&P Global Platts Metals Week annual average New York dealer price for Grade A tin metal was \$15.80 per pound in 2021, a 98% increase from the 2020 average New York dealer price of \$7.99 per pound. The LME remained the principal commodity exchange for trading tin. In 2021, the annual average LME cash price for tin was \$14.78 per pound, a 90% increase from the 2020 average LME price of \$7.77 per pound (table 1).

## Foreign Trade

In 2021, the United States imported a total of 858,000 t of tin products valued at \$2.12 billion dollars, a 14% increase in quantity and 66% increase in value compared with those in 2020. Refined tin imports, which supplied most domestic primary tin requirements, totaled 38,100 t valued at \$1.13 billion in 2021, a 20% increase in quantity and more than double the value compared with that in 2020. Imports of tin alloys totaled 1,110 t in 2021 valued at \$25 million, a 32% increase in quantity and more than double in value from that in 2020. The leading tin imports in 2021 by quantity, were tinplate and terneplate, which equaled 797,000 t and were valued at \$868 million, a 14% increase in quantity and an increase of 29% in value from that in 2020. Leading sources of refined tin to the United States were Peru (30%), Indonesia (22%), Bolivia (18%), Malaysia (10%), and Brazil (9%) (tables 7, 8).

In 2021, the United States exported a total of 98,700 t of tin products valued at \$203 million dollars, a slight decrease in quantity and a 38% increase in value from that in 2020. Refined tin exports in 2021 equaled 1,290 t valued at \$32.1 million, more than double in quantity and more than triple in value from that in 2020. Exports of tin alloys totaled 630 t valued at \$14.5 million, a 44% decrease in quantity and a 16% decrease in value from that in 2020. The leading tin exports in 2021 by quantity were tinplate and terneplate, which equaled 84,500 t and were valued at \$82.3 million, a decrease of 7% in quantity and an increase of 27% in value from that in 2020 (table 6).

## World Review

In 2021, the International Tin Association Ltd. (ITA) reported the results from its annual surveys; the first compiles an annual list of the world's leading tin producers, and the second estimates global tin use by application.

According to the ITA, the world's 10 leading refined tin producers and their 2021 production were Yunnan Tin Group Co. Ltd. (China), 82,000 t; Minsur S.A. (Peru), 31,800 t; PT Timah (Persero) Tbk (Indonesia), 26,500 t; Yunnan Chengfeng Non-ferrous Metals Co. Ltd. (China), 17,000 t; Malaysia Smelting Corp. Berhad (Malaysia), 16,400 t; Empresa Metalúrgica Vinto S.A. (Bolivia), 12,100 t; Thailand Smelting and Refining Co. Ltd. (Thailand), 12,100 t; Jiangxi New Nanshan Technology Ltd. (China), 11,600 t; Guangxi China Tin Group Co. Ltd. (China), 10,100 t; and Aurubis Beerse nv

(Belgium), 9,800 t. Production for the top producer Yunnan Tin increased by 10% compared with that in 2020. Among the other top five producers, Minsur S.A and Yunnan Chengfeng reported increases of 62% and 3%, respectively. Meanwhile, Malaysia Smelting and PT Timah reported decreases of 27% and 42%, respectively, in production compared with that in 2020. Overall production by the top 10 refined tin producers increased slightly in 2021 compared with that in 2020 (International Tin Association Ltd., 2022a).

In 2021, 128 companies participated in the ITA annual survey of global tin use by application (101 companies participated in 2020). Based on results of the survey, estimated total refined tin use was 389,500 t, an 8% increase compared with 361,900 t in 2020. Total global tin use, both refined and unrefined tin, was 436,100 t, a 4% increase compared with that in 2020. The recycling input rate, an indicator of sustainability in tin use, was reported as 28% in 2021, compared with 33% in 2020. Solder remained the predominant application for tin, accounting for 49% of global use, a slight increase compared with that in 2020. The proportions for chemicals, tinplate, batteries, and tin copper remained unchanged at 17%, 12%, 7%, and 7%, respectively, whereas the “Other” category, which consisted of traditional metal product markets, decreased by 1 percentage point from that in 2020 (International Tin Association Ltd., 2021d, 2022b).

**Belgium.**—In July, Aurubis AG (Germany) announced a \$32 million<sup>1</sup> investment to build a new recycling facility in Beerse. The facility was expected to enhance the processing of anode sludge and facilitate a more efficient extraction of tin and precious metals such as gold and silver. Construction was slated to begin in the second quarter of 2022, with commissioning expected in early 2024 (Aurubis AG, 2021a).

**China.**—In 2021, the tin market in China was characterized by disruptions from severe weather events, global coronavirus disease 2019 (COVID-19) pandemic-related challenges, regulatory compliance issues, and maintenance schedule challenges. In January 2021, it was reported that tin ore and concentrate imports to China from Burma decreased by 17% to 36,400 t in 2020 compared with those in 2019. This decline was attributed to flooding in Burma that hampered mining operations and COVID-19-related disruptions that hindered logistic operations. To counter the decreased supply from Burma, China increased its imports from other countries by 19%, turning to sources such as Australia, Congo (Kinshasa), Laos, Russia, and Vietnam to fulfill its tin ore and concentrate demand (International Tin Association Ltd., 2021a).

In March, Yunnan Tin Group Co. Ltd. reported that it had completed commissioning of a new smelter in the Mengzi Economic Development Zone, Yunnan Province. This development was part of a broader initiative to reallocate industrial operations away from residential areas to comply with environmental standards. The facility was expected to significantly enhance production capabilities and reach a full production capacity of 70,000 metric tons per year (t/yr) by yearend (International Tin Association Ltd., 2021h).

In April, environmental inspections in Gejiu, Yunnan Province, led to temporary halts in tin refining processes. These inspections were part of China’s ongoing efforts to enforce environmental regulations among industrial operations (International Tin Association Ltd., 2021b).

In June, Yunnan Tin Company Ltd. announced a 45-day production halt at its main smelter in Yunnan Province for annual maintenance. This halt continued until August, at which point the company reported the completion of its maintenance shutdown, allowing production activities to resume with minimal disruption to the company’s production schedule (International Tin Association Ltd., 2021f, g, j).

Drought conditions in Yunnan Province during the summer months led to power supply issues. The region’s reliance on hydropower severely affected electricity availability, reducing tin smelter operations. These power issues highlighted the vulnerability of the tin production process to environmental factors and energy reliability. In September, China implemented strict power consumption measures to manage energy usage and support its carbon neutrality goals. These measures affected various industries, including tin smelting and processing (International Tin Association Ltd., 2021c, e, i).

**Congo (Kinshasa).**—Alphamin Resources Corp. (Mauritius) produced 10,969 t of payable tin in concentrate at its underground Bisie tin mine in 2021, the mine’s second full year of production. The company commenced commercial production at the Bisie Mine, in North Kivu Province, in September 2019 and produced 5,220 t of tin in concentrate by yearend 2019 and 10,319 t in 2020. During 2021, Alphamin announced the completion of its \$5 million fine tin recovery plant that was expected to increase tin production at Bisie by 5% to 10% (Alphamin Resources Corp., 2021, p. 4, 10). Additionally, the company reported the allocation of \$10.5 million towards exploration drilling during 2021 and expected to spend approximately \$17 million in 2022 to increase its resource base. Tin production at the Bisie Mine was projected to increase to 12,000 t in 2022 (Alphamin Resources Corp., 2022, p. 2–4, 10).

**Indonesia.**—PT Timah, a leading global tin producer, produced 24,700 t of tin in ore and 26,500 t of tin metal in 2021, decreases of 38% and 42%, respectively, from ore and metal production in 2020. Additionally, the company produced 7,080 t of tin chemicals and 576 t of tin solder, a 56% increase and 29% decrease, respectively, from chemical and solder production in 2020. PT Timah attributed the 2021 decrease in tin production to a decrease in global tin demand and issues related to the COVID-19 pandemic at the company’s mining operations in Bangka Belitung Islands and Riau Islands Provinces. In 2021, PT Timah announced that construction on its Advanced Tin Smelter project at its existing smelter in Muntok was still ongoing. The project included installing new smelting equipment that used top-submerged lance (TSL) technology and was initiated in response to the low recovery rate of the existing smelter technology and decreasing availability of high-grade tin ore. By yearend, the project was nearly complete. Once complete, the smelter would have an annual capacity of 40,000 t/yr of crude tin (PT Timah Tbk, 2022, p. 5, 18, 112, 132–134).

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<sup>1</sup>Where necessary, values have been converted from euro area euros (EUR) to U.S. dollars (US\$) at the annual average exchange rate of EUR0.846=US\$1.00 for 2021.



**Malaysia.**—From June through December 2021, Malaysia Smelting Corp. Berhad (MSC) suspended its tin smelting and mining operations in compliance with COVID-19 pandemic lockdown measures issued by the Government. The company declared force majeure, suspending all contractual obligations to its customers. In 2021, the company reported production of 2,408 t of tin in concentrate and 16,619 t of refined tin, a slight increase and a 26% decrease, respectively, compared with the 2,350 t and 22,325 t produced in 2020.

Additionally, MSC reported on the successful commissioning of its new smelter in Pulau Indah, which was operating at 75% of its designed capacity. The expansion was expected to increase MSC's production capacity by 50%, equivalent to an additional 40,000 t/yr, and had the potential to increase further to 60,000 t/yr. The Pulau Indah facility used a single stage smelting process to enhance extractive yields and reduce human resource costs. Its strategic location near a port and an LME warehouse was expected to yield savings in transportation and distribution expenses. Moreover, MSC announced plans to install a waste heat recovery system to convert the smelter's thermal energy into power. The company expected to decommission its older Butterworth smelter as the site achieved a steady operational state (Malaysia Smelting Corp. Berhad, 2021, p. 14–18).

## Outlook

Tin is a vital component of the electronics and packaging industries. As such, the demand for tin is currently closely tied to these industries. According to the ITA, future demand for tin will be driven largely by electronics and energy uses, including computing and robotics, electric vehicles, and energy generation, storage, and infrastructure. The ITA projects that refined tin production and consumption will increase in 2022 compared with those in 2021. Consumption is forecast to exceed production by 15,300 t, a substantial deficit compared with that in 2021 (International Tin Association, 2022c, p. 12).

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TABLE 1  
SALIENT TIN STATISTICS<sup>1</sup>

(Metric tons, tin content, unless otherwise specified)

	2017	2018	2019	2020	2021
United States:					
Production, secondary, tin content from old scrap <sup>c</sup>	10,000	9,890	10,500	9,550	9,030
Exports, refined tin	1,560	941	1,300	519	1,290
Imports for consumption, refined tin	34,300	36,800	34,100	31,600	38,100
Consumption, reported:					
Primary	23,300	28,000	28,500	28,300 <sup>r</sup>	26,300
Secondary	3,100	4,680	4,240	2,840 <sup>r</sup>	2,740
Stocks, yearend, U.S. industry <sup>2</sup>	6,660	10,100	10,300	10,400 <sup>r</sup>	8,910
Price, average: <sup>3</sup>					
Platts Metals Week New York dealer, Grade A      cents per pound	936.65	935.87	868.08	798.65	1,580.06
London Metal Exchange Ltd., cash      do.	911.22	914.29	846.43	777.15	1,478.14
World, production: <sup>4</sup>					
Mine	341,000	327,000	294,000 <sup>r</sup>	276,000 <sup>r</sup>	305,000
Smelter:					
Primary	351,000	350,000	347,000	344,000	343,000
Secondary	22,800	19,400	19,000	18,700	18,900
Total	373,000	370,000	367,000	363,000	362,000

<sup>c</sup>Estimated. <sup>r</sup>Revised. do. Ditto.

<sup>1</sup>Table includes data available through August 29, 2022. Data are rounded to no more than three significant digits, except "Price, average"; may not add to totals shown.

<sup>2</sup>Includes primary, secondary, in process, jobbers-importers, and pig tin afloat to the United States.

<sup>3</sup>Source: S&P Global Platts Metals Week.

<sup>4</sup>May include estimated data.

TABLE 2  
U.S. CONSUMPTION OF PRIMARY AND SECONDARY TIN<sup>1</sup>

(Metric tons, tin content)

	2020	2021
Stocks, January 1 <sup>2</sup>	9,010 <sup>r</sup>	9,050
Net receipts during year:		
Primary	28,800	26,700
Secondary	2,480 <sup>r</sup>	1,030
Scrap	2,360 <sup>r</sup>	3,160
Total receipts	33,600 <sup>r</sup>	30,900
Total available	42,700 <sup>r</sup>	39,900
Processed:		
Tin consumed in manufactured products:		
Primary	28,300 <sup>r</sup>	26,300
Secondary	2,840 <sup>r</sup>	2,740
Total	31,300 <sup>r</sup>	29,100
Intercompany transactions in scrap	606	770
Total processed	32,000 <sup>r</sup>	29,800
Stocks, December 31 (total available less total processed)	10,700 <sup>r</sup>	10,100

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through September 2, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes tin in transit in the United States.



TABLE 3  
U.S. CONSUMPTION OF TIN, BY FINISHED PRODUCT<sup>1</sup>

(Metric tons, tin content)

Product	2020			2021		
	Primary	Secondary	Total	Primary	Secondary	Total
Alloys, miscellaneous <sup>2</sup>	3,740	W	3,740	3,100	W	3,100
Babbitt	227	W	227	207	W	207
Bar tin	536	--	536	542	--	542
Bronze and brass	832	1,080	1,910	699	656	1,360
Chemicals	7,690 <sup>r</sup>	W	7,690 <sup>r</sup>	6,810	W	6,810
Solder	3,210 <sup>r</sup>	W	3,210 <sup>r</sup>	2,840	W	2,840
Tinning	314	W	314	345	W	345
Tinplate <sup>3</sup>	6,880 <sup>r</sup>	W	6,880 <sup>r</sup>	6,480	W	6,480
Other <sup>4</sup>	4,880	1,750 <sup>r</sup>	6,630 <sup>r</sup>	5,310	2,080	7,390
Total	28,300 <sup>r</sup>	2,840 <sup>r</sup>	31,100 <sup>r</sup>	26,300	2,740	29,100

<sup>r</sup>Revised. W Withheld to avoid disclosing company proprietary data; included with "Other." -- Zero.

<sup>1</sup>Table includes data available through September 2, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includesterne metal.

<sup>3</sup>Includes secondary pig tin and tin acquired in chemicals.

<sup>4</sup>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<sup>1</sup>

(Metric tons)

	2020	2021
Plant raw materials:		
Pig tin:		
Primary <sup>2</sup>	7,950 <sup>r</sup>	7,880
Secondary	484 <sup>r</sup>	15
In process <sup>3</sup>	488 <sup>r</sup>	498
Total	8,920 <sup>r</sup>	8,390
Additional pig tin:		
Jobbers-importers	W	W
Afloat to United States	W	W
Total	1,440	517
Grand total	10,400 <sup>r</sup>	8,910

<sup>r</sup>Revised. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Table includes data available through September 2, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes tin in transit in the United States.

<sup>3</sup>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<sup>1</sup>

(Metric tons)

Type of scrap	Gross weight of scrap						Tin recovered <sup>e</sup>		
	Stocks, January 1	Receipts	Consumption			Stocks, December 31	New	Old	Total
			New	Old	Total				
2020:									
Copper-base scrap: <sup>c</sup>									
Ingot makers	2,890	29,500	W	W	29,700	2,090 <sup>r</sup>	(2)	(2)	(2)
Brass mills <sup>3</sup>	W	W	W	W	W	W	(2)	(2)	(2)
Foundries and other plants	497	1,700	W	W	1,700	441 <sup>r</sup>	(2)	(2)	(2)
Total	XX	XX	XX	XX	XX	XX	(2)	(2)	(2)
Lead-base scrap	11,400	1,050,000	W	W	1,050,000	W	(2)	(2)	(2)
Tin-base scrap <sup>4</sup>	W	W	W	W	W	W	(2)	(2)	(2)
Grand total	XX	XX	XX	XX	XX	XX	7,990	9,550	17,500
2021:									
Copper-base scrap: <sup>c</sup>									
Ingot makers	2,090	29,700	W	W	29,700	2,090	(2)	(2)	(2)
Brass mills <sup>3</sup>	W	W	W	W	W	W	(2)	(2)	(2)
Foundries and other plants	441	862	W	W	857	446	(2)	(2)	(2)
Total	XX	XX	XX	XX	XX	XX	(2)	(2)	(2)
Lead-base scrap	W	842,000	W	W	W	W	(2)	(2)	(2)
Tin-base scrap <sup>4</sup>	W	W	W	W	W	W	(2)	(2)	(2)
Grand total	XX	XX	XX	XX	XX	XX	7,570	9,030	16,600

<sup>c</sup>Estimated. <sup>r</sup>Revised. W Withheld to avoid disclosing company proprietary data. XX Not applicable.

<sup>1</sup>Table includes data available through September 2, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Withheld to avoid disclosing company proprietary data; included in totals.

<sup>3</sup>Consumption is assumed to be equal to receipts.

<sup>4</sup>Includes tinplate and other scrap recovered at detinning plants.

TABLE 6  
U.S. EXPORTS OF TIN IN VARIOUS FORMS<sup>1</sup>

Form	2020		2021	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Unwrought:				
Refined tin	519	\$9,820	1,290	\$32,100
Tin alloys	1,130	17,200	630	14,500
Wrought:				
Tin bars, rods, profiles, and wire	4,640	41,500	7,230	54,000
Tin foil	239	1,630	78	591
Tin plates, sheet, and strip	2,270	3,910	1,630	5,810
Tin tubes, pipes, and tube and pipe fittings	158	2,250	171	2,440
Tin waste and scrap	1,200	1,840	2,770	4,460
Tin flakes and powders	232	4,440	367	7,210
Tinplate and ternplate	90,500	64,900 <sup>r</sup>	84,500	82,300

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through August 2, 2022. 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<sup>1</sup>

Form	2020		2021	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Unwrought:				
Refined tin	31,600	\$539,000	38,100	\$1,130,000
Tin alloys	843	11,600	1,110	25,000
Wrought:				
Tin bars, rods, profiles, and wire	1,160	34,100 <sup>r</sup>	1,770	57,600
Tin foil	47	1,630	110	5,090
Tin plates, sheet, and strip	58	282	38	259
Tin tubes, pipes, and tube and pipe fittings	10	134	38	186
Tin waste and scrap	20,700	8,700	18,600	13,200
Tin flakes and powders	128 <sup>r</sup>	4,000	300	7,000
Tin oxides	160	2,780	489	14,500
Tinplate and ternplate	697,000	673,000	797,000	868,000

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through August 2, 2022. 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<sup>1</sup>

Country or locality	2020		2021	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	372	\$6,500	323	\$9,820
Bolivia	5,060	86,800 <sup>r</sup>	6,830	192,000
Brazil	3,080	52,800	3,470	103,000
Canada	8	116	5	160
China	(2)	2	1,560	54,900
Indonesia	9,170	148,000	8,410	241,000
Malaysia	3,740	64,000	3,870	115,000
Peru	8,850	156,000	11,400	351,000
Poland	1,080	19,600	1,290	33,300
Thailand	174	3,110	287	8,320
Other	103	2,020	679	22,500
Total	31,600	539,000	38,100	1,130,000

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through August 2, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9  
TIN: WORLD MINE PRODUCTION, BY COUNTRY OR LOCALITY<sup>1</sup>

(Metric tons, tin content)

Country or locality	2017	2018	2019	2020	2021
Australia	7,402	6,871	7,738	8,118	8,772
Bolivia	18,341	17,251	17,147	14,709	19,628
Brazil	17,081	17,591	14,867	16,893	15,517
Burma <sup>e, 2</sup>	67,500	54,600	43,900 <sup>r</sup>	36,400 <sup>r</sup>	36,900
Burundi <sup>e</sup>	140	200	240	160 <sup>r</sup>	110
China	95,500	94,800	84,500	94,500 <sup>r</sup>	90,000 <sup>e</sup>
Congo (Kinshasa) <sup>e</sup>	11,000	9,800	11,200	16,400 <sup>r</sup>	16,700
Indonesia	83,000	85,000	77,468	52,467 <sup>r</sup>	70,000 <sup>e</sup>
Laos	1,083	480	1,168 <sup>r</sup>	1,335 <sup>r</sup>	1,980
Malaysia	3,894	3,868	3,611	2,963 <sup>r</sup>	5,000 <sup>e</sup>
Mongolia	25	17 <sup>r</sup>	26	100 <sup>e</sup>	100 <sup>e</sup>
Namibia	--	--	10	312	494
Nigeria <sup>e, 3</sup>	8,300	7,800	1,600 <sup>r</sup>	1,200 <sup>r</sup>	1,600
Peru	17,790	18,601	19,853	20,647	26,995
Portugal	81	111	108	104 <sup>r</sup>	100 <sup>e</sup>
Russia	1,011	1,531 <sup>r</sup>	2,471 <sup>r</sup>	2,559 <sup>r</sup>	3,000 <sup>e</sup>
Rwanda <sup>e</sup>	3,000	3,000	2,400	1,800	2,000
Spain	--	--	--	61	60 <sup>e</sup>
Tanzania	91	8	18	20 <sup>e</sup>	20 <sup>e</sup>
Thailand, mineral concentrate	541	75	73	315 <sup>r</sup>	300 <sup>e</sup>
Uganda	66	53	15	-- <sup>r</sup>	--
United Kingdom	255	230 <sup>e</sup>	--	--	--
Vietnam	5,000	5,500	5,500	5,400 <sup>e</sup>	5,400 <sup>e</sup>
Total	341,000	327,000	294,000 <sup>r</sup>	276,000 <sup>r</sup>	305,000

<sup>e</sup>Estimated. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through August 29, 2022. All data are reported unless otherwise noted; totals may include estimated data. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes tin content of tin-tungsten concentrate.

<sup>3</sup>Tin content is estimated as 62% of reported gross weight concentrate.

TABLE 10  
TIN: WORLD SMELTER PRODUCTION, BY COUNTRY OR LOCALITY<sup>1,2</sup>

(Metric tons, tin content)

Country or locality	2017	2018	2019	2020	2021
Belgium, secondary	9,700	9,330	9,300	9,000	9,800
Bolivia, primary	16,648	15,611	15,111	10,414	16,258
Brazil, primary	13,796	12,900	11,927	11,810	16,000 <sup>c</sup>
China, primary	178,400	177,400	181,200	203,000	180,000 <sup>c</sup>
Greece, secondary <sup>c</sup>	50	50	--	--	--
India:					
Primary	15	18	19	13	19
Secondary	3,000 <sup>c</sup>	--	--	--	--
Total	3,020	18	19	13	19
Indonesia, primary	80,000	81,427	76,389	58,790	70,000 <sup>c</sup>
Japan, primary	1,624	1,650	1,547	1,558	1,500 <sup>c</sup>
Malaysia, primary	27,200	27,341	25,673	22,598	16,400
Norway, secondary <sup>c</sup>	50	50	--	--	--
Peru, primary	17,906	18,255	19,555	19,585	25,947
Rwanda, primary	-- <sup>c</sup>	--	300	300	300 <sup>c</sup>
Spain, secondary	24	81	101	115	110 <sup>c</sup>
Thailand, primary	10,588	10,721	10,956	11,265	12,100
United States, secondary <sup>c</sup>	10,000	9,890	10,500	9,550	9,030
Vietnam, primary	4,400	4,900	4,800	4,600 <sup>c</sup>	4,600 <sup>c</sup>
Grand total	373,000	370,000	367,000	363,000	362,000
Of which:					
Primary	351,000	350,000	347,000	344,000	343,000
Secondary	22,800	19,400	19,900	18,700	18,900

<sup>c</sup>Estimated. -- Zero.

<sup>1</sup>Table includes data available through May 1, 2023. All data are reported unless otherwise noted; totals may include estimated data. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

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