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E. I. DU PONT DE NEMOURS & COMPANY

WILMINGTON, DELAWARE 19898

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ENGINEERING DEPARTMENT

January 5, 1971

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INDUSTRIAL DEPARTMENTS
MATERIALS ENGINEERING
THERMAL INSULATION RELATIVE DUSTINESS STUDY

Attached is a copy of a study report by Haskell Lab. on the dustiness of thermal insulation materials. This study was initiated by the Materials Engineering Group of ESD and was done in conjunction with Haskell Lab. and the Engineering Test Center as a part of the Company Thermal Insulation Program.

The purpose of the study was to determine the relative potential dustiness, as received from the manufacturer, of the asbestos bearing thermal insulations presently in our engineering standards.

With the information contained in this report and the following information in this letter, it should be possible to select insulations, when handled with reasonable care, that will fall within the presently established Threshold Limit Values (TLV) for asbestos dust. Conversely it points out the brands of insulation that present the greatest potential hazard.

I recommend that the fiber count be used to determine the least hazardous material rather than the materials with higher coarse/fine ratios (irrespirable/respirable) since the fiber counts are made on what are essentially respirable samples.

Note that the count of fibers greater than 5 microns in length represents only an 18 minute sampling period. The Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists represent time-weighted concentrations for a 7 or 8-hour work day and 40-hour work

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BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

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week. An insulator working under normal insulation shop conditions would be exposed to much less average concentrations. The ACGIH states "Time-weighted averages permit excursions above the limit provided they are compensated by equivalent excursions below the limit during the work day".

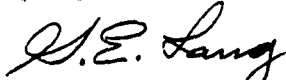
The statement in the report that the composition of the samples taken during sawing were the same as the samples taken after a settling period is significant in that we should not favor materials that visibly appear to have rapid settle out of dust after working them.

An inquiry to all of the manufacturers of the materials we tested determined that the types of asbestos in the insulations was either amosite or chrysotile; none contained any crocidolite, which is considered to be the least desirable. The percent of asbestos content of each of the insulations, as advised by the manufacturers compared very closely to the amounts determined in our study.

Specific recommendations have not been made because the insulations showing the least fiber count can be handled so carelessly that they can become the most hazardous, and conversely the ones showing the higher fiber counts can be handled so carefully that they become the least hazardous. Since insulation shops and operations vary widely throughout the Company the insulation selection should be made to meet the specific site conditions.

If I can be of further service to you, please contact me.

ENGINEERING SERVICE DIVISION


G. E. Lang, Consultant
Materials Engineering

GEL/cgs
Attach.

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This plastic "tent" fitted over a Cape Asbestos Company turbine controls dust during rip-out and spraying operations. The small portable vacuum exhaustor seen on the left provides negative pressure inside the "tent."

Anti-Dust Crews Trained —With Special Vans

Specially trained insulation demolition and rip-out crews using newly developed techniques and equipment—including special vans fitted with change rooms—are now operating in Great Britain.

The Cape Asbestos Corporation of London has instituted the program in order to minimize the exposure of workers to insulation dust.

Details of the program were reviewed with IHRP personnel by Mr. Alex Cross and Dr. Walter Smither of Cape Asbestos. This was part of the continuing program of cooperation between insulation industry scientists and engineers in other countries and the IHRP. Both Dr. Smither and Mr. Cross visited Mount Sinai during the summer to study dust control measures developed here.

Change Rooms and Showers

Each special van contains a "clean room" for taking on (and later putting on) street clothes and a "dirty room" for putting on (later taking off) work clothes. Shower facilities are available for use after work.

The men working with the unit are trained in the latest techniques to minimize dust production. Moreover they use all necessary personal protection equipment and clothing. This includes plastic or nylon coveralls and air-supplied or face respirators, when appropriate.

During the removal of old insulation material, the work area is completely enclosed and other trades are

excluded. Material to be removed is extensively wetted and localized exhaust systems are used whenever possible to minimize dust spread.

Minimum Dust Exposure

This program now introduces on land measures similar to those used for insulation removal aboard ship. (See story on page 4 on insulation work in British Naval shipyards)

Dr. Smither, who is Medical Director of the Cape Asbestos Corporation, emphasized that the workers in the special crews will not experience greater dust exposure than those applying new insulation.

"The procedures and the protective equipment available to these men reduce their dust exposure to a minimum," he said.



A new disposable dust-mist respirator. It weighs only 1 3/4 oz.

New Dust-Mist Respirator Put On the Market

A new disposable dust-mist respirator was introduced by the Safety Products Division of the American Optical Corporation on October 26.

The commercial availability of the first effective disposable respirator culminates two years of effort on the part of the IHRP to obtain a respirator suitable for insulation workers. (See *Insulation Hygiene Progress Reports*, vol. 1, nos. 2 and 3, and vol. 2, no. 3.)

90% of Dust Excluded

The disposable respirator announced by American Optical has been awarded a United States Bureau of Mines approval under Schedule 21B. Under this approval schedule, certain respirator efficiency standards must be met.

These include lack of penetration of dust through the filter material, low resistance to breathing with standardized loading, and little leakage about the face seal.

It is this last standard that, in general, limits the efficiency of approved respirators. Under Schedule 21B, the face seal must exclude 90 per cent of the dust from a standardized aerosol.

Six Points in Favor

The most important features of the American Optical respirator are:

1. a new fibrous filter medium that is highly efficient.
2. a large effective filtering area to provide very low resistance to breathing.
3. a weight only 1 3/4 ounces.
4. a foam-face-sealing gasket that is efficient and, in addition, improves wearer comfort.
5. a malleable metal frame that permits the wearer to adjust to the contours of his face, and
6. two adjustable harness straps to allow a good fit of the respirator on the face.

Worker Acceptance

Other disposable dust respirators, manufactured by the Minnesota Mining and Manufacturing Co. and by the Welch Manufacturing Co. have been field tested by the IHRP for worker acceptance.

Also under development are models by other manufacturers, including Willson Products Division of ESB Inc.

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