INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC.

MELLON INSTITUTE, 4400 FIFTH AVENUE

PITTSBURGH, PA. 15213

June 6, 1966



Proposal for

Owens-Corning Fiberglas Corporation

for

The Investigation on the Pulmonary Effects of Filamentous Glass Dust

Introduction

In order to answer questions regarding the pulmonary effects of filamentous glass dust, the investigation outlined below is proposed. This investigation will be concerned with the pulmonary effects of three types of filamentous glass dust: (a) glass dust without a binder, (b) glass dust with a phenol-formaldehyde type of binder, and (c) glass dust with the type of binder used in glass textiles.

The feasibility of the investigation hinges upon the ability of the industry to supply this laboratory quantities of filamentous glass that has a diameter of 1μ or less. This diameter of filamentous glass is required so that when the length of the fiber is reduced to 3 to 5μ, the glass particles will still be filamentous in character (a filament or fiber has been defined as a particle with a length that is at least three times its diameter).

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Proposal

Two species of animals, rats and hamsters, will be exposed for the greater portion of their life time to high concentrations of filamentous glass dust in inhalation chambers. There will be three types of filamentous glass dust blown into as many chambers:

a. without binder
b. with the phenol-formaldehyde type of binder (exact formulation to be agreed upon)
c. with the textile type of binder (exact formulation to be agreed upon).

The method of producing the dust will be similar to that used successfully for reducing asbestos fibers to a respirable particle size, namely continuous hammer milling. The apparatus of Holt and Young(*) with some modifications will be employed. It is hoped to attain a dust concentration of near 100 mg/m³ in the chambers. Dust exposures will be over a period of two years.

It is anticipated that filamentous glass without binder will not be available and that it will be necessary to prepare binder-free glass dust. For this purpose, filamentous glass dust coated with the textile-type of binder will be used because this binder is more easily destroyed than the phenol-formaldehyde type. The coated glass will be treated with aqua regia to destroy the binder, thoroughly washed and dried prior to dissemination into the inhalation chamber.

The air flow through the chamber will be monitored. The exhaust air from the chambers will be passed through electrostatic precipitators

(*) Holt, P.S. and Young, D. K. A Dust-Feed Mechanism Suitable for Fibrous Dust. Ann. Occ. Hyg. 2:245, 1960.

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before venting it to the outside. The dust collected from the precipitators will be weighed. The weight of this dust divided by the volume of air passing through the chamber during the time that the dust accumulated represents the average dust concentration in the chamber.

Exposure of the animals will be over a two-year period, six hours per day, five days per week. To determine the progress of the lung dusting, some animals will be killed after six months of exposure and some, after 12 months. The survivors will be killed after 24 months of exposure.

All animals will be autopsied and the lungs expanded with buffered formalin under a head of 10-12 cm water. Blocks of lung representative of all lobes will be embedded in paraffin and sectioned at 6μ . The sections will be stained by appropriate methods and significant fields photographed.

A tabular summary of the experimental protocol is given on Page 5.

Reports

An interim report based on the findings in the 60 animals killed after six and 12 months dust exposure respectively (see tabular summary) will be submitted about 18 months after the beginning of exposure. The final report will be submitted within a year after the conclusion of the investigation and will be in the form of a manuscript suitable for publication.

Publication

No advertising, promotional, or publicity matter containing any reference to the Industrial Hygiene Foundation or to any of its employees shall be made use of by Owens-Corning Fiberglas Corporation or anyone

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in their behalf unless approval in writing has been received from the Industrial Hygiene Foundation. The Industrial Hygiene Foundation reserves exclusive right to publication of material developed in the Foundation's Research Laboratory in suitable scientific journals if the results of the research merit publication; however, no findings in association with the name of Owens-Corning Fiberglas Corporation will be published unless permission is given.

Cost

The cost of this study will be $60,000; $20,000 a year for three years.

OWENS-CORNING FIBERGLAS CORPORATION

By _____

INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC.

By _____
Managing Director

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TABULAR SUMMARY OF PROTOCOL

Dust	Number of Animals		Dust Concent. in Chamber mg/m^3	Number of Animals Killed for Sampling at Period					
				6 months		12 months		24 months	
	rats	hamsters		rats	hamsters	rats	hamsters	rats	hamsters
Glass Dust without Binder	30	30	100	5	5	5	5	20	20
Glass Dust with Phenol-Formaldehyde Type Binder	30	30	100	5	5	5	5	20	20
Glass Dust with Textile-Type Binder	30	30	100	5	5	5	5	20	20
Totals	90	90		15	15	15	15	60	60

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