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ENGINEERING MANAGERS
DOMESTIC SHELTERS

11 & S

Industrial Hygiene

1983 MAY 12

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RE: ASBESTOS SUBSTITUTES FOR POTROOMS

Attached is a summary of items we have found satisfactory, are testing, or have found unsatisfactory as asbestos substitutes for potroom application. There are a number of areas where we could use additional information on test outcomes and current costs from each plant. Of particular interest is cost, because the number of substitutes has grown to where we should start making choices based on economics. Our objective is to maintain this data base as accurately as plant input allows and provide technical expertise in materials selection. Please provide an update on an annual basis.

Our current comments and recommendations are as follows:

Bus Insulation

The purpose of insulation is to electrically isolate leaves in balanced bus systems. Insulation must withstand bus temperature, generally 150 to 250°F. It must be able to resist molten bath spills, to a limited extent, where the edge is exposed.

Current recommendation is an aluminum bar with a 1/16 inch piece of Westinghouse, Micarta H-2497, NEMA Grade G-11, or equal, insulating plate taped to each side. Use Scotch No. 10, non-conductive tape, or equal.

Cradle to Potshell Insulation

The purpose of insulation is to act as a thermal barrier to prevent distortion of cradles caused by high shell temperature. Insulation must withstand shell temperature and shell compressive load.

Current recommendation is Johns-Manville Cerewool Millboard. It is about one-fourth as expensive as Chem-fil GRC sheet, which has also been used in this application.

Cradle Wedge Insulation

The purpose of insulation is to provide a "parting surface" between the wedge and the shell. Service temperature must exceed 1000°F because of shell side temperatures.

Current recommendations is Sepco, Style 709, graphited cloth, 1/16 inch thick. Massena uses a fiberglass cloth hand-dipped in graphite which also performs satisfactorily.

Crucible Lid Seal

Current recommendations are:

- °Pyrotek Z-5 treated fiberglass braided rope (favored)
- °Sepco FG801 fiberglass rope

Exhaust Duct

Badin, Massena, Tennessee, Warrick, and Wenatchee have all tested Pyrotek Hetron 197 fume duct with success. Badin, Tennessee, Warrick, and Wenatchee are replacing transite duct with the Pyrotek product on an as-required basis. Vancouver is using a similar product made by E. J. Bartell. We endorse conversion to the Pyrotek duct at the present pace.

Exhaust Duct Gasket

This gasketing is installed between mating flanges of the superstructure exhaust duct. It must have a minimum working temperature of 400°F, and must be able to resist fluoride attack.

Current recommendations are:

- °Ametex Norfab Series 400
- °Pyrotek T-22 Fiberseal Cloth

Poker Roller Insulation

We have been using Westinghouse Micarta H-12426, Nema Grade G-9, glass cloth epoxy, insulating plate, or equal, for this application. Vancouver is testing Pyrotek's TS-106 dense board which may also prove to be a satisfactory product for this application.

Side Cover Insulation

We recommend an aluminum bar wrapped with fiberglass cloth in place of a bar of any insulating material. The aluminum bar resists physical abuse better than any insulating material alone, found to date. The bolted or riveted connections between the cover and bar must be insulated with Westinghouse Micarta HY-1293, Nema Grade G-7, glass cloth silicon insulating bushings, or equal.

Recommended cloths are:

- °Alpha-Martex Style 1925, treatment #9383, tape
- °Ametex G36P752 fiberglass cloth (favored)
- °Pyrotek H-3 Fiberseal fabric
- °Southern Textiles Weldgard fiberglass tape

Siphon Gasket

The following materials have been used successfully:

- °Babcock and Wilcox Kaowool, 8 Lb. Density
- °Carborundum Fiberfrax
- °Garlock 7021 Bluegard Paper
- °Johns-Manville Cerefelt
- °Johns-Manville Cerewool Millboard
- °Pyrotek G-1 Fiberseal Felt
- °Pyrotek M-13 Compressible Board (favored)
- °Sepco FG801 Fiberglass Rope

Superstructure Foot Insulation

We have continued to specify Ebony-asbestos because no substitute has proven itself satisfactory for the high compressive loads of our more modern pots.

Walkway Grating Insulation

We are currently specifying hardwood (sap-soft maple) treated with Koppers NCX. However, the wood chars from molten bath, even with the fire-retardent treatment. Badin is testing Pyrotek's Phenolic Paper and G-5 board products. Wenatchee is using a Micarta Nema Grade G-10. (A G-11 might be an improvement, since it has better temperature resistance.) Results will indicate whether these are suitable substitutes for wood.

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SIPHON DUCT GASKET

VANCOUVER/S S SARGENT & JELLY'S
WARRICK/T T PYROTEK
WENATCHEE/S S PYROTEK
MASSENA/S S PYROTEK
MASSENA/U U PYROTEK
ROCKDALE/S S
TENNESSEE/S S
VANCOUVER/S S FERNACEL
WARRICK/S S S & S TEXTILES
WENATCHEE/S S
VANCOUVER/T T PYROTEK

FIBERGLASS, .125" WALL, HIGH TEMPERATURE RESIN
METRON 197, 1/4"-6 PLY, .450 C-1 PAPER & CERAMIC CEMENT LINER, SPIRAL WND
METRON 197, 1/8"-5 PLY, .030 C-1 PAPER & CERAMIC CEMENT LINER, SPIRAL WND
T-22 FIBERSEAL FABRIC, .060", .35 OZ/FT², 1100 F CONT, 1400 F MAX
T-1 FIBERSEAL FELT, .25", 6 LB/FT², 1400 F CONT AND MAX
NEOPRENE RUBBER
DUCT TAPE (STD. HVAC TYPE)
P-64 COTTON CLOTH TAPE
#3516 H3, 100% POLYESTER, FLAM RESIST
DUCT TAPE (STD. HVAC TYPE)
TS-106 DENSE BOARD, .106 LB/FT², 430 F CONT

\$71.23 EA
\$153.00 EA
\$3.25 YD
\$0.13 YD
\$0.19 YD
774

1 650 Jan-76
10
1 774 Jan-81
Jan-79
120 5,400 Jan-51
2 1,300 Jan-61

1911.D. 781.65
1911.D. 651.65, 781.65, 781.65, 781.65

FOKER ROLLER INSULATION

POT SIDE COVER INSULATION

BADIN/S S PYROTEK
BADIN/S S ANETEX
MASSENA/S S
MASSENA/T T ALMAC PLASTICS
MASSENA/U U JOHNS-MANVILLE
MASSENA/U U PYROTEK
MASSENA/U U PYROTEK
MASSENA/U U PYROTEK
MASSENA/U U CHECK-FIL
ROCKDALE/S S SOUTHERN TEXTILES
VANCOUVER/S S ALPHA-MARTEN
WARRICK/S S PYROTEK
WENATCHEE/S S ANETEX
WENATCHEE/S S ANETEX
MASSENA/S S
ROCKDALE/S S ROCKBESTOS
TENNESSEE/S S
VANCOUVER/S S GENERAL ELECTRIC
WARRICK/S S
WENATCHEE/S S ROCKBESTOS
WENATCHEE/T T ROCKBESTOS
BADIN/S S PYROTEK
BADIN/S S PYROTEK
BADIN/S S PYROTEK
MASSENA/S S JOHNS-MANVILLE
MASSENA/S S PYROTEK
MASSENA/U U PYROTEK
MASSENA/U U PYROTEK

H-3 FIBERSEAL FABRIC, .018", 16 OZ/FT², 1400 F CONT AND MAX
636P752 FIBERGLASS CLOTH, 1/8"
HS FIBERGLASS, .5x2x16.25"
GRADE HST HI-TEMP GLASS POLYESTER, .5x2"
MAFINITE-P, .5"
H-3 FIBERSEAL FABRIC, .013", 16 OZ/FT², 1400 F CONT AND MAX
H-50 FIBERSEAL BOARD, .5", .45 LB/FT², 1300 F CONT
TS-106 DENSE BOARD, .106 LB/FT², 430 F CONT
ERC SHEET 125/S, 600 F CONT
WELDED FIBERGLASS TAPE
STYLE 1923, TREATMENT #9383, 1/16" FIBERGLASS
H-3 FIBERSEAL FABRIC, .018", 16 OZ/FT², 1400 F CONT AND MAX
636P752 FIBERGLASS CLOTH, 1/8"
10-8765 FIBERGLASS ROPE, .25"
HI-TEMP SILICON BRAID, COPPER CONDUCTOR, 1000V, 200 DEG.C
ECC-WIDE BRAID, 600V, 180 DEG.C, 41 STRAND, .45 MIL SILICON RUBBER, 45 MIL BRD
SILICON RUBBER WITH GLASS BRAID
SI-57275, #12 SWITCHBOARD WIRE
TYPE FES TEFLON, 1000V, 110 DEG.C
SR-HD-600V 125 DEG.C, 2 COND. COPPER
ROCKWIDE BRAID, 600V, 180 DEG.C, 41 STRAND, 45 MIL SILICON RUBBER, 45 MIL BRD
M-13 COMPRESSIBLE BOARD, .125", 24 LB/FT², 2300 F CONT, 3000 F MAX
6-1, .5", 1400 F MAX
T-1 FIBERSEAL FELT, .25", 6 LB/FT², 1400 F CONT AND MAX
CEREWOL MILLBOARD
M-13 COMPRESSIBLE BOARD, .125", 24 LB/FT², 2300 F CONT, 3000 F MAX
6-1, .5", 1400 F MAX
T-1 FIBERSEAL FELT, .25", 6 LB/FT², 1400 F CONT AND MAX

\$310.58 FT2

NOT USED, ANETEX TAPE TYPE 600-1000

FRACTURES UNDER USE

LINES 7 & 8 ONLY

POT WIRING

ROCKDALE/S S ROCKBESTOS
TENNESSEE/S S
VANCOUVER/S S GENERAL ELECTRIC
WARRICK/S S
WENATCHEE/S S ROCKBESTOS
WENATCHEE/T T ROCKBESTOS
BADIN/S S PYROTEK
BADIN/S S PYROTEK
BADIN/S S PYROTEK
MASSENA/S S JOHNS-MANVILLE
MASSENA/S S PYROTEK
MASSENA/U U PYROTEK
MASSENA/U U PYROTEK

\$0.41 FT2
\$0.52 FT
\$0.50 FT
\$0.14 FT
\$0.13 FT
\$0.58 FT
\$0.44 FT

40 29,760
40 29,760
10 6,500 Jan-80
Jan-63
20 9,360
25 7,650 Jan-82

PREFERRED OVER 6-1 AND 1-1

SIPHON BASKET

NOT USED, J-M 80-PT FIBERGLASS

SUPERSTRUCTURE FOOT INSULATION

[illegible]