

Zinc

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Canada is an important producer and exporter of zinc and zinc products. Zinc metal production in Canada dates back from the early 1900s when the Consolidated Mining and Smelting Company of Canada (which later became Cominco Limited in 1966, followed by Teck Cominco Limited in 2001) started production at a small electrolytic zinc plant at Trail, British Columbia. With a smelting capacity of just over 800 000 t/y from four smelting facilities located across the country, today Canada produces some 10% of the world's total supply of zinc.

HISTORY

Zinc is a relative newcomer to the group of metals discovered and used by society. While the first use of copper pre-dates recorded history and the discovery of tin goes back 5000 years, the first recovery of metallic zinc, however, came much later. The production of metallic zinc was first described in India around 1200 A.D. By 1374, zinc was recognized as a new metal, the eighth to be discovered at that time, and a limited amount of commercial zinc production was under way. Although brass-making had developed much earlier, the zinc in brass was obtained by treating zinc ore to produce zinc vapour, which combined with granulated copper under heat. From India, zinc production was introduced to China sometime around 1600 A.D. and then began to be exported to Europe.

The first full-scale zinc smelting operation outside of Asia started in Bristol, England, in about 1743. By the beginning of the 19th century, zinc production was established on the continent of Europe, notably in Belgium and parts of eastern Europe. In the latter half of the century, large zinc industries developed rapidly in the United States and Germany.

ZINC IN CANADA

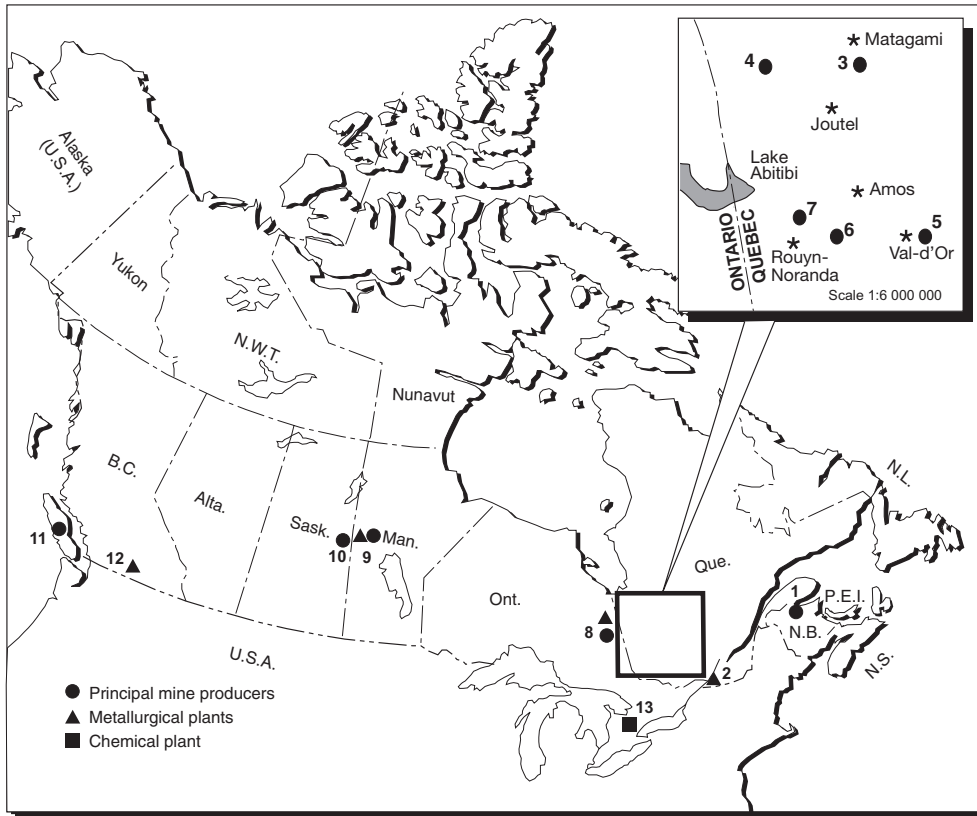
Zinc production in Canada dates back to the time around the First World War when the Consolidated Mining and Smelting Company of Canada began operating a small electrolytic zinc plant at Trail, British Columbia, to help offset a critical wartime shortage of zinc in the United Kingdom. At that time, in fact, the Consolidated Mining and Smelting Company and Anaconda Copper Mining Company in Montana were pioneering the production of zinc in North America by the electrolytic method.

The ores used at Trail came from the Sullivan mine near Kimberly, but production was hampered because the complex lead-zinc-iron ore was difficult to treat by existing methods. In 1920, however, the differential flotation method was successfully applied to separate the Sullivan ore into a lead concentrate, a zinc concentrate and an iron by-product. This marked the beginning of significant zinc production in Canada. Today the Trail operations are the world's largest fully integrated lead and zinc smelting and refining complex. Owned and operated by Teck Cominco Limited of Vancouver, the Trail facility has a zinc production capacity of some 290 000 t/y.

In Manitoba, the discovery of significant zinc and copper ore with important quantities of gold in 1915 led to the development of the Flin Flon-Snow Lake mining camp, smelter complex and dedicated power plant in the late 1920s. Since 1930, Hudson Bay Mining and Smelting Company Limited has owned and operated some 30 mines that in turn have fed the company's metallurgical complex at Flin Flon. The Flin Flon smelter and refinery complex has undergone significant capital improvements since it first started operations in 1930 with the introduction of zinc pressure leach technology in the early 1990s and a new tank house in 2000 that expanded zinc production capacity to 115 000 t/y.

The Kidd Creek orebody was discovered in 1963 and Texasgulf began open-pit mining the deposit in 1966 near Timmins, Ontario. The Kidd Creek zinc plant started production in 1972. In 1983, Kidd Creek started up a zinc

Figure 1
Zinc Producers in Canada, 2004



Numbers refer to locations on map above.

ZINC-PRODUCING MINES

- | | |
|--------------------|---|
| 1. Brunswick | Noranda Inc. |
| 3. Bell-Allard* | Noranda Inc. |
| 4. Selbaie* | Les Mines Selbaie |
| 5. Louvicourt | Aur Resources Inc./Novicourt Inc. |
| 6. LaRonde | Agnico-Eagle Mines Limited |
| 7. Bouchard-Hébert | Breakwater Resources Ltd. |
| 8. Kidd Creek | Falconbridge Limited |
| 9. Callinan | Hudson Bay Mining and Smelting Co., Limited |
| Trout Lake | Hudson Bay Mining and Smelting Co., Limited |
| Chisel North | Hudson Bay Mining and Smelting Co., Limited |
| 777 | Hudson Bay Mining and Smelting Co., Limited |
| 10. Konoto Lake | Hudson Bay Mining and Smelting Co., Limited |
| 11. Myra Falls | Breakwater Resources Ltd. |

ZINC METALLURGICAL PLANTS

- | | |
|----------------|---|
| 2. Valleyfield | Canadian Electrolytic Zinc Limited |
| 8. Kidd Creek | Falconbridge Limited |
| 9. Flin Flon | Hudson Bay Mining and Smelting Co., Limited |
| 12. Trail | Teck Cominco Limited |

ZINC OXIDE PLANTS

- | | |
|------------|---|
| 13. Zochem | Hudson Bay Mining and Smelting Co., Limited |
|------------|---|

WEB SITE

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| www.noranda.com |
| www.noranda.com |
| www.bhpbilliton.com |
| www.aurresources.com |
| www.agnico-eagle.com |
| www.breakwater.ca |
| www.falconbridge.com |
| www.hudbayminerals.com |
| www.hudbayminerals.com |
| www.hudbayminerals.com |
| www.hudbayminerals.com |
| www.hudbayminerals.com |
| www.breakwater.ca |

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| www.noranda.com |
| www.falconbridge.com |
| www.hudbayminerals.com |
| www.teckcominco.com |

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| www.zochem.com |
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* Closed in 2004.

pressure leaching facility plant. Today, Falconbridge Limited owns and operates the Kidd Creek complex with a production capacity of 145 000 t/y.

With the discovery of significant zinc-bearing ores in northern Quebec and Ontario in the late 1950s and early 1960s, Noranda Inc. began looking at options to build an electrolytic zinc plant. Construction began at Vallyfield, Quebec, just west of Montréal, in 1962 and Canadian Electrolytic Zinc (CEZ), a subsidiary of Noranda, was brought into production in 1963. Plant capacity has increased steadily from its original 64 000 t/y at the time of opening to 260 000 t/y today.

Zinc mines have been found in every province and territory with the exception of Alberta and Prince Edward Island. Operations in 2004 are listed in Figure 1.

USES

The greatest use for zinc is as a coating for iron and steel products to make them resistant to rust and corrosion. The application of a zinc coating, known as galvanizing, is accomplished electrolytically or by hot-dip methods. Galvanizing accounts for about 47% of the worldwide use of zinc.

The most commonly galvanized products are sheet and strip steel, tube and pipe, and wire and wire rope. The automobile industry is the largest user of galvanized steel. The desire to reduce weight and improve fuel efficiency has led to increased use of galvanized steel by the automotive industry to protect the thinner gauges of steel from corrosion. Both hot-dipped and electro-galvanized steel are used, the thicker coating of hot-dipped steel giving more corrosion protection to unexposed surfaces and the thinner coating of electro-galvanized steel providing a smoother finish for exposed painted surfaces.

Galvanized sheet and strip steel are also widely used by the construction industry for roofing and siding, and for heating and ventilation ducts, as well as for many other applications. Nails and other building materials are often hot-dip galvanized. Zinc and zinc-aluminum thermally sprayed coatings are used for the long-term corrosion protection of large steel structures such as bridges and hydroelectric transmission towers.

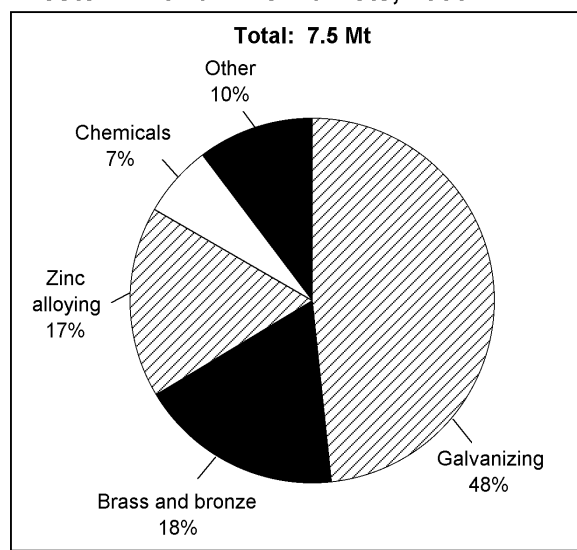
Another important use of zinc is in the manufacture of a vast range of die-cast products. Because it has a relatively low melting point and is very fluid, zinc is easy to pour when melted. Therefore, it is well suited to rapid, assembly-line die-casting, particularly to produce small and intricate shapes.

A major use of die castings is in the automobile industry as trim pieces, grills, door and window handles, carbure-

tors, pumps, and other components. However, with the trend toward lighter, more energy-efficient cars, zinc demand for this purpose has declined in recent years. Other familiar zinc die castings include small electrical appliances, business machines and other light equipment, tools, and toys.

Another important use of zinc is in the manufacture of brass, which is essentially an alloy of copper and zinc with the proportion of zinc ranging from 5 to 40%. The zinc brasses have good physical, electrical and thermal properties, and are corrosion resistant. They are used in plumbing, heat exchange equipment, and a wide range of decorative hardware, to name a few applications. Rolled zinc metal is a basic component in dry-cell batteries, and zinc oxide is used as a catalyst in the manufacture of rubber and as a pigment in white paint. It is also used in agricultural products, cosmetics and medicinal products.

Figure 2
Western World Zinc Markets, 2003



Source: International Lead and Zinc Study Group.

NATURAL OCCURRENCE

Zinc is never found as the free metal but is found in association with a number of other elements to form a number of important ores of zinc such as sphalerite (zinc blende, zinc sulphide, ZnS), smithsonite (zinc carbonate, ZnCO₃), zincspar (also zinc carbonate, ZnCO₃), and marmatite (zinc sulphide, ZnS, containing some iron sulphide, FeS). Like all metals, zinc is a natural component of the Earth's crust and is therefore present in varying concentrations in rock, soil, water and air.

In Canada, zinc deposits fall into four main categories: sedimentary exhalative (SEDEX); massive sulphide, Mississippi Valley-type (MVT); volcanogenic massive sulphide (VMS); and skarn deposits. As the name suggests, SEDEX deposits comprise layers of massive sulphide minerals interbedded with sedimentary rocks and tend to be associated with large deposits of lead and zinc. Examples of such deposits include the Sullivan mine in British Columbia. MVT deposits are named after large-scale lead and zinc deposits found in the region in the United States along the Mississippi River where they were first discovered. MVT deposits are characterized by a simple mineralogy that includes pyrite (iron sulphide), galena (lead sulphide) and sphalerite (zinc sulphide) hosted in undeformed, calcium- and magnesium-rich carbonate rocks (limestones). Examples of this type of deposit are found at the Polaris and Nanisivik mines in Nunavut, both of which closed in late 2002.

VMS deposits can be classified into sub-categories depending on their mineralogy: copper-zinc, copper-zinc-lead and Besshi-type. As found with SEDEX deposits, VMS deposits are formed through the exhalation of hydrothermal fluids on the sea floor. In the case of VMS, the host rocks are submarine igneous rocks rather than sedimentary rocks. The largest example of a VMS-type deposit in Canada is the Kidd Creek copper-zinc mine near Timmins, Ontario. Other examples include the Flin Flon copper-zinc deposits in north-central Manitoba. Many of these types of deposits can also contain significant quantities of gold, such as those deposits in the Abitibi region of northwestern Quebec. While the copper-zinc deposits are found typically associated with greenstone (mafic) volcanic host rocks such as basalts, the zinc-lead-copper deposits are associated with more felsic to intermediate volcanic rocks such as rhyolite and dacite. Examples of these types of deposits include the mines in the Bathurst region of New Brunswick. Skarn deposits are formed at or near the contact between a typically carbonate-rich host rock with an igneous intrusion. Variations in the type of igneous intrusion result in variations in the mineralization that follows. An example of a lead-zinc skarn is the Sa Dena Hes deposit near Watson Lake, Yukon.

HEALTH AND ENVIRONMENT

Zinc plays an important role as a micro-nutrient in the development and health of a variety of plants and animals. In humans, zinc plays an important role in the function of more than 200 enzymes, for the stabilization of DNA and the expression of genes, and for the transfer of nervous signals.

The human body contains 2-3 g of zinc. The recommended daily zinc intake is 12 mg/day for adult women and 15 mg/day for adult men. Daily intake is not only

dependent on food, but also on sex, age and general health status. Growing infants, children, adolescents, women in pregnancy, and the elderly have a higher zinc requirement.

Food is the primary source of zinc for humans with only a small part coming from drinking water. The major sources of zinc in the diet are red meat, poultry, fish, seafood, whole cereals and dairy products.

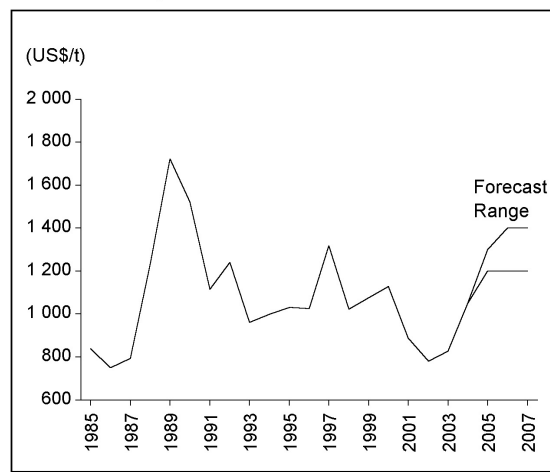
PRICE OUTLOOK

Cash settlement prices on the London Metal Exchange (LME) started trading in the US\$1000/t price range at the start of the year, peaking at \$1155/t by mid-March, followed by a slow downward slide to \$943/t in September. Prices rallied through the last quarter as stocks declined, reaching their highest level for the year on December 31 at \$1270/t, the highest level for zinc prices since the last peak in September 2000. The average zinc price for 2004 reached US\$1047.83/t, up 21% from \$828.39/t in 2003.

While consumer stocks fell by about 5000 t during the year, inventories on the LME started the year at just under 740 000 t, rising to their highest level at 787 000 t in April before declining again to end the year at their lowest level at just under 630 000 t. After three years of market oversupply in the Western World, preliminary figures, as compiled by the International Lead and Zinc Study Group, indicate that the market was in deficit by just under 250 000 t in 2004 and a deficit of just under 200 000 t is expected in 2005.

Prices will continue to reflect the shortfall in supply in the market and are expected to average between US\$1200 and \$1300/t in 2005.

Figure 3
Zinc Prices, 1985-2007



Source: International Lead and Zinc Study Group.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 64. (2) Information in this review was current as of May 31, 2005. (3) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/mms/cmy/com_e.html.

NOTE TO READERS

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TARIFFS

Item No.	Description	Canada			United States	EU	Japan
		MFN	GPT	USA	Canada	Conventional Rate (1)	WTO (2)
2603.00	Copper ores and concentrates						
2603.00.00.30	Zinc content	Free	Free	Free	Free	Free	Free
2607.00	Lead ores and concentrates						
2607.00.00.30	Zinc content	Free	Free	Free	Free	Free	Free
2608.00	Zinc ores and concentrates						
2608.00.00.30	Zinc content	Free	Free	Free	Free	Free	Free
2616.10	Silver ores and concentrates						
2616.10.00.30	Zinc content	Free	Free	Free	Free	Free	Free
26.20	Ash and residues (other than from the manufacture of iron or steel) containing arsenic, metals or their compounds						
	Containing mainly zinc:						
2620.11	Hard zinc spelter	Free	Free	Free	Free	Free	Free
2620.19	Others	Free	Free	Free	Free	Free	Free
2817.00	Zinc oxide; zinc peroxide	Free-5.5%	Free	Free	Free	5.5%	4.3%
28.33	Sulphates; alums; peroxosulphates (persulphates)						
2833.26	Of zinc	Free	Free	Free	Free	5.5%	3.9%
79.01	Unwrought zinc						
	Zinc, not alloyed:						
7901.11	Containing by weight 99.99% or more of zinc	Free	Free	Free	Free	2.5%	Free-4.30 yen/kg
7901.12	Containing by weight less than 99.99% of zinc	Free	Free	Free	Free	2.5%	Free-4.30 yen/kg
7901.20	Zinc alloys:						
7901.20.00.10	Containing by weight 90% or more but less than 97.5% of zinc	Free	Free	Free	Free	2.5%	Free-4.20 yen/kg
7901.20.00.20	Containing by weight less than 90% of zinc	Free	Free	Free	Free	2.5%	Free-4.20 yen/kg
7902.00	Zinc waste and scrap	Free	Free	Free	Free	Free	Free
79.03	Zinc dust, powders and flakes						
7903.10	Zinc dust	Free	Free	Free	Free	2.5%	3%
7903.90	Other	Free	Free	Free	Free	2.5%	3%
7904.00	Zinc bars, rods, profiles and wires	Free	Free	Free	Free	5%	3%
7905.00	Zinc plates, sheets, strip and foil	Free	Free	Free	Free	5%	3%
7906.00	Zinc tubes, pipes, and tube or pipe fittings (for example, couplings, elbows, sleeves)	3%	Free	Free	Free	5%	3%
7907.00	Other articles of zinc						
7907.00.10	Anodes for electroplating	Free	Free	Free	Free	5%	3%
7907.00.20	Discs or slugs, containing by weight 90% or more of zinc; gutters, roof capping, skylight frames and other fabricated building components	3%	Free	Free	Free	5%	3%
7907.00.90	Other	3%	3%	Free	Free	5%	3%

Sources: Canadian Customs Tariff, effective January 2005, Canada Border Services Agency; Harmonized Tariff Schedule of the United States, 2005; Official Journal of the European Union (October 30, 2004 Edition); Customs Tariff Schedules of Japan, 2004.

(1) The customs duties applicable to imported goods originating in countries that are Contracting Parties to the General Agreement on Tariffs and Trade or with which the European Community has concluded agreements containing the most-favoured-nation tariff clause shall be the conventional duties shown in column 3 of the Schedule of Duties. (2) WTO rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, ZINC PRODUCTION AND TRADE, 2002-04, AND USE, 2001-03

Item No.	2002		2003		2004 (p)		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
PRODUCTION							
	(All Forms) (1)						
	New Brunswick	256 562	313 519	278 205	324 387	245 369	332 475
	Quebec	236 995	289 607	252 852	294 826	257 014	348 254
	Ontario	100 774	123 146	71 744	83 653	83 473	113 106
	Manitoba	96 813	118 306	83 445	97 297	100 108	135 646
	Saskatchewan	5 172	6 320	5 368	6 259	5 171	7 006
	British Columbia	67 982	83 074	65 692	76 597	44 564	60 384
	Nunavut	159 632	195 070	—	—	—	—
	Total	923 930	1 129 043	757 307	883 020	735 698	996 871
	Mine output (2)	916 220	..	788 063	..	788 336	..
	Refined (3)	793 410	..	761 199	..	804 219	..
EXPORTS							
2608.00.30	Zinc content in zinc ores and concentrates						
	Belgium	103 377	65 917	54 759	30 735	96 398	71 007
	Spain	61 395	40 572	65 345	39 687	50 090	36 553
	Japan	50 805	50 205	40 035	54 438	25 471	20 455
	Poland	5 391	3 054	10 493	6 476	12 380	12 633
	South Korea	21 199	20 449	3 841	2 867	18 008	12 259
	Norway	18 448	14 148	13 317	8 217	15 524	10 768
	Finland	44 715	40 497	26 395	15 828	7 877	8 427
	Other countries	104 011	97 420	43 691	28 534	2 432	1 658
	Total	409 341	332 262	257 876	186 782	228 180	173 760
2620.11	Ash and residues containing hard zinc spelter						
	India	—	—	—	—	20	12
	United States	439	318	295	196	—	—
	Total	439	318	295	196	20	12
2620.19	Ash and residues containing mainly zinc, n.e.s.						
	United States	10 884	7 762	10 790	6 976	13 987	9 566
	Other countries	220	164	254	183	326	342
	Total	11 104	7 926	11 044	7 159	14 313	9 908
2817.00	Zinc oxide; zinc peroxide						
	United States	44 782	60 902	47 297	58 384	49 711	70 163
	Brazil	395	546	259	359	553	860
	Belgium	740	793	453	424	500	546
	France	502	536	243	303	261	347
	Hong Kong	168	286	130	209	177	276
	Other countries	287	439	712	963	1 374	1 828
	Total	46 874	63 502	49 094	60 642	52 576	74 020
2833.26	Zinc sulphate						
	United States	2 127	2 180	5 295	4 718	5 378	4 569
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc						
	United States	374 128	507 762	343 563	420 089	359 478	501 316
	Taiwan	7 089	8 673	17 913	21 124	19 988	27 890
	Hong Kong	3 734	4 838	4 931	5 964	8 347	12 155
	Malaysia	5 392	7 082	4 792	5 739	6 792	9 611
	Philippines	4 867	6 331	5 158	6 286	2 180	3 222
	Indonesia	2 674	3 630	1 979	2 439	1 998	2 876
	Other countries	6 966	8 828	1 839	2 299	3 559	5 249
	Total	404 850	547 144	380 175	463 940	402 342	562 319

TABLE 1 (cont'd)

Item No.		2002		2003		2004 (p)	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)							
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc						
	United States	165 910	221 224	178 583	221 128	176 907	248 472
	Hong Kong	8 985	13 238	6 878	9 339	13 310	20 701
	Taiwan	3 868	5 133	8 787	10 693	7 601	11 235
	Indonesia	4 526	6 125	3 645	4 506	4 085	6 030
	Japan	2 194	2 972	3 631	4 596	3 429	5 092
	Malaysia	2 335	3 294	4 842	6 504	2 361	3 489
	Philippines	2 753	3 652	1 118	1 445	1 376	1 949
	Other countries	2 829	3 981	2 894	3 897	2 647	3 818
	Total	193 400	259 619	210 378	262 108	211 716	300 786
7901.20	Zinc alloys, unwrought						
	Hong Kong	–	–	–	–	1 211	1 977
	United States	501	866	574	833	604	1 208
	Other countries	2	5	61	137	20	40
	Total	503	871	635	970	1 835	3 225
7902.00	Zinc waste and scrap						
	China	611	670	5 177	5 951	15 003	17 627
	United States	28 935	13 178	8 089	6 628	9 448	9 042
	Other countries	725	729	1 114	577	3 663	4 338
	Total	30 271	14 577	14 380	13 156	28 114	31 007
7903.10	Zinc dust						
	United States	6 224	13 112	5 918	11 313	4 259	8 652
	Other countries	57	134	28	56	50	121
	Total	6 281	13 246	5 946	11 369	4 309	8 773
7903.90	Zinc powders and flakes						
	United States	10 863	24 423	9 094	18 133	12 349	24 145
	Belgium	282	346	428	496	391	615
	South Korea	83	99	45	51	19	27
	Other countries	184	387	10	38	11	34
	Total	11 412	25 255	9 577	18 718	12 770	24 821
7904.00	Zinc bars, rods, profiles and wire						
	United States	160	1 079	278	1 394	365	1 758
	Thailand	7	19	58	145	163	353
	Other countries	..	1	58	136	23	66
	Total	167	1 099	394	1 675	551	2 177
7905.00	Zinc plates, sheets, strip and foil						
	United States	46	203	89	257	102	792
	South Korea	10	46	13	53	–	–
	Other countries	8	30	3	7	–	–
	Total	64	279	105	317	102	792
7906.00	Zinc tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves)						
	United States	831	5 244	876	5 157	1 318	9 446
	Other countries	5	17	3	39	1	15
	Total	836	5 261	879	5 196	1 319	9 461
7907.00	Other articles of zinc						
	United States	2 925	25 786	2 795	22 873	1 618	15 571
	Other countries	284	1 215	110	545	134	732
	Total	3 209	27 001	2 905	23 418	1 752	16 303
	Total exports	1 120 878	1 300 540	948 978	1 060 364	965 277	1 221 933

TABLE 1 (cont'd)

Item No.		2002		2003		2004 (p)	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
IMPORTS							
2603.00.00.30	Zinc content in copper ores and concentrates United States	2	2	–	–	53	52
2607.00.00.30	Zinc content in lead ores and concentrates United States	2 637	2 882	2 496	2 020	2 647	2 197
	Peru	–	–	3 294	1 540	–	–
	Total	2 637	2 882	5 790	3 560	2 647	2 197
2608.00.00.30	Zinc content in zinc ores and concentrates United States	186 962	80 351	219 852	123 895	185 723	148 334
	Peru	75 514	34 763	113 607	45 086	56 570	49 555
	Mexico	13 576	12 543	42 557	19 170	20 828	17 514
	Other countries	1	1	20 547	15 476	3 565	2 771
	Total	276 053	127 658	396 563	203 627	266 686	218 174
2620.19	Ash and residues containing mainly zinc, n.e.s. United States	355	329	529	436	420	407
	Other countries	182	178	7	3	–	–
	Total	537	507	536	439	420	407
2817.00	Zinc oxide; zinc peroxide United States	7 213	9 738	6 593	8 032	8 916	12 418
	Mexico	2 204	2 304	2 787	2 572	3 142	2 886
	China	1 085	1 124	800	766	387	389
	Other countries	4	5	10	14	85	102
	Total	10 506	13 171	10 190	11 384	12 530	15 795
2833.26	Zinc sulphate United States	2 267	1 812	1 880	1 352	2 738	2 111
	China	1 897	1 057	1 732	809	1 921	1 122
	Other countries	277	220	906	503	262	207
	Total	4 441	3 089	4 518	2 664	4 921	3 440
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc Peru	567	734	245	362	2 029	2 965
	United States	487	739	402	598	722	1 048
	South Africa	243	333	–	–	538	754
	Russia	3 525	4 933	2 982	4 936	–	–
	Other countries	205	265	117	154	231	357
	Total	5 027	7 004	3 746	6 050	3 520	5 124
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc United States	91	124	61	77	137	195
7901.20	Zinc alloys, unwrought United States	4 349	7 449	4 529	7 452	6 694	11 272
	Other countries	4	8	1	1	37	59
	Total	4 353	7 457	4 530	7 453	6 731	11 331
7902.00	Zinc waste and scrap United States	331	306	247	263	348	340
	Other countries	12	9	–	–	19	30
	Total	343	315	247	263	367	370
7903.10	Zinc dust Belgium	5 480	9 253	5 387	8 452	5 685	10 206
	India	47	83	390	603	1 037	1 915
	United States	643	1 390	825	1 657	633	1 351
	Other countries	..	1	125	203	2	4
	Total	6 170	10 727	6 727	10 915	7 357	13 476

TABLE 1 (cont'd)

Item No.	2002		2003		2004 (p)					
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)				
IMPORTS (cont'd)										
7903.90	Zinc powders and flakes									
	United States	513	696	1 042	1 465	674	1 223			
	Other countries	23	33	21	27	12	23			
	Total	536	729	1 063	1 492	686	1 246			
7904.00	Zinc bars, rods, profiles and wire									
	United States	660	1 956	686	1 632	6 156	9 038			
	China	62	207	215	678	317	959			
	India	32	94	93	249	34	110			
	Other countries	149	250	83	230	123	203			
	Total	903	2 507	1 077	2 789	6 630	10 310			
7905.00	Zinc plates, sheets, strip and foil									
	United States	619	1 975	661	1 859	663	1 816			
	France	140	701	117	517	365	1 654			
	Germany	398	1 659	456	1 984	279	1 127			
	Peru	52	123	74	200	24	57			
	Other countries	1	1	4	19	11	12			
	Total	1 210	4 459	1 312	4 579	1 342	4 666			
7906.00	Zinc tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves)									
	Mexico	177	1 122	218	1 422	360	1 759			
	United States	669	4 186	326	2 202	223	1 736			
	India	59	493	140	1 051	203	1 428			
	Other countries	67	412	66	277	127	540			
	Total	972	6 213	750	4 952	913	5 463			
7907.00	Other articles of zinc									
	United States	2 706	11 015	2 187	9 285	2 037	10 361			
	China	903	3 430	828	2 951	765	3 353			
	Taiwan	693	2 632	884	3 139	460	2 661			
	Other countries	1 008	3 611	615	2 363	445	2 344			
	Total	5 310	20 688	4 514	17 738	3 707	18 719			
	Total imports	319 091	207 532	441 624	277 982	318 647	310 965			
		2001 (a)		2002			2003			
		Primary	Recycled	Total	Primary	Recycled	Total	Primary	Recycled	Total
		(tonnes)								
QUANTITY USED (4)(5)										
Zinc used for or in the manufacture of:										
	Copper alloys (brass, bronze, etc.)	x	x	2 412	x	x	624	x	x	543
	Galvanizing: electro	x	x	2 018	x	x	1 719	x	x	1 064
	hot dip	x	x	72 676	x	x	74 823	x	x	70 290
	Zinc die-cast alloys	x	x	26 665	x	x	34 429	x	x	33 790
	Other products (including rolled and ribbon zinc, zinc oxides, electroplating)	x	x	40 819	x	x	38 313	x	x	39 473
	Total	143 431	1 159	144 590	147 895	2 013	149 908	143 097	2 499	145 596
	User stocks, year-end	9 814	375	10 189	10 484	274	10 758	9 320	303	9 623

Sources: Natural Resources Canada; Statistics Canada.

– Nil; . . Not available; n.e.s. Not elsewhere specified; (p) Preliminary; x Confidential.

(a) Increase in number of companies being surveyed.

(1) New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. (2) Zinc content of ores and concentrates produced. (3) Refined zinc produced from domestic and imported ores.

(4) Consumer survey does not represent 100% of Canadian use and is therefore consistently less than apparent use. (5) Due to sensitivity in some end-use categories, a breakdown of primary and recycled sources is not provided in order to be consistent.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, ZINC PRODUCTION AND EXPORTS, 1990-2004

	Production		Exports		
	All Forms (1)	Refined (2)	In Ores and Concentrates	Refined	Total
	(tonnes)				
1990	1 179 372	591 786	716 185	452 251	1 168 436
1991	1 083 008	660 552	566 815	520 508	1 087 323
1992	1 195 736	671 702	678 172	509 744	1 187 916
1993	990 727	659 881	455 953	493 265	949 218
1994	976 309	690 965	450 320	551 168	1 001 488
1995	1 094 703	720 346	609 575	533 179	1 142 754
1996	1 162 720	716 467	670 790	581 608	1 252 398
1997	1 026 864	703 798	489 697	546 965	1 036 662
1998	991 584	745 131	425 340	576 925	1 002 265
1999	963 321	776 927	327 662	610 792	938 454
2000	935 713	779 892	318 752	602 626	921 378
2001	1 012 048	661 172	419 164	495 184	914 348
2002	923 931	793 410	409 343	598 251	1 007 594
2003	757 307	761 199	257 877	590 555	848 432
2004 (p)	735 699	804 219	228 181	614 060	842 241

Sources: Natural Resources Canada; Statistics Canada.

(p) Preliminary.

(1) New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. (2) Refined zinc produced from domestic and imported ores.

TABLE 3. WESTERN WORLD PRIMARY ZINC STATISTICS, 2000-2004

	2000	2001	2002	2003	2004 (p)
	(000 tonnes)				
Mine production (zinc content)	6 323	6 618	6 469	6 706	6 548
Metal production	6 140	6 276	6 652	6 644	6 703
Metal used	7 153	6 898	7 121	7 105	7 455

Source: International Lead and Zinc Study Group.

(p) Preliminary.

TABLE 4. WORLD MINE PRODUCTION OF ZINC, 2000-2004

	2000	2001	2002	2003	2004 (p)
	(000 tonnes)				
EUROPE					
Finland	16	20	35	39	37
Ireland	263	298	253	419	438
Poland	157	153	152	154	148
Russia	163	164	162	159	179
Spain	204	161	70	15	–
Sweden	177	159	149	188	199
Others	83	97	89	45	36
Subtotal	1 063	1 052	910	1 019	1 037
AFRICA					
Morocco	105	89	91	69	87
Namibia	40	37	41	108	198
South Africa	63	61	64	41	32
Others	48	49	46	41	36
Subtotal	256	236	242	259	353
OCEANIA					
Australia	1 379	1 476	1 444	1 447	1 298
AMERICAS					
Bolivia	151	145	142	145	147
Brazil	100	111	133	147	165
Canada	1 002	1 065	916	788	791
Mexico	393	429	446	472	462
Peru	910	1 056	1 219	1 369	1 209
United States	852	842	784	768	739
Others	109	121	119	106	94
Subtotal	3 517	3 769	3 759	3 795	3 607
ASIA					
China	1 780	1 572	1 624	2 029	2 264
India	208	222	234	305	341
Iran	102	105	121	111	114
Japan	64	45	43	45	48
Kazakhstan	322	320	376	392	384
North Korea	34	28	32	52	62
Thailand	27	24	25	31	40
Turkey	48	36	43	40	39
Others	38	48	51	53	48
Subtotal	2 623	2 400	2 549	3 058	3 340
Total world	8 839	8 932	8 904	9 579	9 635

Source: International Lead and Zinc Study Group.
(p) Preliminary.

TABLE 5. WORLD ZINC METAL PRODUCTION, (1) 2000-2004

	2000	2001	2002	2003	2004 (p)
	(000 tonnes)				
EUROPE					
Belgium	264	256	239	244	257
Finland	223	249	235	266	285
France	318	329	334	253	260
Germany	357	357	378	388	358
Italy	170	179	176	123	118
Netherlands	217	206	203	223	225
Norway	138	145	145	142	140
Poland	173	175	159	154	154
Russia	242	250	257	253	240
Spain	391	437	503	519	525
Others	277	295	285	176	148
Subtotal	2 770	2 877	2 914	2 741	2 710
AFRICA					
Algeria	26	26	34	32	30
Namibia	–	–	–	47	119
South Africa	103	109	111	112	105
Zambia	–	–	2	2	2
Subtotal	129	135	147	193	256
AMERICAS					
Argentina	36	40	39	39	34
Brazil	192	193	255	258	266
Canada	780	661	793	761	805
Mexico	235	304	302	319	338
Peru	200	190	170	202	195
United States	371	329	344	353	355
Subtotal	1 814	1 717	1 904	1 932	1 993
ASIA					
China	1 957	2 038	2 155	2 319	2 519
India	204	234	248	280	270
Japan	654	644	640	651	635
Kazakhstan	262	277	286	279	338
South Korea	477	508	608	645	669
Thailand	101	105	105	107	103
Others	119	130	147	186	202
Subtotal	3 774	3 936	4 189	4 467	4 736
OCEANIA					
Australia	494	556	567	553	474
Total world	8 981	9 221	9 721	9 887	10 170

Source: International Lead and Zinc Study Group.

– Nil; (p) Preliminary.

(1) Total production by smelters and refineries of zinc in marketable form or used directly for alloying, including production on toll in the reporting country, regardless of the type of source material from which it is produced, i.e., whether ores, concentrates, residues, slag or scrap. Remelted zinc and zinc dusts are excluded.

TABLE 6. ZINC USE, (1) BY COUNTRY AND BY REGION, 2000-2004

	2000	2001	2002	2003	2004 (p)
	(000 tonnes)				
EUROPE					
Belgium	383	374	352	350	365
France	311	327	290	291	298
Germany	532	543	526	539	514
Italy	385	348	374	348	389
Russia	137	150	153	189	164
Spain	203	222	220	226	242
United Kingdom	210	191	185	188	185
Others	655	656	660	658	683
Subtotal	2 816	2 811	2 760	2 789	2 840
AFRICA					
South Africa	92	89	95	86	96
Others	78	87	92	88	97
Subtotal	170	176	187	174	193
OCEANIA					
Australia	217	222	249	254	250
New Zealand	14	16	17	13	13
Subtotal	231	237	266	267	263
AMERICAS					
Brazil	188	198	216	215	239
Canada	175	180	192	185	188
Mexico	212	210	225	236	240
United States	1 348	1 179	1 222	1 155	1 252
Others	177	169	173	162	194
Subtotal	2 101	1 936	2 028	1 953	2 113
ASIA					
China	1 350	1 500	1 750	2 155	2 470
India	270	286	310	332	347
Japan	676	633	603	619	623
South Korea	438	401	476	470	484
Taiwan	294	276	302	330	342
Others	637	663	710	739	791
Subtotal	3 679	3 759	4 151	4 645	5 057
Total world	8 997	8 920	9 391	9 828	10 468

Source: International Lead and Zinc Study Group.

(p) Preliminary.

(1) Total refined zinc use, including zinc used directly for the production of zinc alloys, regardless of the type of source material from which it is produced, i.e., ores, concentrates, residues, slags or scrap. Remelted zinc and zinc dusts are excluded.

TABLE 7. CANADA, ZINC METAL CAPACITY, 2004

Company and Location	Annual Rated Capacity
	(000 tonnes of slab zinc)
PRIMARY	
Canadian Electrolytic Zinc Limited Salaberry-de-Valleyfield, Quebec	267
Falconbridge Limited Timmins, Ontario	150
Hudson Bay Mining and Smelting Co., Limited Flin Flon, Manitoba	115
Teck Cominco Limited Trail, British Columbia	290
Total primary, Canada	822

Source: Natural Resources Canada.

**TABLE 8. MONTHLY AVERAGE ZINC
PRICES, 2003 AND 2004**

	LME Special High Grade Settlement
	(US\$/t)
2003	
January	781.4
February	785.2
March	790.9
April	754.7
May	775.6
June	790.6
July	827.5
August	817.9
September	818.2
October	898.0
November	914.5
December	977.8
Yearly average	828.4
2004	
January	1 017.0
February	1 087.7
March	1 105.8
April	1 032.7
May	1 028.3
June	1 021.5
July	988.4
August	975.8
September	975.2
October	1 064.9
November	1 095.6
December	1 180.2
Yearly average	1 047.8

Source: International Lead and Zinc Study Group.