

Gypsum and Anhydrite

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GYPNUM

Canadian shipments of crude gypsum totalled 8.5 Mt valued at \$91.7 million in 1997, compared to 8.2 Mt valued at \$85.4 million in 1996. This increase of about 4% resulted from continued strength in exports to the United States and higher domestic demand, mainly in British Columbia.

The Canadian Industry

Most gypsum producers in Canada are closely integrated in both mining and wallboard manufacturing. Essentially all gypsum mining and related production plants are listed in Table 2.

In **Atlantic Canada**, Nova Scotia accounts for more than 75% of Canada's output and nearly all of its exports of natural gypsum (Table 1). Most gypsum deposits being mined in the Atlantic provinces are characterized by high quality, amenability to inexpensive mining methods, and close access to coastal bulk-shipping facilities.

Louisiana-Pacific Corporation announced in December that it had reached an agreement in principle to sell its gypsum fibre panel plant in Port Hawkesbury, Nova Scotia, to USG Corporation. The new operating company is CGC Inc. of Mississauga, Ontario, which operates one mine in Ontario, as well as gypsum wallboard plants in Ontario and Quebec. Natural gypsum is purchased locally, perlite is imported, and large quantities of recycled paper are backhauled, mainly from the United States. (This project was the first in Atlantic Canada to manufacture gypsum board products for both regional and export markets.)

Atlantic Gypsum Resources, Inc. of Newfoundland continued its production of gypsum from the Fischells Brook property on the southeast side of St. Georges Bay, about 10 km south of the Flat Bay gypsum

property formerly operated by Domtar Inc. Major customers for this gypsum are Atlantic Gypsum Ltd. and North Star Cement Ltd. for wallboard and for use as a set regulator in cement, respectively.

Exploratory work was carried out in 1997 by Tusk Mining Limited at a new gypsum deposit situated at Murchyville in central Nova Scotia. Possible reserves of more than 300 Mt have been delineated at the site, which is located about 60 km from Sheet Harbour.

In **Quebec**, there is no production of natural or commercial-quality synthetic gypsum. CGC continued to use synthetic gypsum at its Montréal wallboard plant, which is now capable of using desulphogypsum from its \$11 million facility at Belledune, New Brunswick. (This facility was built in cooperation with New Brunswick Power Corporation.)

In **Ontario**, two underground mines remain in operation. All of Ontario's production of natural gypsum is now used on site since Westroc Industries Limited closed its mine at Drumbo in 1995. Westroc now uses 100% synthetic gypsum, provided under a long-term contract with Ontario Hydro, to maintain output of wallboard at its Mississauga, Ontario, plant. This contract is for approximately 200 000 t/y of desulphogypsum from Ontario Hydro's Lambton facility, which is the site of the first flue-gas desulphurization (FGD) system at a thermal-electric generating station in Ontario.

In **western Canada**, production of natural gypsum from Amaranth in Manitoba and from Windermere (Elkhorn II deposit) and Canal Flats in British Columbia serve the Prairie region and a portion of the B.C. market not served by imports. The Georgia-Pacific Corporation (GPC) plant in Surrey, British Columbia, meets most of its requirements for natural gypsum under a long-term contract with a 49%-owned Mexican affiliate.

Several companies continue to use recycled gypsum wallboard in their production processes. The newly acquired GPC wallboard plant located in Surrey, British Columbia, was the first in North America to use large quantities. This was possible through arrangements with a reclaimer, New West Gypsum, now based in Oakville, Ontario. Up to one fifth of the raw material needs of some plants in Canada include

recycled material – a combination of about 75% scrap from new construction sites (post-construction material) and 25% waste from wallboard plants. Westroc currently recycles about 20 000 t and 30 000 t of board annually at its Vancouver and Mississauga plants, respectively.

World Developments and Trade

World reserves of gypsum are widespread and are conservatively estimated to be about 2.4 billion t. World production of gypsum in 1997 was an estimated 100.2 Mt, based on a revised estimate by the U.S. Geological Survey (Office of Minerals Information). The United States ranked number one with 17.0 Mt, followed by China (9.0 Mt) and Canada (8.5 Mt). Shipments of wallboard by U.S. producers were 2.4 billion m², based on estimates made in late 1997.

International gypsum trade has become more important in North American markets in recent years because of low production costs and competitive shipping rates. In particular, U.S. imports of gypsum from Spain remain relatively high, amounting to several hundred thousand tonnes per year, mainly because of relatively low east-to-west backhaul freight rates. Canada's imports of gypsum from Mexico, as described earlier, as well as those from the United States, are used by both wallboard and cement manufacturers. Imports from Spain, however, are used only by specific cement manufacturers.

The Canadian International Trade Tribunal (CITT) concluded in early 1998 that normal values and export prices now prevail for gypsum board originating in or exported from the United States. As a result of this ruling, anti-dumping duty liabilities have been discontinued.

Major developments in the United States that have influenced North American consumption of natural gypsum and synthetic gypsum include: a \$120 million wallboard plant modernization by USG Corporation in East Chicago; the opening of a new \$110 million gypsum wood fibre (GWF) panels plant by USG in Gypsum, Ohio; construction of a new \$85 million wallboard plant by Georgia Pacific Corp. in Indiana; a \$75 million expansion by James Hardie Industries Limited at its wallboard plant in Nashville, Arkansas (this expansion, planned for 1998, follows two earlier wallboard plant expansions in Seattle, Washington, and Las Vegas, Nevada); and construction of a second wallboard line in Baltimore, Maryland, by National Gypsum Company.

Processing and Markets

In general, the wallboard industry serves the residential, institutional and commercial building sectors. Housing starts have become a less reliable indicator of the demand for gypsum wallboard because its improved fire-retarding qualities and

increased renovation activity have encouraged its broader use. In Canada, expenditures on major renovations in 1995, the most recent year for which data are available, reached \$17.5 billion, accounting for 23% of total capital expenditures on construction, according to Statistics Canada (catalogue no. 61-223).

The Portland cement industry accounts for about 15% of North American gypsum use. Crushed, noncalcined gypsum, acting as a set regulator, in a proportion up to 5% by total weight, is ground with primary stage clinker to produce the final cement product. Based on this proportion of gypsum, the total amount required by cement producers in Canada is estimated to be about 550 000 t/y.

For agricultural purposes, specifications mainly relate to the degree of fineness. Gypsum combines with potassium-aluminum silicates in the soil, resulting in the release of potassium for use as a nutrient. Gypsum also serves to reduce sub-soil acidity, which is particularly beneficial in aluminum-rich lateritic soils. In addition, it provides a source of calcium and sulphur trioxide, and helps break up hard soils, allowing better aeration and water penetration and retention.

For filler uses, gypsum is dried and finely ground to a range of particle sizes for use in joint compounds (mainly with gypsum wallboard), plastics, paint and paper. Relatively pure uncalcined gypsum, depending on glass batch chemistry, may also substitute for salt cake (sodium sulphate) in glass manufacturing. Special high-purity gypsum may be used in foods and pharmaceutical products.

ORTECH International sponsored the Fifth International Conference on Flue-Gas Desulphurization and Synthetic Gypsum in Toronto in May 1997. This series of conferences has contributed greatly to improving communication and the dissemination of new information among power utilities and other synthetic gypsum producers, consumers and equipment suppliers.

In the United States, an estimated 2.4 Mt/y of synthetic FGD gypsum is consumed as a complete or partial substitute for natural gypsum in the manufacture of wallboard, according to *The Economics of Gypsum* (7th edition, 1997).

The increased use of lime/limestone FGD technology, along with the implications relating to industrial minerals, prompted a cooperative project by Natural Resources Canada (NRCan) and the former U.S. Bureau of Mines (now the Office of Minerals Information, U.S. Geological Survey) to produce a bibliography on the subject. A free copy of *Flue Gas Desulfurization and Industrial Minerals: A Bibliography*, which has more than 4000 references covering the period 1982 through June 1993, can be obtained from NRCan or the U.S. Geological Survey.

Prices

Prices for gypsum in merchant markets are negotiated among buyers and sellers, and published figures have little relevance. In the United States, average prices for crude material, f.o.b. mine, were about US\$7.00/t during the five-year period from 1993 to 1997, according to preliminary information from the U.S. Geological Survey.

Outlook

Canadian shipments of gypsum in 1998 are expected to increase by about 2% based on an increase in construction activity. Housing starts in Canada were 111 000 in 1995, 125 000 in 1996, and about 149 000 in 1997. According to the Canada Mortgage and Housing Corporation, about 162 000 housing starts are forecast in 1998. With real economic growth in both Canada and the United States expected to continue, the outlook continues to be positive for the office and industrial building sectors.

Housing starts in the United States are expected to increase by about 2-3% in 1998 compared to 1997 based on relatively low inflation and interest rates. Total construction is expected to remain firm based on relatively high consumer confidence and strength in repair and renovation work, as well as office construction.

Although new construction materials are being introduced, demand for gypsum wallboard is expected to remain popular because of its low price, ease of installation, and well-recognized fire-retarding properties. Diverse uses relating 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 much, although the future availability of synthetic gypsum resulting from more strenuous emission controls will influence developments in some areas. The recycling of scrap and waste gypsum from construction sites and wallboard manufacturing lines will continue to become more important in both Canada and the United States.

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 1996 were 188 000 t for all uses, based on final figures; similarly, shipments in 1997 were an estimated 195 000 t, according to the

Nova Scotia Department of Natural Resources. These shipments were mainly to the United States for use as a peanut crop fertilizer and for manufacturing Portland cement. Smaller quantities were shipped to Quebec and Ontario for the production of cement.

Test work on the use of anhydrite in floor screed and suspended floor systems, which had been carried out as part of a Canada-Nova Scotia cooperative mineral development agreement, showed promise as new uses for Canadian gypsum. Similarly, testing on the use of anhydrite (in combination with water and special chemicals) as a mine "pack" construction material to improve underground support in coal mines has been encouraging.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of January 30, 1998.

TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2520.10	Gypsum; anhydrite	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 prosthesis	Free	Free	Free	Free
6809.90.90	Other	6.5%	3%	Free	Free

Sources: Customs Tariff, effective January 1998, Revenue Canada; Harmonized Tariff Schedule of the United States, 1998.

TABLE 1. CANADA, GYPSUM PRODUCTION AND TRADE, 1995-97

Item No.	1995		1996		1997P	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
PRODUCTION (shipments)						
Crude gypsum						
Nova Scotia	6 656 754	66 645	6 578 674	67 668	6 837 343	73 735
Ontario	899 422	14 517	x	x	x	x
British Columbia	x	x	x	x	x	x
Manitoba	x	x	x	x	x	x
Newfoundland	-	-	x	x	x	x
Total ¹	8 054 741	88 417	8 201 774	85 415	8 502 643	91 704
IMPORTS						
2520.10 Gypsum, anhydrite						
United States	65 589	1 931	114 537	4 261	111 263	6 718
Mexico	111 512	1 491	132 163	1 603	96 122	1 768
People's Republic of China	85	6	29	2	20	10
United Kingdom	-	-	279	20	11	9
Other countries	141	10	200	14	121	16
Total	177 327	3 438	247 208	5 900	207 537	8 521
2520.20 Gypsum; anhydrite; plasters						
United States	34 897	8 854	32 932	8 819	31 546	9 007
Korea, Republic of	-	-	4	...	43	39
Japan	46	47	34	36	30	25
Germany	336	114	50	52	21	18
Netherlands	-	-	8	8	53	16
Other countries	96	41	49	20	83	30
Total	35 375	9 056	33 077	8 935	31 776	9 135
	(square metres)		(square metres)		(square metres)	
6809.11 Plasterboards, etc., not ornamental; faced or reinforced with paper or paperboard						
United States	..	136	..	509	..	2 352
United Kingdom	..	75	..	124	..	97
Other countries	..	13	..	15	..	34
Total	..	224	..	648	..	2 483
6809.19 Plasterboards, etc., not ornamental; faced or reinforced, n.e.s.						
United States	..	2 238	..	3 466	..	4 414
Thailand	..	-	..	-	..	283
Other countries	-	19	..	16	..	28
Total	..	2 257	..	3 482	..	4 725
6809.90 Articles of plaster or compositions based on plaster, n.e.s.						
United States	..	3 845	..	3 804	..	4 011
United Kingdom	..	1 274	..	848	..	757
People's Republic of China	..	411	..	553	..	653
Mexico	..	269	..	326	..	426
Thailand	..	75	..	193	..	273
Other countries	..	234	..	168	..	211
Total	..	6 108	..	5 892	..	6 331
Total imports of gypsum and gypsum products	..	21 083	..	24 857	..	31 195
EXPORTS						
2520.10 Gypsum, anhydrite						
United States	5 519 570	59 663	5 486 553	61 739	5 934 326	75 489
Denmark	41 398	418	39 347	409	20 892	528
Venezuela	-	-	-	-	26 415	255
Israel	-	-	-	-	22	30
Czech Republic	-	-	51	20	44	26
Indonesia	-	-	26	25	25	26
Other countries	4 459	164	33	38	250	42
Total	5 565 427	60 245	5 526 010	62 231	5 981 974	76 396

TABLE 1 (cont'd)

Item No.	1995		1996		1997P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
EXPORTS (cont'd)							
2520.20	Gypsum; anhydrite; plasters						
	United States	2 325	965	2 567	1 209	1 247	840
	Korea, Republic of	10	22	—	—	25	23
	Thailand	100	85	24	19	18	22
	Japan	34	50	35	56	24	12
	France	—	—	16	10	36	10
	Other countries	401	303	266	175	—	—
	Total	2 870	1 425	2 908	1 469	1 350	907
		(square metres)		(square metres)		(square metres)	
6809.11	Plasterboards, etc., not ornamental; faced or reinforced with paper or paperboard						
	United States	65 694 439	103 729	78 135 664	139 989	93 644 082	176 825
	Singapore	—	—	—	—	21 203	269
	Chile	—	—	—	—	98 000	198
	Cuba	2 220	9	59 234	147	30 623	123
	Australia	—	—	41 920	30	9 599	93
	Portugal	10 060	30	73 425	74	37 765	76
	Barbados	53 701	26	13 100	36	18 110	43
	Ukraine	—	—	15 954	38	15 293	35
	Czech Republic	98 196	58	42 237	63	5 519	22
	Other countries	455 933	384	129 251	224	65 223	162
	Total	66 314 549	104 236	78 510 785	140 601	93 945 417	177 846
6809.19	Plasterboards, etc., not ornamental; faced or reinforced, n.e.s.						
	United States	..	14 034	..	13 462	..	15 203
	Russia	—	—	—	—	..	91
	United Kingdom	—	—	..	74	..	90
	Bermuda	..	13	—	—	..	54
	United Arab Emirates	—	—	..	15	..	54
	Saint Pierre and Miquelon	—	—	..	3	..	28
	Spain	—	—	—	—	..	21
	Japan	..	1 109	—	—	..	8
	Other countries	..	282	..	436	..	42
	Total	..	15 438	..	13 990	..	15 591
6809.90	Articles of plaster or compositions based on plaster						
	United States	..	5 087	..	10 284	..	16 886
	Japan	..	127	..	1 284	..	505
	Philippines	—	—	..	—	..	133
	Finland	—	—	..	29	..	102
	Italy	—	—	—	—	..	71
	Hong Kong	—	—	..	386	..	24
	United Kingdom	—	—	..	124	..	22
	Other countries	..	362	..	373	..	218
	Total	..	5 576	..	12 480	..	17 961
	Total exports of gypsum and gypsum products	..	186 920	..	230 771	..	288 701

Sources: Natural Resources Canada; Statistics Canada.

— Nil; . . Not available; . . . Amount too small to be expressed; n.e.s. Not elsewhere specified; P Preliminary; 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, 1997

Company	Location	Operation
NEWFOUNDLAND		
Atlantic Gypsum Resources, Inc.	Fischells Brook	Open-pit mining
Atlantic Gypsum, Limited, a division of Atlantic Group Limited	Corner Brook	Wallboard manufacture
NOVA SCOTIA		
CGC Inc.	Port Hawkesbury	Fibre-gypsum board manufacture
Georgia-Pacific Corporation	McKay Settlement	Open-pit mining
Fundy Gypsum Company	Wentworth and Miller Creek	Open-pit mining of gypsum and anhydrite
Georgia-Pacific Corporation	Sugar Camp	Open-pit mining of gypsum
Little Narrows Gypsum Company	Little Narrows	Open pit mining of gypsum and anhydrite
National Gypsum (Canada) Ltd.	Milford	Open-pit mining of gypsum
NEW BRUNSWICK		
Westroc Industries Limited	McAdam	Wallboard manufacture
QUEBEC		
CGC Inc.	Montréal	Wallboard manufacture
	St-Jerome	Wallboard plant mothballed
Georgia-Pacific Corporation	Montréal	Distribution terminal only
Westroc Industries Limited	Montréal	Wallboard manufacture
ONTARIO		
CGC Inc.	Hagersville	Underground mining and wallboard manufacture
Georgia-Pacific Corporation	Caledonia	Underground mining and wallboard manufacture
Westroc Industries Limited	Clarkson	Wallboard manufacture
MANITOBA		
Georgia-Pacific Corporation	Amaranth	Open-pit mining
	Winnipeg	Wallboard manufacture
Westroc Industries Limited	Amaranth	Open-pit mining
	Winnipeg	Wallboard manufacture
ALBERTA		
Georgia-Pacific Corporation	Edmonton	Wallboard manufacture
Westroc Industries Limited	Calgary	Wallboard manufacture
BRITISH COLUMBIA		
Georgia-Pacific Corporation	Canal Flats	Open-pit mining
	Vancouver	Gypsum products manufacture
Westroc Industries Limited	Vancouver	Gypsum products manufacture
	Windermere	Open-pit mining

Source: Natural Resources Canada.

TABLE 3. CANADA, GYPSUM PRODUCTION, TRADE AND CONSUMPTION, 1975, 1980 AND 1985-97

	Production ¹	Imports ²	Exports	Apparent Consumption ³
	(tonnes)			
1975	5 719 451	553 338	3 691 676	2 581 113
1980	7 336 000	154 717	4 960 240	2 530 477
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 ^P	8 502 643	207 537	5 981 974	2 728 206

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 HS class 2520.10.00 (gypsum, anhydrite).¹ Producers' shipments, crude gypsum. ² Includes crude and ground, but not calcined. ³ Production plus imports minus exports.**TABLE 4. CANADA, HOUSE CONSTRUCTION, BY PROVINCE, 1996 AND 1997**

	Starts			Completions			Under Construction		
	1996	1997	% Diff.	1996	1997	% Diff.	1996	1997	% Diff.
Newfoundland	2 034	1 696		1 958	1 988		2 003	1 683	
Prince Edward Island	554	470		525	548		194	124	
Nova Scotia	4 059	3 813		4 062	3 756		1 944	1 926	
New Brunswick	2 722	2 702		2 591	3 084		1 131	729	
Subtotal, Atlantic provinces	9 369	8 681	-7	9 136	9 376	+3	5 272	4 362	-17
Quebec	23 220	25 896	+12	22 194	26 308	+19	6 784	6 289	-7
Ontario	43 062	54 072	+26	40 729	51 297	+26	24 447	27 239	+11
Manitoba	2 318	2 612	+13	1 588	2 943	+85	1 538	1 176	-24
Saskatchewan	2 438	2 757	+13	1 910	2 409	+26	1 314	1 662	+26
Alberta	16 665	23 671	+42	16 357	20 259	+24	7 437	10 744	+44
Subtotal, Prairie provinces	21 421	29 040	+36	19 855	25 611	+30	10 289	13 582	+32
British Columbia	27 641	29 351	+6	25 920	30 794	+19	23 878	22 412	-6
Total Canada	124 713	147 040	+18	117 834	143 386	+22	70 670	73 984	+5

Source: Canada Mortgage and Housing Corporation.

TABLE 5. CANADA, VALUE OF CONSTRUCTION BY TYPE, 1993-95

	1993	1994	1995
	(\$ millions)		
BUILDING CONSTRUCTION			
Residential	32 577	34 922	29 186
Industrial	2 219	3 006	3 243
Commercial	8 479	6 251	6 265
Institutional	4 123	4 931	4 982
Other building	1 840	1 948	2 095
Total building	49 238	51 058	45 770
ENGINEERING CONSTRUCTION			
Marine	243	492	445
Transportation	5 340	6 032	6 436
Waterworks	793	904	1 140
Sewage, dams, sanitary systems	1 303	1 501	1 585
Electric power	5 347	3 965	3 441
Railway, telephones	1 587	1 446	1 298
Gas and oil facilities	9 503	13 721	13 474
Other engineering	2 188	2 325	2 803
Total engineering	26 304	30 386	30 621
Total construction	75 542	81 444	76 391

Sources: Natural Resources Canada; Statistics Canada, catalogue no. 61-223.
Notes: Numbers may not add to totals due to rounding. Expenditures include value of new construction as well as major renovation work purchased.

TABLE 6. WORLD PRODUCTION OF GYPSUM, 1996 AND 1997

	1996	1997 ^e
	(000 tonnes)	
United States	17 500	17 000
People's Republic of China	8 000	9 000
Thailand	8 900	8 600
Canada	8 200	8 500
Iran	8 300	8 300
Spain	8 000	8 000
Japan	5 350	5 300
Mexico	5 260	5 300
France	5 000	5 000
United Kingdom	2 000	2 000
Australia	2 000	2 000
Other countries	21 100	21 200
Total world	99 610	100 200

Sources: Natural Resources Canada; U.S. Geological Survey Commodity Summaries, January 1998.

^e Estimated.