

# Gypsum and Anhydrite

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## **GYP SUM**

Canadian shipments of natural gypsum totaled 8.8 Mt valued at \$112.7 million in 2002, based on preliminary data (Table 1). This amount compares to 7.8 Mt valued at \$96.0 million in 2001, based on final data. The reported 13% increase in shipments resulted mainly from increased construction activity in Canada, based on preliminary data from Statistics Canada and the Gypsum Association. In addition to shipments of natural gypsum in 2002, domestic shipments of commercial-quality, synthetic, flue-gas desulphurization (FGD) gypsum from coal-fired generating stations are estimated to be about 350 000 t/y. Total use of FGD gypsum in Canada, including imports, is estimated to be about 500 000 t/y.

## **Canadian Industry**

Most producers of natural gypsum in Canada are closely integrated in both mining and wallboard manufacturing. Five major companies operate a total of 10 mines and 13 wallboard plants accounting for an estimated 1900 employees. The major gypsum mining and related production plants are listed in Table 2. In addition, two companies produce FGD gypsum for the manufacture of wallboard in Canada. These are: 1) Ontario Power Generation Inc. (OPG), which sells its product to Westroc Inc., located near Toronto, Ontario; and 2) NB Power (Bellefleur Generating Station) in New Brunswick, which sells its product to CGC Inc. in Montréal, Quebec. (Both OPG and NB Power use the wet limestone system for recovering FGD gypsum.)

In Atlantic Canada, Nova Scotia accounts for about 83% of Canada's output of natural gypsum and nearly all of its exports. Most gypsum deposits being mined in the Atlantic provinces are characterized by their high quality,

amenability to inexpensive mining methods, and close access to coastal bulk-shipping facilities.

Galen Gypsum Mines Limited in St. George's, Newfoundland and Labrador, has been reactivated and supplied gypsum to Lafarge Gypsum Canada Inc. in Corner Brook.

Georgia-Pacific Corporation, operating in Nova Scotia, plans to close its mine at Sugar Camp, Cape Breton Island, and phase in a new mine in 2003 in the same area near Melford.

In Quebec, most demand for gypsum is satisfied by shipments of raw material, including synthetic gypsum, from Atlantic Canada.

In Ontario and in western Canada there were no new developments reported.

## **World Developments and Trade**

Natural gypsum is by far the most important source of raw material for this mineral's many uses. However, synthetic gypsum produced mainly by the FGD process accounts for 3-5% of the total combined output of crude and commercial-quality synthetic gypsum produced in Canada.

Stricter environmental regulations worldwide have acted as a driver to reduce sulphur dioxide regulations in many countries. In the United States, of 19 newly built plants or expansions since 1998, nearly all use synthetic (mainly FGD) gypsum. The production of synthetic gypsum in the United States is estimated to be 7.7 Mt, accounting for about one third of the combined output of crude and synthetic gypsum, which totals 23.8 Mt. This amount represents about 24% of total apparent use, which in turn represents more than a twofold increase during the five-year period from 1998 to 2002, according to the U.S. Geological Survey (USGS).

World production of gypsum in 2002 is an estimated 103 Mt, based mainly on USGS sources (Office of Minerals Information's web site at [www.usgs.gov](http://www.usgs.gov)). The United States ranked number one with production of 16.1 Mt, followed by Iran, 11.0 Mt; Canada, 8.9 Mt; Spain, 7.5 Mt; and Mexico, 6.3 Mt.

Canada's imports of gypsum from the United States and Mexico (Table 1) are used by both wallboard and cement manufacturers. Imports from Spain, however, are believed to be entirely non-calcined material for use by some cement producers.

In the United States, the construction of several major new plants and expansions designed to use only synthetic gypsum continued during 2002.

## Processing and Markets

The gypsum wallboard industry mainly serves the residential, institutional and commercial building sectors. In North America, wallboard manufacturing accounts for an estimated 75% of gypsum use, cement processing accounts for 10-15%, and agriculture and industrial processes account for the remainder of uses.

Canadian wallboard plants in 2002 shipped about 305 million m<sup>2</sup> (3.28 billion square feet) of finished products compared to about 294 million m<sup>2</sup> in 2001, according to Statistics Canada. (This amount represents an increase of about 4% compared to the previous 12-month period.)

Shipments of wallboard by U.S. producers in 2002 were 2.77 billion m<sup>2</sup> (29.87 billion square feet), according to the Gypsum Association.

The Portland cement industry requires crushed, non-calcined gypsum acting as a set regulator in a proportion up to 5% by total weight. This mineral is ground with the primary stage clinker to produce a secondary stage cement powder for use mainly in concrete products. Based on this proportion of gypsum, the total amount of gypsum required by cement producers in Canada is estimated to be 500 000-550 000 t/y.

Other uses for gypsum relate mainly to agriculture as a soil conditioner and as a mineral filler in joint compounds, plastics and paints, and in certain glass-making technologies.

A portion of the gypsum waste generated annually by wallboard manufacturing, installation and demolition is recycled. Although data are not available, it is estimated that 100 000-200 000 t/y of gypsum are recycled; this amount would represent 5-10% of the gypsum used for making wallboard in Canada.

Process Research ORTECH Inc. sponsored Gypsum and Fly Ash 2002 – 7th International Science and Technology Conference and Short Course, which was held in Toronto in June 2002. This series of conferences has contributed greatly to improving communication and the dissemination of new information among power utilities and other synthetic gypsum producers, users and equipment suppliers. Also, with renewed interest in the importance of fly ash as a major coal combustion product (CCP) used as a

supplementary cementing material (SCM) to partially replace energy-intensive Portland cement, this conference attracted a wide range of delegates. (The use of CCPs in Canada is highlighted in a separate commodity chapter entitled *Cement* – refer to Table 4.)

## Prices

Prices for gypsum in merchant markets are negotiated among buyers and sellers, and published figures are not always relevant. In Canada, the average reported value for crude gypsum, f.o.b. mine, is about \$12/t for the five-year period from 1998 to 2002.

## Outlook

Canadian shipments of gypsum in 2003 are expected to be lower, mainly based on weaker exports to the United States. However, housing starts in Canada are expected to remain firm. Housing starts were about 205 000 in 2002, according to the Canada Mortgage and Housing Corporation. By way of comparison, starts were about 152 000 in 2000 and 163 000 in 2001. (Additional information relating to residential construction can be obtained on the Internet at [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca).) Non-residential construction, mainly based on gains in institutional building permits, is expected to be greater in 2003.

Diverse uses of gypsum related to building plasters, Portland cement, fillers and pigments, soil conditioners, and fertilizers as a diluent are important and tend to expand with overall economic growth. The present structure of the industry in Canada is not expected to change significantly, although the future availability of low-cost synthetic gypsum resulting from more strenuous emission controls may serve to increase demand for this mineral.

Based on a recent study, FGD systems to capture sulphur dioxide from power plant stacks may double by 2006. In addition, it has been stated that limestone wet scrubbing with a gypsum by-product will continue to be the leading desulphurization technology used on all continents. However, lime-based systems and ammonia scrubbers will also be important ([www.mcilvainecompany.com](http://www.mcilvainecompany.com)).

## ANHYDRITE

Production and trade statistics for anhydrite are included with gypsum. Anhydrite, the anhydrous form of gypsum (about twice as hard and also denser than gypsum), is produced by Fundy Gypsum Company at Wentworth, Nova Scotia, and by Little Narrows Gypsum Company at Little Narrows, Nova Scotia.

Shipments of anhydrite in 2001 were about 125 000 t, mainly to the United States for use as a peanut crop fertilizer, and to Quebec and Ontario for final-stage processing

of Portland cement. Similarly, shipments in 2002 were an estimated 130 000 t, according to the Nova Scotia Department of Natural Resources.

*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 June 30, 2003. (3) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/mms/cm/com\\_e.html](http://www.nrcan.gc.ca/mms/cm/com_e.html).*

#### NOTE TO READERS

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#### TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2520.10	Gypsum; anhydrite	Free	Free	Free	Free
2520.20	Plasters	Free	Free	Free	Free
68.09	Articles of plaster or of compositions based on plaster; Boards, sheets, panels, tiles and similar articles, not ornamented				
6809.11	Faced or reinforced with paper or paperboard only				
6809.11.10	Gypsum wallboard	6%	Free	Free	Free
6809.11.90	Other	6%	Free	Free	Free
6809.19.00	Other	6.5%	3%	Free	Free
6809.90	Other articles				
6809.90.10	Models and casts, of a kind used in the manufacture of dental prostheses	Free	Free	Free	Free
6809.90.90	Other	6.5%	3%	Free	Free

Sources: Canadian *Customs Tariff*, effective January 2003, Canada Customs and Revenue Agency; *Harmonized Tariff Schedule of the United States*, 2003.

**TABLE 1. CANADA, GYPSUM PRODUCTION AND TRADE, 2000-02**

Item No.	2000		2001		2002 (p)		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>PRODUCTION (shipments)</b>							
Crude gypsum							
Newfoundland and Labrador	x	x	x	x	—	—	
Nova Scotia	6 953 440	81 337	6 397 057	75 468	7 361 326	86 936	
Ontario	x	x	x	x	x	x	
Manitoba	x	x	x	x	x	x	
British Columbia	x	x	x	x	x	x	
Total (1)	8 572 464	105 655	7 821 013	95 965	8 905 978	113 285	
<b>IMPORTS</b>							
2520.10	Gypsum, anhydrite						
	United States	78 882	10 240	155 897	12 232	257 394	14 012
	Mexico	75 673	1 763	87 204	1 424	75 015	1 078
	Other countries	49	42	59	19	50	32
	Total	154 604	12 045	243 160	13 675	332 459	15 122
2520.20	Gypsum; anhydrite; plasters						
	United States	36 194	11 197	36 916	11 958	60 039	14 610
	Italy	(r) 131	82	68	49	226	100
	Germany	51	46	76	70	78	77
	Japan	122	106	256	168	77	43
	United Kingdom	34	11	34	16	87	24
	France	9	1	2	...	20	12
	Other countries	171	56	218	143	76	17
	Total	(r) 36 712	11 499	37 570	12 404	60 603	14 883
		(n.a.)	(\$000)	(n.a.)	(\$000)	(n.a.)	(\$000)
6809.11	Plasterboards, etc., not ornamental; faced or reinforced with paper or paperboard						
	United States	n.a.	7 475	n.a.	15 487	n.a.	31 386
	France	—	—	n.a.	1	n.a.	51
	United Kingdom	n.a.	35	n.a.	83	n.a.	38
	Other countries	n.a.	61	n.a.	184	n.a.	69
	Total	n.a.	7 571	n.a.	15 755	n.a.	31 544
6809.19	Plasterboards, etc., not ornamental; faced or reinforced, n.e.s.						
	United States	n.a.	10 822	n.a.	13 275	n.a.	15 273
	Mexico	n.a.	...	n.a.	134	n.a.	378
	France	n.a.	...	n.a.	59	n.a.	107
	China	n.a.	29	n.a.	34	n.a.	45
	Other countries	n.a.	21	n.a.	18	n.a.	55
	Total	n.a.	10 872	n.a.	13 520	n.a.	15 858
6809.90	Articles of plaster or compositions based on plaster						
	United States	n.a.	(r) 3 527	n.a.	2 010	n.a.	2 853
	United Kingdom	n.a.	507	n.a.	245	n.a.	2 035
	Mexico	n.a.	1 531	n.a.	2 639	n.a.	935
	China	n.a.	(r) 1 058	n.a.	1 109	n.a.	540
	Thailand	n.a.	18	n.a.	53	n.a.	364
	France	n.a.	3	n.a.	16	n.a.	94
	Other countries	n.a.	126	n.a.	127	n.a.	149
	Total	n.a.	(r) 6 770	n.a.	6 199	n.a.	6 970
	Total imports of gypsum and gypsum products						
		n.a.	(r) 48 757	n.a.	61 553	n.a.	84 377
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>EXPORTS</b>							
2520.10	Gypsum, anhydrite						
	United States	6 318 451	97 430	5 596 557	83 356	5 244 145	68 184
	Czech Republic	—	—	—	—	832	56
	Latvia	—	—	—	—	457	42
	Hong Kong	—	—	—	—	144	10
	Other countries	235	14	—	—	82	6
	Total	6 318 686	97 444	5 596 557	83 356	5 245 660	68 298

**TABLE 1 (cont'd)**

Item No.	2000		2001		2002 (p)		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>EXPORTS (cont'd)</b>							
2520.20	Gypsum; anhydrite; plasters						
	United States	765	651	2 118	1 897	4 488	2 530
	Ireland	—	—	—	—	125	70
	China	—	—	21	55	12	7
	Cuba	—	—	79	119	4	3
	Other countries	242	157	48	29	118	100
	<b>Total</b>	<b>1 007</b>	<b>808</b>	<b>2 266</b>	<b>2 100</b>	<b>4 747</b>	<b>2 710</b>
		<b>(square metres)</b>		<b>(square metres)</b>		<b>(square metres)</b>	
6810.11	Plasterboards, etc., not ornamental; faced or reinforced with paper or paperboard						
	United States	73 254 228	129 152	72 511 762	82 971	51 542 296	61 384
	Saint Kitts and Nevis	—	—	29 680	74	134 238	374
	France	—	—	590	16	21 795	52
	Cuba	14 017	35	24 040	87	6 767	26
	Saint Pierre and Miquelon	8 767	6	7 949	26	8 848	22
	Dominican Republic	—	—	—	—	19 587	21
	Bermuda	10 300	26	13 180	33	7 600	19
	Trinidad and Tobago	32 658	81	5 308	16	25 000	16
	Saint Vincent and the Grenadines	—	—	—	—	870	3
	Chile	513	4	—	—	—	—
	China	17 200	43	—	—	—	—
	Croatia	5 400	14	—	—	—	—
	Germany	14 900	37	—	—	—	—
	Hong Kong	26 042	50	—	—	—	—
	Hungary	12 122	47	—	—	—	—
	India	4 950	12	—	—	—	—
	Latvia	4 672	8	7 031	32	—	—
	Portugal	19 000	48	—	—	—	—
	Saudi Arabia	26 155	65	—	—	—	—
	Argentina	—	—	3 329	8	—	—
	Japan	—	—	440	3	—	—
	Taiwan	—	—	6 907	21	—	—
	<b>Total</b>	<b>73 450 924</b>	<b>129 628</b>	<b>72 610 216</b>	<b>83 287</b>	<b>51 767 001</b>	<b>61 917</b>
		<b>(n.a.)</b>	<b>(\$000)</b>	<b>(n.a.)</b>	<b>(\$000)</b>	<b>(n.a.)</b>	<b>(\$000)</b>
6809.19	Plasterboards, etc., not ornamental; faced or reinforced, n.e.s.						
	United States	n.a.	28 110	n.a.	29 694	n.a.	27 689
	Switzerland	—	—	—	—	n.a.	157
	United Arab Emirates	—	—	—	—	n.a.	135
	Fiji	—	—	—	—	n.a.	83
	Other countries	n.a.	488	n.a.	832	n.a.	96
	<b>Total</b>	<b>n.a.</b>	<b>28 598</b>	<b>n.a.</b>	<b>30 526</b>	<b>n.a.</b>	<b>28 160</b>
6809.90	Articles of plaster or compositions based on plaster						
	United States	n.a.	29 759	n.a.	35 570	n.a.	37 955
	Finland	n.a.	123	n.a.	56	n.a.	451
	Hong Kong	—	—	—	—	n.a.	243
	Singapore	—	—	—	—	n.a.	136
	United Arab Emirates	n.a.	22	—	—	n.a.	117
	Bermuda	n.a.	21	n.a.	50	n.a.	92
	Other countries	n.a.	177	n.a.	197	n.a.	268
	<b>Total</b>	<b>n.a.</b>	<b>30 102</b>	<b>n.a.</b>	<b>35 873</b>	<b>n.a.</b>	<b>39 262</b>
	<b>Total exports of gypsum and gypsum products</b>	<b>n.a.</b>	<b>286 580</b>	<b>n.a.</b>	<b>235 142</b>	<b>n.a.</b>	<b>200 347</b>

Sources: Natural Resources Canada; Statistics Canada.

— Nil; . . . Amount too small to be expressed; n.a. Not applicable; n.e.s. Not elsewhere specified; (p) Preliminary (r) Revised; x Confidential.

(1) Totals do not include gypsum produced or shipped for use by Canadian Portland cement producers.

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

**TABLE 2. CANADA, GYPSUM MINING AND GYPSUM PRODUCTS MANUFACTURING OPERATIONS, 2002**

Company	Location	Operation
<b>NEWFOUNDLAND AND LABRADOR</b>		
Galen Gypsum Mines Limited	Coal Brook	Open-pit mining
Lafarge Gypsum Canada Inc.	Corner Brook	Wallboard manufacture
<b>NOVA SCOTIA</b>		
CGC Inc.	Port Hawkesbury	Fibre-gypsum board manufacture
Fundy Gypsum Company	Wentworth and Miller Creek	Open-pit mining of gypsum and anhydrite
Georgia-Pacific Corporation	Sugar Camp	Open-pit mining
Little Narrows Gypsum Company	Little Narrows	Open-pit mining of gypsum and anhydrite
National Gypsum (Canada) Ltd.	Milford	Open-pit mining
<b>NEW BRUNSWICK</b>		
Westroc Inc.	McAdam	Wallboard manufacture
<b>QUEBEC</b>		
CGC Inc.	Montréal	Wallboard manufacture
	Saint-Jérôme	Wallboard plant mothballed
Georgia-Pacific Corporation	Montréal	Distribution terminal only
Westroc Inc.	Montréal	Wallboard manufacture
<b>ONTARIO</b>		
CGC Inc.	Hagersville	Underground mining and wallboard manufacture
Georgia-Pacific Corporation	Caledonia	Underground mining and wallboard manufacture
Westroc Inc.	Clarkson	Wallboard manufacture
<b>MANITOBA</b>		
Westroc Inc.	Amaranth	Open-pit mining
	Winnipeg	Wallboard manufacture
<b>ALBERTA</b>		
Georgia-Pacific Corporation	Edmonton	Wallboard manufacture
Westroc Inc.	Calgary	Wallboard manufacture
<b>BRITISH COLUMBIA</b>		
Georgia-Pacific Corporation	Canal Flats	Open-pit mining
	Vancouver	Gypsum products manufacture
Westroc Inc.	Vancouver	Gypsum products manufacture
	Windermere	Open-pit mining

Source: Natural Resources Canada.

**TABLE 3. CANADA, GYPSUM PRODUCTION, TRADE AND USE, 1985-2002**

	Production (1)	Imports (2)	Exports	Apparent Use (3)
	(tonnes)			
1985	7 760 783	121 802	5 879 664	2 002 921
1986	8 802 805	221 644	5 921 982	3 102 467
1987	9 093 926	217 625	5 704 853	3 606 698
1988 (a)	8 813 760	274 917	5 651 286	3 437 391
1989	8 179 588	291 373	5 357 055	3 113 906
1990	7 977 685	318 114	5 757 327	2 538 472
1991	6 727 221	259 863	4 940 193	2 046 891
1992	7 294 700	260 505	5 010 649	2 544 556
1993	7 563 369	280 581	5 315 618	2 528 332
1994	8 587 303	292 156	5 942 572	2 936 887
1995	8 054 741	177 327	5 565 427	2 666 641
1996	8 201 774	247 208	5 526 010	2 922 972
1997	8 627 772	220 914	5 981 974	2 866 712
1998	8 306 534	96 593	5 552 146	2 850 981
1999	9 345 342	121 048	6 224 830	3 241 560
2000	8 572 464	154 604	6 318 686	2 408 382
2001	7 821 013	243 160	5 596 557	2 467 616
2002 (p)	8 905 978	332 459	5 245 660	3 992 777

Sources: Natural Resources Canada; Statistics Canada.

(p) Preliminary.

(a) Beginning in 1988, imports and exports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Imports and exports include H.S. class 2520.10.00 (gypsum, anhydrite).

(1) Producers' shipments of crude gypsum. (2) Includes crude and ground, but not calcined. (3) Production plus imports minus exports.

**TABLE 4. CANADA, PRODUCTION AND USE OF COAL COMBUSTION PRODUCTS (CCPs), 2002<sup>(1,2)</sup>**

	Fly Ash	Bottom Ash	FGD Gypsum	Other (3)	Total CCPs
(000 tonnes)					
<b>PRODUCTION</b>					
Produced	4 744	1 886	354	133	7 116
Disposed/stored	3 851	1 664	–	133	5 648
Removed from disposal	10	3	–	–	13
<b>USE (DOMESTIC)</b>					
Cement	382	161	–	–	543
Concrete/grout	423	–	–	–	423
Mining applications	115	–	–	–	115
Roadbase/subbase	8	23	–	–	31
Wallboard	–	–	504	–	504
Other (4)	90	52	–	–	142
Total use	1 017	236	504	–	1 757
Individual use percentage	21	13	142	–	n.a.
Cumulative use percentage	21	19	25	25	25

Sources: Compiled by Natural Resources Canada in cooperation with the Canadian Electricity Association and the Association of Canadian Industries Recycling Coal Ash (CIRCA).  
– Nil; n.a. Not applicable; FGD Flue-gas desulphurization.

(1) Reported production of coal combustion products (CCPs) may include both dry and ponded categories. (2) Use (domestic), as reported, includes amounts imported (assumed H.S. codes 2621.00 relating to fly ash and H.S. 2520.10 relating to gypsum). (3) Cfb (circulating fluidized bed) fly ash and bottom ash. (4) Includes waste stabilization and specialty uses such as mineral filler and flowable fill.

**TABLE 5. WORLD PRODUCTION OF GYPSUM, 2001 AND 2002**

	2001	2002 (e)
(000 tonnes)		
Canada	7 821	8 906
Australia	3 800	3 800
China	6 800	6 800
France	4 500	4 500
India	2 250	2 300
Iran	11 000	11 000
Japan	5 900	5 800
Mexico	7 500	6 300
Spain	7 500	7 500
Thailand	5 900	6 100
United Kingdom	1 500	1 500
United States	16 300	16 100
Other countries	22 500	22 700
Total world	103 271	103 306

Sources: Natural Resources Canada; United States Geological Survey, January 2003.

(e) Estimated.