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ANNUAL INDUSTRY REPORT - MANUFACTURES OF THE NON-METALLIC MINERALS GROUP

THE ARTIFICIAL ABRASIVES INDUSTRY, 1938

The factory selling value of all products made during 1938 by the manufacturers in Canada of artificial abrasives and abrasive products amounted to $9,579,705. This value represented a decline of 32 per cent from the total of $14,174,351 in 1937 and 10 per cent from the 1936 output of $10,631,533.

Sixteen establishments made artificial abrasives and abrasive products in 1938, fourteen being in Ontario and two in Quebec. The average number of employees was 1,141 and payments in salaries and wages totalled $1,602,771. Expenditures for manufacturing materials amounted to $2,657,393, and $830,813 was paid out for fuel and electricity. Capital investment in the industry totalled $6,754,670, of which $3,368,646 was for land and buildings.

Artificial abrasives were made by 4 plants in Ontario and 2 in Quebec. The output of these 6 works was valued at $7,836,135 and included 50,515 tons of crude fused alumina at $5,165,920; 19,094 tons of crude silicon carbide at $2,002,041 and other products and by-products such as ferrosilicon, firesand, refractory brick, refractory cements, calcium boride, crude boron carbide and boron carbide shapes. An average of 834 people were employed and salaries and wages totalled $1,163,391.

Ten other plants were occupied chiefly in making abrasive products such as wheels, paper, pulpstones and sharpening stones; 9 made abrasive wheels and segments, 7 made sharpening stones and files, and 2 made abrasive cloth and paper. The value of all products made in these establishments was $1,743,570. The number of employees was 307 and payments for salaries and wages amounted to $439,380.

Exports of crude artificial abrasives totalled 60,111 tons valued at $3,773,570 in 1938, and the exports of wheels and stones were reported at $79,923.

Imports of crushed or ground artificial grains were appraised at $418,462 and manufactured grinding wheels at $88,851 in 1938.

Table 1 - PRINCIPAL STATISTICS FOR THE ARTIFICIAL ABRASIVES INDUSTRY IN CANADA, 1936 - 1938

		1936	1937	1938
Number of firms		15	16	16
Capital employed	$	6,241,502	7,151,369	6,754,670
Number of employees - On salary		247	245	272
On wages		902	1,044	869
Total		1,149	1,289	1,141
Salaries and wages - Salaries	$	503,954	575,319	549,628
Wages	$	1,024,240	1,420,270	1,053,143
Total	$	1,528,194	1,995,589	1,602,771
Cost of fuel and electricity	$	967,236	1,222,529	830,813
Cost of materials at works	$	3,164,252	4,351,854	2,657,393
Selling value of products at works ..	$	10,631,533	14,174,351	9,579,705

NOTE - Profits or losses cannot be calculated from the above figures as data are not available for general expense items such as interest, rent, depreciation, taxes, insurance, advertising, etc.

Table 2 - CAPITAL EMPLOYED, 1937 and 1938

	1937	1938
	$	$
Present value of lands, buildings, machinery and equipment	3,416,068	3,368,646
Inventory value of materials, finished products, fuel and other supplies on hand, and stocks in process	2,181,608	2,585,000
Operating capital (cash, bills and accounts receivable, etc.)	1,553,693	801,124
TOTAL	7,151,369	6,754,670

Table 3 - WAGE-EARNERS, BY MONTHS, 1937 and 1938 (On the last working day of each month)

Month	1937	1938	Month	1937	1938
January	1,000	1,048	July	1,205	806
February	1,027	1,003	August	1,192	813
March	1,076	942	September	1,168	806
April	1,127	889	October	1,155	815
May	1,178	855	November	1,124	805
June	1,181	864	December	1,121	809
			AVERAGE	1,289	869

Table 4 - REGULAR HOURS WORKED PER WEEK BY WAGE-EARNERS, 1937 (Overtime not included)

Hours worked per week	Per cent of wage-earners	Hours worked per week	Per cent of wage-earners
30 hours or less	5.7	51 - 54 hours	3.3
31 - 43 hours	16.7	55 hours	0.9
44 hours	5.7	56 - 64 hours	2.1
45 - 47 hours	11.4	65 hours or over	0.7
48 hours	49.0		
49 - 50 hours	4.5		

Table 5 - FUEL AND ELECTRICITY USED, 1937 and 1938

Kind	Unit of measure	1937 Quantity	1937 Cost at works	1938 Quantity	1938 Cost at works
			$		$
Bituminous coal - Canadian	short ton	173	1,317	173	1,254
Imported	short ton	6,782	44,219	5,590	35,264
Anthracite coal (for fuel only) ..	short ton	390	3,646	302	2,660
Coke (for fuel only)	short ton	89	794	129	1,299
Gasoline	Imp.gal.	...	...	335	80
Kerosene	Imp.gal.	...	...	75	14
Fuel oil	Imp.gal.	181,328	12,066	167,978	12,621
Gas - Manufactured	M cu. ft.	822	667	575	721
Natural	M cu. ft.	2,082	1,503	1,899	1,432
Other fuel	$	...	158	...	5
Electricity purchased	K. W. H.	419,282,048	1,158,159	288,408,154	775,463
TOTAL	$	...	1,222,529	...	830,813

Table 6 - POWER EQUIPMENT, 1937 and 1938

	1937 Number of units	1937 Total rated horse power	1938 Number of units	1938 Total rated horse power
Gasoline engines - Ordinarily in use ...	1	26	1	27
Electric motors run by purchased power -				
Ordinarily in use	661	6,696	855	7,180
In reserve or idle	89	1,010	80	802
Electric motors run by regenerated power				
Ordinarily in use	75	265	...	...
Boilers - Ordinarily in use	10	691	11	616
In reserve or idle	...	...	1	125

Table 7 - MATERIALS USED IN MANUFACTURING, 1937 and 1938

Material	Unit of measure	1937 Quantity	1937 Cost at works	1938 Quantity	1938 Cost at works
			$		$
Bauxite and pure alumina	short ton	102,843	2,200,551	57,120	1,267,712
Coal (not for fuel) -					
For fused alumina	short ton	1,140	5,928	308	1,603
For silicon carbide	short ton	6,416	38,519	5,855	35,241
Coke (not for fuel) -					
For fused alumina	short ton	5,910	30,416	3,723	20,391
For silicon carbide	short ton	25,734	345,241	17,647	230,963
Electrodes	short ton	1,580	203,155	929	111,746
Feldspar	short ton	53	1,503	41	1,129
Iron borings	short ton	10,025	107,827	5,651	51,155
Salt	short ton	338	2,786	203	1,784
Sawdust	short ton	9,277	26,431	7,132	19,242
Silica sand	short ton	45,240	211,899	32,746	159,284
Artificial abrasive grains ...	short ton	2,364	400,479	2,534	281,475

Table 7 - MATERIALS USED IN MANUFACTURING, 1937 and 1938 (Concluded)

Material	Unit of measure	1937 Quantity	1937 Cost at works	1938 Quantity	1938 Cost at works
			$		$
Natural abrasive grains -					
Garnet	lb.	327,139	28,951	195,536	17,219
Emery	lb.	...	(a)	66,191	3,807
Quartz or flint	lb.	...	(a)	405,282	4,937
Other	lb.	399,235	12,956	22,195	2,805
Bonding and bushing materials -					
Clay bonds	lb.	739,025	22,511	436,380	13,015
Silicate	lb.	...	(a)	6,781	340
Elastic mixture	lb.	51,760	9,846	15,150	3,654
Bakelite and synthetic resins	lb.	107,544	37,926	108,591	37,426
Lead for bushings	lb.	70,648	4,655	35,150	1,814
Cotton cloth	...	...	103,599	...	71,390
Kraft and rope paper	...	...	119,223	...	61,543
Containers and packing material	...	...	46,063	...	29,555
All other materials	...	...	385,389	...	228,163
TOTAL	...	...	4,351,854	...	2,657,393

(a) Not separately stated in 1937.

Table 8 - PRODUCTS MANUFACTURED, 1937 and 1938

Product	1937 Short tons	1937 Selling value at works	1938 Short tons	1938 Selling value at works
		$		$
Crude silicon carbide	25,644	2,808,016	19,094	2,002,041
Crude fused alumina	86,604	8,435,371	50,515	5,165,920
Silicon carbide firesand, etc.	703	11,192	321	5,147
Abrasive wheels and segments	...	1,165,406	...	916,695
Sharpening stones and files	...	95,317	...	91,467
Ferrosilicon	7,396	94,824	6,819	79,369
Other products (x)	...	1,564,225	...	1,319,066
TOTAL	...	14,174,351	...	9,579,705

(x) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by only one or two companies.

Table 9 - PRODUCTION OF CRUDE ARTIFICIAL ABRASIVES IN CANADA, 1923 - 1938

Year	Crude Silicon Carbide Quantity	Crude Silicon Carbide Selling value at works	Crude Fused Alumina Quantity	Crude Fused Alumina Selling value at works	TOTAL Quantity	TOTAL Selling value at works
	Tons	$	tons	$	Tons	$
1923	12,660	1,382,747	32,201	3,620,497	44,861	5,003,244
1924	15,207	1,773,864	29,822	3,170,205	45,029	4,944,069
1925	16,945	1,864,009	30,337	3,281,708	47,282	5,145,717
1926	17,958	1,732,942	34,649	3,423,526	52,607	5,156,468
1927	17,333	1,961,910	35,086	3,230,928	52,419	5,192,838
1928	19,008	2,098,199	39,413	3,786,113	58,421	5,884,312
1929	21,592	2,577,033	53,857	4,974,789	75,449	7,551,822

Table 9 - PRODUCTION OF CRUDE ARTIFICIAL ABRASIVES IN CANADA, 1923 - 1938 (Concluded)

Year	Crude Silicon Carbide		Crude Fused Alumina		T O T A L	
	Quantity	Selling value at works	Quantity	Selling value at works	Quantity	Selling value at works
	Tons	$	Tons	$	Tons	$
1930 ...	22,778	2,111,476	42,894	3,376,908	65,672	5,488,384
1931 ...	10,754	1,060,712	35,781	3,007,307	46,535	4,068,019
1932 ...	3,164	269,405	6,658	427,628	9,822	697,033
1933 ...	7,887	765,192	20,967	1,726,191	28,854	2,491,383
1934 ...	16,398	1,858,746	44,596	3,955,837	60,994	5,814,583
1935 ...	18,475	1,788,657	51,194	4,735,019	69,669	6,523,676
1936 ...	23,805	2,299,602	59,533	5,762,217	83,338	8,061,819
1937 ...	25,644	2,808,016	86,604	8,435,371	112,248	11,243,387
1938 ...	19,094	2,002,041	50,515	5,165,920	69,609	7,167,961

Table 10 - PRODUCTION OF ARTIFICIAL ABRASIVE WHEELS AND SEGMENTS(x) IN CANADA, 1923 - 1938

Year	Selling value at works	Year	Selling value at works
	$		$
1923	566,426	1931	347,345
1924	425,384	1932	293,528
1925	426,341	1933	336,647
1926	619,124	1934	569,764
1927	634,007	1935	785,777
1928	847,489	1936	862,283
1929	819,884	1937	1,165,406
1930	546,276	1938	916,695

(x) Sharpening stones and artificial pulpstones not included.

Table 11 - IMPORTS INTO CANADA AND EXPORTS OF ABRASIVES, 1937 and 1938

	1 9 3 7		1 9 3 8	
	Quantity	Value	Quantity	Value
		$		$
IMPORTS				
Artificial abrasive grains, crushed or ground for use in Canadian manufactures	...	699,020	...	418,462
Diamond dust or bort and black diamond for borers	...	4,630,037	...	3,950,698
Diatomaceous earth or infusorial earth (Kieselguhr), ground or unground.. Cwt.	43,940	63,917	51,299	73,900
Emery in bulk, crushed or ground	...	60,030	...	38,743
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives	...	106,232	...	88,851
Grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives	...	16,353	...	21,257
Manufactures of emery or of artificial abrasives, not otherwise provided for	...	62,864	...	42,345
Grindstones, not mounted, and not less than 36 inches in diameter	1,587	157,699	840	91,205

Table 11 - IMPORTS INTO CANADA AND EXPORTS OF ABRASIVES, 1937 and 1938 (Concluded)

	1937		1938	
	Quantity	Value	Quantity	Value
		$		$
IMPORTS - (Con)				
Grindstones, not otherwise provided for ..... No.	7,133	11,306	4,516	6,161
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground	...	26,238	...	24,688
Sand paper, glass, flint and emery paper and emery cloth	...	80,521	...	60,560
TOTAL	...	5,914,217	...	4,816,870
EXPORTS				
Abrasives, natural, n.o.p. in ore or bulk, crushed or ground, including infusorial earth, rotten stone, tripoli, etc. ..... Cwt.	8,422	13,153	6,397	11,346
Abrasives, artificial, crude, including carborundum ..... Cwt.	2,258,435	6,544,454	1,202,216	3,773,570
Abrasives, artificial, made up into wheels, stones, etc. (To March 31, 1938)	...	141,214	...	47,704
Abrasives, artificial, made up into wheels and stones (From April 1, 1938)	...	...	...	32,219
Sandpaper, glass, flint and emery paper, and emery cloth (From Apr.1, 1938)	...	...	...	79,600
Grindstones, manufactured	...	135	...	5,441
TOTAL	...	6,698,956	...	3,949,880

DIRECTORY OF FIRMS IN THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY, 1938

Names of Firms and Addresses	Products
(a) ARTIFICIAL ABRASIVES	
Abrasive Co. of Canada, Ltd. H.O. - 858 Burlington St. E., Hamilton, Ont. Plants - Hamilton, Ont. Arvida, Que.	Crude fused alumina; ferrosilicon.
Canadian Carborundum Co. Ltd., H.O. - Box 65, Niagara Falls, Ont. Plants - Shawinigan Falls, P.Q. Niagara Falls, Ont.	Crude silicon carbide; crude fused alumina; ferrosilicon; firesand; refractory brick; refractory cements.

DIRECTORY OF FIRMS IN THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY, 1958
(Concluded)

Names of Firms and Addresses	Products
(a) ARTIFICIAL ABRASIVES (Con.)	
Exolon Company, H.O. - Blasdell, N.Y., U.S.A. Plant - Thorold, Ont.	Crude silicon carbide; crude fused alumina; firesand; ferrosilicon; graphite; calcium boride.
Lionite Abrasives, Ltd. H.O. - Niagara Falls, N.Y., U.S.A. Plant - Stanley St., Niagara Falls, Ont.	Crude fused alumina; ferrosilicon; crude abrasive scrap.
Norton Company, H.O. - Worcester, Mass., U.S.A. Plant - Chippawa, Ont.	Crude fused alumina; crude silicon carbide; crude boron carbide; boron carbide shapes; ferrosilicon.
(a) ABRASIVE PRODUCTS	
Brantford Grinding Wheels Ltd., 186 Pearl St., Brantford, Ont.	Abrasive wheels and segments.
Canada Sand Papers Limited, H.O. - Box 260, Preston, Ont. Plant - Plattsville, Ont.	Abrasive cloth; abrasive paper.
Canadian Carborundum Co. Ltd., Niagara Falls, Ont.	Abrasive wheels and segments; sharpening stones, and files.
Canadian Hart Grinding Wheel Co., 491 Dundas St., Galt, Ont.	Abrasive wheels and segments; sharpening stones and files.
Dominion Abrasive Wheel Co. Ltd., 49 Main St., Mimico, Ont.	Abrasive wheels and segments; sharpening stones and files.
Empire Abrasives, 24 Lewis St., Brantford, Ont.	Abrasive wheels and segments; sharpening stones and files.
Lion Grinding Wheels, Ltd., 192 Pearl St. E., Brockville, Ont.	Abrasive wheels and segments.
Norton Company of Canada, Ltd., 3 Beach Road, Hamilton, Ont.	Abrasive wheels and segments, artificial pulpstones; tiles; sharpening stones and files.
Ontario Abrasive Wheels Limited, 41 George St., Prescott, Ont.	Abrasive wheels and segments; sharpening stones and files.
Canadian Durex Abrasives Limited, H.O. - 154 Pearl St., Toronto, Ont.	Abrasive cloth; abrasive paper; adhesive tape; and processed material.
Wright Abrasives, 54 Alanson St., Hamilton, Ont.	Abrasive wheels and segments; sharpening stones and files.

APPENDIX

NATURAL ABRASIVES - Only 5 firms in Canada produced natural abrasives during 1938, there being 3 in Nova Scotia, 1 in New Brunswick and 1 in British Columbia. Production was valued at $30,040.

CORUNDUM - Corundum is found in Canada in an area embracing several townships in Renfrew and Hastings counties in the Province of Ontario. Corundum mining as an industry made its appearance there in 1900 and production reached a maximum in 1906. Shipments of the mineral in Canada during the period 1900 - 1921 totalled 19,524 short tons valued at $2,104,251. No commercial shipments have been reported since 1921. No imports of corundum into Canada were shown in Customs reports for either 1937 or 1938.

Imports into Canada in 1938 of manufactures of emery or of artificial abrasives n.o.p. were valued at $42,345 of which those appraised at $39,353 came from the United States. Imports of emery in bulk, crushed or ground were valued at $38,743 in 1938.

DIATOMITE - Production of diatomite in Canada during 1938 totalled 398 short tons valued at $13,842 compared with 643 short tons at $18,606 in 1937. The greater part of the output in 1938, as in former years, came from deposits located near Tatamagouche, Colchester county, Nova Scotia. The balance of production as recorded for 1938 represented primary sales of material previously mined from deposits located in the Cariboo District of British Columbia. Diatomite was also produced in 1937 and previous years from deposits occurring in the Muskoka area, Ontario.

A report issued in 1938 by the Bureau of Mines, Ottawa, states - "Approximately 80 per cent of the diatomite now being consumed in Canada is in the form of filter-pads, about 15 per cent is used for insulation and the remainder is absorbed as a filler, concrete admixture, silver polish base, and in chemicals. Amongst the recent applications, the use of diatomite in the paint and varnish industry has demonstrated its advantages as a flattening agent and as an extender. Deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to foreign competition and to the, at present, comparatively small Canadian demand, only the properly prepared diatomite of the highest quality can now be successfully marketed on a scale sufficiently large to warrant the operations of a property and the erection of a plant. The present price in Canada varies from $35 to $40 per ton for concrete admixture; $35 to $75 for insulation and filtration; up to $200 in small lots of material suitable for polishes; imported insulation bricks vary from $85 to $140 per 1,000, according to grade and density".

The total Canadian output of diatomite since 1896 when it was first produced in the Dominion, to the end of 1938, totalled 21,727 short tons valued at $496,310.

Imports into Canada of diatomaceous earth or infusorial earth (Kieselguhr) ground or unground in 1938 totalled 2,565 short tons valued at $73,900 compared with 2,197 tons at $63,917 in 1937. Of the 1938 imports, 2,555 tons worth $73,449 came from the United States.

GARNETS - No commercial production of garnets has been reported in Canada for several years. In 1938 prospecting and exploratory work were conducted by Garnet Concentrates Inc., on a garnet deposit located in Beaudin township, Abitibi district, Quebec and in the same province construction work was carried on by Grenat

APPENDIX - (Continued)

Garnets - Concluded
Canada Limitee at a property situated in Joly township, Labelle county; neither of these firms reported commercial shipments during the year under review. The total recorded production of garnets in Canada during the past years totalled 1,612 tons valued at $107,350 and was confined to the years 1923, 1924 and 1927. In 1923 a deposit of garnets in Ashby township, Ontario was operated by the Bancroft mines syndicate; the total production of garnet concentrates and crude garnets amounting to 1,250 tons valued at $100,000 was shipped to the Carborundum Company Limited, Niagara Falls, N.Y., for use as an abrasive material; the production of garnets in 1924 amounting to 360 tons valued at $7,200 also originated in Ontario and was shipped to the same company at Niagara Falls, N.Y. In 1927 development work was conducted on a garnet deposit in Joly township, Labelle county, Quebec and a shipment of 2 tons was made.

Garnet is employed chiefly in the manufacture of abrasive papers and cloths while small amounts are utilized in the grinding of plate glass and other products.

No imports of garnet, described as such, were recorded in Canada during 1937 or 1938; the mineral, however, may enter in the form of abrasive paper or combined with other abrasive imports, n.o.p. It has been reported that approximately 175 tons of graded garnet grains are imported annually into Canada. In 1938 the artificial abrasives industry used 98 short tons of garnets valued at $17,219 compared with 164 tons at $28,951 in 1937.

Engineering and Mining Journal's "Metal and Mineral Markets" - New York - October, 1939, quotations for garnet were - per ton, f.o.b. New Hampshire mines; concentrate, $30; grain, $80 to $140. New York: Adirondack garnet concentrates $85. Spanish grades, $60, c.i.f. port of entry. Nominal.

GRINDSTONES - Quarry sales of grindstones and other natural abrasive stones in Canada during 1938 totalled 306 short tons valued at $16,198 compared with 412 tons at $21,429 in 1937. The shipments in 1938 included 21 tons of sharpening stones valued at $3,408 and 285 tons of grindstones worth $12,790. The stone for the processing of these products was quarried in Nova Scotia and New Brunswick. No production of pulpstones was reported in 1938; in 1937 the Canadian output of these stones totalled 87 short tons valued at $4,875. The entire production of pulpstones in 1937 originated in a quarry situated on the northeast end of Gabriola Island, near Nanaimo, Vancouver Island, British Columbia.

In 1937 Canadian grindstones were valued at approximately $50 per ton and pulpstones at $57 per ton at the quarries. The Bureau of Mines, Ottawa reported in 1938 that there was a demand for good pulpstones, particularly for use in the large magazine grinders, but as deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used recently in Canadian pulpmills was produced in the Dominion. The artificial pulpstones made of silicon carbide segments and also more recently of fused alumina segments are gradually but surely replacing the natural stone.

Imports of grindstones etc., into Canada in 1938 were as follows:-Grinding wheels, manufactured by the bonding together of either natural or artificial

APPENDIX - (Concluded)

Grindstones - Concluded

abrasives, value $88,851 ($84,404 from United States); Grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives, value $21,257 ($20,848 from United States); Grindstones not mounted and not less than 36 inches in diameter number 840 value $91,205 (189 at $6,366 from United Kingdom and 650 at $84,375 from United States) Grindstones n.o.p. number 4,516 value $6,161.

Exports of manufactured grindstones from Canada in 1938 were valued at $5,441.

VOLCANIC DUST - No production has been reported in Canada since 1934. This material is used as an abrasive base in scouring and cleaning compounds. Deposits occur in Saskatchewan, Alberta and British Columbia.

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