



# 2007 Minerals Yearbook

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TIN [ADVANCE RELEASE]

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# TIN

By James F. Carlin, Jr.

**Domestic survey data and tables were prepared by Linda M. White, statistical assistant, and the world production tables were prepared by Linder Roberts, international data coordinator.**

Tin has not been mined in the United States since 1993; consequently, the country is reliant on imports and recycling for its tin needs. In 2007, 25 firms consumed 70% of the reported primary tin used domestically. The major uses were as follows: solders, 29%; metal containers, 21%; transportation, 14%; construction, 11%; and other, 25%. The estimated value of primary tin metal consumed domestically was \$470 million. Industry stocks at yearend increased by 15% compared with those at yearend 2006 (table 1). The Defense Logistics Agency (DLA), which manages the National Defense Stockpile (NDS), sold 4,535 metric tons (t) of pig tin from the stockpile during 2007.

Approximately 14,800 t of tin, most of it from old scrap, was recycled (table 5). About one-quarter of the tin consumed in the United States was recycled metal. The recycling rate for steel cans was 65% compared with 63% in 2006, 56% in 1995, and 15% in 1988 (Jim Woods, director, Public and Education Relations, Steel Recycling Institute, written commun., January 7, 2009).

World tin mine output increased by 10% compared with that in 2006, and world primary tin smelter production increased slightly compared with that of 2006 (tables 1, 9, 10). Despite the production increases, industry analysts considered the world tin market in 2007 to be in a supply-demand equilibrium. The composite tin price increased by 59% from that of 2006, largely owing to investment fund buying. Of the 20 countries in which tin was mined, the top 5 accounted for 93% of the total world tin production of 326,000 t. China was the leading producer (41% of world output), followed by Indonesia (31%) and Brazil (3%). World tin reserves were estimated to be 6.1 million metric tons (Mt), about 17 times the estimated annual world primary tin consumption of 350,000 t. Most tin reserves are in Asia and South America.

## Legislation and Government Programs

In 2007, the DLA sold 4,535 t of tin under the basic ordering agreement (BOA) and the long-term negotiated contract formats. The effect of proposed NDS tin sales on domestic markets is assessed by the Market Impact Committee, which is comprised of several Federal agencies, including the U.S. Geological Survey (USGS).

The DLA Annual Materials Plan for tin was to sell 12,000 t per fiscal year. This quantity represents the maximum amount of tin that can be sold in a fiscal year. The remaining tin inventory is stored at the Hammond, IN, depot. Under the BOA approach, DNSC posts the amount of tin that it wants to sell on its Web site once each week. Interested companies submit a bid, and DNSC makes a sales determination within 2 hours of the close

of bids. BOA sales began in 2002. As of December 31, 2007, the Government stockpile tin inventory was 4,059 t.

## Production

**Mine.**—Tin was not produced at any domestic mine in 2007. Until 1993, a few small tin mines had operated sporadically in the United States. However, USGS canvasses confirm that there has been no primary domestic tin production since that year.

**Secondary.**—Industry analysts considered the United States to be the world's leading producer of secondary or scrap tin. Most secondary tin has been generated during manufacturing in the United States from various scrapped alloys of tin and recycled in those same alloy industries. Secondary tin from recycled fabricated parts has been used in many kinds of products and is a particularly important source of tin for the manufacture of solder and brass/bronze.

The Steel Recycling Institute, funded by the domestic steel industry, continues 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 65% in 2007, up slightly from 63% in 2006.

## Consumption

In 2007, consumption of primary tin decreased by 19% compared with that in 2006 (tables 1, 2). Domestic consumption data for tin were developed by the USGS from a voluntary survey of tin consumers. Of the 151 firms to which a survey form was sent, 116 responded, including the major consumers. Data for the nonrespondents were estimated based on prior-year reporting.

The total number of metal cans shipped was 134 billion in 2007 compared with 136 billion in 2006. The Can Manufacturers Institute no longer provides a categorization by types of can (for example, aluminum versus steel). Steel (essentially tinplate and tin-free steel) dominated in the food, pet, and general line can markets, and aluminum held 100% of the beverage can market (Can Manufacturers Institute, 2007, p. 20).

Arcelor Mittal SA (Luxembourg, Luxembourg) remained the world's leading steel producer with plants on most of the world's continents. The company also was the leading tinplate producer in the United States. During 2007, the U.S. Department of Justice ordered Arcelor Mittal to sell its Sparrows Point, MD, steel plant to remedy the competitive harm arising from the 2006 combination to form Arcelor Mittal, causing lessened competition in the tinplate market (American Metal Market, 2007).

## Prices

The Platts Metals Week average composite price for tin metal increased by 59% compared with that of 2006. Industry observers attributed the marked price increase to investment fund purchases and selective demand increases in some parts of the world. The London Metal Exchange Ltd. (LME) remained the primary trading site for tin. Tin is one of only six metals traded on the LME.

## Foreign Trade

U.S. imports of refined tin, which supplied most domestic tin requirements, decreased by 20% compared with those of 2006 (tables 7, 8). Imports of tin in all forms (metal, ore and concentrate, scrap, and waste) remained duty free, and were held in U.S. warehouses by trading firms until sold to customers. Foreign-owned trading firms tended to dominate the marketing of imports. U.S. imports of tin came mostly from Peru, Bolivia, China, Brazil, and Singapore, in descending order. Refined tin exports were small compared with imports (table 6).

## World Review

The tin development organization ITRI (Frogmore, United Kingdom) forecast global tin demand to be flat in 2007 compared with that of 2006. World tin use in 2006 was estimated to be 362,000 t, which represented an increase of almost 9% from that in 2005, owing largely to strong growth in tin usage for solder purposes amid a rapid rise in lead-free solders. However, 2007 showed a fairly weak first half for electronics, according to ITRI, coinciding with a lack of new legislation coming into force to reduce lead content, especially in solder. Legislation on the use of lead in solders was expected in China, but the matter had no definite date of implementation. Solders accounted for 188,000 t of global tin consumption in 2006, about 50% of total tin consumption, compared with a 50% share in 2005. Tinplate, accounting for 16% or 59,000 t of global estimated usage in 2006, was experiencing some growth in markets in developing countries, although this was offset by declines elsewhere in the world, for an expected stable figure in 2007 (Platts Metals Week, 2007).

According to another report from ITRI, the number of tin producers and European Union (EU) importers committed to data generation for the registration of tin metal under the new EU Registration Evaluation and Authorization of Chemicals (REACH) regulation continues to increase. REACH came into existence on June 1, 2007. REACH was designed to ensure that information was available on all chemicals and metals manufactured and/or used in the EU in order to minimize any possible risk to human health or the environment from these products (Platts Metals Week, 2008).

Consolidation of steel plants and tin mills continued throughout the world in 2007. One of the largest was the purchase by Tata Iron & Steel Co. Ltd. (Mumbai, India) of the assets of Corus Group (London, United Kingdom), creating the world's fifth-ranked steelmaker in terms of tonnage produced. The \$12 billion acquisition created a company with combined

crude steel capacity of 27 million metric tons per year. Both firms had been important users of tin and producers of tinplate (Metal Bulletin, 2007).

More than 5 Mt of steel cans was recycled worldwide in 2005 representing an average recycling rate of 65%, according to the International Iron and Steel Institute's (IISI) (Brussels, Belgium) Committee on Packaging. This rate has increased every year for the past 5 years, and by a total of 7% since 2001 (Canmaker, The, 2007).

Although the United States was thought to be the world's leading recycler of steel cans, China was close behind, according to figures released by the IISI. American steelmakers recovered 1.3 Mt of post-consumer steel cans for recycling in 2007, while China recycled an estimated 1.2 Mt in the first year that China's can recycling data were reported by the world steel organization. The 27 member countries of the EU recycled 2.5 Mt in 2007. Japan's 88% recovery rate was the highest among the countries surveyed. China was second at (75%), and the United States was sixth (63%) after the Republic of Korea, South Africa, and the EU (American Metal Market, 2008).

Because of the dramatic increase in demand for tin in selected countries, particularly in China, tin prices in 2007 recovered to a level not seen since the early 1980s. These increased prices resulted in a renewed interest in restarting old, closed tin mining operations and accelerated development of previously identified tin properties. Examples are the reactivation of the centuries-old South Crofty Tin Mine in the United Kingdom; Metal X Ltd.'s redevelopment of the Collingswood (Australia) and the Renison Tin Mines (Tasmania); Silver Standard's initiative to reopen the Pirguitas Tin Mine site in Argentina; and even PT Timah's consideration of evaluating deep-sea tin dredging techniques in Indonesia (TIN World, 2007b).

**Australia.**—BlueScope Steel Ltd. (Melbourne, Victoria) announced the permanent shutdown of tinplate operations at the Port Kembla (New South Wales) steel works in 2007. The operation had two tinplate lines with a combined capacity of 500,000 metric tons per year (t/yr). The company attributed the closure to rising raw material costs and falling demand for tinplate (CRU Tin Monitor, 2007).

Yunnan Tin Co., Ltd. (Kunming, Yunnan Province, China) was supporting an exploration joint venture in Australia that launched an initial public offering of shares. New South Wales-based YTC Resources Ltd. sought to raise \$3 million to explore for tin and copper-gold prospects near Orange, New South Wales. Tin exploration was expected to be focused around old mining areas where tin and associated metals, including silver and tungsten, were mined until the 1970s (CRU Tin Monitor, 2007).

**China.**—Malaysia Smelting Corp. (MSC) entered into a contract with Guangxi Guilin Jinwei Realty Co. Ltd. and Vertex Metals Inc. to establish a new joint-venture operation called Guilin Hinwei Tin Technology Co. Ltd. for the smelting and refining of tin. The new operation was expected to be located in Guilin, Guangxi Province, and will be owned 58% by Jinwei, 40% by MSC, and 2% by Vertex (TIN World, 2007b).

Yunnan Tin announced in March that it had agreed to purchase a 67% stake in Gejiu Zili Metallurgy Co., Ltd. Yunnan Tin was the leading producer of refined tin worldwide, with

2006 output of 52,400 t. That total included production from its Singapore Tin Industries Ltd. joint venture. Gejiu is based in the same city as Yunnan Tin and ranked fourth in China and tenth in the world in refined tin production in 2006, with output of 9,000 t (China Metal Market—Lead, Zinc & Tin, 2007).

**Indonesia.**—PT Timah (Jakarta), the country's leading tin producer from both mine and smelter sources, announced plans to spend \$145 million in 2007 to expand its tin smelting capacity and repair some of its dredging fleet. Included will be funds for two new furnaces, each with 7,000 t/yr capacity; one each for its Kunder and Mentok smelters. These additions were expected to increase Timah's tin smelting capacity to about 62,000 t/yr (CRU International Ltd., 2007).

Yunnan Tin announced a joint venture with partner Singapore Tin Industries Ltd. (Singapore) to establish a 36,000-t/yr integrated tin mining, smelting, refining, and an end-product operation on Bangka Island. The partnership would establish the new entity, PT Indo Yunnan Mineral Utama, by acquiring and consolidating existing plants on Bangka Island (CRU International Ltd., 2007).

**Portugal.**—Companhia Siderúrgica Nacional (CSN) (Rio de Janeiro, Brazil) announced the suspension of operations at its Lusosider tin mill subsidiary in Paio Pires, near Lisbon. The tin mill was one of the smallest tinplate producers in Europe, with a capacity of about 60,000 t/yr (Metals Place, 2008).

**Russia.**—Vostek Corp. and Norinco International Corp. (Beijing, China) announced that jointly they planned to construct a new float glass and glass container plant in the Tver region of Russia. Completion was scheduled by late 2008. The glass container production line would be built first, and then the float glass line with an annual capacity of 18 million square meters of glass. The plant was expected to cost \$150 million to build (Glass Magazine, 2007a).

**Thailand.**—Sumitomo Corp. (Tokyo, Japan), Metal One Corp. (Tokyo), and Nippon Steel Corp. (Tokyo) agreed to increase the production capacity of Siam Tinplate Co. Ltd., at Map Ta Phut Industrial Estate in Rayong, to 260,000 t/yr from 150,000 t/yr by 2008 (TIN World, 2007b).

**United Arab Emirates.**—Guardian Industries Corp. (Auburn Hills, MI) and its joint-venture partners National Co. for Glass Industries and Al Zamil Group, both of Saudi Arabia, announced the startup of their new float glass plant, Guardian RAK in Ras Al Khaimah. The facility will produce 700 metric tons per day of float glass for automotive and construction applications. The plant will employ about 300 workers. The float glass process uses a considerable amount of molten tin metal (Glass Magazine, 2007b).

**United Kingdom.**—The long history of production of tin at the South Crofty Mine in Cornwall will be accelerated following the formation of a new mining company. Western United Mines Ltd. was a newly formed company that will own and operate the South Crofty operation. Baseresult Holding Ltd., which bought South Crofty in 2001, was the majority shareholder in Western United Mines along with Cassiterite LP. South Crofty was the United Kingdom's last working tin mine when it closed in 1998. Baseresult expected to spend \$5 million during 2008 for mine development, and another \$75 million by the time the mine

restarts production, which was expected by yearend 2009 (TIN World, 2007a).

## Outlook

Domestic demand for primary tin worldwide was expected to increase moderately in the near term, at a rate of about 3% per year. That rate, however, could double in a few years if new applications—especially those in which tin is substituted for toxic materials, such as lead-free solders—continue to find acceptance in the marketplace.

World tin reserves appeared to be adequate to meet foreseeable demand. Secondary sources of tin were likely to remain an important component of supply, especially in the United States. National Defense Stockpile tin stocks are expected to be exhausted by yearend 2009 at the current rate of sales, so domestic tin requirements will continue to be met primarily through imports.

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

		2003	2004	2005	2006	2007
United States:						
Production, secondary, contained tin <sup>c</sup>	metric tons	5,500	5,240	11,700	11,600 <sup>r</sup>	11,900
Exports, refined tin	do.	3,690	3,650	4,330	5,490	6,410
Imports for consumption, refined tin	do.	37,100	47,600	37,500	43,300	34,600
Consumption, contained tin:						
Primary	do.	32,900	36,700	31,400	29,200 <sup>r</sup>	23,700
Secondary	do.	4,510	7,990	9,170	8,480 <sup>r</sup>	7,490
Stocks, yearend, U.S. industry, contained tin	do.	7,960	8,980 <sup>r</sup>	8,080 <sup>r</sup>	7,890 <sup>r</sup>	9,100
Prices, average, contained tin:						
New York, NY, market	cents per pound	232.36	409.37	360.94	419.49	679.50
Platts Metals Week composite	do.	339.78	547.30	483.05	565.12 <sup>r</sup>	899.48
London, United Kingdom	do.	222.00	385.00	334.00	398.00	659.00
Kuala Lumpur, Malaysia	do.	221.67	385.11	333.55	397.69	658.42
World, production, contained tin:						
Mine	metric tons	261,000 <sup>r</sup>	304,000 <sup>r</sup>	305,000 <sup>r</sup>	296,000 <sup>r</sup>	326,000 <sup>e</sup>
Smelter:						
Primary	do.	270,000	295,000 <sup>r</sup>	324,000 <sup>r</sup>	331,000 <sup>r</sup>	339,000 <sup>e</sup>
Secondary	do.	11,900	11,700	20,200	19,100	18,400 <sup>e</sup>
Undifferentiated	do.	200	200 <sup>e</sup>	200	50 <sup>r</sup>	--

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

<sup>1</sup>Data are rounded to no more than three significant digits, except prices.

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

(Metric tons of contained tin)

	2006 <sup>r</sup>	2007
Stocks, January 1 <sup>2</sup>	7,640	7,230
Net receipts during year:		
Primary	29,900	25,600
Secondary	5,040	4,950
Scrap	4,100	3,030
Total receipts	39,000	33,600
Total available	46,600	40,800
Tin consumed in manufactured products:		
Primary	29,200	23,700
Secondary	8,480	7,490
Total	37,700	31,100
Intercompany transactions in scrap	469	505
Total processed	38,100	31,700
Stocks, December 31 (total available less total processed)	8,520	9,140

<sup>r</sup>Revised.

<sup>1</sup>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 of contained tin)

Product	2006			2007		
	Primary	Secondary	Total	Primary	Secondary	Total
Alloys, miscellaneous <sup>2</sup>	2,260	W	2,260	1,880	W	1,880
Babbitt	484 <sup>r</sup>	W	484	604	W	604
Bar tin	698 <sup>r</sup>	W	698 <sup>r</sup>	788	W	788
Bronze and brass	1,360 <sup>r</sup>	1,950 <sup>r</sup>	3,300 <sup>r</sup>	1,110	1,690	2,800
Chemicals	9,290 <sup>r</sup>	W	9,290 <sup>r</sup>	6,070	W	6,070
Collapsible tubes and foil	W	W	W	W	W	W
Solder	6,540 <sup>r</sup>	6,220 <sup>r</sup>	12,800 <sup>r</sup>	4,970	5,460	10,400
Tinning	696 <sup>r</sup>	--	696 <sup>r</sup>	451	--	451
Tinplate <sup>3</sup>	7,110 <sup>r</sup>	--	7,110 <sup>r</sup>	7,010	--	7,010
Tin powder	W	W	W	W	W	W
Type metal	W	W	W	W	W	W
White metal <sup>4</sup>	W	W	W	W	W	W
Other	722 <sup>r</sup>	322 <sup>r</sup>	1,040 <sup>r</sup>	777	339	1,120
Total	29,200 <sup>r</sup>	8,480 <sup>r</sup>	37,700 <sup>r</sup>	23,700	7,490	31,100

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

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

<sup>2</sup>Includes terre metal.

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

<sup>4</sup>Includes pewter, britannia metal, and jewelers' metal.



TABLE 4  
U.S. INDUSTRY YEAREND TIN STOCKS<sup>1</sup>

(Metric tons)

	2006	2007
Plant raw materials:		
Pig tin:		
Virgin <sup>2</sup>	5,910 <sup>r</sup>	7,280
Secondary	540 <sup>r</sup>	502
In process <sup>3</sup>	896 <sup>r</sup>	871
Total	7,340 <sup>r</sup>	8,650
Additional pig tin:		
Jobbers-importers	316	277
Afloat to United States	230	172
Total	546	449
Grand total	7,890 <sup>r</sup>	9,100

<sup>r</sup>Revised.

<sup>1</sup>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 represent scrap only, tin content.

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				
2006:									
Copper-base scrap:									
Ingot makers	4,020 <sup>r</sup>	65,300 <sup>r</sup>	17,200	48,600 <sup>r</sup>	65,700	3,560 <sup>r</sup>	W	2,040	2,040
Brass mills <sup>2</sup>	--	W	W	W	W	W	1,830	W	1,830
Foundries and other plants	1,500	27,600	17,000	10,400	27,400 <sup>r</sup>	1,630	W	388	388
Total	XX	XX	XX	XX	XX	XX	1,830	2,430	4,250
Lead-base scrap	21,100	1,370,000	19,400	1,340,000	1,360,000	29,400	510	9,170	9,680
Tin-base scrap <sup>3</sup>	W	W	W	W	W	W	W	W	W
Grand total	XX	XX	XX	XX	XX	XX	2,340	11,600	13,900
2007:									
Copper-base scrap:									
Ingot makers	3,560	76,200	15,100	60,500	75,600	4,210	530	2,650	3,180
Brass mills <sup>2</sup>	--	W	W	W	W	W	1,480	W	1,480
Foundries and other plants	1,630	18,700	W	W	18,800	1,560	W	199	199
Total	XX	XX	XX	XX	XX	XX	2,010	2,850	4,850
Lead-base scrap	29,400	1,330,000	32,500	1,310,000	1,340,000	25,100	853	9,080	9,940
Tin-base scrap <sup>3</sup>	W	W	W	W	W	W	W	W	W
Grand total	XX	XX	XX	XX	XX	XX	2,860	11,900	14,800

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

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

<sup>2</sup>Consumption is assumed to be equal to receipts.

<sup>3</sup>Includes tinplate and other scrap recovered at detinning plants.

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

Year	Tinplate and terneplate				Tin scrap and other tin-bearing material except tinplate scrap <sup>2</sup>	
	Quantity		Ingots and pigs		Quantity	
	(metric tons, gross weight)	Value (thousands)	(metric tons)	Value (thousands)	(metric tons, gross weight)	Value (thousands)
2006	198,000	\$137,000	5,490	\$40,500	23,500	\$63,000
2007	194,000	118,000	6,410	46,400	13,000	53,300

<sup>1</sup>Data are rounded to no more than three significant digits.

<sup>2</sup>Includes rods, profiles, flakes, tubes, and pipes.

Source: U.S. Census Bureau.

TABLE 7  
U.S. IMPORTS FOR CONSUMPTION OF TIN IN VARIOUS FORMS<sup>1</sup>

Year	Miscellaneous, <sup>2</sup> value (thousands)	Dross, skimmings, scrap residues, tin alloys, n.s.p.f. <sup>3</sup>		Tinplate and terneplate		Tin compounds		Tinplate scrap	
		Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
		2006	\$23,000	7,750	\$34,300	495,000	\$371,000	440	\$4,320
2007	38,400	11,700	25,800	471,000	369,000	448	6,260	6,690	2,050

<sup>1</sup>Data are rounded to no more than three significant digits.

<sup>2</sup>Includes tinfoil, tin powder, flitters, metallics, manufactures, and n.s.p.f.

<sup>3</sup>Not specifically provided for.

TABLE 8  
U.S. IMPORTS FOR CONSUMPTION OF UNWROUGHT TIN METAL,  
BY COUNTRY<sup>1</sup>

Country	2006		2007	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	18	\$205	29	\$353
Bermuda	--	--	250	3,600
Bolivia	8,160	71,000	4,340	62,900
Brazil	1,300	11,000	2,600	33,200
Canada	17	175	20	283
China	4,440	36,100	4,230	52,900
Hong Kong	99	865	--	--
Indonesia	4,600	36,200	1,680	19,300
Japan	40	356	--	--
Malaysia	245	1,820	14	144
Netherlands	--	--	100	1,060
Peru	21,600	184,000	18,700	262,000
Singapore	1,090	8,560	1,730	25,400
Thailand	210	1,960	--	--
United Kingdom	1,370	12,300	881	11,700
Other	63	609	15	214
Total	43,300	365,000	34,600	473,000

-- Zero.

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

Source: U.S. Census Bureau.



TABLE 9  
TIN: WORLD MINE PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Metric tons)

Country	2003	2004	2005	2006	2007 <sup>e</sup>
Australia	3,864	1,196	2,819	1,478 <sup>r</sup>	2,085 <sup>3</sup>
Bolivia	16,755	17,569	18,640 <sup>r</sup>	17,669 <sup>r</sup>	17,500
Brazil	12,217	12,202	11,739	8,528 <sup>r,p</sup>	9,500 <sup>p</sup>
Burma <sup>4</sup>	606	526	708	923 <sup>r</sup>	900
Burundi	5	9	4	46 <sup>r</sup>	50
China <sup>e</sup>	102,000	118,000	126,000	126,000 <sup>r</sup>	135,000
Congo (Kinshasa) <sup>e</sup>	1,400 <sup>r</sup>	4,500 <sup>r</sup>	4,500 <sup>r</sup>	3,500 <sup>r</sup>	3,500
Indonesia	71,694	65,772	78,404 <sup>r</sup>	80,933 <sup>r</sup>	102,000
Laos	360 <sup>e</sup>	400	450 <sup>r,e</sup>	450 <sup>r,e</sup>	450
Malaysia	3,359	2,745	2,857	2,398 <sup>r</sup>	2,500
Mexico	21 <sup>e</sup>	24	17	25	25
Nambia	43	15	--	--	--
Niger <sup>e</sup>	11	3,100 <sup>3</sup>	3,100	3,100	3,100
Nigeria <sup>e,5</sup>	1,800	1,000	1,300 <sup>r</sup>	1,400 <sup>r</sup>	1,500
Peru	40,202	67,675	42,145	38,470	39,019 <sup>3</sup>
Portugal	218	220	243 <sup>r</sup>	25	25 <sup>p</sup>
Russia <sup>e</sup>	2,000	2,500	3,000	3,000	2,500
Rwanda	990 <sup>r</sup>	2,400 <sup>r</sup>	3,100 <sup>r,e</sup>	2,600 <sup>r</sup>	2,600
Spain	247 <sup>r</sup>	231 <sup>r</sup>	--	--	--
Thailand	793	586	158 <sup>r,e</sup>	190 <sup>r</sup>	120
Uganda	1	2	2	2	2
Vietnam <sup>e</sup>	2,100	3,500	5,400 <sup>r</sup>	5,400 <sup>r</sup>	3,500
Total	261,000 <sup>r</sup>	304,000 <sup>r</sup>	305,000 <sup>r</sup>	296,000 <sup>r</sup>	326,000

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

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

<sup>2</sup>Table includes data available through July 18, 2008.

<sup>3</sup>Reported figure.

<sup>4</sup>Includes content of tin-tungsten concentrate.

<sup>5</sup>Concentrate gross weight reported, estimated 62% tin content.

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

(Metric tons)

Country	2003	2004	2005	2006	2007 <sup>e</sup>
<b>Australia:</b>					
Primary	597	467	594	572 <sup>r</sup>	118
Secondary <sup>e</sup>	300	300	300	400	400
Total <sup>c</sup>	897	767	894	972 <sup>r</sup>	518
Belgium, secondary <sup>c</sup>	5,000	5,000	7,000	6,000	5,000
Bolivia, primary	12,836	13,627	13,841	14,100 <sup>r,e</sup>	13,500
<b>Brazil:</b>					
Primary	10,761	11,512	8,986	8,780 <sup>r,p</sup>	9,000 <sup>p</sup>
Secondary <sup>e</sup>	250	250	250	250	250
Total <sup>c</sup>	11,011	11,762	9,236	9,030 <sup>r</sup>	9,250
Bulgaria, secondary <sup>c</sup>	10	10	10	10	10
Burma, primary <sup>e</sup>	30	30	30	30	30
China, primary <sup>e</sup>	98,000	115,000	122,000	132,000 <sup>r</sup>	151,000
Czech Republic, secondary <sup>e</sup>	100	100	100	100	100
Denmark, secondary <sup>c</sup>	100	100	100	100	100
Greece, secondary <sup>e</sup>	100	100	100	100	100
Indonesia, primary	66,284	49,872	65,300	77,400 <sup>r</sup>	77,600
Japan, primary	662	707	754	854 <sup>r</sup>	874 <sup>3</sup>
Malaysia, primary	18,250	33,914	36,924	22,850 <sup>r</sup>	25,000
Mexico, primary	1,769	25 <sup>r</sup>	17 <sup>r</sup>	25 <sup>r</sup>	25
Nigeria, primary <sup>e</sup>	25	25	25	-- <sup>r,e</sup>	--
Norway, secondary <sup>e</sup>	50	50	50	50	50
Peru, primary	39,181	41,613	36,733	40,495 <sup>r</sup>	36,004 <sup>3</sup>
<b>Russia:<sup>c</sup></b>					
Primary	4,100	4,570	5,000	4,980	3,800
Secondary	500	500	500	500	400
Total	4,600	5,070	5,500	5,480	4,200
Rwanda	200	200 <sup>e</sup>	200	50 <sup>r</sup>	-- <sup>3</sup>
Spain, secondary <sup>c</sup>	25	25	10	10	10
Thailand, primary	15,400	20,800	31,600 <sup>r</sup>	27,540 <sup>r</sup>	20,400 <sup>e</sup>
United States, secondary	5,500 <sup>r</sup>	5,240 <sup>r</sup>	11,700 <sup>r</sup>	11,600 <sup>r</sup>	11,900 <sup>3</sup>
Vietnam, primary	1,915	2,356	1,766 <sup>r</sup>	1,830 <sup>r</sup>	2,000
<b>Grand total</b>	<b>282,000</b>	<b>306,000 <sup>r</sup></b>	<b>344,000</b>	<b>351,000 <sup>r</sup></b>	<b>346,000</b>
<b>Of which:</b>					
Primary	270,000	295,000 <sup>r</sup>	324,000	331,000 <sup>r</sup>	339,000
Secondary	11,900	11,700	20,200	19,100	18,400
Undifferentiated	200	200 <sup>e</sup>	200	50 <sup>r</sup>	--

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

<sup>1</sup>World 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). This table reflects metal production at the first measurable stage of metal output. Table includes data available through July 18, 2008.

<sup>3</sup>Reported figure.