

FROM

MICHAEL J. VAUDREUIL

TO

L. L. Haisch
Vancouver Works

PITTSBURGH OFFICE

INDUSTRIAL HYGIENE CONTACTS -
DOMESTIC & FOREIGN

1980 August 14

**PLAINTIFF'S
EXHIBIT**

AL-243

RE: ASBESTOS REPLACEMENT PROGRAM

As part of Alcoa's asbestos replacement program, a listing of applications and substitutes for asbestos was compiled and distributed in August of 1979. Since that time, some headway has been made in the development of substitutes for several uses of asbestos. The progress to date is reviewed in the attached memorandum.

An updated version of the original master listing is in preparation. Distribution of the revised registry is planned for 1980 November 01. However, critical to this effort is additional input from all Alcoa locations. Information on current plant asbestos use, as well as any successes (or failures) with substitute materials is requested. In order to meet the November 01 target date for release of the updated list, replies should be received by 1980 October 01. This ongoing exchange of information is necessary for the continued success of the program.

With the assignment of Haig Sakoian as Senior Industrial Hygienist, Tennessee Operations, I have assumed the responsibility for overall coordination of the asbestos replacement program. Therefore, please direct all future correspondence to my attention.

Michael J. Vaudreuil
MICHAEL J. VAUDREUIL

MJV:mlf

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Attachments

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FROM MICHAEL J. VAUDREUIL

TO MEMORANDUM

PITTSBURGH OFFICE

1980 August 14

RE: ASBESTOS REPLACEMENT UPDATE

The following sections summarize the progress made over the past year in the search for asbestos substitute materials. The discussions are organized by asbestos product, and within each section by specific application. A supplemental list of substitute material suppliers is included.

1. Molten Metal Marinite

There is presently only one necessary use for asbestos in ingot plant operations; that is, header applications. There are adequate replacements in Johns-Manville's Marinite I and Pyrotek's Pyrotherm B-2 board products and R-680 for all other melting and casting needs. Therefore, Molten Metal Marinite need not, and should not be used for dams, basins, troughs, etc. However, at present, the suitability of substitute materials for use as floats is questionable.

Some header-related applications of asbestos have also been eliminated. After header design modifications, R-680 can be used for all FDC headers 635 mm (25 in.) and smaller. With this substitution, Lafayette, Vancouver and Massena should be asbestos free.

Molten Metal Marinite must still be used for HDC and tool and jig headers. R&D programs at ATC will continue to address these areas.

2. Asbestos Rope

Fiberseal A-1 rope (Pyrotek, Inc.) can be used in place of asbestos rope for sealing the gap between the mold and bottom block in FDC casting operations. It prevents metal leakage and its good thermal stability allows it to be reused numerous times. It may also be used for sealing joints in pouring troughs.

Z-5 treated fiberglass rope (Pyrotek, Inc.) can be used successfully as a crucible lid gasket on vacuum-type potroom tapping crucibles. It replaces the presently used Johns-Manville 872 or 702 asbestos gasketing material. However, Z-5 will not replace gaskets made of twisted aluminum foil. Plants using foil gaskets will in all probability have to continue that practice.

3. Transite

Transite, a structural, fire-retardant asbestos/portland cement board, is used extensively in construction. ATC has tested glass-reinforced cement (GRC) sheet as a replacement for transite.



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Although GRC boards are not suitable for high temperatures ($>320^{\circ}\text{C}$) or molten metal contact, they can be used in fire resistant components, pipe work, furnace shells, etc. Physical properties are similar to transite except that GRC board has lower shear strength. However, proper engineering design can compensate for this deficiency.

4. Thermocouple Insulation

Finding a suitable replacement for asbestos-coated thermocouple wire has been particularly troublesome. Many substitutes have been rejected because of low abrasion resistance and/or friability at high temperatures.

A new ceramic fiber product from 3M, Nextel 312, purportedly exhibits excellent abrasion resistance and immunity to thermal shock. The attached brochure provides more complete product information. If physical properties of Nextel 312 are as claimed, it should prove to be a suitable substitute for asbestos coated wire.

Comments and additions to the information presented are encouraged.

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SUPPLEMENTAL SUPPLIER LIST

<u>Product</u>	<u>Available Forms</u>	<u>Supplier</u>	<u>Phone No.</u>
Nextel 312 TM (ceramic fiber)	1. woven fabric and tape 2. braided sleeving 3. bulk fiber	Ceramic Fiber Products/3M 219-1 3M Center St. Paul, MN 55101	612/733-1558
Zetex TM (a.k.a. Pyrotex TM)	1. woven fabric	Newtex Industries Railroad Avenue P. O. Box 25 Victor, NY 14564	716/924-9135
Thermoglass TM (fiberglass)	1. twisted rope 2. braided sleeving 3. woven fabric and tape	Amatex Corp. 1032 Stanbridge St. Norristown, PA 19404	215/277-6100
HI Fibe ^R (coated polyethylene fibers)	1. fiber fillers for cement, caulkings, etc.	Hill Bros. Chemical Co. One City Boulevard Suite 1521 Orange, CA 92668	714/634-3322
Celiox Fibers (polyacrylonitrile)	1. fabrics *2. conversion to pure carbon fibers	Celanese Plastics & Specialities Co. 26 Main Street Chatham, NY 07928	201/635-2600
*heat treatment			
CER-WOOL (ceramic fiber)	1. blankets 2. vacuum-formed boards 3. bulk fiber	C. E. Refractories P. O. Box 828 Valley Forge, PA 19482	412/351-4409
Siltemp (fibrous glass)	1. cloth	Haveg Industries, Inc. 900 Greenback Road Wilmington, DE 19808	1-800-441-7777
GRC Sheet (fiberglass reinforced cement)	1. flat and corrugated board	GRC Products, Inc. 17051 I.H. 35N Schertz, TX 78154	512/651-6773
GRC Sheet (fiberglass reinforced cement)	1. flat and corrugated board	CEM-FIL Corporation 120 Spence Lane Nashville, TN 37210	615/883-7563
Preox TM (polyacrylonitrile fiber)	1. woven fabric	Gentex Corporation Carbondale, PA 18407	717/282-3550
Kelvar TM and Nomex TM (aramid fiber)	1. cloth 2. rope 3. pump packings 4. tapes and webbings 5. braided sleeving	E.I. duPont de Nemours & Co. Textile Fibers Department Wilmington, DE 19898	302/999-4693

MICHAEL J. VAUDREUIL:mlf
80-08-05

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Nextel[®] 312

3M

Ceramic Fiber Products

Product Bulletin

Thermocouple Insulation

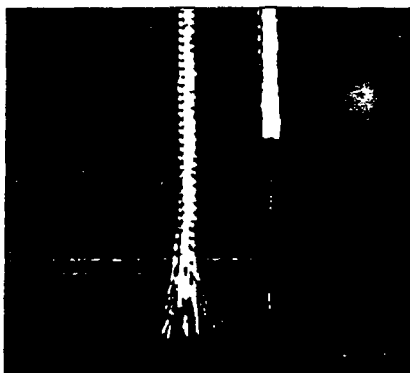
At last: a practical high-temperature insulating material that eliminates the two biggest causes of thermocouple failure.

Dimensional stability and abrasion resistance have always been big sources of trouble for high-temperature insulators. The most commonly used fibers—those made from vitreous silica—typically shrink, abrade, fray, or crumble to the point where wires become exposed. This obviously creates a potential for inaccurate temperature readings. The traditional alternative, ceramic beads, solves the problem of excessive shrinkage and abrasion but only at a high cost for labor.

Now there's a better alternative. Nextel[®] 312 Ceramic Fiber from 3M. Nextel 312 withstands operating temperatures of 1000° F. to 2600° F. continuously. It shrinks less and resists the combined effects of abrasion, flexing, and high temperatures better than asbestos, quartz, and vitreous silica fibers. It also offers good chemical resistance and immunity to thermal shock.

Proven dimensional stability.

A recent test compared the dimensional stability of Nextel 312 and vitreous silica by heating sleeves braided around separate lengths of wire for ½ hour at 2000° F. When the samples were removed from the furnace, Nextel 312 still covered the wire completely, thanks to shrinkage of less than 1 per cent. The vitreous silica fiber had shrunk by roughly 12 per cent, leaving an inch of wire exposed at one end.



Nextel 312 braided around a thermocouple wire and heated at 2000° F. for ½ hour shrank 1%. Vitreous silica handled the same way shrank 12%.

Exceptional resistance to abrasion.

In another test, a Duplan "silk-testing machine" was used to compare filaments of Nextel 312 and vitreous silica. Blades were rubbed back and forth on the two products after they had been heated for ½ hour at 1000° F., 1500° F., and 2000° F. Results showed that Nextel 312 lasted 2½ to 5 times as long as the vitreous silica fiber. This means that at 1000° F. Nextel 312

performed 400 per cent better. The figures for 1500° F. and 2000° F. were 300 per cent and 166 per cent respectively.

No residual acids or chlorides to cause etching of wires.

Because Nextel 312 Ceramic Fibers contain no residual acids or chlorides, there's no chemical present to corrode or etch the wires. Even in a test involving exposure to 96 per cent relative humidity, no noticeable electrolytic corrosion was detected. The test consisted of putting Nextel 312 fibers in contact with two unconnected bare #32 copper wires. A 250-volt D.C. potential was applied across the wires. After 20 hours, corrosion was determined by calculating the ratio of anode wire tensile strength to cathode wire tensile strength. Three test runs produced ratios above 0.99; since the maximum ratio possible was 1.00, there was essentially no electrolytic corrosion.

Available from your local thermocouple supplier.

Nextel 312 is being manufactured in production quantities right now. For more information on how it can increase the service life of your thermocouples, contact your supplier. Or call 3M at 612-733-1558 (in Northeast locations call 201-575-2076) or write 3M at the address below.

4-MBT-1-1(110,5)11

LITHO IN U.S.A.

Ceramic Fiber Products/3M
219-1 3M Center
St. Paul, Minnesota 55101

3M

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