

FROM E. E. RUMBERGER
PITTSBURGH OFFICE

TO



1982 February 16

RE: ASBESTOS REPLACEMENT

The attached Asbestos Replacement Report is being distributed to plant Department Managers and Superintendents for Engineering, Procurement, Safety, Environmental Control and Industrial Hygiene. It comments on successful and unsuccessful substitutes for asbestos.

Considerable progress has been made in the plants over the past two years in implementing safer substitute materials. This report should be helpful to you in knowing the results of the experiences at the other plants. It might also serve as a useful guide to be used in your next staff meeting to explore your success in making your plant as free from asbestos-containing materials as possible.

We are asking that plant Engineering and Procurement Managers keep us advised of their results in seeking safer substitute materials. This will permit us to share the information throughout the plants. The very worthwhile efforts being made in the plants are much appreciated.

E. E. RUMBERGER

EER:mlf

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Industrial Hygiene Technical Bulletin

NO. 82-3

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RE: ASBESTOS REPLACEMENT

The Asbestos Replacement Program was initiated a number of years ago as a result of the health hazards associated with handling asbestos and asbestos-containing materials. The program is a cooperative effort between Production, Engineering, Procurement, Research, Safety and Industrial Hygiene at the plant and corporate levels. It continues to be Alcoa's objective to replace all asbestos with safer substitutes whenever possible.

The only exception is that we do not encourage the immediate removal of affixed asbestos insulation so long as it is in good condition. When it does become necessary to replace worn asbestos-containing materials, safer substitutes should be used. When asbestos is being removed, proper precautions must be taken to protect employees from inhaling asbestos fibers.

Considerable progress has been made in the past two years toward making Alcoa plants asbestos free. The attached report summarizes plant experiences and identifies successful substitutes. It also identifies unsuccessful products that have been tested and failed. The report contains sections on General Applications, Potroom Use, Carbon Bake Use, Wire, Rod and Bar Use, and a List of Asbestos Replacement Manufacturers. This report should benefit each plant based on the experience in other plants.

To continue to coordinate these efforts, it is important that Engineering and Procurement at each plant copy the Corporate Industrial Hygiene Division on all efforts made towards asbestos replacement . . . whether positive or negative results occur.

Please review this present status report and advise us of any new experiences at your location. If we can be of any further assistance, please let us know.

SCOTT M. ANDERSON

SMA:mlf

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Attachment

ASBESTOS REPLACEMENT PROGRAM

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ASBESTOS REPLACEMENT PROGRAM

GENERAL APPLICATIONS

<u>Material & Use</u>	<u>Replacement Status</u>
<u>Belting for Drip Casting</u>	Fiberseal Fabric was tested and found to be inadequate.
<u>Block or Brick for furnaces</u>	Ceramic fiber refractory block is an acceptable substitute. There are no asbestos products currently being installed in melting furnaces, holding furnaces, or heat-treat furnaces.
<u>Brake Linings</u>	A possible (but untested) replacement for asbestos brake linings is RF-28-3D Truck Blocks (4602-FF) from Limpco Manufacturing in Greensville, PA.
<u>Cement Patch for Boiler Maintenance</u>	Two grades: 1. <u>Hydraulic-setting cement</u> - contains mineral wool and Portland Cement; temperature range up to 1000°F. <u>Suppliers:</u> a) Johns-Manville "375" b) Keene Corporation "Super Powerhouse" c) 48 Insulation "Quick-Set Cement" 2. <u>High-Temperature Grade</u> - contains mineral wool; temperature range 1000°F to 1900°F. <u>Suppliers:</u> a) Johns-Manville "360" b) Keene Corporation "Super 1900" c) 48 Insulation Super "48"

ASBESTOS REPLACEMENT PROGRAM

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Material & Use

Cloth and Paper
for Insulation
and Welding
Protection

Replacement Status

Cloth substitutes include: Pyrotek Fabrics,
Refrasil, Nor-Fab, Kelnit Welding Blankets

Paper Substitute: Johns-Manville - Cerawool Paper - or other ceramic fiber papers
(Note: Paper should not be used for welding protection.)

Gloves

Flame-resistant terrycloth gloves can be used
for temperatures up to 700°F. Some substitutes
successfully used at ATC include Kevlar Mittens
(up to 400°F) and Kevlar Gloves (up to 900°F).
These products are available from Kranso Glove
& Mitten, Milwaukee, or A-Best Products, Cleveland.
Other products are Kelnit 29, Keller Gloves,
Pyrotex, Textoglass Gloves, and Pre-ox Gloves.

Marinite and Marinite
Floats for Molten
Metal Casting

For most HDC and FDC ingot operations,
Johns-Manville's (J.M.) asbestos-free Marinite-C
board should replace the asbestos Molten Metal
Marinite. The applications for Marinite-C
include molten metal transfer troughs, baffles,
basins and floating skimmers. In certain
applications, an acceptable alternate for
Marinite-C is Pyrotek's asbestos-free Pyrotherm
B-3 manufactured by Cape Boards of England.
Johns-Manville's asbestos-free Marinite-I is
not recommended for molten aluminum operations.

Order boards on Travel:

Leuni (Pyrotek N-12) Board

Marinite CL (Low Density)

(Marinite is continued on Page 3.)

ASBESTOS REPLACEMENT PROGRAM

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Material & Use

Replacement Status

An asbestos-free material for the critical HDC and FDC header applications (sheet ingot headers at Tennessee South Plant and Warrick, Hunter caster tips at Badin, small round HDC headers at Badin, and tool and jib plate headers at Vernon) has yet to be developed for commercial use. Until this product is available, we will continue to use asbestos header grade molten metal Marinite.

Almost all asbestos uses in FDC ingot operations can be replaced by Alcoa's R-680.

Pump Packing

In most cases, pump packing materials are bonded in rubber or some other coating compound. These usually generate little potential for fiber exposure and need not be substituted. However, some packings, such as uncoated, noncompressed, braised asbestos may offer a potential for exposure and should be replaced. The plant industrial hygienist should be consulted when there is a question of whether or not a material should be replaced.

Since specific needs and equipment types vary dramatically, pump packing and general packing materials are purchased at the plant level. Suitable replacements should be sought by plant Purchasing by direct contact with manufacturers and suppliers.

ASBESTOS REPLACEMENT PROGRAM

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Material & Use

Rope for packing
and sealing

Replacement Status

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.

Fiberseal K-2 (Pyrotek, Inc.) has been used successfully by Massena as a replacement for the asbestos rope which was used to pack bottom blocks.

Another alternative is Thermo-Ceram Rope by Garlock.

Tubing Tape for
furnace seals
and general
insulation

Tape replacements include Pyrotex, Refrasil, Fiberfrax, and Nor-Fab.

ASBESTOS REPLACEMENT PROGRAM

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Material & Use

Thermocouple Wire

Replacement Status

Sleeves made of Refrasil or Fiberfrax material may be used in place of asbestos-coated wire in some cases. Tennessee has successfully used a fiberglass-coated, braided, and wrapped thermocouple wire from Thermoelectric Co., Saddlebrook, N.J. - P/N Q/Q/20-J (Standard Grade) in their ingot preheat and a two conductor 20 gauge premium grade thermocouple wire - Q/TW-20-JJ in their annealing furnace.

Warrick has found two thermocouple wire substitutes:

1. J type lead wire 6Al6 gauge by Thermoelectric.
2. K type 16 gauge wire made of fused teflon, polyvinyl and fiberglass by Claud S. Gordon Co.

A ceramic fiber product from 3M, Nextel 312, has been tried, but it has not held up during use.

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ASBESTOS - POTROOM USE SUBSTITUTES

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<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Cradle to Pot Shell</u>	Quarry Tile	Wenatchee	Good replacement
<u>Insulation</u>	Curit Fiberglass Fill Board	Warrick	Seems OK
	Cerawool Fill Board	Warrick	Will test
	Cem-Fil GRC Sheet	Warrick	Didn't hold up
	Cem-Fil GRC	Massena	Not successful
	J-M Asbestos-Free Millboard CEK44444 Mill Board	Massena	Installed on some pots and appears OK. Will be used on all future pot rebuilds.
			Mechanical Engineering Division, Pittsburgh, specifies Johns-Manville Cerawool Millboard as a substitute for JM-106 Millboard. Compressive strength and insulating quality are comparable. Cost for Cerawool Millboard is \$1.50 each for 1/4" x 3" x 48" pieces in lots of 250, or \$1.25 each in lots of 500. This is less than the \$5.00 per piece you are paying for Chem-Fil board.
<u>Superstructure Foot</u>	Cem-Fil GRC 9"x7"x1"	Badin	Product was not even and resulted in rocking of the superstructure.
<u>Insulation</u>	Marinite P - 1/2" sheet	Massena	To be tested
		Badin	Crushed
	R-680	Badin	Currently testing
			Mechanical Engineering Division, Pittsburgh, presently specifies ebony asbestos for this item. Tests on other materials have not been successful.

ASBESTOS - POTROOM USE SUBSTITUTES

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<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Pot Cover Insulation</u>	Almac Plastic Industries' High-Temp. Glass	Massena	To be tested
	Marinite P - 1/2" sheet	Massena	Not successful
	Pyrotek Fiberscal H-3 Fabric	Badin	Double the fabric; works well for repairs.
		Massena	Not successful
		Warrick	Works well; now standard; also works for sideshield insulation.
	Amatex-Thermoglass #G-36P752	Wenatchee	Satisfactory
		Badin	Will use in all new pot covers.

Mechanical Engineering Division, Pittsburgh, has eliminated use of asbestos by wrapping Amatex-Thermoglass #G-36P752 around an aluminum bar. In other installations, fiberglass fabrics have been used as the insulating material.

ASBESTOS - POTROOM USE SUBSTITUTES

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<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Walkway Grating</u>	Pyrotek E-40	Badin	Crumbled
<u>Insulation</u>	Pyrotek Phenolic Paper	Badin	Currently testing; easy to work with but expensive.
	Pyrotherm G-5 Insulating Board	Badin	To be tested
	Marinite P - 1" Board	Badin	Not satisfactory
	Marinite P - 1/2" Board	Badin	Not satisfactory
		Massena	Not successful
	GRC Cem-Fil 1/4" & 3/8"	Massena	Not successful
	M-50 Pyrotherm Dense Board	Massena	Unsuccessful; it crumbles.
	Chem-Fil Fiberboard by Louisville Insulation	Warrick	Currently trying this cement-fiberglass product

Mechanical Engineering Division, Pittsburgh, specified Chem-Fil fiber reinforced cement for the new Badin and Noranda potlines. Previously specified Koppers NCX (fire-retardant) treated wood. The disadvantage of wood is that it still chars when exposed to molten bath. The cost of Chem-Fil and treated wood are comparable.

ASBESTOS - POTROOM USE SUBSTITUTES

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<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Bus Insulation</u>			
	Marinite P - 1" sheet	Badin	Crumbles
	Marinite P - 1/2" sheet	Massena	Not successful
	Cum-Fil GRC 1/4" & 1/2"	Massena	Not successful
	Mechanical Engineering Division, Pittsburgh, eliminated use of transite by substituting an aluminum bar with a 1/16" layer of glass fabric epoxy, NEMA Grade G-11, taped to each side of the bar.		
<u>Pot Exhaust Duct</u>	<u>Pyrrotek Pipe</u>	Warrick	Looked good in preliminary testing; continuing testing with interior coatings to prevent corrosion.
<i>Same</i>	<i>Hetron 197 -</i>	Badin	Looks good on 9 pots; changing to this product.
<i>Consists of fiberglass resin pipe lined with ceramic paper glued to fiberglass</i>		Wenatchee	Fiberglass pipe with antimony and dynel liners failed, and replaced by normal transite.
	Hetron 92	Wenatchee	Fiberglass pipe with antimony and asbestos linings - satisfactory.
	Fiberfrax Laminate Tubes by Carborundum, Inc.	ATC	Currently testing
	Mechanical Engineering Division, Pittsburgh, has conducted extensive tests on Hetron 197 at Wenatchee and Warrick. This material is quite expensive and may not be as durable as transite.		

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ASBESTOS - POTROOM USE SUBSTITUTES

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Specific Application

Exhaust Duct Gaskets

<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
Pyrotek Fiberseal Felt T-1	Massena	Not successful
Pyrotek T-22 Fiberglass Cloth	Massena	Successful; replacing asbestos as pots are rebuilt. Mechanical Engineering Division, Pittsburgh, is specifying asbestos impregnated sheet material; however, Carlock's Gylon material would probably work for this application.
Pyrotek Fiberseal M-13 1/8" Compressible Board	Massena	Satisfactory
	Badin	Currently using this product.
Fiberseal Felt G-1 - 1/2" & T-1 - 1/4"	Massena	Unsuccessful
	Badin	Tested and proved OK, but prefer Fiberseal M-13.
J-M Asbestos-Free Millboard	Massena	Satisfactory, presently in use.
J-M Ceraform Heat Seal	Rockdale	Not as stable as asbestos; needs to be replaced more often. Mechanical Engineering Division, Pittsburgh, presently specifying Pyrotek T-1 felt material for this application.

Siphon Gaskets

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ASBESTOS - POTROOM USE SUBSTITUTES

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<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Ladle & Ladle Lid Seal</u>	<i>Potroom</i> Silicon Red Rubber Air Hose - 3/4"	Warrick	Standard usage (but different seal than other plants)
	Fiberseal Rope F-10, 1-1/2"	Massena	Unsuccessful
	Refrasil-wrapped around rubber hose	Badin	No good; rubber melts; seal breaks.
	1" Fiberseal Rope D-1	Anaconda	Uses 600 ft. per month of D-1
	Pyrotek Treated Z-5 Tape	Massena	Successful; presently in use. Mechanical Engineering Division, Pittsburgh, presently specifying Pyrotek Z-5 material. Several layers of this material are used for one seal.
<u>High Temperature Exposure Insulated Electrical Wire P-75, P-225 Potwiring, P-225 Jackmotors, Calrod heaters</u>	High Temperature Silicon Braid Copper Conductor, 1000 V., 200°C	Massena	Satisfactory. Limited replacement practice.

ASBESTOS - CARBON BAKE USE SUBSTITUTES

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<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Exhaust Duct Manifold Gaskets</u>	Pyrotek Composition Boot V-5, M-6, H-3 Fabric	Massena	To be tested. Expect shipment October 1981.

ASBESTOS - WIRE, ROD AND BAR USE SUBSTITUTES

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Jarke Rack Liners</u>	Pyrotek 747 Cloth	Massena	Unsatisfactory; frays easily.
	Pyrotek F-1 Cloth	Massena	Unsatisfactory; frays easily.
	Pyrotek T-23 Tape	Massena	Unsatisfactory; frays easily.
	Pyrotek Glass and Kevlar Blend	Massena	Unsatisfactory; frays easily.
	Pyrotek T-22 Tape	Massena	Unsatisfactory; frays easily.
	Newtex Fabric Tape	Massena	Unsatisfactory; frays easily.
	Zetex 1200 Tape	Massena	Unsatisfactory; frays easily.
	Zetex 32500	Massena	Successful so far; encouraging.

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ASBESTOS REPLACEMENT MANUFACTURERS

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<u>Product</u>	<u>Supplier</u>	<u>Telephone No.</u>
<u>Pyrotex</u>	Newtex Industries, Inc. Railroad Avenue P. O. Box 25 Victor, New York 14564	716/924-9135
<u>Fiberseal Products</u>	Pyrotek, Inc. East 9601 Montgomery Avenue Spokane, WA 99206 -OR- Box 77 - R.D. #1 Claremont Road Carlisle, PA 17013 -OR- Santa Fe Springs, CA	509/926-6211 717/249-2075
<u>Refrasil</u>	HITCO Division of Armco Steel Middletown, Ohio 45042	
<u>Nor-Fab Yarns; Fabrics</u>	Amatex 1032 Stanbridge Street Norristown, PA 19404	215/277-6100
<u>Fiberfrax</u>	The Carborundum Company Insulation Division P. O. Box 808 Niagara Falls, NY 14302	716/278-6221
<u>Hi-Temp 270</u>	Penn Compression Moulding, Inc. Burton Street Pittsburgh, PA 15218	412/351-4004
<u>Ceramic Fiber Products</u>	Kaowool Babcock & Wilcox Cem-Fil Corporation Two International Plaza Drive Nashville, TN 37217 Keller Glove Mfg. Co. Plumsteadville, PA 18949	615/361-4664 215/766-8818
<u>Marinite and Other Products</u>	Johns-Manville The Manville Corporation Ken-Caryl Ranch Denver, CO 80217	303/978-2000

*No
use Manville Products office*

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