

Lead

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Canada is an important world producer and supplier of refined lead, ranking seventh in mine production in 2003 after the United States, China, Germany, the United Kingdom, Australia and Japan. In Canada, primary lead is produced mainly as a co-product of zinc. Recycling of lead, mainly from scrapped car batteries, is an important source of refined lead in Canada, representing nearly 50% of total refined production.

HISTORY OF LEAD

Lead has been known since ancient times and is one of several metals that were discovered during the early periods of human history. Some experts believe that lead was used as early as 5000 B.C. The oldest archaeological evidence of lead use by humans is a figurine found in the Dardanelles area of Asia Minor dating from 3800 B.C.

Lead was used in coinage in China about 2000 B.C. and was mined by the Greeks from about 1200 B.C. to make coins, ornaments, weights and many other articles. One of lead's most enduring uses has been as pipe for the transportation of water. Romans manufactured lead pipes in one standard length and in several diameters, and used lead extensively in municipal water systems. The Roman word for lead is *plumbum*, which led to the modern English words "plumber" and "plumbing." The chemical symbol for lead, Pb, was also derived from the Latin word.

LEAD IN CANADA

An outcrop of lead-zinc ore was discovered in the Kootenay region of British Columbia in the 1820s. Active prospecting in the area dates from 1865 and mining commenced shortly thereafter. In the early years, the ores from British Columbia were sent to the United States for smelting and refining.

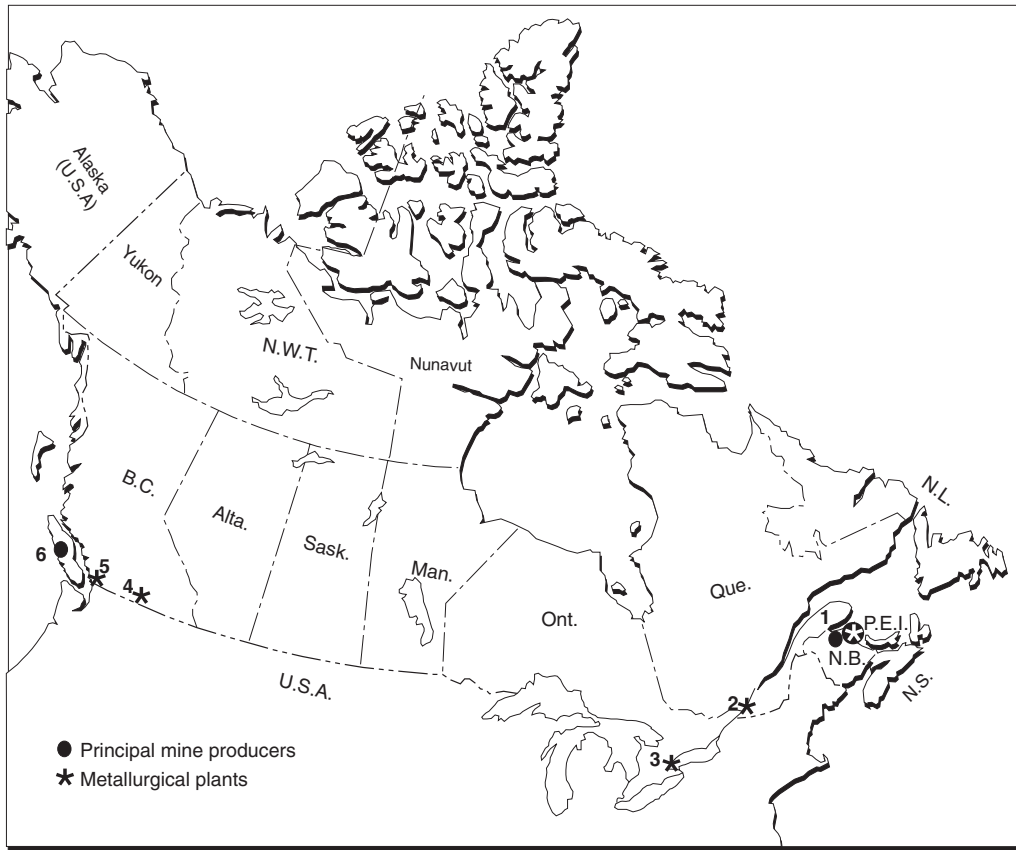
The now-famous Sullivan mine started operation near Kimberley, British Columbia, in the early 1900s and continued to produce lead until its closure in December 2001. By 1914, the Sullivan mine was the largest lead producer in Canada, a position it held for 50 years until the Pine Point mine in the Northwest Territories completed its first year of operation in 1966. Pine Point closed in 1988. The Kingdon mine at Galetta, on the Ottawa River near Arnprior, Ontario, was discovered in 1884, operated briefly in the 1880s, and was reactivated in 1914, producing lead and zinc ore until the early 1930s. The discovery of lead and zinc ores by the Geological Survey of Canada on Baffin Island in the mid-1950s led to the development of the Nanisivik mine in the mid-1970s. The mine closed in September 2002. The discovery of lead-zinc on Little Cornwallis Island in 1971 led to the development of the Polaris mine. Operated by Teck Cominco, the mine had the distinction of being the most northerly base-metal mine until its closure at the end of August 2002 after 20 years of operation.

Today, Noranda's operation at the Brunswick mine near Bathurst, New Brunswick, is the largest producer of lead. Lead has been mined in every province and territory with the exception of Alberta, Saskatchewan and Prince Edward Island. Operations in 2003 are listed in Figure 1.

USES

The largest single use of lead today is in the manufacture of the lead-acid storage battery, a vital part of every automobile. The average car battery contains about 10 kg of lead. Lead-acid batteries for automotive, industrial and consumer purposes account for about 75% of the world's demand for lead. In the communications industry, lead is still used extensively as protective sheathing for underground and underwater cables, including transoceanic cable systems. Certain lead compounds are used as paint pigments. Red lead (lead oxide) is the basic paint primer for iron and steel. Lead's corrosion-resistant nature also makes it suitable for applications in sheeting for roofing purposes, while its radiation attenuation properties prevent the emission of harmful radiation from television, video and computer screens.

Figure 1
Lead Producers in Canada, 2003



Numbers refer to locations on map above.

LEAD-PRODUCING MINES

1. Brunswick, Noranda Inc.
6. Myra Falls, Boliden Limited

WEB SITE

- www.noranda.com
www.boliden.ca

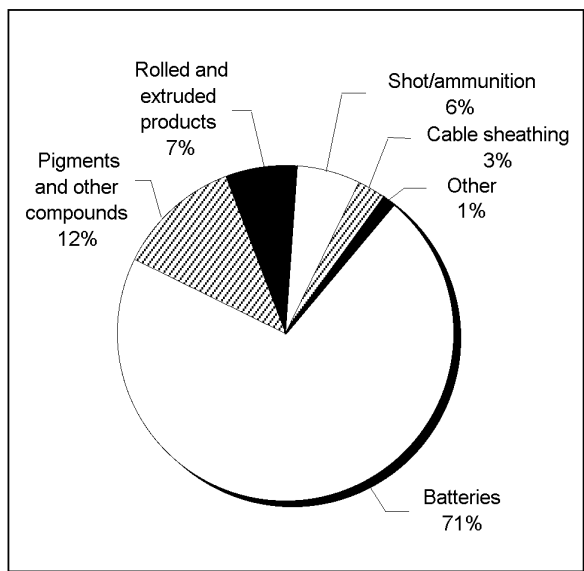
LEAD METALLURGICAL PLANTS

1. Belledune, Noranda Inc.
2. Nova Pb Inc.
General Smelting Company of Canada
3. Tonolli, Tonolli Canada Ltd. and Canada Metal Company
4. Trail, Teck Cominco Limited
5. Metalex Products Ltd.

- www.noranda.com
www.novapb.com
www.generalsmeltingofcanada.ca

- www.teckcominco.com

Figure 2
Western World Lead Markets, 2003



Source: International Lead and Zinc Study Group.

International Lead and Zinc Study Group, it is expected that there will be a deficit of about 130 000 t in the Western World market for refined lead metal in 2004. This should translate into higher prices over the coming months with lead prices expected to average in the US\$800/t range in 2004.

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 14, 2004. (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

The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

NATURAL OCCURRENCE

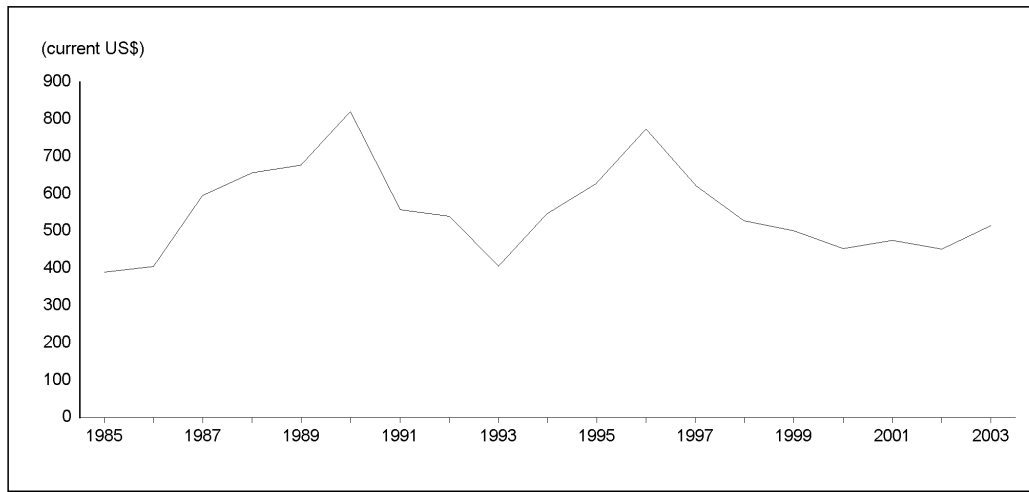
Almost all lead is obtained from sulphide ores in which the most common lead mineral is galena (PbS). It is usually found in combination with other sulphide ores, most frequently those of zinc, and also those of copper. Other lead-containing minerals include cerrusite (PbCO₃) and angulsite (PbSO₄).

PRICE OUTLOOK

Cash London Metal Exchange (LME) settlement prices for lead traded between US\$430 and \$500/t for the first half of the year and then followed a steady climb to reach a maximum of US\$739/t on December 31, 2003. Overall, cash settlement prices for lead averaged US\$515.66/t in 2003, an increase of 12% over the previous year. LME stocks followed a steady decline from a maximum of 183 725 t at the start of January to a minimum of 108 975 t at the end of December.

Lead concentrate markets have been particularly tight as more older mines close and fewer new projects with significant amounts of lead come on stream. The tight market is already being reflected by lower treatment charges and cutbacks at some smelters. Increased demand in Asian markets, particularly China, coupled with an overall decline in refined output, will continue to keep markets tight for lead. Overall, taking into consideration the information provided by the member countries of the

Figure 3
Average LME Cash Settlement Prices for Lead, 1985-2003



Source: London Metal Exchange.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan
		MFN	GPT	USA	Canada (1)	Conventional (1)	WTO (2)
2607.00	Lead ores and concentrates	Free	Free	Free	Free	Free	Free
78.01	Unwrought lead						
7801.10	Refined lead						
7801.10.10	Pig and block	Free	Free	Free	Free	2.5%	Free-2.70 yen/kg
7801.10.90	Other	2.5%	Free	Free	Free	2.5%	Free-2.70 yen/kg
7801.91	Other: Containing by weight antimony as the principal other element	Free	Free	Free	Free	2.5%	Free to 2.8%
7801.99.10	Lead bullion	2.5%	Free	Free	Free	Free	Free-2.8%
7801.99.20	Lead alloys	2.5%	Free	Free	Free	2.5%	3% or 4.50 yen/kg
7801.99.90	Other	2.5%	Free	Free	Free	2.5%	Free-4.50 yen/kg
7802.00	Lead waste and scrap	Free	Free	Free	Free	Free	2.1%
7803.00	Lead bars, rods, profiles and wire						
7803.00.10	Bars and rods, not alloyed	2.5%	Free	Free	Free	5%	3%
7803.00.90	Other	3%	Free	Free	Free	5%	3%
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) not exceeding 0.2 mm						
7804.11.10	Of lead-tin alloys, whether or not containing antimony	Free	Free	Free	Free	5%	3%
7804.11.90	Other	3%	Free	Free	Free	5%	3%
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
7804.19.10	Not alloyed, of a thickness exceeding 0.2 mm but not exceeding 5 mm, and a width exceeding 600 mm	2.5%	Free	Free	Free	5%	3%
7804.19.20	Of lead-antimony-tin alloys	2.5%	Free	Free	Free	5%	3%
7804.19.90	Other	2.5%	Free	Free	Free	5%	3%
7804.20	Powders and flakes						
7804.20.10	Powders, not alloyed	2.5%	Free	Free	Free	Free	3%
7804.20.20	Alloyed powders; flakes	2.5%	Free	Free	Free	Free	3%
7805.00	Lead tubes, pipes, and tube or pipe fittings	3%	Free	Free	Free	Free-5%	3%
7806.00	Other articles of lead	3%	Free	Free	Free	Free-5%	3%

Sources: Canadian *Customs Tariff*, effective January 2004, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2004; *Official Journal of the European Union* (October 30, 2003 Edition); *Customs Tariff Schedules of Import Duties for Japan, 2003*.

(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, LEAD PRODUCTION (1) AND TRADE, 2001-03, AND USE, 2000-2002

Item No.	2001		2002		2003	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
SHIPMENTS						
New Brunswick	82 368	59 964	71 551	50 801	71 241	49 156
British Columbia	35 278	25 682	6 256	4 442	5 899	4 070
Nunavut	32 743	23 837	23 523	16 701	-	-
Total	150 389	109 483	101 330	71 944	77 140	53 227
Mine output (2)	153 932	..	97 178	..	81 386	..
Refined production						
Primary	127 007	..	136 896	..	121 540	..
Recycled	103 921	..	114 664	..	107 152	..
Total	230 928	..	251 560	..	228 692	..
EXPORTS						
2603.00.20	Lead content of copper ores and concentrates	-	-	-	-	-
2607.00	Lead ores and concentrates					
	China	15 049	7 575	11 495	6 520	7 605
	Belgium	4 792	2 454	8 003	5 870	-
	Germany	10 600	7 860	22 807	15 064	-
	Italy	4 368	2 320	-	-	-
	Sweden	23 384	16 597	-	-	-
	Total	58 193	36 806	42 305	27 454	7 605
2607.00.20	Lead content of lead ores and concentrates					
	China	15 027	5 169	11 479	4 341	7 588
	Belgium	4 784	1 654	7 985	3 357	-
	Germany	10 600	7 860	22 807	15 064	-
	Italy	4 368	1 529	-	-	-
	Sweden	23 384	16 597	-	-	-
	Total	58 163	32 809	42 271	22 762	7 588
2608.00.20	Lead content of zinc ores and concentrates					
	Romania	-	-	-	-	4 603
	Belgium	6 013	1 869	6 289	2 107	4 860
	Poland	3 071	1 022	3 316	1 079	3 010
	Russia	-	-	-	-	1 188
	Italy	1 845	567	-	-	-
	Peru	-	-	1 307	427	-
	Total	10 929	3 458	10 912	3 613	13 661
7801.10	Unwrought lead					
	Refined lead					
	United States	123 586	104 485	134 752	108 847	121 626
	Netherlands	-	-	4 003	2 558	5 005
	Ireland	-	-	3 003	1 957	496
	Italy	1 604	1 120	-	-	391
	Malaysia	71	61	80	70	101
	Japan	116	166	61	87	52
	Other countries	-	-	293	198	11
	Total	125 377	105 832	142 192	113 717	127 682
7801.91	Lead, unwrought, containing by weight antimony as the principal other element					
	United States	18 225	18 234	17 601	15 981	20 553
	Belgium	-	-	-	-	538
	Netherlands	-	-	199	94	180
	China	-	-	1 801	573	220
	Argentina	-	-	646	363	121
	France	-	-	101	54	-
	Total	18 225	18 234	20 348	17 065	21 612
7801.99	Lead, unwrought, n.e.s.					
	United States	26 062	24 276	20 061	17 788	25 707
	Malaysia	2 055	1 758	7 396	5 715	4 992
	Mexico	-	-	655	514	2 781
	China	-	-	1 010	347	2 209
	Taiwan	-	-	-	-	1 082
	Philippines	61	55	1 119	923	692
	Poland	-	-	-	-	576
	Singapore	377	327	482	400	267
	Belgium	-	-	-	-	260
	Thailand	125	96	1 267	959	180
	Other countries	95	91	135	112	35
	Total	28 775	26 603	32 125	26 758	38 781
	Total	28 775	26 603	32 125	26 758	38 781

TABLE 1 (cont'd)

Item No.	2001		2002		2003		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
EXPORTS (cont'd)							
7802.00	Lead waste and scrap						
	United States	1 632	729	352	369	817	568
	Other countries	–	–	49	31	210	385
	Total	1 632	729	401	400	1 027	953
7803.00	Lead bars, rods, profiles and wire						
	United States	308	490	416	537	533	1 227
	Other countries	–	–	15	62	164	232
	Total	308	490	431	599	697	1 459
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) <0.2 mm						
	Qatar	–	–	–	–	1	2
	Malta	–	–	2	3	–	–
	United States	–	–	–	5	–	–
	Total	–	–	2	8	1	2
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
	United States	875	1 196	1 453	2 134	1 347	1 963
	Other countries	2	3	–	2	3	2
	Total	877	1 199	1 453	2 136	1 350	1 965
7804.20	Lead powders and flakes						
	South Korea	–	–	–	–	7	27
	India	–	–	–	–	–	14
	United States	89	113	100	135	–	–
	Total	89	113	100	135	7	41
7805.00	Lead tubes, pipes, and tube or pipe fittings (i.e., couplings, elbows, sleeves)						
	United States	8	28	29	64	17	47
	Other countries	–	–	1	9	14	26
	Total	8	28	30	73	31	73
7806.00	Other articles of lead						
	United States	..	5 902	..	5 592	..	6 131
	Other countries	–	48	–	41	–	110
	Total	..	5 950	..	5 633	..	6 241
	Total exports	..	199 442	..	197 591	..	163 549
IMPORTS (3)							
2607.00	Lead ores and concentrates						
	United States	23 477	58 579	13 558	46 949	18 552	73 616
	Peru	28 374	39 120	44 878	59 557	41 633	43 309
	Australia	–	–	4 201	12 018	10 705	14 370
	Chile	3 079	3 859	17	3 936	4 839	3 907
	Brazil	13	1 776	10	1 261	19	3 090
	Bolivia	–	–	10	3	664	1 194
	Netherlands	10	717	–	–	5	697
	Argentina	1 226	1 655	–	–	–	–
	Honduras	16	2 793	2 017	1 775	–	–
	Mexico	50	77	–	–	–	–
	Morocco	1 579	2 273	6 532	1 958	–	–
	Total	57 824	110 849	71 223	127 457	76 417	140 183
2607.00.00.20	Lead content of lead ores and concentrates						
	Peru	28 349	33 427	44 833	50 465	38 257	26 807
	United States	18 369	22 229	10 817	11 019	15 756	14 186
	Australia	–	–	4 162	4 162	10 658	6 110
	Chile	3 079	3 859	–	–	4 827	3 116
	Bolivia	–	–	–	–	653	958
	Argentina	1 226	1 655	–	–	–	–
	Mexico	50	77	–	–	–	–
	Morocco	1 579	2 273	6 532	1 958	–	–
	Honduras	–	–	2 017	1 775	–	–
	Total	52 652	63 520	68 361	69 379	70 151	51 177
2608.00.00.20	Lead content of zinc ores and concentrates						
	United States	2 271	2 032	298	305	170	205
	Mexico	105	121	–	–	–	–
	Total	2 376	2 153	298	305	170	205

TABLE 1 (cont'd)

Item No.	2001		2002		2003		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
IMPORTS (cont'd)							
2616.10.00.20	Lead content of silver ores and concentrates						
	Peru	508	295	176	52	375	185
	Bolivia	85	42	8	6	8	4
	United States	2 593	1 430	—	—	—	—
	Chile	—	—	10	3	—	—
	Total	3 186	1 767	194	61	383	189
7801.10.10	Refined lead, unwrought, pig and block						
	United States	961	819	1 302	1 273	803	828
	China	—	—	—	—	493	405
	Spain	—	—	—	—	203	227
	Other countries	14	15	120	134	—	—
	Total	975	834	1 422	1 407	1 499	1 460
7801.10.90	Refined lead, unwrought, other						
	United States	213	255	136	148	23	26
	Spain	2 136	6 507	233	267	4	5
	Other countries	—	—	3	4	6	7
	Total	2 349	6 762	372	419	33	38
7801.91	Lead, unwrought, containing by weight antimony as the principal other element						
	Mexico	—	—	—	—	74	90
	United States	183	213	15	20	28	33
	Other countries	1	2	—	—	2	2
	Total	184	215	15	20	104	125
7801.99	Lead, unwrought, other						
	United States	487	1 761	285	453	653	769
	Other countries	8	9	26	28	4	4
	Total	495	1 770	311	481	657	773
7802.00	Lead waste and scrap						
	United States	54 956	11 882	41 058	7 354	40 965	6 779
	China	86	37	42	17	108	58
	France	—	—	192	33	283	52
	Other countries	135	65	124	58	32	8
	Total	55 177	11 984	41 416	7 462	41 388	6 897
7803.00	Lead bars, rods, profiles and wire						
	United States	842	1 354	1 253	2 136	1 413	2 415
	South Korea	1	2	9	16	245	512
	Japan	250	444	—	1	100	176
	Other countries	24	52	6	12	8	14
	Total	1 117	1 852	1 268	2 165	1 766	3 117
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) <0.2 mm						
	New Zealand	113	120	75	77	268	174
	United States	223	234	134	175	91	124
	Germany	8	10	20	16	22	19
	United Kingdom	52	65	57	73	13	19
	Other countries	—	—	3	4	4	8
	Total	396	429	289	345	398	344
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
	United States	174	250	151	211	205	308
	United Kingdom	1	2	15	18	15	25
	France	—	—	7	8	12	16
	Germany	15	22	11	21	13	15
	Other countries	12	20	2	2	—	1
	Total	202	294	186	260	245	365
7804.20	Lead powders and flakes						
	United States	71	136	79	145	128	169
	Other countries	—	—	—	—	2	3
	Total	71	136	79	145	130	172
7805.00	Lead tubes, pipes, and tube or pipe fittings (i.e., couplings, elbows, sleeves)						
	United States	18	30	15	27	7	10
	Other countries	—	—	—	—	8	14
	Total	18	30	15	27	15	24

TABLE 1 (cont'd)

Item No.	2001		2002		2003				
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)			
IMPORTS (cont'd)									
7806.00	Other articles of lead								
	United States								
	4 052	5 418	3 329	4 829	2 747	3 778			
	Japan								
	371	467	567	733	135	176			
	Germany								
	135	126	164	162	146	158			
	China								
	32	45	35	42	38	41			
	United Kingdom								
	11	19	14	19	25	30			
	Other countries								
	520	629	150	221	46	57			
	Total								
	5 121	6 704	4 259	6 006	3 137	4 240			
Total imports									
	129 491	145 779	121 347	146 560	126 342	158 132			
QUANTITY USED (4)									
Lead used for or in the production of:									
	2000 (a)		2001			2002			
	Primary	Recycled (5)	Total	Primary	Recycled (5)	Total	Primary	Recycled (5)	Total
Antimonial lead	x	x	x	x	x	x	x	x	x
Batteries and battery oxides	13 286	12 915	26 201	x	x	x	x	x	x
Chemical uses: white lead, red lead, litharge, tetraethyl lead, etc.	x	x	x	x	x	x	x	x	x
Copper alloys: brass, bronze, etc.	14	13	27	12	8	20	x	x	19
Lead alloys:									
Solders	273	1 184	1 457	x	x	x	x	x	x
Others (including babbitt, type metals, etc.)	x	x	x	x	x	x	x	x	x
Semi-finished products:									
Pipe, sheet, traps, bends, blocks for caulking, ammunition, etc.	2 428	195	2 624	x	x	x	x	x	x
Other lead products	2 014	1 809	3 823	3 201	1 695	4 896	3 296	1 316	4 612
Total, all categories	30 146	51 219	81 365	23 009	33 947	56 956	31 844	(r) 34 730	(r) 66 575

Sources: Natural Resources Canada; Statistics Canada.

- Nil; .. Not available; n.e.s. Not elsewhere specified; (r) Revised; x Confidential.

(a) Increase in number of companies being surveyed.

(1) Production includes recoverable lead in ores and concentrates shipped valued at the Montréal Exchange average price for the year. (2) Lead content of domestic ores and concentrates exported. (3) Imports from "other countries" may include re-imports from Canada. (4) Available data, as reported by users. (5) Includes all remelt scrap lead used to make antimonial lead.

TABLE 2. CANADA, LEAD PRODUCTION, TRADE AND USE, 1975, 1980 AND 1985-2003

	Production				Domestic Exports (1)			Imports Refined	Quantity Used (3)
	All Forms (2)	Primary	Refined Recycled	Total	In Ores and Concentrates	Refined	Total		
	(tonnes)								
1975	349 133	171 516	..	171 516	211 909	110 882	322 791	(a) 1 962	89 192
1980	251 627	162 463	72 117	234 580	147 008	126 539	273 547	(a) 2 602	106 836
1985	268 291	173 220	66 791	240 011	93 657	113 993	207 650	(a) 5 675	104 447
1986	334 342	169 934	87 746	257 680	118 373	111 831	230 204	(a) 4 247	94 680
1987	373 215	139 475	91 186	230 661	207 936	100 204	308 140	(a) 12 558	97 281
1988	351 148	179 461	88 615	268 076	200 822	179 946	380 768	15 132	88 728
1989	268 887	157 330	85 515	242 845	170 582	121 444	292 026	11 734	88 408
1990	233 372	87 180	96 465	183 645	221 566	84 007	305 573	11 781	72 203
1991	248 102	106 420	105 946	212 366	175 150	86 631	261 781	7 553	80 253
1992	339 626	151 252	101 633	252 885	190 822	131 546	322 368	8 289	92 420
1993	183 105	147 907	69 107	217 014	96 428	124 610	221 038	11 612	91 915
1994	167 584	153 035	98 605	251 640	55 923	133 203	189 126	5 119	95 764
1995	204 227	178 019	103 372	281 391	90 254	140 478	230 732	3 967	91 171
1996	241 751	192 877	117 914	310 791	154 697	159 860	314 557	4 179	93 373
1997	170 847	139 736	131 659	271 395	112 694	155 639	268 333	5 843	92 997
1998	150 019	129 750	135 737	265 487	52 250	145 358	197 608	6 460	87 466
1999	155 369	148 526	117 889	266 415	58 831	139 622	198 453	7 663	92 557
2000	143 303	159 192	125 141	284 833	50 524	148 428	198 952	7 028	81 365
2001	150 389	127 007	103 921	230 928	69 093	126 652	195 744	(r) 5 110	56 956
2002	101 330	136 896	114 664	251 560	53 183	144 177	197 360	3 619	66 575
2003 (p)	77 140	121 540	107 152	228 692	22 068	129 737	151 805	4 071	..

Sources: Natural Resources Canada; Statistics Canada.

.. Not available; (p) Preliminary; (r) Revised.

(a) Lead in pigs, blocks and shot.

(1) Beginning in 1988, exports and imports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Ores and concentrates include HS classes 2603.00.20, 2607.00.20, 2608.00.20 and 2616.10.20. Refined exports include HS classes 7801.10, 7803.00, 7804.11, 7804.19 and 7804.20. Refined imports include HS classes 7801.10.10, 7801.10.90, 7803.00, 7804.11, 7804.19 and 7804.20. (2) Recoverable lead in ores and concentrates shipped. (3) Primary and recycled in origin, as measured by a survey of users.

**TABLE 3. ANNUAL AVERAGE LEAD PRICES,
1975-2003**

	London Metal Exchange			
	Settlement		Three Months	
	(US\$/t)	(US¢/lb)	(US\$/t)	(US¢/lb)
1975	413.48	18.75	441.93	18.82
1976	451.51	20.48	469.03	21.28
1977	617.78	28.02	626.84	28.43
1978	658.87	29.89	659.07	29.90
1979	1 203.15	54.57	1 149.95	52.16
1980	909.12	41.24	911.46	41.34
1981	734.73	33.33	750.12	34.03
1982	544.08	24.68	562.53	25.52
1983	425.27	19.29	440.55	19.98
1984	444.36	20.16	445.25	20.20
1985	394.10	17.88	394.12	17.88
1986	406.89	18.46	407.26	18.47
1987	597.41	27.10	567.38	25.74
1988	655.83	29.75	635.68	28.83
1989	676.14	30.67	659.36	29.91
1990	817.85	37.10	790.82	35.87
1991	557.84	25.30	568.90	25.81
1992	540.04	24.50	553.56	25.11
1993	406.38	18.43	420.36	19.07
1994	549.01	24.90	564.10	25.59
1995	630.51	28.60	638.88	28.98
1996	773.96	35.11	771.22	34.98
1997	624.08	28.31	633.01	28.71
1998	528.42	23.97	533.29	24.19
1999	502.24	22.78	508.89	23.08
2000	454.22	20.60	468.07	21.23
2001	476.04	21.59	483.24	21.92
2002	452.52	20.53	461.65	20.94
2003	515.66	23.39	517.53	23.48

Source: International Lead and Zinc Study Group.

**TABLE 4. LME MONTHLY AVERAGE LEAD PRICES,
2002 AND 2003**

	London Metal Exchange			
	Settlement		Three Months	
	(US\$/t)	(US¢/lb)	(US\$/t)	(US¢/lb)
2002				
January	512.43	23.24	509.91	23.13
February	479.95	21.77	489.25	22.19
March	480.15	21.78	492.42	22.34
April	472.36	21.43	484.67	21.98
May	451.89	20.50	463.61	21.03
June	440.00	19.96	451.86	20.50
July	446.13	20.24	456.52	20.71
August	423.24	19.20	432.67	19.63
September	421.26	19.11	430.50	19.53
October	418.15	18.97	428.80	19.45
November	442.12	20.05	449.05	20.37
December	443.61	20.12	452.26	20.51
2003				
January	444.66	20.17	455.61	20.67
February	475.83	21.58	479.77	21.76
March	456.67	20.71	465.12	21.10
April	437.38	19.84	447.02	20.28
May	463.50	21.02	465.98	21.14
June	468.02	21.23	471.38	21.38
July	514.78	23.35	508.09	23.05
August	496.52	22.52	500.38	22.70
September	521.27	23.65	522.77	23.71
October	587.33	26.64	583.83	26.48
November	622.33	28.23	620.15	28.13
December	692.07	31.39	683.95	31.02

Source: International Lead and Zinc Study Group.

**TABLE 5. MINE PRODUCTION OF LEAD, BY COUNTRY,
1999-2003**

	1999	2000	2001	2002	2003 (p)
	(000 t)				
EUROPE					
Bulgaria	14	14	16	24	17
Greece	19	16	27	29	2
Ireland	39	57	45	32	50
Italy	5	3	4	4	5
Macedonia	27	24	20	15	5
Poland	63	51	53	57	42
Romania	18	19	20	18	16
Russia	14	14	14	19	25
Spain	29	51	36	6	2
Sweden	118	107	88	44	51
Serbia and Montenegro	9	4	5	–	–
Total Europe	355	360	326	247	217
AFRICA					
Morocco	80	82	77	62	54
Namibia	12	12	13	12	16
South Africa	80	75	51	50	42
Other Africa	8	8	8	7	6
Total Africa	179	178	159	130	118
AMERICAS					
Canada	162	149	154	97	81
Mexico	126	138	136	139	142
Peru	271	271	289	297	308
United States	513	458	463	449	458
Other Americas	39	37	38	40	41
Total Americas	1 111	1 053	1 080	1 022	1 030
ASIA					
China	549	660	599	641	959
India	38	36	32	34	44
Iran	17	17	18	17	16
Japan	6	9	5	6	6
Kazakhstan	31	39	43	43	44
North Korea	16	12	9	10	12
Thailand	12	11	–	3	–
Turkey	14	16	18	17	14
Other Asia	5	5	4	1	1
Total Asia	688	805	728	772	1 096
OCEANIA					
Australia	633	650	714	658	648
Total world	2 966	3 046	2 998	2 830	3 108

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
– Nil; (p) Preliminary.

**TABLE 6. REFINED LEAD PRODUCTION, BY COUNTRY,
1999-2003**

	1999	2000	2001	2002	2003 (p)
	(000 t)				
EUROPE					
Belgium	110	119	100	88	65
Bulgaria	82	84	83	66	69
Czech Republic	25	28	30	29	26
France	273	262	230	203	101
Germany	353	387	375	378	357
Italy	215	231	222	193	214
Poland	64	56	66	66	60
Russia	44	32	58	63	60
Spain	98	120	122	116	102
Sweden	79	78	75	65	76
United Kingdom	372	338	382	368	347
Other Europe	140	146	138	128	118
Total Europe	1 855	1 881	1 889	1 763	1 595
AFRICA					
Morocco	65	67	58	72	69
South Africa	52	46	55	61	64
Other Africa	14	12	12	11	11
Total Africa	131	125	125	144	145
AMERICAS					
Brazil	52	50	47	37	35
Canada	266	284	231	252	223
Mexico	199	241	236	234	238
Peru	111	116	118	120	112
United States	1 447	1 457	1 376	1 364	1 381
Other Americas	60	68	64	73	70
Total Americas	2 136	2 216	2 072	2 080	2 059
ASIA					
China	918	1 100	1 195	1 325	1 578
India	64	67	63	78	82
Japan	293	312	302	286	295
Kazakhstan	159	208	159	158	141
Malaysia	33	32	38	40	57
North Korea	14	10	7	6	7
South Korea	190	220	211	243	230
Taiwan	53	55	62	55	56
Other Asia	158	159	172	176	201
Total Asia	1 882	2 163	2 209	2 367	2 647
OCEANIA					
Australia	271	259	271	302	307
New Zealand	6	11	9	9	8
Total Oceania	277	270	280	311	315
Total world	6 280	6 655	6 574	6 665	6 762

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
(p) Preliminary.

TABLE 7. REFINED LEAD USE, BY COUNTRY, 1999-2003

	1999	2000	2001	2002	2003 (p)
	(000 t)				
EUROPE					
Austria	55	60	59	60	56
Belgium	51	57	40	34	37
France	260	268	265	230	220
Germany	372	390	404	385	384
Ireland	30	29	34	42	38
Italy	279	279	284	286	258
Netherlands	30	29	30	29	34
Poland	60	52	59	70	58
Russia	95	83	94	111	99
Spain	192	219	231	238	216
United Kingdom	325	327	318	311	302
Other Europe	231	225	254	248	241
Total Europe	1 980	2 018	2 072	2 044	1 943
AFRICA					
Algeria	21	21	20	21	21
Egypt	8	9	9	9	10
South Africa	67	59	59	71	85
Other Africa	37	41	35	34	44
Total Africa	133	130	123	135	160
AMERICAS					
Brazil	108	114	112	112	112
Canada	70	68	55	58	51
Mexico	187	258	253	270	259
United States	1 793	1 791	1 695	1 536	1 523
Other Americas	105	99	79	85	88
Total Americas	2 263	2 330	2 194	2 061	2 033
ASIA					
China	524	590	700	950	1 183
India	112	119	127	130	142
Indonesia	45	66	48	61	69
Iran	65	68	70	68	72
Japan	289	301	284	253	248
Malaysia	76	84	82	86	90
South Korea	272	303	314	343	349
Taiwan	150	170	167	154	137
Thailand	66	96	82	111	130
Other Asia	196	198	185	209	229
Total Asia	1 796	1 995	2 059	2 365	2 649
OCEANIA					
Australia	56	41	41	39	38
New Zealand	6	5	4	3	4
Total Oceania	62	46	45	42	42
Total world	6 235	6 519	6 493	6 647	6 827

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
(p) Preliminary.

TABLE 8. WESTERN WORLD PRODUCTION OF LEAD FROM RECYCLING, (1) 1999-2003

	1999	2000	2001	2002	2003 (p)
	(000 t)				
EUROPE					
Austria	24	23	22	21	20
Belgium	77	107	100	88	65
France	150	137	132	121	94
Germany	192	216	218	237	225
Ireland	11	9	10	7	8
Italy	148	163	164	152	166
Netherlands	18	21	20	18	17
Spain	98	120	122	116	102
Sweden	44	47	44	47	52
United Kingdom	183	182	183	175	185
Other Europe	42	38	38	33	31
Total Europe	987	1 063	1 053	1 015	965
AFRICA					
Algeria	6	6	6	6	6
Morocco	6	4	4	4	4
South Africa	52	46	49	61	64
Other Africa	7	6	5	5	5
Total Africa	71	62	64	76	80
AMERICAS					
Brazil	52	50	47	37	35
Canada	118	125	104	115	111
Mexico	91	79	92	106	109
United States	1 097	1 115	1 086	1 102	1 136
Other Americas	60	60	55	63	59
Total Americas	1 418	1 429	1 384	1 423	1 450
ASIA					
India	19	25	19	35	41
Indonesia	18	18	18	17	18
Iran	28	28	28	30	31
Japan	168	182	175	178	190
Malaysia	33	32	38	40	57
South Korea	57	66	63	64	60
Taiwan	53	55	62	55	56
Thailand	23	24	28	40	45
Other Asia	70	70	76	76	88
Total Asia	469	500	507	535	586
OCEANIA					
Australia	32	34	34	34	38
New Zealand	6	11	9	9	8
Total Oceania	37	45	43	43	46
Total Western	2 983	3 099	3 052	3 092	3 126

Sources: Natural Resources Canada; International Lead and Zinc Study Group.

(p) Preliminary.

(1) Refined lead and lead alloys (lead content) produced from scraps, wastes and residues.