CANADA

DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

CENSUS OF INDUSTRY

MINING, METALLURGICAL & CHEMICAL BRANCH

THE ABRASIVES INDUSTRY

IN

CANADA

1934

including: 1. Natural Abrasives
2. Artificial Abrasives and Abrasive Products.

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Dominion Statistician: R. H. Coats, LL.D., F.R.S.C., F.S.S. (Hon.)
Chief - Mining, Metallurgical and Chemical Branch: W. H. Losee, B.Sc.

THE ABRASIVES INDUSTRY IN CANADA, 1934.

A report just issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa contains the following information concerning the abrasives industry.

The Abrasives Industry in Canada is classified into two main divisions: (1) The Natural Abrasives Industry, covering the production of natural abrasives such as grindstones, pulpstones and scythestones, corundum, diatomite, volcanic dust, etc., and (2) The Artificial Abrasives and Abrasive Products Industry, which includes the manufacture of silicon carbide, fused alumina, abrasive wheels, abrasive paper, etc.

1. NATURAL ABRASIVES

CORUNDUM - Corundum crystals are found in an area embracing several townships in Renfrew and Hastings counties in the province of Ontario. The commercial production of the mineral commenced in this area about 1900 and shipments reached a maximum in 1906. Corundum mining practically ceased with the perfedtion and production of artificial abrasives by the electric furnace. In 1921 grain corundum amounting to 403 tons valued at $55,965 was exported to the United States; since that year no shipments of corundum have been reported in Canada.

The world's supply of corundum now comes almost entirely from the Transvaal in the Union of South Africa where the mineral is described as usually occurring in unconsolidated surface deposits resulting from the disintegration of corundum-bearing gneiss. Shipments of corundum in South Africa during 1934 totalled 3,201.90 tons valued at £23,844 as compared with 1,303.837 tons worth £9,531 in 1933.

The greater portion of the corundum mined is used normally in the manufacture of abrasive wheels. The lens and optical grinding trades also utilize some of the mineral in the form of fine flour or grain.

The higher grades of emery, a mixture of magnetite and corundum, comes largely from Asiatic Turkey and Greece; emery powder is consumed chiefly in the surfacing of plate glass and in the manufacture of abrasive cloth, grinding compounds and polishing and grinding wheels.

No imports or exports of corundum were reported in Canada during either 1933 or 1934. The value of emery, crushed or ground, imported into Canada in 1934 totalled $40,709 as compared with $26,371 in 1933. Imports of sand paper, glass, flint and emery paper or emery cloth in 1934 totalled in value $92,046 as against $81,559 in the preceding year and of the 1934 imports, $60,112 came from the United States and $25,621 from the United Kingdom.

"Metal and Mineral Markets" quoted emery, September, 1935 - per ton, f.o.b. New York, domestic crude ore, first grade, $10. Other American ore, delivered to grinders, per gross ton, $16; Turkish and Naxos ore, $30 to $40. F.O.B. Pennsylvania, in 350 pound kegs: Turkish, Khasia and Naxos grain emery, 6½ cents per pound; American, 4 cents.

DIATOMITE - Production of diatomaceous earth in Canada during 1934 totalled 1,372 short tons valued at $54,910 as compared with 1,789 tons worth $36,648 in 1933. The material in 1934 came from the provinces of Nova Scotia, Ontario and British Columbia. In Nova Scotia shipments of diatomite were made during 1934 by International Diatomite Industries Ltd., from the Little River, Digby county, and from East New Annan, Colchester county, about eleven miles south of Tatamagouche harbour. The crude material is excavated from bogs, air-dried to remove moisture, and then fed into a kiln where the balance of the moisture is removed and the carbonaceous matter burned.

In Ontario calcined diatomite was shipped from stock by Diatomite Products Ltd.; the large treatment plant of this company located at Martin Siding, in the Muskoka district, remained inactive throughout the year. At Novar the mill of Dominion Diatomite Ltd. was in operation throughout the latter part of October and shipments of calcined diatomite were made; no crude diatomite was mined during 1934. The plant and deposits of this company were optioned towards the end of the year by Diatomite Refiners Co., Toronto.

At Quesnel in the Cariboo district, British Columbia, a relatively few tons of diatomite were mined by the B.C. Refractories Ltd. This output was shipped to the company's plant in Vancouver and was utilized chiefly for insulation purposes. The Quesnel area contains the largest deposits of diatomite known within the Dominion. During 1934 it was reported that a small testing plant was erected in Vancouver for the treatment of diatomite mud from Burnaby Lake; this deposit is located only a short distance from the city of Vancouver.

The Department of Mines, Ottawa, report that:- "Deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to foreign competition and to the present comparatively small Canadian demand, only the highest quality and properly prepared diatomite can be successfully marketed on a scale sufficiently large to warrant the operations of a property and the erection of a plant."

The National Research Council, Ottawa, recently conducted research to ascertain whether any of the Canadian deposits of diatomaceous earth could be satisfactorily used in place of the imported earths now used to assist the filtration of syrups in sugar refining. It was found that the earths so far tested were not efficient enough in their raw state. The possibility of increasing their efficiency by processing will next be taken up by the Council.

The amount of diatomite used as an abrasive material in polishes, etc., is relatively small; much greater quantities of the material are now used for filtration purposes and insulation. It is also utilized in the manufacture of asphalt battery boxes, insulation for acoustical purposes, absorbents, light-weight fillers, paints, etc.

Tripoli is a form of silica which closely resembles diatomite but is of entirely different origin, being generally regarded as a chalcedonic variety of silica; no production of this mineral is reported in Canada. It is used to a considerable extent as a mechanical cleanser, in admixture with soap and other detergents and for foundry partings; it is also employed interchangeably with pulverized silica for use as a filler or inert extender in paints and transparent wood fillers.

The material is usually sold by sample, the governing factors being the quantity of free quartz grains or "grit", colour and fineness.

Imports of diatomaceous earth or infusorial earth (Kieselguhr) into Canada during 1934 totalled 24,832 cwt. valued at $39,315 as compared with 48,600 cwt. worth $72,133 in 1933. In 1934 the entire imports came from the United States.

"Canadian Chemistry and Metallurgy" quote diatomite, September, 1935, various grades $40-$60 per ton.

Diatomite shipments in Canada during the first six months of 1935 totalled 293 tons valued at $5,682 as compared with an output of 755 tons at $15,110 for the same months of 1933.

WORLD'S PRODUCTION OF DIATOMACEOUS EARTH

(Taken from the Imperial Institute's publication "The Mineral Industry of the British Empire and Foreign Countries")

(Long tons)

Producing Country	1931	1932	1933
BRITISH EMPIRE			
Northern Ireland	3,401	3,731	3,998
Canada	1,437	1,336	1,597
Barbados	10	10	10
Australia	1,067	1,484	2,849
FOREIGN COUNTRIES			
Denmark (moler) (estimated)	34,000	29,000	21,000
France	10,600	9,000	3,000
Germany (exports)	4,908	3,945	4,483
Hungary (exports)	1,392	1,017	1,246
Italy	857	758	1,919
Norway (exports)	84	113	221
Spain (estimated)	2,200	2,200	3,300
Sweden	621	702	640
Algeria	10,984	10,285	10,826
Mexico	3	...	...
United States	(c) 73,891	(c) 73,891	(b) 80,300
Chile	100	(a)	(a)
Japan	6,701	7,032	14,371
Korea	700	1,761	2,994
Netherlands East Indies	80	40	(a)

NOTE - 12,027 long tons of Diatomaceous Earth were recorded as produced in U.S.S.R. (Russia) during year ended September, 1928 - later figures are not available.

(a) Information not available.
(b) Estimated.
(c) Annual average of 3 years' production, 1930-1932.

GARNETS - Garnets have not been commercially produced in Canada for some years. In 1933 some prospecting work was conducted on garnet deposits occurring in the vicinity of Labelle, Quebec, and northwest of North Bay, Ontario; small trial shipments of the mineral were made from both areas during that year. According to the Department of Mines, Ottawa, about 85 per cent of the world's garnet production is used for making abrasive coated papers and cloths and almost all the balance for

glass surfacing. During recent years the artificial abrasive coated papers have made increasing inroads into the garnet paper production.

The bulk of the world's supply of garnet is reported as coming from Gore Mountain, Warren county, New York State, U.S.A. Prices f.o.b. United States mines were quoted $80 - $85 per ton for concentrates, and $45 for glass surfacing fines in 1934.

GRINDING PEBBLES - No shipments of Canadian pebbles suitable for use as grinding material have been reported since 1926; during that year 64 tons were shipped from deposits occurring on the north shore of Lake Superior near Jackfish. In the United States, pebbles and tube mill liners are made from quartzite at Jasper, Minn.;their use, however, is declining owing to the increasing use of metal balls and steel and rubber liners. The Department of Mines, Ottawa, reports that a considerable deposit of pebbles suitable for grinding purposes occurs on the north shore of Gabarus Bay, Cape Breton county, Nova Scotia.

GRINDSTONES, PULPSTONES AND SCYTHESTONES - Shipments of grindstones, pulpstones and scythestones from Canadian quarries in 1934 amounted to 987 tons valued at $46,478 as compared with 498 tons worth $21,919 in 1933, an increase of 97.8 per cent in quantity and 212 per cent in value.

During 1934 the Read Stone Company, Ltd., operated its sandstone quarry at Quarry Island, Pictou county, Nova Scotia, from May to October; crude grindstones produced at Quarry Island were shipped, for finishing, to the company's plant located at Stonehaven, New Brunswick.

The same company maintained steady production of grindstones and scythestones in the province of New Brunswick, stone being obtained in this province largely in the vicinity of Stonehaven. At Quarryville, New Brunswick, the National Trust Company, receiver for the Miramichi Quarry Company, Ltd., shipped pulpstones finished from stone taken from stock; the dressing works was operated throughout the months of July, August and September. Sandstone quarried by E. A. Smith at Shediac, New Brunswick, was exported to the United States for use as sharpening stone.

In British Columbia, J.A. and C. H. McDonald, Ltd., shipped finished pulpstones from their dressing works located in Vancouver; stone used for these was quarried during 1934 in the Rupert district of Gabriola Island, near Nanaimo.

Report No. 760, recently issued by the Department of Mines, Ottawa, states: "The large size Canadian grindstones are mainly used for sharpening pulp mill knives, and in the United States are used in the file, machine-knife, granite tool, and shear manufacturing industries. The small stones are used for scythe and axe grinding ... There is a demand for good pulpstones, particularly for use in large magazine grinders, but since deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used in Canadian pulp mills is being produced in Canada ... 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 grinding wheels, manufactured by the bonding together of either natural or artificial abrasives, totalled $103,630 in value in 1934 as compared with a value of $47,965 in 1933. Imports of grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives, amounted to $10,366 in 1934 as against a value of $5,141 in the preceding year. Grindstones numbering 1,024 with a value of $140,327 were imported in 1934, these were not mounted and

not less than 36 inches in diameter. Imports of grindstones, n.o.p., in 1934 numbered 4,056 worth $4,491. Exports of manufactured grindstones were evaluated at $4,947 in 1934 as compared with a value of $2,840 in 1933.

VOLCANIC DUST (PUMICITE) - Shipments of volcanic dust in Canada totalled 31 tons valued at $620 in 1934 as compared with 118 tons worth $2,360 in 1933. Most of the production during 1934 came from Williams Lake, British Columbia, and was for use as an oil filtering medium. The material was mined for some years from deposits occurring near Waldeck, situated a few miles east of Swift Current, Saskatchewan. The Saskatchewan deposits were not actively operated in 1934 and shipments in the province amounted to only one ton during the year.

Volcanic dust has been successfully used as a cold water calcimine, as a cleanser, as a glass and metal polish, as a hand cleanser, and as a sweeping compound. The University of Saskatchewan has recently experimented with the mineral as a ceramic glaze.

Possible imports of volcanic dust are not recorded as such, however, imports of pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground, were valued at $25,142 in 1934 as compared with $18,113 in 1933.

Tripoli was quoted, United States, October, 1935: car lots, f.o.b. seller's works, air floated, bags, ton, $27.50 up; double ground, car lots, works, bags, ton $18.00 up; once ground, car lots, works, bags, ton $16.00 up.

Table 1 - PRINCIPAL STATISTICS OF THE NATURAL ABRASIVES INDUSTRY IN CANADA, 1933 and 1934.

		1933	1934
Number of firms		9	11
Capital employed	$	58,556	234,776
Number of employees - On salary		1	6
On wages		18	28
Total		19	34
Salaries and wages - Salaries	$	1,500	5,208
Wages	$	6,296	15,372
Total	$	7,796	20,580
Cost of fuel and electricity	$	1,034	2,616
Selling value of products	$	60,927	102,008

Table 2 - WAGE-EARNERS, BY MONTHS, IN THE NATURAL ABRASIVES INDUSTRY, 1934.

Month	1934	Month	1934
January	5	July	49
February	10	August	44
March	12	September	61
April	13	October	29
May	45	November	21
June	41	December	5

Table 3 - PRODUCTION (SALES) OF NATURAL ABRASIVES IN CANADA, 1933 and 1934.

Province	DIATOMITE		GRINDSTONES, PULPSTONES AND SCYTHESTONES		VOLCANIC DUST	
	Tons	$	Tons	$	Tons	$
1933						
Nova Scotia	1,747	34,940	21	868	...	...
New Brunswick	...	...	277	12,051	...	...
Ontario	28	1,298	...	...	...	...
Saskatchewan	...	...	...	...	118	2,360
British Columbia .	14	410	200	9,000	...	...
TOTAL	1,789	36,648	498	21,919	118	2,360
1934						
Nova Scotia	1,320	52,800	50	1,762	...	...
New Brunswick	...	...	535	27,091	...	...
Ontario	46	1,920	...	...	...	...
Saskatchewan	...	...	...	...	1	20
British Columbia .	6	190	402	17,625	30	600
TOTAL	1,372	54,910	987	46,478	31	620

Table 4 - PRODUCTION OF DIATOMITE IN CANADA, 1925 - 1934.

Year	Tons	$	Year	Tons	$
1925 ...	...	...	1930 ...	554	13,247
1926 ...	...	...	1931 ...	1,610	32,789
1927 ...	266	6,650	1932 ...	1,496	29,509
1928 ...	368	8,960	1933 ...	1,789	36,648
1929 ...	429	10,330	1934 ...	1,372	54,912

Table 5 - PRODUCTION OF GRINDSTONES, PULPSTONES AND SCYTHESTONES IN CANADA, 1925-1934.

Year	Tons	$	Year	Tons	$
1925 ...	2,562	124,165	1930 ...	830	62,021
1926 ...	2,695	151,227	1931 ...	621	38,103
1927 ...	2,251	125,017	1932 ...	328	15,735
1928 ...	1,855	100,960	1933 ...	498	21,919
1929 ...	1,947	106,354	1934 ...	987	46,478

Table 6 - PRODUCTION OF VOLCANIC DUST IN CANADA, 1925 - 1934.

Year	Tons	$	Year	Tons	$
1925 ...	160	1,380	1930 ...	242	4,840
1926 ...	90	630	1931 ...	128	2,560
1927 ...	105	735	1932 ...	180	3,600
1928 ...	485	9,795	1933 ...	118	2,360
1929 ...	300	6,000	1934 ...	31	620

Table 7 - CONSUMPTION OF PULPSTONES BY THE CANADIAN PULP AND PAPER INDUSTRY, 1931-1934.

Year	Number for 2 ft. wood	Value	Number for 2.5 ft. wood	Value	Number for 4 ft. wood	Value
		$		$		$
1931	226	72,588	225	71,760	285	337,580
1932	210	65,450	139	46,436	222	249,373
1933	321	98,475	95	31,945	199	223,635
1934	378	103,811	84	29,680	268	292,359

LIST OF FIRMS IN THE CANADIAN NATURAL ABRASIVES INDUSTRY, 1934.

Name of Firm	Head Office Address	Location of Plant
	DIATOMITE	
NOVA SCOTIA -		
International Diatomite Industries, Ltd.	206 Patriot Bldg., Concord, New Hampshire, U.S.A.	Little River East New Annan
ONTARIO -		
Diatomite Products Ltd.	805 Trusts and Guarantee Bldg., Toronto	Martin Siding, Muskoka.
Diatomite Refiners Co.	45 Richmond St.W.,Toronto	Nova, Muskoka.
BRITISH COLUMBIA -		
B.C. Refractories Ltd.	660 Taylor St., Vancouver	Quesnel
Hind, W. H.	Vancouver	Burnaby Lake
	GARNETS	
QUEBEC -		
La Belle Mining Inc.	4203 Brebeuf, Montreal	Joly Tp.Labelle Co.
	GRINDSTONES, PULPSTONES AND SCYTHESTONES	
NOVA SCOTIA -		
The Read Stone Co. Ltd.	Box 549, Sackville, N.B.	Quarry Island
NEW BRUNSWICK -		
National Trust Co. Ltd. (Miramichi Quarry Co. Ltd.)	225 St.James St.,Montreal,P.Q.	Quarryville
The Read Stone Co. Ltd.	Box 549, Sackville	Stonehaven
Smith, E. A.	Box 79, Shediac	Shediac
BRITISH COLUMBIA -		
J.A. and C. H. McDonald, Ltd.	1571 Main St., Vancouver	Gabriola Island and Vancouver
	VOLCANIC DUST	
SASKATCHEWAN -		
Chadwick, A. W.	1178 Osler St., Regina	Waldeck
BRITISH COLUMBIA -		
G. G. Groome	- - -	Williams Lake

- - - - - - -

2. THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY, 1934.

Production of artificial abrasives increased considerably in 1934, the tonnage of crude silicon carbide and fused alumina at 60,994 tons being more than double the output of 28,854 tons in 1933 and the highest reported since 1930. The record production was in 1929 when 75,449 tons were made.

In 1934 reports were received from 14 plants of which 13 were located in Ontario and 1 in Quebec. The total value of production was $7,414,853 and the average number of employees was 861.

Artificial abrasives were made in 6 works located near the power centres of Niagara Falls and Shawinigan Falls; 3 of these establishments made only fused alumina, 1 made only silicon carbide, and 2 made both fused alumina and silicon carbide. The output of these works was valued at $6,278,142, including 60,994 tons of silicon carbide and fused alumina worth $5,814,583 and other products and by-products such as ferrosilicon, firesand, fused magnesia, refractory cements, boron carbide and boron carbide shapes, etc.

Abrasive products such as wheels, paper, cloth, pulpstones, sharpening stones and files, were manufactured in 9 different plants in 1934. Seven concerns made wheels and segments and 2 made abrasive cloth or paper. The production of wheels and segments was valued at $569,764 in 1934.

Imports of abrasives of all kinds advanced to $2,208,791 in 1934 from $903,780 in 1933, and exports increased to $3,951,910 from $2,204,360.

Table 8 - PRINCIPAL STATISTICS OF THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY, 1933 and 1934.

		1933	1934
Number of firms		14	14
Capital employed	$	5,176,927	5,109,861
Number of employees - On salary		145	183
On wages		427	678
Total		572	861
Salaries and wages - Salaries	$	266,755	343,316
Wages	$	438,974	748,676
Total	$	705,729	1,091,992
Cost of fuel and electricity	$	481,152	697,028
Cost of materials at works	$	1,338,879	2,317,552
Selling value of products at works	$	3,550,456	7,414,853

Table 9 - CAPITAL EMPLOYED, 1933 and 1934.

	1933	1934
	$	$
Present value of lands, buildings, machinery and equipment	2,862,091	2,765,418
Inventory value of materials on hand, stocks in process, fuel and other supplies	641,796	982,830
Inventory value of finished products on hand	1,206,887	883,212
Operating capital (cash, bills and accounts receivable, etc.)	466,153	478,401
TOTAL	5,176,927	5,109,861

Table 10 - WAGE-EARNERS, BY MONTHS, 1933 and 1934.

Months	1933 Male	1933 Female	1933 TOTAL	1934 Male	1934 Female	1934 TOTAL
January	269	...	269	575	...	575
February	282	...	282	601	...	601
March	270	...	270	626	...	626
April	281	...	281	651	...	651
May	379	...	379	647	...	647
June	424	...	424	697	...	697
July	509	...	509	702	...	702
August	504	...	504	740	...	740
September	530	...	530	742	...	742
October	545	...	545	721	...	721
November	552	...	552	712	...	712
December	568	...	568	711	...	711
AVERAGE	427	...	427	678	...	678

Table 11 - FUEL AND ELECTRICITY USED, 1933 and 1934.

Kinds	Unit of measure	1933 Quantity	1933 Cost at works	1934 Quantity	1934 Cost at works
			$		$
Bituminous coal - Canadian	short ton	29	245	87	571
Imported	short ton	2,986	16,567	4,010	25,235
Anthracite coal (for fuel only)	short ton	165	1,771	283	2,992
Coke (for fuel only)	short ton	15	66	76	675
Fuel oil	Imp. gal.	1,008	101	106,276	7,721
Gas - Manufactured	M cu.ft.	613	458	1,392	1,008
Natural	M cu.ft.	487	383	177	141
Other fuel	xxx	...	56	...	222
Electricity purchased	K.W.H.	176,776,840	461,505	254,540,628	658,463
TOTAL	xxx	...	481,152	...	697,028

Table 12 - POWER EQUIPMENT, 1933 and 1934.

	1933 Number of units	1933 Total rated horse power	1934 Number of units	1934 Total rated horse power
Primary equipment	...	...	...	...
Electric motors run by purchased power.	613	6,277	678	5,948
TOTAL	613	6,277	678	5,948
Boilers	8	708	8	700

Table 13 - MATERIALS USED IN MANUFACTURING, 1933 and 1934.

Materials	1933 Quantity	1933 Cost at works	1934 Quantity	1934 Cost at works
	Tons of 2,000 lb.	$	Tons of 2,000 lb.	$
Bauxite and pure alumina	24,041	631,122	51,143	1,108,239
Coal (not for fuel) - For fused alumina	2,476	13,251	67	366
For silicon carbide			5,285	27,378
Coke (not for fuel) - For fused alumina	2,087	10,339	1,969	11,520
For silicon carbide	7,060	92,817	16,423	219,990

Table 13 - MATERIALS USED IN MANUFACTURING, 1933 and 1934. (concluded)

Materials	1933 Quantity	1933 Cost at works	1934 Quantity	1934 Cost at works
	Tons of 2,000 lb.	$	Tons of 2,000 lb.	$
Electrodes	536	71,371	790	105,419
Feldspar	6	115	25	688
Iron borings	4,449	32,559	5,941	51,084
Salt	95	874	159	1,347
Sawdust	2,888	9,270	5,392	16,624
Silica sand	13,577	68,186	29,991	150,870
Artificial abrasive grains	688	113,535	1,432	214,121
Natural abrasive grains	137	17,269	209	23,928
Bonding and bushing materials -				
(a) Clay bonds	...		245	19,560
(b) Elastic mixture			7	2,975
(c) Bakelite and synthetic resins	...	47,888	6	6,221
(d) Lead for bushings			20	1,657
Cotton cloth	...	31,259	...	89,125
Kraft paper	...	14,231	...	31,161
Containers, boxes, packages, etc.	...	7,445	...	24,395
All other materials	...	177,348	...	210,884
TOTAL	...	1,338,879	...	2,317,552

Table 14 - PRODUCTS MANUFACTURED, 1933 and 1934.

Products	Unit of measure	1933 Quantity	1933 Selling value at works	1934 Quantity	1934 Selling value at works
			$		$
Crude silicon carbide	ton	7,887	765,192	16,398	1,858,746
Fused alumina	ton	20,967	1,726,191	44,596	3,955,837
Refractories (silicon carbide fire-sand, etc.)	ton	982	27,060	1,383	33,515
Abrasive wheels and segments	xx	...	336,647	...	569,764
Sharpening stones and files	xx	...	43,886	...	62,929
Other products (x)	xx	...	651,480	...	934,062
TOTAL	xx	...	3,550,456	...	7,414,853

(x) Includes ferrosilicon, abrasive cloth, abrasive paper, tiles, artificial pulpstones, graphite, boron carbide, boron carbide shapes, fused magnesia, refractory cements, firebrick, adhesive tape, etc.

Table 15 - PRODUCTION OF ARTIFICIAL ABRASIVES IN CANADA, 1923 - 1934.

Years	SILICON CARBIDE Quantity	SILICON CARBIDE Selling value at works	FUSED ALUMINA Quantity	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
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

Table 16 - PRODUCTION OF ARTIFICIAL ABRASIVE WHEELS AND SEGMENTS(x) IN CANADA, 1923-1934.

Years	Selling value at works	Years	Selling value at works
	$		$
1923	566,426	1929	819,884
1924	425,384	1930	546,276
1925	426,341	1931	347,345
1926	619,124	1932	293,528
1927	634,007	1933	336,647
1928	847,489	1934	569,764

(x) Sharpening stones and artificial pulpstones not included.

DIRECTORY OF FIRMS IN THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY, 1934.

Names	Addresses	Products
	(a) ARTIFICIAL ABRASIVES	
Abrasive Co. of Canada,Ltd.,The	858 Burlington St.E.,Hamilton,Ont.	Fused alumina; ferrosilicon.
Canadian Carborundum Co. Ltd.	H.O.-P.O.Box 65, Niagara Falls,Ont. Plants - Shawinigan Falls, P.Q. Niagara Falls, Ont.	Crude silicon carbide; fused alumina; ferrosilicon; firebrick; refractory cement.
Exolon Company, The	H.O. - Blasdell, N.Y., U.S.A. Plant - Thorold, Ont.	Crude silicon carbide; fused alumina; refractories; ferrosilicon; graphite; aluminous refractories.
Lionite Abrasives Ltd.	H.O.-P.O. Box 3, Niagara Falls,Ont. Plant-Stanley St.,Niagara Falls,Ont.	Fused alumina; ferrosilicon.
Norton Company	H.O.- Worcester, Mass., U.S.A. Plant - Chippawa, Ont.	Fused alumina; crude silicon carbide; boron carbide, boron carbide shapes; fused magnesia.
	(b) ABRASIVE PRODUCTS	
Brantford Grinding Wheel Co.Ltd.	186 Pearl St., Brantford, Ont.	Abrasive wheels.
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; sharpening stones and files.
Canadian Durex Abrasives Limited	154 Pearl St., Toronto, Ont.	Abrasive cloth; abrasive paper; adhesive tape and processed materials.
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; sharpening stones and files.
Lion Grinding Wheels Limited	192 Pearl St., Brockville, Ont.	Abrasive wheels; sharpening files and stones.

DIRECTORY OF FIRMS IN THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY, 1934 (concluded)

Names	Addresses	Products
	(b) ABRASIVE PRODUCTS (concluded)	
Norton Company of Canada, Limited	3 Beach Road, Hamilton, Ont.	Abrasive wheels; saggers; artificial pulpstones; tiles; sharpening stones and files.
Ontario Abrasive Wheels Limited	Prescott, Ont.	Abrasive wheels; sharpening stones and files.

Table 17 - IMPORTS INTO CANADA AND EXPORTS OF ABRASIVES IN 1933 and 1934.

	1933 Quantity	1933 Value $	1934 Quantity	1934 Value $
IMPORTS				
Artificial abrasives in bulk, crushed or ground, when imported for use in the manufacture of abrasive wheels and polishing composition	...	194,618	...	306,377
Diamond dust or bort, and black diamonds for borers	...	354,999	...	1,395,404
Emery in bulk, crushed or ground	...	26,371	...	40,709
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives	...	47,965	...	103,630
Grinding stones or blocks manufactured by the bonding together of either natural or artificial abrasives	...	5,141	...	10,366
Grindstones, not mounted, and not less than 36 inches in diameter No.	...	76,615	1,024	140,327
Grindstones, n.o.p. No.	...	2,516	4,056	4,491
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground	...	18,113	...	25,142
Sand paper, glass, flint and emery paper or emery cloth	...	81,559	...	92,046
Iron, sand or globules, or iron shot, and dry putty, adapted for polishing glass or granite or for sawing stone	...	7,063	...	12,642
Manufactures of emery or of artificial abrasives, n.o.p.	...	24,717	...	38,342
Diatomaceous earth or infusorial earth (kieselguhr), ground or unground Cwt.	44,120	71,166	24,832	39,315
TOTAL	...	903,780	...	2,208,791
EXPORTS				
Grindstones, manufactured	...	2,840	...	4,947
Abrasives -				
Natural, n.o.p., in ore or bulk, crushed or ground (x) Cwt.	36,096	43,906	26,434	33,512
Artificial, crude, including silicon carbide Cwt.	628,958	2,121,681	1,267,651	3,869,613
Artificial, made up into wheels, stones, etc.	...	35,933	...	43,838
TOTAL	...	2,204,360	...	3,951,910

(x) Including infusorial earth, rotten stone, tripoli, etc.