Members' Rep
& Illinois PCB.

BULLETIN

NO. 416

October 28, 1971

PROPOSED ILLINOIS BAN ON ASBESTOS IN BRAKE LINING

There has been considerable activity by members of the Asbestos Study Committee as regards the proposed Illinois regulations on "Asbestos and Spray Insulation". To quote from Part VII, Section 702 of the regulations proposed by the Illinois Pollution Control Board:

> "The use of asbestos in the brake lining of vehicles manufactured after January 1, 1975, and sold for use in Illinois is prohibited."

In the Board's explanation it notes that the prohibition is worded to avoid the necessity of fitting vehicles manufactured prior to 1975 with "non-asbestos" brakes. However, there is no question but that the ban includes original equipment linings, and there can be little doubt but that replacement linings on these vehicles must also be of a "non-asbestos" type. Further, interpretation of the proposed regulations indicates that all vehicles are included: Passenger Cars, Trucks, Off Highway Equipment, Farm Tractors and the like. Also, the Board apparently considers "clutch facings to be the same as brake linings". While the immediate effect would be on those supplying original equipment linings, the secondary effect would be felt by all friction material manufacturers.

In the Board's explanation they state: "These prohibitions have been made with full consideration given to the available alternative materials."

From the Illinois hearings this past month, the Institute has received several articles of interest:

(1) Johns-Manville memorandum, October 20, 1971, by Mr. Swetonic summarizing the Chicago hearings on October 15, 1971.

(2) Written presentation by Dr. F. Pundsack of Johns-Manville as given at the Chicago hearings.

(3) Dr. W. J. Nicholson, Mt. Sinai Hospital, a presentation in support of the Board's regulations, at the Chicago hearings.

(4) Chicago Sun-Times October 18, 1971 report on the Chicago hearings.

(5) Waukegan newspaper report of October 20, 1971 concerning the hearings in Waukegan.

(6) Johns-Manville memorandum, October 20, 1971, by W. Raines summarizing the Waukegan hearings on October 19, 1971.

Attached to the delegates copies only of this Bulletin are excerpts:

(1) Entire J-M summary of the Chicago Hearings.

C-22 (1H)

– Continued –

PLAINTIFF'S EXHIBIT WV-06014

PLAINTIFF'S EXHIBIT 11702.0

(2) Entire J-M summary of the Waukegan Hearings.

(3) Pages 20, 21 of Dr. Pundsack's presentation at the Chicago Hearings.

All those who have appeared at the hearings feel it is most urgent that the brake lining manufacturers advise the Control Board of their position on this proposed ban. It has been learned that the Control Board was surprised over the lack of response to the brake lining ban from friction material manufacturers.

Realizing the unreasonable deadline you must work against, comments should be in the hands of the Pollution Control Board by November 10, 1971. Please write:

Mr. Samuel T. Lawton
State of Illinois Pollution Control Board
189 West Madison Street
Suite 900
Chicago, Illinois 60602

The comments must be your own. We suggest that the primary force of these comments might be the lack of availability of known substitutes at this time. A secondary point might be that the Federal EPA (Environmental Protection Agency) is currently having studies made concerning the extent of emissions in the general environment from brake linings, and these results will not be known till mid 1972. Unless you have specific medical background, we suggest you not question the proposed safety standards on asbestos concentrations. Further, as is the case with most government bureaus, any pleading on cost or economics should be avoided. Please note that the portion of the proposed regulations that we are concerned with at this time is the general environment from brake lining emissions on vehicles in use. While the in-plant environment is also covered in the proposed regulations, we are advising our members primarily on the proposed ban on brake lining on vehicles.

Should you write Mr. Lawton, it would be appreciated if you would send a copy to the Institute. If there are any questions, please give me a call.

E. W. Drislane
Executive Secretary

Distribution: Active

Asbestos Study Com

AUTO FRICTION CORP.

MANUFACTURERS OF BRAKE LINING

November 3, 1971

Mr. Samuel T. Lawton
State of Illinois
Pollution Control Board
185 West Madison Street
Suite 900
Chicago, Illinois 60602

Dear Mr. Lawton:

It has come to my attention that the State of Illinois is considering regulations or legislation which would prohibit the use of asbestos in the manufacture of brake lining for use in your State.

I also understand, that there was a certain amount of disappointment expressed by members of your Board that there was a lack of response from the friction material manufacturers.

The reason that we have not responded before this, is that until I read a recent article in Chemical Week Magazine, I was not aware that regulations or legislation was being promulgated.

I may state quite succintly two basic objections to this proposed regulation or legislation on the part of our Company:

1. There is a complete lack of availability of a known substitute at this time for asbestos in the manufacture of the broadest range of friction material products for safe and accepted use in automotive vehicles.

2. The Environmental Protection Agency of the U.S. Government has presently commissioned studies to be made concerning the extent of emission in the general environment from brake lining. The results of this study will not be reported until mid 1972.

I appreciate this opportunity to inform you of our comments, and remain,

Sincerely,
AUTO FRICTION CORPORATION

Norman Comins
Vice President

bcc: Mr. E. W. Drislane
FMCI, New York

bcc: Mr. C. J. Weber
Mr. G. R. Miller
Mr. G. L. Wilson - Plt. I, Akron
Mr. S. W. Drislane - PMSI

November 4, 1971

Mr. Farnel T. Lawton
State of Illinois Pollution Control Board
189 West Madison Street
Suite 900
Chicago, Illinois 60602

Dear Mr. Lawton:

As a manufacturer of brake lining, it came as a complete shock to World Bestos Company, Division of The Firestone Tire & Rubber Company, to learn of the proposed 1975 restriction of the use of asbestos in the brake lining of vehicles sold for use in Illinois.

For such a widely affecting regulation to have been proposed must have been based on a substantial amount of damning evidence of an unequivocal nature. We would like to be supplied a list of references or still better copies of all scientific data upon which the proposed regulation was based or used as support so that we can make our own analysis of said data and begin our alternative research program immediately.

If these studies for which the regulations were based upon are indeed scientifically reliable, then a three year waiting period is in question. Can you explain how the three year figure was arrived at and the thinking and reasoning for such a delay and grace period?

We would also like to have made available that information regarding suitable available alternative materials and the test data clearing these materials. Further, we would like to see the available data which supports the alternative materials in brake lining tests such as Department of Transportation vehicle tests and pertinant indoor Dynamometer tests.

We should like to say that references which we have seen and are aware of do not suggest that brake lining emissions constitute any known health hazard. Therefore, we feel that the proposed regulation will not accomplish in fact its intent (that is, to reduce asbestos levels in ambient air) through such an enactment.

In conclusion our observation at the present time is that the proposed regulation may be based on unsupported and insufficiently comprehensive data to warrant such extensive action by the State of Illinois.

Very truly yours,

WORLD ASBTOS COMPANY

James C. W. Hanning

James C. W. Hanning
Manager, Technical-Research

JCWH:lka

Attachment

MAREMONT
CORPORATION

188 NORTH MICHIGAN AVENUE • CHICAGO, ILLINOIS 60601 • TELEPHONE (312) 263-7676

November 5, 1971

Mr. Samuel T. Lawton
State of Illinois Pollution Control Board
189 West Madison Street
Suite 900
Chicago, Illinois 60602

Dear Mr. Lawton:

I am writing you to register concern on the part of Maremont Corporation relative to the proposed Illinois ban on asbestos in brake lining, effective after January 1, 1975.

Maremont currently produces, under the brand name "Grizzly", both passenger car and heavy duty vehicle brake lining for the aftermarket and has been a part of the Friction Material industry for over twenty years.

We are most concerned with this proposed legislation since it is our combined technical opinion that there is not, at the present time, nor will there be in the foreseeable future, a suitable alternative to asbestos in friction material that will yield the performance characteristics required in today's braking systems. Further, proposed federal improvements in braking systems to be effective after 1975 will require those manufacturers now participating in the industry to devote their time and energies to sophisticated improvements within an asbestos based product, making the research for an asbestos substitute a goal beyond the available technical abilities of most manufacturers, should that substitute really exist.

Mr. Lawton, I would appreciate your continued review of the matter and hope that Maremont's concern will be given appropriate consideration.

Sincerely,

Andre A. Laus
Vice President and General Manager
Brake Systems Division

AAL/gjk

CASSBESTOS MANUFACTURING CORPORATION

(201) ARmory 8-6655

45 EAST 5TH STREET

PATERSON, NEW JERSEY 07524

QUALITY FRICTION MATERIALS SINCE 1919

Nov. 8, 1971

State of Illinois Pollution Control Board
169 West Madison Street
Suite 900
Chicago, Illinois 60602

Att: Mr. Samuel T. Lawton

Gentlemen:

As a brake lining manufacturer whose product contains asbestos we are much concerned over the Illinois Proposed Ban on Asbestos in Brake Lining, particulated by Part VII, Section 702 from the regulations proposed by the Illinois Pollution Control Board.

Our company, and our industry as an entity, is definitely not interested in producing products which will have harmful emission effects in the atmosphere. But we do believe the above cited section of the proposed law does not have evidence to back up its severity---evidence that proves a harmful emission-factor as a result of/or because of the asbestos content in friction materials.

On the basis of reports of testing emissions we believe that although it is within the power of the State of Illinois Pollution Control Board to have asbestos banned from brake linings, we feel that to do so would eliminate an effective and useful brake lining component without justification.

We are certain that many of the emission tests have been forwarded to the Board, and that the Board is aware of the tests of emissions now being made by the Federal Environmental Protection Agency. We believe that this data will be most helpful in determining the effects of asbestos-emissions from use in brake lining, and will establish whether these emissions are of any danger or if they are negligible.

BRASSBESTOS
MANUFACTURING
CORPORATION

(201) ARmory 8-8855

45 EAST 5TH STREET
PATERSON, NEW JERSEY 07524

QUALITY FRICTION MATERIALS SINCE 1919

If the emissions prove to be a harmful pollutant our company will certainly support your Board in eliminating this hazard. But until reliable evidence supports this possibility we are reluctant to accept any unsupported position.

Our company has been producing brake linings since 1919. (The basic company was formed in 1917.) During this span of over 53-years we have produced hundreds of millions of feet of asbestos brake linings. In our process, we deal closely with raw asbestos fiber. Of course, we use protective measures in handling these materials---as well as other fine powders. We have never had, in our history, a case of asbestosis or any other asbestos-induced illness among any of our personnel.

We believe this record is not uncommon among brake lining manufacturers. We are aware of the fact that in other industries who use asbestos there are systems which do not control or contain the material. However, our chief concern is with the brake lining industry, and the effects in the atmosphere of the use of asbestos in brake linings. We believe that the asbestos is locked-into the brake lining material, and that during its normal usage the heat of the friction converts any residue into an inert non-fibrous material which will not be hazardous in nature.

We look to your Board for a full analysis of this matter, and a just decision based upon proved and repeatable data of a factual, non-emotional, nature.

Very truly yours,
BRASSBESTOS MFG. CORPORATION

WILLIAM SIMON
President

S:g

Abex Corporation

Research Center

MANWAH, NEW JERSEY 07430
TEL. 201-529-3450

November 8, 1971

Mr. Samuel T. Lawton
State of Illinois Pollution Control
189 West Madison Street
Suite 900
Chicago, Illinois 60602

Dear Mr. Lawton:

In conjunction with hearings recently held regarding Regulation No. R71-16 "Asbestos and Spray Insulation" proposed by the Illinois Pollution Control Board, we believe it would be helpful to you to have our comments as a major manufacturer of friction material.

The Abex Corporation, through its American Brakeblok Division is one of the major suppliers of friction material for brake and clutch use in the United States. During 1971, our sales of asbestos containing friction material for use in vehicles operating in the United States will be in excess of 20 million dollars.

Our interest is specific to Part VII, Section 702 of the proposed regulations which states "The use of asbestos in the brake lining of vehicles manufactured after January 1, 1975, and sold for use in Illinois is prohibited". Our comments are as follows:

1. Asbestos fiber is an important component of organic friction material used in brake and clutch facings for vehicles manufactured and used in the United States. Of known fibrous material, asbestos imparts unique strength and thermal properties to friction lining, in addition to providing unique performance characteristics essential to safe and reliable braking and clutching of vehicles.

2. We are aware of investigations conducted on the nature of wear products from linings in use, as well as the identification of airborne particles from operating brakes. Air sample analysis conducted by our Medical Department to collect wear product particles during brake operation on our laboratory dynamometers confirms the findings of J. R. Lynch as reported in his study "Brake Lining Decomposition Products" published in the Journal of the Air Pollution Control Association, Vol. 18, No. 12, December, 1968.

3. Abex Corporation, in conjunction with Arthur D. Little, Inc., submitted a technical proposal to the Environmental Protection Agency in response to that agency's request for proposal No. EHSD 71-NEC 102 "Characterization of Emission from Automobile Brake and Clutch Linings". In this way we are well aware of the investigation work now being carried out by the [redacted]

Corporation under contract to the Environmental Protection Agency. We understand that results from this contract research will not be known until the middle of 1972 at the earliest. It is our opinion that the results of this study will verify again that airborne particulate matter from vehicle brakes and clutches does not constitute a dangerous health factor in Urban air pollution.

We believe that the proposed ban on manufacture and use of asbestos containing friction material is unwarranted and unnecessary. We recommend that Part VII, Section 702 be removed and not made part of regulations proposed by the Illinois Pollution Control Board.

Very truly yours,

G. R. Graham

G. R. Graham
Director
Friction Materials
Research

GRG:mmp

BC: Messrs.: N. G. Belury
C. L. Romine
F. B. Herlihy
E. H. Feierabend
E. W. Drislane, FMSI, Inc.
W. P. Raines, AIA/North America

BRITISH FRICTION MATERIALS COUNCIL

SECRETARIES:
BAKER, ROOKE & CO.
CHARTERED ACCOUNTANTS
TELEPHONE: 01-242 6811

99, ALDWYCH,
LONDON, WC2B 4JY

362/m/BFMC

26th November, 1971.

The Secretary,
Friction Materials Standards Institute, Inc.,
370 Lexington Avenue,
New York, N.Y.10017,
U.S.A.

Dear Sir,

We have been asked by our members in the British friction materials industry in the U.K. to put their views to you on the proposed Illinois State Regulations concerning asbestos and asbestos products. We enclose herewith their comments on the friction material aspect of these draft Regulations.

We have no doubt that the American lining manufacturers will be making strong representations to the Illinois authorities for amendments to the proposals and perhaps you could let us know their comments. We shall also be grateful if you could make our views known as set out in this enclosure.

Yours faithfully,

Secretaries

Enc.

BAN ON ASBESTOS-BASED BRAKE LININGS

The British friction materials industry views with deep concern the proposed ban on the use of asbestos in brake linings by the State of Illinois.

It is not aware of any medical evidence that could possibly justify such legislation. On the contrary it would have the effect of withdrawing from the market products that were used to promote road safety, without producing any significant improvement in the levels of urban atmospheric pollution. It would expect any of the known alternatives to asbestos to produce general particulate pollution of a measurable amount.

1. Whatever materials are used for brake linings the current state of the art is such that the action of braking will generate products of wear. The asbestos content of conventional brake linings is almost entirely converted by the action of braking into forsterite or other amorphous, inert materials which are no longer asbestos. On the other hand, if non-asbestos alternatives are used (e.g. iron powder, sintered metal, ceramics, steel wool etc.,) the resulting wear products will be released unchanged.

2. Measurements have been made of the amount of free asbestos fibre left in brake lining dust. It is an insignificant proportion of what is in any case a minute amount of total dust.

   The amount of free asbestos fibre that has been found in brake lining dust from vehicles, is about 1% of the total products of wear. (1). Indeed estimates vary down to 10^{-9}g/g, i.e. for each gramme of wear products only 10^{-9} grammes of free asbestos may may remain.

3. We assume that the risk of contracting mesothelioma is the principal cause of environmental concern - there is clearly no possibility whatever as a result of vehicle braking, of a community risk of asbestosis or lung cancer, which are solely occupational risks. For technical reasons only chrysotile asbestos is used in the manufacture of brake linings and disc brake pads. This is not the type of asbestos with which mesothelioma has been mainly associated.

4. Measurements of chrysotile asbestos in the ambient air in an industrial centre in the United Kingdom have shown that the level must be less than 10^{-7} g/m^3 because of the limitations of the method used. This means that they must be a thousand times lower than the British Government acceptable level for occupational exposure. Current investigations using a more sensitive method indicate levels of 10^{-9} to 10^{-10} g/m^3, i.e. 2 or 3 orders lower still. (2).

   Brake lining wear cannot therefore be a serious source of atmospheric pollution.

5. In one of the largest brake testing laboratories in the world, housing many dynamometers engaged 24 hours a day in wearing away friction materials, the average monthly asbestos count is 0.2 fibres /cc, a tenth of the British Government's occupational standard.

Chrysotile Asbestos in Urban Air

THE industrial use of chrysotile asbestos is increasing and the question of whether its concentration in urban air constitutes a hazard has been raised. But measurements of asbestos in air near asbestos factories have proved negative with present analytical methods, so under the sponsorship of the Asbestos Research Council we are developing a more sensitive technique. This article is a preliminary account of the estimation of chrysotile near a large asbestos textile factory at Rochdale, Lancashire. There are several uncertainties in the technique, so we were expecting to obtain only an order of magnitude estimate. Nevertheless this would have been an important figure to have because of the lack of data on the amount of asbestos in air. As it happened, we were only able to determine an upper limit for the chrysotile concentration which turned out to be three orders of magnitude lower than the threshold value for occupational exposure set by asbestos regulations. Obviously even more sensitive techniques are required and are now being developed.

We used an X-ray diffraction technique based on the measurement of the integrated area under the (002) peak of chrysotile. The equipment, which consisted of a Phillips 1010 generator, a vertical goniometer with a step scanning attachment, and a proportional counter with pulse height discrimination, could be reliably calibrated down to 10 μg of chrysotile compared with the 1 to 10 mg range reported by Crable[1], and was cross-checked by estimating the magnesium content of the calibration samples by atomic absorption spectroscopy. Sampling involved the collection of airborne solids from 3,000 m³ (10^6 l.) of air by an electrostatic device (R. Litton Systems Inc.) in which up to 10,000 l. min^{-1} are drawn through a 20 kV corona discharge. Particles in the air are electrostatically precipitated onto a plate and concentrated into ~100 ml. of liquid.

The collection efficiency depends on the size distribution of the particles and the sampling rate, but the size distribution of chrysotile in the atmosphere is not known. Therefore we estimated the collection efficiency indirectly by running the sampler in part of the asbestos factory where a low concentration of asbestos is known to occur (Fig. 1) and we found the collection efficiency to be almost 100% when the air is sampled at about 2,000 l. min^{-1}, dropping to between 25 and 50% at the rate of 10,000 l. min^{-1}, depending on the actual size distribution present. As we were aiming at only an order of magni-

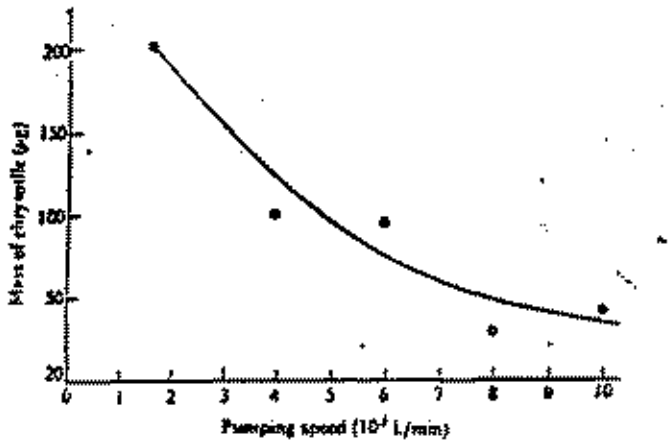

Fig. 1 Observed amounts of chrysotile in 5,000 l. of factory air, sampled at different rates.

Table 1 Weather Conditions during Sampling

Date (1970)	Site	Wind	Weather
April 22	1	SW moderate	Broken cloud
April 24	1	SW slight	Ground haze
April 27	1	NE moderate	Ground haze
April 29	1	SW moderate	Ground haze
May 6	1	S strong	Ground haze
May 13	1	N fresh	Ground haze
May 28	3	W light	Overcast, dull
May 28	3	W light	Overcast, dull
May 30	4	W light	Overcast, dull
May 30	4	W light	Overcast, dull
June 3	2	SW light	Overcast
June 10	2	SW slight	Heat haze
June 10	2	SW slight	Heat haze
October 23	1	W moderate	Broken cloud
October 23	1	W moderate	Broken cloud
October 23	1	W moderate	Broken cloud
October 28	1	N light	Broken cloud
October 28	1	N light	Broken cloud
October 28	1	N light	Broken cloud

tude assessment of asbestos in urban air, we were prepared to accept this uncertainty in the collection efficiency.

The map (Fig. 2) and Table 1 show the location of the sampling sites and the conditions in which the samples were obtained. The factory is in a hollow, and sampling site No. 2 is at the same height as the roof of the filter gallery, which is the chief air outlet from the factory. Sampling site No. 1 is about 30 foot higher than site No. 2. Sites 3 and 4 were in the gardens of houses, site 3 being about 5 km upwind of the factory and site 4 being about 300 m downwind.

All the diffraction traces (for example, Fig. 3) contained strong lines of kaolinite and quartz, probably from the local soil, which made the assessment of chrysotile difficult because the broad (001) line of kaolinite (7.18 Å) is close to the major (002) line of chrysotile (7.36 Å). Fortunately chrysotile is easily decomposed by boiling in 1 N hydrochloric acid whereas kaolinite is unaffected, so it should be possible to measure the amount of chrysotile present by subjecting the samples to acid leaching and measuring the corresponding reduction of the intensity of the composite X-ray band. The fact that this process led to no reductions in band intensity for any of the samples indicated that the amount of chrysotile present was below our detection limit.

We ought to have been able to detect 10 μg of chrysotile by itself, but clearly the presence of kaolinite may have reduced the sensitivity. But the addition of 100 μg of chrysotile to our collected samples could easily be detected, so we can say that our samples collected from 1,000 m³ of air contained less than 100 μg of chrysotile—in other words, there was less than 0.1 μg of chrysotile per m³ of air. The threshold limit for occupational exposure set by the 1969 Asbestos Regulations[2] is 0.1 mg m⁻³.

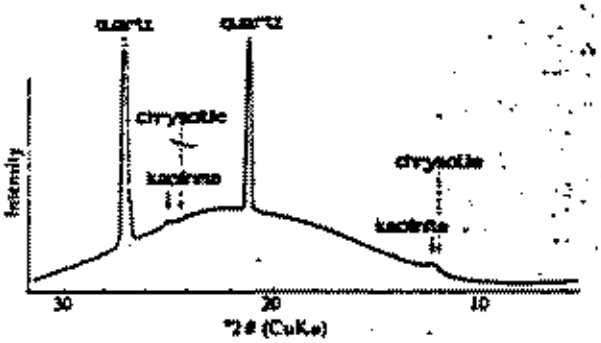

Fig. 3 X-ray diffraction pattern from a typical dust sample near the Rochdale factory.

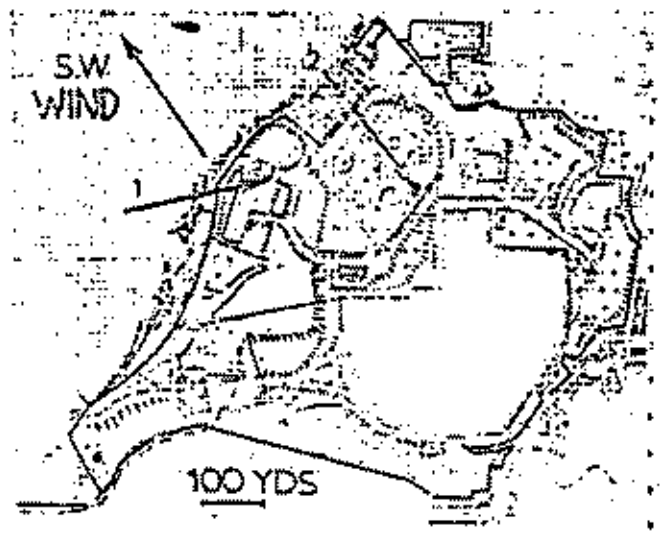

Fig. 2 Plan of T.B.A. factory, Rochdale. The sampling sites

A more sensitive method for estimating chrysotile is required and we are developing a technique based on electron microscopy. Preliminary examinations under the electron microscope of samples collected by the Litton sampler indicate that the actual chrysotile level may be a further three orders of magnitude below the X-ray detection limit (that is, about 0.1 ng).

The samples have so far been collected in the close vicinity of the Rochdale factory. It is now proposed to sample air at certain representative urban and rural locations in UK and estimate their chrysotile content.

A. L. Rickards
D. V. Badami

Turner Brothers Asbestos Co. Ltd,
PO Box 40,
Rochdale, Lancashire

Received April 18; revised September 22, 1971.

[1] Crable, J. V., *Amer. Ind. Hyg. Assoc. J.*, 27, 285 (1966).
[2] *Standards for Asbestos Dust Concentration for Use with the Asbestos*