



# 2010 Minerals Yearbook

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ZINC

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In 2010, U.S. production of recoverable zinc was 723,000 metric tons (t), a slight increase from that of 2009 (table 1). The value of domestic mine production was approximately \$1.62 billion. Alaska continued to be the dominant zinc-producing State, accounting for 87% of recoverable production. Zinc was also produced from mines in Idaho, Missouri, and Tennessee. Domestic exports of zinc contained in ores and concentrate decreased by 4% to 752,000 t in 2010 and were predominantly sent to Canada (19%), Japan (18%), the Republic of Korea (17%), and Spain (15%) (table 7). Imports for consumption of zinc contained in ores and concentrates decreased by 57% to 32,200 t from those in 2009. Total U.S. refined zinc production in 2010 was estimated to have increased by 22% to 249,000 t. Imports of refined zinc in 2010 decreased slightly to 671,000 t. Refined zinc was imported primarily from Canada (75%), Mexico (12%), Spain (6%), and Peru (4%). Domestic exports of refined zinc increased by 1,240 t to 4,200 t in 2010. Globally, zinc mine production increased by 6% to 12 million metric tons (Mt); zinc metal production increased by 13% to 12.7 Mt (tables 10, 11).

## Legislative and Government Programs

A U.S. stockpile of zinc has been maintained since 1967 for national defense purposes. In 1992, Public Law 102-484, which authorized the disposal of the entire inventory of zinc from the National Defense Stockpile (NDS), was signed. The Defense Logistics Agency, DLA Strategic Materials (formerly Defense National Stockpile Center), which maintains the NDS, was authorized to sell 7,710 t of zinc during fiscal year 2010 (October 1, 2009, to September 30, 2010; actual quantity sold would be limited to remaining inventory). However, there were no sales of zinc during the fiscal year; sales of zinc from the NDS have been suspended since August 2008 owing to concerns regarding domestic availability and access to various raw materials. The Department of Defense (DOD) submitted an initial report to Congress in August 2006, which recommended a more detailed review of the current stockpile disposal policy and to determine whether the NDS could assure future availability of materials for defense needs considering current world market conditions. In August, the Secretary of Defense submitted a report outlining several strategies the DOD can undertake to mitigate possible disruptions to material supplies, including strategic sourcing, partnerships with foreign nations, and traditional stockpiling (U.S. Department of Defense, 2009, p. 8, 58; 2011, p. 2, 6).

## Environment and Health

Zinc is an important micronutrient for human health by helping to maintain proper enzyme activity. Diarrhea, caused by contaminated drinking water and poor sanitation, causes

the death of approximately 1.5 million children per year and is the second leading cause of death among children under five. Zinc supplements, in conjunction with oral rehydration salts, have been recommended for the treatment of acute diarrhea by the World Health Organization since 2004. In 2009, the Clinton Global Initiative, the International Zinc Association, and UNICEF partnered together to create the “Zinc Saves Kids” program in an effort to eliminate zinc deficiency in developing countries. Since the creation of the initiative, about 50 countries have adopted new policies to include zinc supplementation in child health management.

The “HarvestZinc Fertilizer Project” was developed in 2008 under the support of several fertilizer and zinc associations to test the use of zinc fertilizers on rice and wheat crops to increase crop yield and correct zinc-deficient soils. The initial phase of the project, which included identifying the zinc fertilizers and application times that would lead to the greatest zinc accumulation in grain, was to be completed in 2011.

## Production

**Mine.**—In 2010, zinc was produced in four States, with Alaska as the leading zinc-producing State. Other zinc-producing States were Idaho, Missouri, and Tennessee. Domestic mine production of recoverable zinc in 2010 was 723,000 t, a slight increase from that of 2009. A decrease in production in Alaska was offset by an increase in Tennessee, owing to the continued ramp up at Nyrstar NV’s (Balen, Belgium) East Tennessee and Middle Tennessee zinc mining complexes. Domestic mine production data were collected by the U.S. Geological Survey (USGS) from a base-metal voluntary survey of lode-mine production. Four companies responded monthly, accounting for 100% of U.S. zinc mine production.

**Alaska.**—Teck Alaska Inc. (a subsidiary of Teck Resources Ltd., Vancouver, British Columbia, Canada) operated the open pit Red Dog zinc-lead mine in the Northwest Arctic Borough under a royalty agreement with NANA Regional Corporation Inc., an Alaskan Native-owned corporation.

Zinc in concentrate production at Red Dog decreased by 8% in 2010 from that of 2009 to 538,000 t owing to lower mill feed grades. In 2010, approximately 28% of Red Dog’s zinc concentrates were refined at Teck’s metallurgical complex at Trail, British Columbia, Canada. Remaining concentrates were sent to Asia and Europe. Reported ore reserves at yearend 2010 totaled 55.3 Mt averaging 15.9% zinc. Zinc in concentrate production in 2011 was projected to total 555,000 t (Teck Resources Ltd., 2011a, p. 34; b, p. 23, 31).

In January, Teck received the necessary permitting from the U.S. Environmental Protection Agency to develop the Aqqaluk Deposit at Red Dog. Pit development commenced in May,

and the first ore from the deposit was processed in August. Teck's operating plan was to continue mining the Main Pit until mid-2011. During this time, the ore will be supplemented with ore from Aqqaluk to maintain efficient production rates (Teck Resources Ltd., 2011b, p. 22–23).

Hecla Mining Co.'s (Coeur d'Alene, ID) underground Greens Creek Mine is a polymetallic (silver-zinc-gold-lead) massive sulfide deposit located on Admiralty Island in the Tongass National Forest near Juneau. Products included gold and silver dore, as well as lead and zinc concentrates, which were sold to smelters globally. In 2010, zinc in concentrate production increased by 6% from that of 2009 to 67,600 t. Reserves at yearend were 7.48 Mt grading 9.3% zinc (Hecla Mining Co., 2011a, p. 12).

Historically, Greens Creek was completely powered by diesel generators located onsite. In 2006, necessary infrastructure was completed to allow surplus hydroelectric power supplied by Alaska Electric Light and Power Co. to reach Greens Creek's facilities. During 2009 and 2010, the mine sourced an increasing amount of its power from hydroelectricity. The project reduced Greens Creek's production costs, which were significantly affected by diesel fuel prices in the past few years (Hecla Mining Co., 2011b, p. 12).

**Idaho.**—Hecla Mining operated the Lucky Friday Mine, an underground silver-lead-zinc mine in the Coeur d'Alene Mining District in northern Idaho. Products included silver-lead concentrate and zinc concentrate. All concentrates in 2010 were sent to Teck's facility at Trail for processing. Zinc in concentrate production at Lucky Friday decreased by 13% in 2010 from that of 2009 to 8,420 t. At yearend, reserves measured 2.89 Mt grading 2.9% zinc (Hecla Mining Co., 2011b, p. 16).

During 2010, Hecla Mining continued early-stage development of an internal shaft (“#4 Shaft”) that would provide access to ore-grade mineralization deeper than the current mining level and extend Lucky Friday's mine life. The company expected full project approval in mid-2011. Production levels at Lucky Friday may be affected as development for the new shaft would take place in the current production shaft (“Silver Shaft”) (Hecla Mining Co., 2011a, p. 7).

**Missouri.**—Doe Run Resources Corp. (St. Louis, MO) operated a series of production shafts that run along the Viburnum Trend lead-zinc-copper ore body in southeast Missouri. Doe Run processed the ore at four mills to produce primarily lead concentrates and to a lesser extent, zinc and copper concentrates.

**Tennessee.**—In 2009, Nyrstar acquired the Middle Tennessee zinc mine complex from Strategic Resource Acquisition Corp. (Toronto, Ontario, Canada) and the East Tennessee zinc mine complex from Glencore International AG (Baar, Switzerland). The mine acquisitions were part of Nyrstar's strategy to increase its vertical integration with the intention of sourcing 50% of its raw material needs internally. The East Tennessee mine complex (the Coy, Immel, and Young Mines) produced 50,000 t of zinc in concentrate in 2010 and was operating at full capacity by the third quarter. The Middle Tennessee mine complex (the Cumberland, Elmwood, and Gordonsville Mines) produced 13,000 t of zinc in concentrate during the year and was operating at 35% of production capacity by yearend. Nyrstar

expected the mines to reach full production capacity [130,000 metric tons per year (t/yr) of zinc in concentrate for both complexes] in early 2011. The concentrate from the Tennessee mines would provide 100% of the feedstock requirements at Nyrstar's Clarksville, TN, zinc refinery. Reserves for the Tennessee mines totaled 5.1 Mt at 3.3% zinc (Nyrstar NV, 2011a, p. 22; b, p. 13).

**Smelter.**—Domestic metal production data were collected by the USGS from a voluntary survey of zinc metal and compounds production. Domestic zinc metal production data were partially estimated based on publicly available information to protect company proprietary data. In 2010, refined zinc was mainly produced in two States—Pennsylvania (Horsehead Holding Corp.'s Monaca facility) and Tennessee (Nyrstar's Clarksville facility). Refined zinc was also produced to a lesser extent by U.S. Zinc's (owned by Votarantim Metais, Sao Paulo, Brazil) recycling operations in Coldwater, MI, and Houston, TX. Estimated refined zinc production in 2010 was 249,000 t.

**Primary.**—Nyrstar's Clarksville electrolytic zinc refinery was the only primary zinc smelter in the United States. Products included Special High Grade (SHG) zinc metal and galvanizing alloys as well as a number of byproducts including cadmium metal, intermediate copper cementate, leach product, synthetic gypsum, and sulfuric acid. Refined zinc production in 2010 increased by 28% from that of 2009 to 120,000 t. The smelter operated at full production capacity the entire year compared with production in 2009 when the smelter operated at reduced levels in the first half of the year in response to the downturn in the zinc market. The zinc recovery rate also improved owing to the inclusion of the Tennessee mines' concentrates, which are a higher grade of zinc compared with other concentrates that have been treated by the refinery in the past (Nyrstar NV, 2011b, p. 14–15).

**Secondary.**—Horsehead produced zinc metal—primarily Prime Western Grade (PW) and to a lesser extent, Special Special High Grade (SSHG)—and zinc oxide at its electrothermic zinc smelter (159,000 t/yr capacity) in Monaca. The PW zinc was sold to hot-dip galvanizers and brass manufacturers, and the SSHG zinc was used as feed for the production of high-purity zinc alloys and powder. Feedstock for the metal production was composed entirely of secondary materials; 73% of the feedstock was sourced from Horsehead's electric arc furnace (EAF) dust recycling operations, and the balance was composed of dross and skimmings sourced from hot-dip galvanizers. Other zinc-bearing residues were sourced from the alloying, brass, and zinc industries. EAF dust is a waste product recovered from the air flow exiting electric arc furnaces during the steel recycling process and typically contains 10% to 20% zinc (Horsehead Holding Corp., 2011a, p. 9).

In addition to the Monaca facility, Horsehead operated six other facilities, including five EAF dust recycling operations located in Barnwell, SC; Beaumont, TX; Calumet, IL; Palmerton, PA; and Rockwood, TN, and a hydrometallurgical metals recovery facility in Bartlesville, OK. In 2010, Horsehead brought the Barnwell, SC, dust recycling facility into production. The new facility has the capacity to process 163,000 t/yr of EAF dust, increasing the company's total EAF dust

processing capacity by 31% to 699,000 t/yr (Horsehead Holding Corp., 2011a, p. 8, 25).

In 2010, Horsehead recycled 498,000 t of EAF dust compared with 373,000 t in 2009. The company attributed the processing rate increase to its acquisition of additional EAF dust sourcing contracts and an increase in domestic steel production. Zinc production at Monaca totaled 112,000 t, a 17% increase from production in 2009 (Horsehead Holding Corp., 2011a, p. 8; b).

Small quantities of secondary refined zinc were also produced at U.S. Zinc's operations in Coldwater and Houston. The facilities produced PW grade and continuous galvanizing grade zinc metal primarily from galvanizing residues, such as dross and skimmings.

## Consumption

Reported U.S. zinc consumption in 2010 was 358,000 t, representing 39% of domestic apparent consumption. Domestic apparent consumption of zinc in 2010 was 907,000 t, a slight increase from apparent consumption in 2009. Reported slab zinc consumption data were collected by the USGS from a voluntary survey on zinc consumption by grade and end use. Changes in zinc consumption usually follow trends in industrial production or, more generally, global economic growth. Global economic activity expanded during 2010, albeit at a sluggish pace. The rate of economic growth in the United States and Japan was slower than that of Europe and the major emerging economies—most notably Brazil, China, and India. The principal use for zinc is for galvanizing, in which a zinc coating is applied to steel to prevent corrosion. Galvanized steel is used extensively in the automotive industry (for example, the vehicle autobody) and in the construction industry (for example, transmission towers, and transportation infrastructure). The American Iron and Steel Institute (2011, p. 33) reported that domestic shipments of galvanized steel in 2010 were 12.2 Mt, a 46% increase from those of 2009.

The next leading end use for zinc is brass and bronze. According to the Copper Development Association (2011, p. 16), the amount of zinc consumed domestically by brass mills, copper ingot makers, and copper foundries was 210,000 t, a 3% decrease from the amount consumed in 2009. Other end uses for zinc include—in descending order by quantity—zinc-base alloys for diecasting, chemicals, and zinc semimanufactures.

## Prices and Stocks

The annual average London Metal Exchange, Ltd. (LME) cash price for SHG zinc in 2010 increased by 31% from that of 2009 to \$2,160.31 per metric ton (97.99 cents per pound). The LME cash price for SHG zinc averaged \$1.10 per pound in January, decreased to 79 cents per pound by midyear, and then increased to \$1.08 per pound by October. The December average price declined to \$1.03 per pound. The annual average Platts North American producer price for SHG zinc in 2010, which was based on the LME cash price plus premium, was \$1.02 per pound. Monthly average North American SHG premiums began the year at nearly 2.87 cents per pound and rose to nearly 5.03 cents per pound by yearend.

Commodity exchange inventories [LME and the Shanghai Futures Exchange (SHFE)] totaled 1.01 Mt of zinc at yearend. Stocks of SHG zinc in global LME warehouses totaled 701,425 t at the close of the year, a 43% increase from the closing stock level in 2009. Much of this increase was attributed to increases in zinc inventories at warehouses in Malaysia and the United States—mainly, New Orleans, LA. At yearend, U.S. warehouses held 73% of LME stocks. At yearend 2010, the SHFE held 309,000 t of zinc, an 80% increase from that of 2009.

## World Review

Global zinc mine production increased by 6% in 2010 from that of 2009 to approximately 12 Mt (table 10). Production increases in Australia, China, and Mexico more than offset substantial decreases in Canada, Ireland, and Peru. China (31% share of global production), Australia (12%), and Peru (12%) were the three leading producers of zinc in concentrate in 2010. Global zinc mine capacity increased by 481,000 t by yearend. Most of the net increase in capacity was as a result of mine reopenings, including Glencore's Iscaycruz Mine in Peru, Mungana Goldmine's Mungana Mine in Australia, and Nyrstar's Tennessee Mines. An expansion of the Jingding Zinc's Lanping Mine in China also significantly contributed to the capacity increase. There were no significant mine closures in 2010 (International Lead and Zinc Study Group, 2011b, p. 6).

Global zinc metal production increased 13% in 2010 from that of 2009 to 12.7 Mt (table 11) owing to the reversal of many production cutbacks at smelters that took place in 2009 owing to deteriorating market conditions. China (41% share of global production), the Republic of Korea (6%), Canada (5%), India (5%), and Japan (5%) were the leading producers of refined zinc metal in 2010.

According to ILZSG, zinc consumption increased 16% in 2010 from that of 2009 to 12.5 Mt owing to a recovery from the economic crisis. Significantly contributing to the year-on-year increase was continued growth in China leading to a 13% consumption increase and a recovery in Europe that resulted in a 29% increase in zinc consumption (International Lead and Zinc Study Group, 2011c).

## Outlook

ILZSG forecast zinc consumption in 2011 to increase by 2% from that in 2010 to 12.85 Mt. China's apparent consumption was expected to increase a modest 2% as a result of a destocking of unreported inventories. Europe's consumption was forecast to increase by 3%. Notable increases in consumption were also expected in Brazil, India, and Turkey (International Lead and Zinc Study Group, 2011a).

World mine production was expected to increase by 4% in 2011 to 12.8 Mt owing to increased production in China, India, Kazakhstan, Mexico, and Russia, despite declines predicted in Australia and Peru. Refined metal production was expected to increase by 3% to 13.2 Mt owing to increases in China, India, and the Republic of Korea. Overall, the zinc metal market in 2011 was forecast to remain in a substantial surplus of 317,000 t followed by smaller surplus in 2012 (International Lead and Zinc Study Group, 2011a).

## References Cited

- American Iron and Steel Institute, 2011, Annual statistical report 2010: Washington, DC, American Iron and Steel Institute, 126 p.
- Copper Development Association, 2011, Annual data 2011: New York, NY, Copper Development Association, 20 p.
- Hecla Mining Co., 2011a, 2010 annual report: Coeur d'Alene, ID, Hecla Mining Co., 12 p.
- Hecla Mining Co., 2011b, Form 10-K—2010: U.S. Securities and Exchange Commission, 36 p.
- Horsehead Holding Corp., 2011a, Form 10-K—2010: U.S. Securities and Exchange Commission, 52 p.
- Horsehead Holding Corp., 2011b, Horsehead Holding Corp. announces fourth quarter 2010 earnings: Pittsburgh, PA, Horsehead Holding Corp. news release, February 25, 4 p.
- International Lead and Zinc Study Group, 2011a, ILZSG session/forecasts: Lisbon, Portugal, International Lead and Zinc Study Group news release, September 30, 4 p.
- International Lead and Zinc Study Group, 2011b, Lead and zinc new mine and smelter projects: Lisbon, Portugal, International Lead and Zinc Study Group, 73 p.
- International Lead and Zinc Study Group, 2011c, Review of trends in 2010—Zinc: Lisbon, Portugal, International Lead and Zinc Study Group news release, February 22, 2 p.
- Nyrstar NV, 2011a, Annual report 2010: Balen, Belgium, Nyrstar NV, 151 p.
- Nyrstar NV, 2011b, Nyrstar Tennessee mines—Analyst site visit, Tennessee: Nyrstar NV, November 7, Presentation, 24 p.
- Teck Resources Ltd., 2011a, 2010 annual report: Vancouver, British Columbia, Canada, Teck Resources Ltd., 130 p.
- Teck Resources Ltd., 2011b, Annual information form for the year ended December 31, 2010: Vancouver, British Columbia, Canada, Teck Resources Ltd., March 15, 76 p.
- U.S. Department of Defense, 2009, Reconfiguration of the National Defense Stockpile report to Congress: Washington, DC, U.S. Department of Defense, 87 p.
- U.S. Department of Defense, 2011, Strategic and critical materials operations report to Congress—Operations under the Strategic and Critical Materials Stockpiling Act during the period October 2009 through September 2010: Washington, DC, U.S. Department of Defense, 69 p.

## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

- Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140.
- Zinc. Ch. in Mineral Commodity Summaries, annual.
- Zinc. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
- Zinc. Mineral Industry Surveys, monthly.

### Other

- American Metal Market, daily.
- China Metal Market—Lead, Zinc & Tin. Beijing Antaika Information Development Co., Ltd., monthly.
- China Metals and Mining, Interfax Ltd., weekly.
- Company media releases, news releases, and regulatory filings.
- Defense Logistics Agency, DLA Strategic Materials.
- Economics of Zinc. Roskill Information Services, Ltd.
- Foreign Government publications.
- International Lead and Zinc Study Group.
- Metal Bulletin, daily, weekly, monthly.
- Metals Insider, Reuters, daily.
- Mining Journal, weekly.
- Platts Metals Week, weekly.
- Russia & CIS Metals and Mining, Interfax Ltd., weekly.
- Ryan's Notes, weekly.
- Zinc. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.

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

	2006	2007	2008	2009	2010	
United States:						
Production:						
Domestic ores, contained zinc	metric tons	727,000	803,000	778,000	736,000	748,000
Domestic ores, recoverable zinc	do.	699,000	769,000	748,000	710,000	723,000
Value, recoverable zinc	thousands	\$2,450,000	\$2,620,000	\$1,470,000	\$1,220,000	\$1,620,000
Refined zinc:						
At primary smelters	metric tons	113,000	121,000	125,000	94,000	120,000
At secondary smelters <sup>c</sup>	do.	156,000	157,000	161,000	109,000	129,000
Total	do.	269,000	278,000	286,000	203,000	249,000
Exports:						
Ores and concentrates, zinc content	do.	825,000	816,000	725,000	785,000	752,000
Refined (slab) zinc	do.	2,530	8,070	3,250	2,960	4,200
Zinc plates, sheets, strip, and foil	do.	3,780	4,310	4,970	6,160	7,380
Imports for consumption:						
Ores and concentrates, zinc content	do.	383,000	271,000	63,200	74,200	32,200
Refined (slab) zinc	do.	895,000	758,000	725,000	686,000	671,000
Zinc plates, sheets, strip, and foil	do.	2,050	2,160	3,330	3,010	3,440
Reported stocks of slab zinc, December 31:						
Producer and consumer	do.	60,000	55,000	56,000	49,000	57,600
Government stockpile	do.	15,300	7,730	7,490	7,490	7,490
Consumption, refined zinc:						
Reported	do.	501,000	436,000	370,000	306,000	475,000
Apparent <sup>2</sup>	do.	1,190,000	1,040,000	1,010,000	893,000	907,000
Price <sup>3</sup>						
North American	cents per pound	158.89	154.40	88.93	77.91	101.98
London Metal Exchange, cash	do.	148.53	147.03	85.01	75.06	97.99
World production:						
Mine	thousand metric tons	10,300	11,000	11,700 <sup>r</sup>	11,400 <sup>r</sup>	12,000
Smelter	do.	10,800	11,400	11,700	11,300 <sup>r</sup>	12,700 <sup>e</sup>

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

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

<sup>2</sup>Domestic production plus net imports, plus adjustments for Government and industry stock changes.

<sup>3</sup>Special High Grade. Source: Platts Metals Week.

TABLE 2  
MINE PRODUCTION OF RECOVERABLE ZINC  
IN THE UNITED STATES, BY STATE<sup>1</sup>

(Metric tons)

State	2009	2010
Alaska <sup>2</sup>	661,000	628,000
Other	49,600 <sup>3</sup>	94,400 <sup>4</sup>
Total	710,000	723,000

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

<sup>2</sup>Data based, in part, on publicly available information.

<sup>3</sup>Includes production from Idaho, Missouri, Montana, Tennessee, and Washington.

<sup>4</sup>Includes production from Idaho, Missouri, and Tennessee.

TABLE 3  
LEADING ZINC-PRODUCING MINES IN THE UNITED STATES IN 2010, IN ORDER OF OUTPUT<sup>1</sup>

Rank	Mine	County and State	Operator	Source of zinc
1	Red Dog	Northwest Arctic, AK	Teck Alaska Inc.	Zinc-lead ore.
2	Greens Creek	Juneau, AK	Hecla Mining Co.	Zinc-silver ore.
3	East Tennessee Zinc Complex <sup>2</sup>	Jefferson and Knox, TN	Nyrstar NV	Zinc ore.
4	Middle Tennessee Zinc Complex <sup>3</sup>	Smith, TN	do.	Do.
5	Brushy Creek	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
6	Lucky Friday	Shoshone, ID	Hecla Mining Co.	Silver ore.
7	Buick	Iron, MO	Doe Run Resources Corp.	Lead ore.
8	Fletcher	Reynolds, MO	do.	Do.
9	Viburnum (#29 and #35)	Washington and Iron, MO	do.	Do.
10	Sweetwater	Reynolds, MO	do.	Do.

Do., do. Ditto.

<sup>1</sup>The mines on this list accounted for more than 99% of recoverable U.S. zinc mine production in 2010.

<sup>2</sup>Coy, Immel, and Young Mines.

<sup>3</sup>Cumberland, Elmwood, and Gordonsville Mines.

TABLE 4  
REPORTED PRODUCTION OF ZINC PRODUCTS  
FROM ZINC-BASE SCRAP IN THE UNITED STATES<sup>1</sup>

(Metric tons)

Products	2009	2010
Redistilled slab zinc	115,000	130,000
Other zinc metal products <sup>2</sup>	1,540	2,190
Zinc in chemical products	W	W
Zinc dust	22,200	22,400

W Withheld to avoid disclosing company proprietary data.

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

<sup>2</sup>Includes electrogalvanizing anodes, remelt die-cast slab, and other metal alloys.

TABLE 5  
ZINC RECOVERED FROM SCRAP PROCESSED IN THE UNITED  
STATES, BY TYPE OF SCRAP<sup>1</sup>

(Metric tons)

	2009	2010
Type of scrap:		
New scrap:		
Zinc-base	82,900	90,700
Copper-base	111,000	117,000
Magnesium-base	100	123
Total	194,000	208,000
Old scrap:		
Zinc-base	70,000	114,000
Copper-base	8,290 <sup>r</sup>	7,800
Aluminum-base	533 <sup>r</sup>	652
Magnesium-base	14	14
Total	78,900 <sup>r</sup>	123,000
Grand total	273,000	331,000

<sup>r</sup>Revised.

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

TABLE 6  
U.S. REPORTED CONSUMPTION OF ZINC IN 2010, BY INDUSTRY USE AND GRADE<sup>1</sup>

(Metric tons)

Industry use	Special	Continuous			Remelt	Total	
	High Grade	High Grade	Galvanizing Grade	Controlled Lead Grade	Prime Western		and other grades
Galvanizing	105,000	86,900	120,000	718	56,200	91	369,000
Zinc-base alloys	34,900	169	--	--	--	--	35,000
Brass and bronze	40,800	4,860	--	--	223	--	45,800
Other	24,100	40	--	--	110	875	25,100
Total	205,000	91,900	120,000	718	56,500	966	475,000

-- Zero.

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

TABLE 7  
U.S. EXPORTS OF ZINC ORES AND CONCENTRATES, BY COUNTRY<sup>1</sup>

	2009		2010	
	Quantity (metric tons, zinc content)	Value (thousands)	Quantity (metric tons, zinc content)	Value (thousands)
Australia	27,400	\$19,500	48,800	\$61,800
Belgium	27,400	25,600	33,500	39,000
Canada	226,000	151,000	146,000	192,000
China	44,900	43,900	60,300	79,800
Costa Rica	--	--	2	15
Denmark	5	3	--	--
El Salvador	3	12	5	18
Finland	26,500	26,600	32,500	39,500
France	--	--	3	14
Germany	6,090	4,330	33,300	37,400
India	104	90	--	--
Israel	--	--	190	108
Italy	42,700	40,500	12,200	13,500
Japan	79,600	59,600	139,000	154,000
Korea, Republic of	189,000	167,000	130,000	142,000
Mexico	12	15	(2)	4
Panama	(2)	3	4	22
Singapore	--	--	62	168
Spain	116,000	118,000	116,000	143,000
Suriname	1	4	--	--
United Kingdom	46	26	51	29
Total	785,000	656,000	752,000	903,000

-- Zero.

<sup>1</sup>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 8  
U.S. EXPORTS OF ZINC COMPOUNDS<sup>1</sup>

	2009		2010	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Chromates of zinc or of lead	56	\$293	35	\$362
Lithopone	666	3,000	725	3,350
Zinc chloride	1,800	2,750	1,930	2,950
Zinc oxide	17,300	31,100	16,700	36,700
Zinc sulfate	1,030	1,610	1,870	2,360
Zinc sulfide	4,510	8,720	5,600	7,950

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

Source: U.S. Census Bureau.

TABLE 9  
U.S. IMPORTS FOR CONSUMPTION OF ZINC COMPOUNDS<sup>1</sup>

	2009		2010	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Chromates of zinc or of lead	32	\$101	168	\$701
Lithopone	1,550	1,520	1,300	1,560
Zinc chloride	249	964	405	1,290
Zinc oxide	69,200	98,500	94,300	185,000
Zinc sulfate	31,700	23,000	37,500	32,300
Zinc sulfide	1,570	2,990	2,570	4,770

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

Source: U.S. Census Bureau.

TABLE 10  
ZINC: WORLD MINE PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Metric tons, zinc content of concentrate and direct shipping, unless otherwise specified)

Country	2006	2007	2008	2009	2010
Algeria	572	--	--	--	--
Argentina	29,808	27,025	30,349	31,869 <sup>r</sup>	30,000 <sup>e</sup>
Armenia	2,932	2,585	4,200	3,800 <sup>r</sup>	7,900
Australia	1,362,000	1,514,000	1,519,000	1,290,000	1,479,000
Bolivia	172,747	214,053	383,619 <sup>r</sup>	430,879 <sup>r</sup>	411,409
Bosnia and Herzegovina <sup>c</sup>	500 <sup>r</sup>	2,600 <sup>r</sup>	4,700 <sup>r</sup>	3,400 <sup>r</sup>	4,000
Brazil	185,211	193,887	173,933	169,000 <sup>r</sup>	175,000
Bulgaria	13,500 <sup>r</sup>	12,200 <sup>r</sup>	10,600 <sup>r</sup>	10,700 <sup>r</sup>	10,000 <sup>e</sup>
Burma	8,000 <sup>r</sup>	10,000 <sup>r</sup>	7,000 <sup>r</sup>	6,000 <sup>r</sup>	7,000
Canada	637,956	630,485 <sup>r</sup>	750,502 <sup>r</sup>	698,901	648,905 <sup>p</sup>
Chile	36,238	36,453	40,519	27,801	27,662
China	2,840,000	3,040,000	3,340,000 <sup>r</sup>	3,330,000 <sup>r</sup>	3,700,000
Congo (Kinshasa)	16,831	18,500	13,523 <sup>r</sup>	12,843 <sup>r</sup>	9,223
Finland	35,700	38,900	27,800	30,233	55,562
Greece	16,414	19,549	22,694	18,126	19,976
Guatemala	6,000	20,000	14,000	--	--
Honduras	37,646	29,211	28,462	36,370	33,839
India	501,700	538,900	613,600	695,000	700,000
Iran <sup>c</sup>	164,000	100,000	69,267 <sup>r,3</sup>	80,000 <sup>r</sup>	100,000
Ireland	425,756	400,898	398,158	385,670	342,434
Japan	7,169	--	--	--	--
Kazakhstan	451,000 <sup>r</sup>	457,000 <sup>r</sup>	469,000 <sup>r</sup>	485,000 <sup>r</sup>	500,000
Korea, North <sup>c</sup>	67,000 <sup>r</sup>	70,000 <sup>r</sup>	50,000 <sup>r</sup>	30,000 <sup>r</sup>	40,000
Korea, Republic of	16	2,034 <sup>r</sup>	1,836 <sup>r</sup>	2,221 <sup>r</sup>	355
Kosovo <sup>4</sup>	2,230	2,460	4,900	3,690	4,000 <sup>e</sup>
Laos	1,100	3,000 <sup>r</sup>	2,200 <sup>r</sup>	3,400 <sup>r</sup>	3,000 <sup>e</sup>
Macedonia	11,000	24,000	29,000	35,000 <sup>r</sup>	35,000 <sup>e</sup>
Mexico	432,347	426,509	397,306	384,478 <sup>r</sup>	518,429
Mongolia	54,850	77,350	71,800 <sup>r</sup>	78,800 <sup>r</sup>	56,300
Morocco	95,000	57,700	96,900	48,600 <sup>r</sup>	61,900
Namibia <sup>5</sup>	55,455	46,335	38,319	48,856 <sup>r</sup>	53,624
Pakistan	--	--	--	1	10
Peru	1,203,364	1,444,381	1,602,597	1,509,129	1,470,450
Philippines	--	7,394 <sup>r</sup>	1,619	10,035	9,268
Poland	126,600 <sup>r</sup>	129,600 <sup>r</sup>	132,400 <sup>r</sup>	115,500 <sup>r</sup>	88,000
Portugal	7,505	24,380	39,254	501	6,422
Romania	8,052	1,000	--	--	--
Russia <sup>e</sup>	190,000	185,000	204,000	225,000	269,000
Saudi Arabia	983	716	3,663	5,000 <sup>r,e</sup>	5,000 <sup>e</sup>
Serbia <sup>e</sup>	2,000 <sup>3</sup>	1,000 <sup>3</sup>	1,000	1,000	1,000
South Africa	34,444	30,859	29,002	28,159	35,824
Spain	--	--	--	1,200 <sup>r</sup>	17,318
Sweden	210,029	214,576	188,048	192,538	198,686
Thailand	32,100	32,921	17,811	34,000	25,529
Turkey	59,000	71,000	73,000	78,000 <sup>r</sup>	88,000 <sup>e</sup>
United States	727,000	803,000	778,000	736,000	748,000
Vietnam <sup>e</sup>	45,000	45,600 <sup>r</sup>	45,600 <sup>r</sup>	45,600 <sup>r</sup>	45,000
Total	10,300,000	11,000,000	11,700,000 <sup>r</sup>	11,400,000 <sup>r</sup>	12,000,000

<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>Table includes data available through July 7, 2011.

TABLE 10—Continued  
ZINC: WORLD MINE PRODUCTION, BY COUNTRY<sup>1,2</sup>

<sup>3</sup>Reported figure.

<sup>4</sup>On February 17, 2008, the Kosovo Assembly declared independence from Serbia.

<sup>5</sup>Does not include ores sent to solvent extraction-electrowinning plant.

TABLE 11  
ZINC: WORLD SMELTER PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Metric tons)

Country <sup>3</sup>	2006	2007	2008	2009	2010 <sup>e</sup>
Algeria, primary <sup>c</sup>	30,000	30,000	30,000	30,000	30,000
Argentina:					
Primary	42,584	42,876	39,479	32,989 <sup>r</sup>	40,000
Secondary	3,407	3,430	3,158	2,639 <sup>r</sup>	3,000
Total	45,991	46,306	42,637	35,628 <sup>r</sup>	43,000
Australia:					
Primary <sup>4</sup>	463,000	502,000	499,000	525,000	499,000 <sup>5</sup>
Secondary <sup>e</sup>	6,000	6,000	6,000	6,000	6,000
Total	469,000	508,000	505,000	531,000	505,000 <sup>5</sup>
Belgium, primary	251,000	241,000	251,000	26,000	260,000
Brazil, primary	272,311	265,126	248,874	250,000 <sup>e</sup>	250,000
Bulgaria, primary and secondary	95,341	99,992	99,699 <sup>r</sup>	92,676 <sup>r</sup>	88,000 <sup>5</sup>
Canada, primary	824,464	802,103	764,312	685,504	691,222 <sup>p,5</sup>
China, primary and secondary <sup>c</sup>	3,170,000	3,740,000	4,000,000	4,280,000 <sup>r</sup>	5,160,000
Czech Republic, secondary <sup>e</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Finland, primary	282,238	305,543	297,722	295,049 <sup>r</sup>	307,144 <sup>5</sup>
France, primary	127,777	129,110	117,861	161,000	163,000
Germany, primary and secondary	342,566	294,735	292,284	153,000 <sup>r,e</sup>	165,000
India, primary and secondary	443,900	453,800	567,800	606,100 <sup>r</sup>	684,300 <sup>5</sup>
Iran <sup>e</sup>	140,000	90,000	60,000 <sup>r</sup>	65,000 <sup>r</sup>	65,000
Italy, primary and secondary <sup>c</sup>	109,000 <sup>5</sup>	109,000	100,000	100,000	100,000
Japan:					
Primary	504,532	495,632 <sup>r</sup>	502,910 <sup>r</sup>	429,165 <sup>r</sup>	458,648 <sup>5</sup>
Secondary	148,715	143,063 <sup>r</sup>	147,957 <sup>r</sup>	111,439 <sup>r</sup>	115,359 <sup>5</sup>
Total	653,247	638,695 <sup>r</sup>	650,867 <sup>r</sup>	540,604 <sup>r</sup>	574,007 <sup>5</sup>
Kazakhstan, primary and secondary	364,821	358,226	365,572 <sup>r</sup>	327,873 <sup>r</sup>	318,800 <sup>5</sup>
Korea, North, primary and secondary <sup>c</sup>	72,000	75,000	75,000	75,000	75,000
Korea, Republic of, primary	662,521	670,000 <sup>r</sup>	738,000	751,179 <sup>r</sup>	717,100 <sup>5</sup>
Kosovo, primary <sup>6</sup>	--	--	--	5,487	5,500
Mexico, primary	279,734	321,932	305,409	300,000 <sup>e</sup>	300,000
Namibia <sup>7</sup>	129,900	150,080	145,400	153,815 <sup>r</sup>	151,688 <sup>5</sup>
Netherlands, primary	238,274	224,838	239,462	224,000	264,000
Norway, primary	160,670	157,027	145,469	138,973	148,862 <sup>5</sup>
Peru, primary	175,250	162,375	190,324	149,494 <sup>r</sup>	261,978 <sup>5</sup>
Poland, primary and secondary	134,000	142,000	142,600 <sup>r</sup>	139,100 <sup>r</sup>	149,000 <sup>5</sup>
Romania, primary and secondary	44,000 <sup>r</sup>	58,000 <sup>r</sup>	62,000	4,000 <sup>r,e</sup>	-- <sup>5</sup>
Russia, primary and secondary <sup>c</sup>	240,000	260,000	260,000	225,000	260,000
Serbia, primary and secondary <sup>c</sup>	15,000 <sup>5</sup>	--	--	--	--

See footnotes at end of table.

TABLE 11—Continued  
ZINC: WORLD SMELTER PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Metric tons)

Country <sup>3</sup>	2006	2007	2008	2009	2010 <sup>6</sup>
South Africa, primary	90,000	101,000	87,000	87,000	90,000 <sup>5</sup>
Spain, primary and secondary	507,440	494,090	456,050	500,776	501,000
Thailand, primary	94,779	99,337	107,753	104,695 <sup>r</sup>	100,000
United States:					
Primary	113,000	121,000	125,000	94,000	120,000 <sup>5</sup>
Secondary <sup>c</sup>	156,000	157,000	161,000	109,000	129,000
Total	269,000	278,000	286,000	203,000	249,000
Uzbekistan, primary	45,000 <sup>e</sup>	71,800	70,445	40,000 <sup>e</sup>	40,000
Grand total	10,800,000	11,400,000	11,700,000	11,300,000 <sup>r</sup>	12,700,000
Of which:					
Primary	4,660,000 <sup>r</sup>	4,740,000 <sup>r</sup>	4,760,000 <sup>r</sup>	4,330,000 <sup>r</sup>	4,750,000
Secondary	314,000 <sup>r</sup>	309,000 <sup>r</sup>	318,000 <sup>r</sup>	230,000 <sup>r</sup>	253,000
Undifferentiated	5,810,000 <sup>r</sup>	6,320,000 <sup>r</sup>	6,630,000 <sup>r</sup>	6,720,000 <sup>r</sup>	7,720,000

<sup>c</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>Wherever possible, detailed information on raw material source of output (primary—directly from ores, and secondary—from scrap) has been provided. In cases where raw material source is unreported and insufficient data are available to estimate the distribution of the total, that total has been left undifferentiated (primary and secondary). To the extent possible, this table reflects metal production at the first measurable stage of metal output. Table includes data available through July 7, 2011.

<sup>3</sup>In addition to the countries listed, Israel also produces small amounts of secondary zinc, but available information is inadequate to make reliable estimates of output levels.

<sup>4</sup>Excludes zinc dust.

<sup>5</sup>Reported figure.

<sup>6</sup>On February 17, 2008, the Kosovo Assembly declared independence from Serbia.

<sup>7</sup>Special high-grade electrowon cathodes from Anglo American plc's Skorpion solvent extraction-electrowinning plant.