

THE NORTH AMERICAN BARIUM CHEMICAL
MARKET

by W. G. WING + M. CLOUTIER
Productive Consultants Co.

1999 Prospectors Assistance Program

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P964

1990

EMPR

ABOUT 1990-1991

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P964 1990 EMR
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PRODUCTIVE CONSULTANTS COMPANY
3330 WARRENSVILLE CENTER ROAD SUITE 203
CLEVELAND, OHIO 44122-3790, U.S.A.

THE NORTH AMERICAN BARIUM CHEMICAL MARKET

EXECUTIVE OVERVIEW

The marketing climate is very favorable. Based upon market conditions Mountain Minerals Company Limited is advised to proceed with the barium chemicals project. Financial and technical evaluations are being prepared by others.

Barium carbonate and barium sulfate are the major barium chemicals of commerce. Other barium chemicals are used in lesser amounts.

Barium chemicals which sell in smaller volumes can be prepared readily from barium carbonate or from an intermediate product, "black ash" obtained during the manufacture of barium carbonate from barium sulfate.

Barium chemicals are used in ceramics, chemical manufacturing, glass, the metal industry and some miscellaneous applications.

Mountain Minerals Company Limited is knowledgeable about the natural barium sulfate market. Except for certain specific accounts or applications, the natural barytes market is not discussed herein.

The basic barium chemical producer of consequence in North America is Chemical Products Company, Cartersville, Georgia. All other barium chemicals are imported from overseas. A source located in a politically and geographically dependable area must necessarily be interesting to consumers of barium chemicals.

Participation in the barium chemicals market enhances Mountain Minerals Company Limited's profitability in two ways.

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THE NORTH AMERICAN BARIUM CHEMICALS MARKET

BARIUM CHEMICALS MAJOR USES

CERAMICS	flux
	harden glazes
	in frit to harden, enhance corrosion resistance
	improve luster
	permanent magnets in loudspeakers
	anti scum agent
CHEMICALS	catalysts
	purify brine in the Hg or membrane process for
	producing Cl_2 and NaOH
	removal of sulfates from orthophosphoric acid
	flameproofing agents
	rat poison
	plastic stabilizers
	dyestuffs
GLASS	flux
	optical glass

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fine glassware

fiberglass

METALS carbon carrier to case harden steel

MISCELLANEOUS raw material in welding electrode sheathing

MARKETS BY PRODUCT

BARIUM CARBONATE

Barium carbonate is the major barium chemical of commerce. There are two reasons for its dominant position:

1. Barium carbonate is used in many industrial applications;
2. Other barium chemicals can be made from barium carbonate.

The 1989 Barium Carbonate market in North America, excluding Mexico, was 30,900 tonnes. Of this amount Canada consumed 900 tonnes while the United States consumption was 30,000 tonnes. In this report all data has been rounded to the nearest whole tonne. Unless otherwise specified all volume data is in metric tons (tonnes)

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Historically the ceramic industry used 33% of the barium carbonate produced, mainly as an anti scum agent in brick and sewer tile, secondary use is as a flux. Smaller amounts are used in other ceramic applications.

Glass industry uses have been 28% of barium carbonate volume most of it in television and instrument picture tubes.

Fiberglass consumption is included as a part of total glass industry volumes shown in this report, therefore glass industry consumption as defined here will be higher than traditionally shown.

Growth is predicted for barium carbonate in three major areas.

Fiberglass

Electronic Ceramics

Chemicals.

The North American Barium Carbonate Market is expected to grow from 30,900 tonnes in 1989 to 38,532 tonnes in 1995. (24.7%)

INDUSTRY	1989	1990	1991	1992	1993	1994	1995
Ceramic	15,180	15,500	15,200	15,100	14,950	14,900	16,200
Glass	8,220	8,500	9,200	10,000	12,000	12,500	12,800
Chemicals	<u>6,600</u>	<u>8,500</u>	<u>8,400</u>	<u>8,600</u>	<u>8,500</u>	<u>8,500</u>	<u>8,500</u>
	30,000	32,500	32,800	33,700	34,450	35,900	37,500

All values in tonnes

CANADIAN BARIUM CARBONATE MARKET, 1989 - 1995

Ceramic	800	816	810	800	820	820	900
Other	<u>100</u>	<u>102</u>	<u>106</u>	<u>120</u>	<u>125</u>	<u>114</u>	<u>132</u>
	900	918	916	930	925	934	1,032

All values in tonnes

(Continued)

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BARIUM SULFATE

Natural barium sulfate also known as barite or barytes is not included in any of the use data shown in this report. Chemically produced Blanc Fixe, precipitated barium sulfate, is of interest.

The Blanc Fixe market is expected to grow. These data were not included in the totals above, thus representing additional tonnage potential if Blanc Fixe is prepared from barium carbonate. Preparation from "black ash" will require capacity for intermediate separation steps. Blanc Fixe growth from 1989 to 1990 will be 1,000 tonnes. Blanc Fixe is readily made from barium carbonate. The world's largest producer uses natural barium carbonate as their source.

Automotive coatings represent the fastest growing volume area for Blanc Fixe. Additional industrial uses are as a white pigment in photographic paper coatings and as a component of certain coprecipitated lakes in the dye industry. The pharmaceutical use in X-Ray imaging is well known.

The only consequential basic barium chemical producer in the United States is Chemical Products Company, Cartersville, GA. China is a source of many barium chemicals. A source located in a politically and geographically dependable area should be of

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interest, at least, as an active secondary source. The relatively stable relationship between Canadian Dollars and United States Dollars should be emphasized as a consideration when talking to prospective customers.

Barium compounds and chemicals are expected be exempt from United States duties as part of the Canada-United States Trade Agreement.

The major obstacle to barium chemical usage is the perceived health hazard as a heavy metal and barium compounds having been identified by IRAC as a carcinogen.

Barium chemicals are used in ceramics, chemical manufacturing, glass, the metal industry and some miscellaneous applications.

MARKETS BY USE

FIBERGLASS

Fiberglass producers will be changing their manufacturing process from the use of barium sulfate to using barium carbonate in order to reduce die corrosion problems. Initially a higher price will be paid for barium carbonate. The fiberglass industry expects to drive the price lower as a result of volume purchases. Barium carbonate producers can expect lower costs associated with higher throughput so that a reasonable compromise yielding significant

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profit to barium carbonate manufacturers is expected. The producer who achieves a true "partnership relation" with the fiberglass industry will have the most advantageous position

CERAMICS

As the North American high-technical industries regain their world market position, electronic ceramics will become a growth industry. Ferrites and electronic ceramics are included in "Ceramics". By 1995 increased sales of these specialty ceramic products will reverse the ceramic industry downturn expected from 1990 to 1994 which will result from a slowed pace in the construction industry. Inroads made by plastic drainage systems causing loss of sales by presently used ceramic systems will exasperate ceramic sales problems. Barium carbonate is used to prevent "scumming", a leaching of insoluble salts in ceramic products. Barium carbonate occurs as witherite in natural form, the last witherite mine in the United Kingdom was closed in 1969.

Applications, for this purpose will continue to exist in brick, roof tile and other ceramic products, particularly those used in areas visible to the consumer.

Some steatite ceramic bodies use BaCO_3 in varying amounts, the range being six to 17.5 weight per-cent.

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In stoneware, art ceramic bodies one weight per-cent is used in certain red stoneware. In Jasper ceramic stoneware art bodies as much as 63 weight per-cent is used, the primary user being Wedgewood, particularly in the blue and white cameo ware. Other companies trying to copy cameo ware would be prospects for barium carbonate.

CHEMICALS

Chemical uses were expected to essentially remain flat and were so reported in a preliminary report submitted earlier. Demands for higher stabilization from plastics users plus results from studies showing that metal replacement in plastic stabilizer systems will not be as easy as predicted by theoretical studies have caused the industry to revise its thinking. Consequently chemical uses will increase.

Continued

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COATINGS

Shifting from barytes to Blanc Fixe by the automobile coatings industry will continue. Market share division between ultra fine ground, natural, white barytes and Blanc Fixe will occur. Price considerations favor ultra fine ground barytes limiting Blanc Fixe market increases. However, some automotive coating areas require Blanc Fixe, therefore consumption will continue to grow.

As the North American population continues to age, the market for X-Ray grade Blanc Fixe will grow. (Average life expectancy in the United States is now 75 years).

As producers battle for photographic paper market dominance in North America sales of Blanc Fixe will increase. As in all paper industry sales, price and delivery capabilities will be important factors.

Blanc Fixe can be made from barium carbonate or from "black ash". Although no technical details have been released by Mountain Minerals Company Limited, it can be inferred that there is a substitute for black ash in their process.

The Blanc Fixe market is expected to show an increase of 1,000 tonnes between 1990 and 1995. The projected rate of growth is

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shown below.

Projected Blanc Fixe Increase

0	100	250	300	400	600	1,000
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All values in tonnes

Adding these amounts to our previous data, shows the following values.

<u>YEAR</u>	<u>TOTAL TONNES</u>
1989	30,900
1990	33,518

The book price for Barium Carbonate is quoted at US\$ 550.00/short ton, bagged, f.o.b. works.

Continued

RECOMMENDATIONS

The marketing climate for barium chemicals in North America looks promising. Subject to the financial analysis, being done by others, it is suggested that the project go forward.

As in most chemical markets there are a small number of large users and several lower volume buyers. Participation in the barium chemicals market enhances Mountain Minerals Company Limited's profitability in two ways: profit and cash flow from additional sales and importantly, the higher profit from producing value added products. Mountain Minerals Company Limited becomes more valuable as a supplier to its customers by being a producer of necessary, sophisticated chemicals. Concurrently the company enhances its value as a principal to the distributor network.

Mountain Minerals Company Limited, by offering distributors a product line providing extra profit, will become a more valuable principal and be able to improve and enhance its distributor network. Consideration should be given to adding a separate distribution system for the glass and ceramic industries.

Blanc fixe is expected to grow as its use in automotive applications replaces ground natural barytes. The battle for

market dominance in photographic paper will also have a salutary effect upon blanc fixe volume, perhaps at the cost of some price erosion.

As the North American population continues to age, United States average life expectancy is now 75 years, medicinal use will increase.

Between 1989 and 1995 blanc fixe usage is expected to grow by 1,000 tones.

Blanc fixe can be made from barium carbonate, "black ash" or its equivalent. Although the process details involved have not been released, by Mountain Minerals Company Limited, logic advises that an equivalent for the black ash stage is involved.

Surface modification of Blanc Fixe can enhance dispersion, form tighter bonds with polymers and reduce settling tendencies. Perhaps an ultra fine grind of natural barytes could be surface modified to enhance suspension and dispersion in coatings, thus giving Mountain Minerals Company Limited customers a complete range of coating grade barium sulphate.

Continued

1989 BARIUM CARBONATE IMPORTS TO THE UNITED STATES

Country of Export	11 Month Metric Tons (Actual)	Year Metric Tons (Annualized)
Brazil	439.3	479.3
Canada	10.0	11.0
Fed. Rep. Germany	690.4	753.2
Hong Kong	240.0	261.6
Italy	1,323.2	1,442.3
Japan	378.4	412.5
Mainland China	3,617.0	3,944.7
New Caldonia	9.0	9.8
Switzerland	9.8	10.7
Taiwan	3.0	3.3
United Kingdom	<u>nm*</u>	<u>nm*</u>
IMPORTS	6,720.1	7,328.4

*Amount is not meaningful

The country of export shown in reports may or may not be the country of origin. For example, at this time, there is no domestic producer of barium carbonate in Canada, all 900 tonnes used are imported.

It is important to determine that barium compounds and chemicals will be exempt from United States duties as part of the Canada-

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United States Trade Agreement.

OTHER BARIUM CHEMICALS

Discussion of other barium chemicals may be premature. However, some import statistics into the United States are of interest for background information and future planning. A sampling is provided below. All data is in tonnes

Barium Oxides, Hydroxides and Peroxides

Country of Export	1889 11 Months (Actual)	1989 Total (Annualized)
China Mainland	407.5	444.5
Hong Kong	9.0	9.8
Japan	<u>48.1</u>	<u>52.5</u>
Total	464.6	506.9

Barium Oxide Octahydrate is produced in the United States. The monohydrate is not.

Note: European sources of barium oxide were not listed on the United States Department of Commerce data provided which was represented as being complete.

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Barium Chloride

Country of Export	1989 11 Months (Actual)	1989 Total (Annualized)
China Mainland	58.5	63.8
Fed. Rep. Germany	78.0	85.1
France	85.1	92.8
Italy	94.0	102.5
Japan	6.4	7.0
Mexico	nm	nm
United Kingdom	<u>9.0</u>	<u>9.8</u>
Totals	331.0	361.0

Additional barium chemicals represent potential additional revenue and profits as Mountain Minerals Company Limited gains credibility in the barium chemicals market place and experience in manufacturing barium chemicals.

Barium Carbonate becomes a source for other products as well as being the major cash contributor enabling operations to fund additional manufacturing capability.

BARIUM CHLORIDE USES

Used in chlorine - sodium hydroxide production to remove sulfates

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so they do not plug diaphragms.

Used in certain lubricant and fuel additive manufacture.

Other chemical manufacturing

BARIUM OXIDE USES

Has been used in some glazes (substitute for CaO)

Used in crystalline glaze raw or fritted. Frit numbers 3466, 3458, 3287, 3240, 3471, 3447, 3560, 3561, 3300, 3257*, 3860*, 3247*.

*denotes highest weight percent users

0.2 wt% used in soda lime tableware

Other chemical products such as plastic stabilizers.

BARIUM SACCHARATE USES

Used in beet sugar processing to recover sugar from discarded molasses. Calcium is commonly used in the Steffen process. Calcium, strontium or barium can be used to form insoluble saccharide which can be regenerated to recover sugar. Barium is outmoded. This survey found no beet sugar producers using barium.

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The only cloud marring our beautiful sky is the specter of IRAC and or other health organizations thoughts about barium compounds. Toxicity of barium is documented in the literature.

COMPETITIVE FORCES

There is one major domestic producer of barium chemicals in the North America, Chemical Products Corporation, Cartersville, Georgia. Chemical Products Corporation is said to be having environmental problems concerned with waste disposal of ash.

Barium and Chemicals Corporation, Steubenville, Ohio produces small amounts of high purity barium carbonate. Several companies make high purity barium carbonate by refining commercial grades. The volume is small. General Electric Company, Cleveland, Ohio sells barium carbonate from their captive production, they also offer strontium chemicals.

Imported barium chemicals enter Canada and The United States from European and Asian sources. A relatively new entrant has been South America, primarily Brazil.

On five June, 1990 we were able to confirm rumors that Sachleben, the world dominant producer of barium carbonate and blanc fixe, was supplementing their capacity by purchases from Chinese

sources and repacking in their own bags. It was also learned that the same producer is importing lithopone from China and surface modifying it.

A North American source for barium chemicals, offering political and geographic stability while operating with a process that is environmentally acceptable should be able to capture a large market share. Once approvals have been received from a few large consumers of barium carbonate credibility will be established by supplying consistent quality delivered on time at reasonably competitive prices. Credibility brings market share. Mountain Minerals Company Limited's location has commercial advantages, Including but not limited to:

1. Domestic North American source
2. Ease of shipments, bulk, bag or semi-bulk
3. Canadian, United States Trade Pact
4. The relationship vis a vis of Canadian and United States dollars
5. Ability to quote one point to point freight rate
6. Faster delivery
7. Stable civil situations
8. Eliminate handling and rehandling of a shipment
9. Ability to supply fast technical and problem solving help
10. North American style customer service
11. Elimination of charges and problems with port handlers
12. An "800" telephone accessible from all of North America

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Barium sulphate by virtue of being almost completely insoluble is presently exempt from most onerous regulations. Other barium chemicals have not fared as well. Normal toxicity of soluble barium compounds does not appear to present problems other than safe handling and disposal practices be followed. IRAC's stand on the potential carcinogenic dangers of barium may cause future problems.

Strontium, a close relative of barium and frequently occurring with it is being investigated as an alternative. All of the salts of barium are duplicated in strontium as are most of the production techniques. Should barium compounds become unable to be used, strontium compounds may very well take their place. A periodic table is appended.

If the technical and financial studies show favorable results: a sound, well conceived and executed marketing program combined with good manufacturing and customer service practices will yield favorable results for Mountain Minerals Company Limited. Profits, cash flow, importance to customers and distributors will all be enhanced.

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An Appendix is attached

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APPENDIX

INDUSTRIAL CONSUMERS

ANNUAL CONSUMPTION (Short Tons unless specified)

BARIUM CARBONATE

APL Engineered Materials
406 N. Busey Ave.
Urbana, IL 61801

\$1.00 Kg

Jess

Buy 3 "9's" pure BaCO_3 and refine it to 5 "9's". \$ 10.00/Kg is a reasonable price for 3 "9's".

The Beaumont Co.
Fourth and Beachurst
Morgantown, WV 26505
(304) 292-9401

1tl

Roger Watson

Glass maker, used in milk glass

Buckman Laboratories, Inc.
1256 Mc Lean Blvd.
Memphis, TN 38108
(901) 278-0330

2,600T Domestic*
600T Imported

Fred Morgan

UV stabilizer and other barium chemicals. Domestic material is the calcined grade sold to the TV tube industry by Chemical Products Co., purchased in 100T hopper cars. Imported product is finer and purchased in bags.

Fred placed an order with a Brazilian source who had worked for two years to have their material approved. They were to use the black ash process, the order has been on the books for one year and not yet filled. Fred thinks environmental problems may have caused the operation to be discontinued.

*Data given is low, actual consumption 5,000T or more/year

ChiVit Corp.
Div. Eagle Picher Corp.
720 S. Edgewood Ave.
Urbana, OH 43078

300T

Ms. Jan Hammond, Buyer

Manufacturing facilities at Urbana, OH and Leesburg, AL. For frits, buy 98.5% +/-0.50% BaCO_3 . Source is Chinese, price \$ 0.22/lb delivered

Circon, ACMI
300 Stillwater Ave.
Stamford, CT 06902
(203) 357-8300
Jay Yi, Eng.

1tl

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Seldom use any due to toxic nature. In 1989, none was used.

Corning Glass Works 8,000T
Corning, NY
(607) 974-9000
Hooker Horton, Purch. Dept, (607) 974-6730 Direct Line
Primarily buy bulk for TV tubes. Some material purchased in bags. Hooker will be happy to meet and talk specifications, price, etc. when the project moves from perhaps to definite. Bagged product is finer than bulk.

The Fenton Art Glass Co. 52T
The Fenton Art Glass Co. 52T
700 Elizabeth St.
Williamstown, WV 26187
(304) 375-6122
Michael D. Fenton, PA
Presently buying in bags, are thinking of Semi bulk bags. Super Sacks, a brand of semi bulk bags, containing 2,000lbs, or weights to meet batch sizes are being offered. No price information available.

Flex O Lite Inc. 2,000T
P.O. Box 4366
St. Louis, MO 63123
(314) 351-4450
Steve Strickland, Glass Technician
Used in high index of refraction glass beads for projection surfaces.

GFS CHEMICALS \$20T
P.O. Box 23214
Columbus, OH 43223
(614) 881-5501
J. Steel Hutchinson, Toll & Custom Work
D.A. Hutchinson, Pres. & CEO
Use as base for other products, primarily high purity, refined. Also buys small amounts of barium acetate. They make reagent grade $\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$ and a number of reagent grade barium compounds. Most of their materials are sold by the gram.

General Electric Co. 100T
Tungsten Products Plant
21800 Tungsten Rd.
Cleveland, OH
(216) 266-2322 Plant
Nancy Ward, Purch Direct Line (216) 266-2295
Ms. Ward is at Nela Park, E. Cleveland, OH. She is not allowed to divulge purchasing specifications or price information unless negotiating with a potential vendor. If production begins or the project is definitely going forward, she will meet with a company representative and discuss specifications.

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Gillinder Brothers, Inc. 5,000#
Box 1007
Erie and Liberty Streets
Pt. Jarvis, NY 12771
Stanly Yang
Use small amounts in glass batch.

Detector Technology 1,000#
Glass Technology
P.O. Box K 300
12 Common St.
Brookfield, MA 01506
(508) 867-5411
Ray Roy
Bought in bags, made in Italy.

The O. Hommel Co. 150T
Box 475
Pittsburgh, PA 15230
(412) 279-0700
D. Travaglina, Purch.
Buys both domestic and import. Domestic at \$ 0.30/lb FOB
Georgia, imported at \$ 0.22-0.25/lb

Johnson Glass Co. and Peltier Glass Co. 2,00-3,000#
P. O. Box 522
Ottawa, IL
(815) 433-0102
Joe Jankowski
Use is very small buy 500 to 1,000 lbs at a time from Kraft
Chemical Co., Chicago, IL. While these two companies are listed
separately in directories they are one manufacturing facility.

Mid Atlantic Glass Co. 6T
P. O. Box 278
Ellenboro, WV
(304) 869-3351
Ernie Doll
Use 50#/day bought from distributor one pallet at a time.

OI-NEG TV Products 40T
Perrysburg, OH
(419) 247-5000
Robert Montgomery
Use material from Chemical Products, "very fine grind" 325
mesh. None is used at their Columbus, OH facility.

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Pemco Products
Mobay Chemical Corp.
Baltimore, MD 21224
(301) 633-9550
Harry Crush, Tech. Dept.
Dennis Zimazick, (301) 631-4330 Direct
While BaCO₃ is still used, they are phasing it out. Barium has been marked as one material to be removed from their porcelain frit.

No data about amounts

Pilgrim Glass Corp. 1,000#
P. O. Box 395
Ceredo, WV 25507
(304) 453-3553
David Parsons, Tank Room Supervisor
In 1989, used 1,000lbs. Annual use varies, depends on sales of milk glass. As of 02/01/90 none was used.

L. E. Smith Glass Co. 7.5-10T
Liberty St.
P.O. Box 963
Mt. Pleasant, PA 15666
(412) 547-3544
Harry Fontana
Bought from distributors. ChemPly, Van Waters & Rogers, Seegott & Associates

Wheaton Fine Glass Co.
Wheaton Glass Co. 150T
Millville, NJ 08332
(609) 825-1400
Robert La Masca, Glass Laboratory
Buy from Chemical Products, Cartersville, GA. Specifications are: 99.0% BaCO₃, Maximum solubles would like 0.1%, have accepted as high as 0.13%, Fe₂O₃ 100ppm; 10% retained on 30 mesh screen, 10% passing 200 mesh screen

Youghiogheny Opalescent Glass Co., Inc. 1t1
2621 W. Crawford Ave.
P.O. Box 296
Connelsville, PA 15425
Sam Solatino
Buy from distributors, use three to four pounds per day

BARIUM HYDROXIDE, MONOHYDRATE

Anzon 105T
2545 Aramingo Ave.
Philadelphia, PA 19125
(215) 427-3000
Glen Atkinson, Lab. (Ext. 945)
Doris Hall, Purch. (Ext 924 or Direct Line 215/427-6924)

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Used to make barium stearate. Barium content is key, 1989 sources were Miljack and Kali Chemie.

Ferro Corporation, Chemical Div.

125T

Krick Rd.

Bedford, OH

Stabilizers and other barium chemicals. Bought in bags, palletized and stretch wrapped. Price ca \$ 0.50/lb

Lancaster Glass Co.

1t1

240 W. Main St.

Lancaster, OH 43130

M. Bartlow, PA

Used in small amounts in the Lancaster line of glassware, none used in the Fostoria line of glassware. Purchased in 1,000-2,000# lots from distributors, usually as part of a load of mixed chemicals.

BARIUM NITRATE

Schott Glass Technologies, Inc.

Up to 200T

400 York Ave.

Dureya, PA 18642

(717) 457-7485

Ron Reed, Batch House

Buy material from China, after the Tieneman Square slaughter when shipments temporarily dried up, they were panicked. Their distributor had ample stock. Ron, said, "We are actively looking for a source less subject to disruption." They used to buy from FMC who have since discontinued production. Specifications are 99.0% BaNO_3 , $\leq 3\text{ppm Fe}_2\text{O}_3$. Top size about 50 mesh, so it is fairly granular.

BARIUM OXIDE MONOHYDRATE

Lubrizol Corp.

500T

Volume decreases yearly, so there is little incentive to change. Sources are Italian and German.

Witco Corp.

10-15T

Organics Div.

2701 Lake St.

Melrose Park, IL 60160

(312) 450-7474

Don Eckert, Product Manager, Stearates

Use to make barium stearate, Witco's barium stearate sales were 25T in 1989. Barium stearate is used as a lubricant in polystyrene and styrene foam. Another use is anti cake in dry fire extinguisher compounds. Use of barium stearate declines yearly as customers change to magnesium or other stearates which do not have the "toxic" characteristics of barium.

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BARIUM SULFATE

Ball-In Con Glass Packaging Corp. 5,000T
1509 S. Macedonia Ave.
Muncie, IN 47302-3664
317/741-7000

Steve Watson, Ceramic Engineer, Buyer
Use BaSO_4 for its sulfate content in container glass. They need a consistent source, use Canadian and Pennsylvania sources. Buy for ultimate purity, no excess salts allowed. Buy in bulk rail cars. Use Na_2SO_4 as an alternate sulfate source.

Crystal Art Glass 300-400#
525 Steubenville
Cambridge, OH 43725
(614) 439-2077
Bernard Boyd
 BaSO_4 purchased 1tl for "moonstone" glass designed to provide high reflectivity.

Lancaster Glass Co. 1tl
240 W. Main St.
Lancaster, OH 43130
M. Bartlow, PA
Used in "very small" quantities, purchased from local distributors in 1,000 - 2,000# quantities. Usual purchase is as part of a load of mixed chemicals. Used in Lancaster products not in Fostoria.

Wheaton Fine Glass Co., Wheaton Glass Co. 1tl
Millville, NJ
(Refer to BaCO_3 Section)
Use small amounts, not in any critical applications, want granular or coarse product. Bought from distributors.

BARIUM TITANATE

General Electric Co. 2,600#
Tungsten Products Plant
21800 Tungsten Rd.
Cleveland, OH
(216) 266-2322 (Plant)
Ms. Nancy Ward, Purch. (216) 266-2295
Will not divulge specifications, unless you announce that you will produce barium titanate.

UNCERTAIN

Accurate Color, Inc. 1.t.1.
120 West Dr.
P.O. Box 120
Lodi, OH 44254-0120
216/ 948-2035

Harry Howard

Use less than truckload quantities in making heat stabilizers.

AKZO CHEMIE AMERICA

175T

Interstab Chemicals, Inc.

P.O. Box 628

New Brunswick, NJ 08093

201/247-2202

Steve Reynolds, Purch., Ext. 230

Steve is new, he knew they used barium monohydrate in heat stabilizers but was not certain if it was oxide or hydroxide. Buy from Filo Chemical Co., New York, NY as well as Ore and Chemical Co.

Note for sales follow up; Chicago office is sales only, no purchasing or manufacturing.

Chroma Corp.

1t1

3900 Dayton St.

Mc Henry, IL 60050

(815) 385-8100

Mary Ann, Customer Service

She checked and was told they use small amounts, 1t1, but was not told which barium chemical was used.

General Electric Co.

No Information

Chemical Products Plant

1099 Ivanhoe Rd.

Cleveland, OH

(216) 266-4612

Karen Love, Materials Manager

Karen knew they used some barium compounds, but claimed not to be sure of which ones or amounts. When she asked her supervisor she was told that this information would not be given out.

COMPANIES WHO RESPONDED "NO BARIUM CHEMICALS USED"

ATO Chemicals-Viking Chemical Co., Bloomington, MN

American Cyanamid Co., Polymer Products Div., Wayne, NJ

BASF Corp., Parsipiny, NJ

Bee Chemical Div., Morton International, Lansing, IL

E. O. Brady Co., Cincinnati, OH

Brooke Glass Co., Wellsburg, WV

Carr-Lowey Glass Co., Baltimore, MD

Consumer's Glass (Domglass, Inc.), Kipling, Ontario

Coors Glass Manufacturing, Wheat Ridge, CO

Erie Glass Manufacturing Co., Park Ridge, IL

Ferro Corp., Cataphote Div., Jackson, MS

Ferro Corp., Electronic Materials Div., Santa Barbara, CA

Flat River Glass Co., Flat River, MO

Ford Motor Co., Glass Div., Detroit, MI and other locations

Foster-Forbes Glass Div., National Can Co., Marion, IN and other locations

Fremont Antique Glass Co., Seattle, WA

General Glass Industries, Jeanette, PA

Gentile Glass Co., Inc., Star City, WV

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Glenshaw Glass Co., Inc., Glenshaw, PA
Graham Fiberglass Ltd., Erin, Ontario
Guardian Industries Corp., Northville, MI and other locations
Guernsey Glass Co., Cambridge, OH
The C. P. Hall Co., Memphis, TN
Halstab Div., Hammond Lead Co., Hammond, IN
Harvey Glass Co., Georgetown, SC
HGP Industries, Inc., Dallas, TX and other locations
Hillsboro Glass Co., Hillsboro, IL
Indiana Glass, Lancaster Colony Co., Cincinnati, OH
Industrial Glass Co., Inc., Bradenton, FL
Jeanette Shade and Novelty, Jeanette, PA
Johns Scientific, Inc., Toronto, Ontario
Mayflower Glass Works, Latrobe, PA
Merix Chemical Co., Chicago, IL
Miller Brewing Co., Glass Plant, Milwaukee, WI
Millstien Industries, Jeanette, PA (Formerly Victory Glass Co.)
Mooney Chemicals, Inc., Cleveland, OH
MoSci Corp., Rolla, MO
North American Phillips Lighting Corp., Fairmount, WV and
Danville, KY
Owens Brockway/Glass Containers
Owens-Illinois, Kimble Glass, Vineland, NJ; Warsaw, IN
Owens Illinois Corporate Center, Toledo, OH
Pennsboro Glass Co., Pennsboro, WV
Pennsylvania Glass Products Co., Pittsburgh, PA
Permalife Glass Fiber Div., Standard Industries, San Antonio, TX
Potter Industries, Inc., Parsippiny, NJ
Quartz Products Corp., Plainfield, NJ
Shott Fiber Optics, Inc., Southbridge, MA
Sinclair Glass Co., Hartford City, IN
Sloan Glass Co., Culloden, WV
Thermal American Fused Quartz Co., Montville, NJ and
Georgetown, DE
Variety Glass, Inc., Cambridge, OH
The Paul Wissmach Glass Co., Inc., Paden City, WV

COMPANIES NO LONGER OPERATING AND/OR TELEPHONE DISCONNECTED

Brilliant Glass Co., Commerce, CA
Gallo Glass Co., Modesto, CA
Quality Glass Co., Morgantown, WV
St. Clair Glass Works, Elwood, IN

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