

AFFIDAVIT OF JOEL B. CHARM

State of New Jersey)

ss:

County of Morris)

JOEL B. CHARM, being duly sworn upon his oath, deposes and says:

1. I was employed as the Director of Corporate Product Safety and Occupational Health by Honeywell International Inc.'s predecessor companies Allied Corporation (formerly named Allied Chemical Corp.) and AlliedSignal Inc., the successors by merger to the Bendix Corporation ("Bendix"), from August 1977 through November 1997. I was the Manager of Occupational Health and Toxicology for Allied Chemical Corp. from May 1975 to August 1977. I have been a certified industrial hygienist since 1971. I hold a master's degree in public health and radiation biology from the University of Michigan, and I have worked in the field of industrial hygiene for over 40 years.

2. I am currently employed by my own company, Charm HS& E International, Inc. Honeywell International Inc. ("Honeywell") is one of my clients, and I have served as the corporate representative for Honeywell in certain cases involving automotive friction products.

3. As corporate representative for Honeywell, I am familiar with the various friction material products which were designed and/or manufactured by Bendix and its successors during and prior to my employment. I have personal knowledge of the various friction material products designed and manufactured by Bendix through my training and employment with AlliedSignal, Inc. (and its predecessors) and my review of Bendix documents and prior depositions of Bendix employees. Based upon my personal knowledge, Bendix and its successors, both during and prior to my employment, designed and manufactured asbestos-containing friction products for automotive applications.

4. Asbestos-containing friction products manufactured by Bendix and its successors contained processed chrysotile asbestos fibers that were encapsulated or locked into the product itself. Together with various friction modifiers and fillers, the asbestos fibers were bound together with a resin binder system and then baked at a temperature in excess of 350 degrees. Although Honeywell does not believe there is any health hazard associated with the proper use of Bendix friction products, since at least as early as 1973, in recognition of OSHA regulations concerning asbestos exposure, Bendix and its successors placed a warning label on all cartons and boxes of asbestos-containing friction products shipped to customers. Bendix and its successors followed OSHA warning regulations even though it has never been determined the exposure to friction products results in an exposure to asbestos fibers equal to or in excess of OSHA exposure limits for asbestos fibers.

5. In or before December 1972 Bendix ordered printing dies from the Vermont Container Corporation for use on its shipping containers. The printing dies contained the OSHA label language as follows:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
BREATHING ASBESTOS DUST MAY CAUSE
SERIOUS BODILY HARM

A copy of the Vermont Container Corporation's invoice #12-077 dated 12/6/72 is attached as Exhibit A.

6. In April 1973, Bendix ordered "caution labels" from Quad City Printing in Troy, New York. Copies of Bendix purchase orders and corresponding invoices from Quad City are attached as Exhibit B. The initial "caution labels" were created by Quad City Printing using a

sample provided by Bendix and were designed to be self-adhesive, with yellow and black lettering, and produced to read as follows:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
BREATHING ASBESTOS DUST MAY CAUSE
SERIOUS BODILY HARM

A copy of this "caution label" is attached as Exhibit C.

7. From at least as early as 1973, warning labels were placed on all cartons and boxes of asbestos-containing friction products shipped to customers. The warning label used at that time contained the warning language specified by the Occupational Safety and Health Administration (OSHA) for asbestos-containing products subject to OSHA's warning label requirements, which was as follows:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
BREATHING ASBESTOS DUST MAY CAUSE
SERIOUS BODILY HARM

Shipments of asbestos-containing friction materials sent in bulk in containers or on pallets to original equipment manufacturers and distributors re-packaging brakes also contained specific warnings that included the above-quoted language.

Sample copies of warning labels containing this language are attached as Exhibit D.

8. In June 1973 Bendix issued General Bulletin G-73-6 to all rebuilders regarding steps necessary to comply with the OSHA regulations, including a statement that “[c]aution labels or lettering should be affixed to any carton or box that may have its contents reground” in conformity with the OSHA language. A copy of General Bulletin G-73-6 is attached hereto as Exhibit E.

9. In 1977 Bendix mailed to its distributors and authorized rebuilders copies of the Friction Material Standard Institute’s (“FMSI”) Brake Lining and Clutch Facing Automotive Data Book which contained a section entitled “Recommended Procedures for Reducing Asbestos Dust During Brake Servicing.”

10. Since 1977, Bendix and its successors (Allied Corporation’s Automotive Sector and AlliedSignal Inc.’s Automotive Sector) distributed subsequent editions of the FMSI Automotive Data Book (also containing a section entitled “Recommended Procedures for Reducing Asbestos Dust During Brake Servicing”) to customers. Copies of the FMSI Automotive Data Book and a section on Recommended Procedures for the years 1977 through 1989 are attached as Exhibit F.

11. In March 1979 Bendix, by means of a General Bulletin, mailed to its distributors and rebuilder customers a Friction Material Standard Institute publication dated October 1978, entitled “Friction Materials Work Practices Guide”. A copy of the March 1979 General Bulletin including the Friction Materials Work Practices Guide is attached as Exhibit G.

12. During 1984 and 1985, Allied Corporations’ Automotive Sector mailed “Product Fact Sheets” to all customers of Bendix friction materials. A copy of the 1984 Product Fact Sheet is attached as Exhibit H.

13. Beginning July 30, 1986, Allied Corporation's Automotive Sector distributed a Material Safety Data Sheet (MSDS) to all customers of Bendix friction materials. Beginning March 1, 1988, AlliedSignal Inc.'s Automotive Sector distributed a revised Material Safety Data Sheet to all customers of Bendix friction materials. Copies of the 1986 and 1988 Material Safety Data Sheets are attached as Exhibit I.

14. In 1986, OSHA promulgated revised language to be used on warnings for asbestos-containing products subject to OSHA's warning label requirements. From September 1986 to June 2001 the warning label for Bendix asbestos-containing friction products contained the revised OSHA warning language as follows:

DANGER

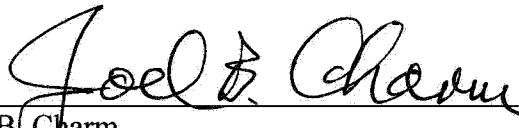
CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

Sample copies of warning labels containing this language are attached as Exhibit J.

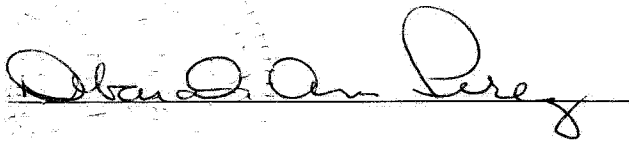
15. Honeywell discontinued the manufacture and sale of asbestos-containing friction products in 2001. Honeywell has continued to label its non-asbestos containing friction materials with cautions concerning dust exposure.


Joel B Charm

Sworn and subscribed to

before me this 24th day of

MAY, 2010



DEBORAH ANN PEREZ
NOTARY PUBLIC OF NEW JERSEY
Commission Expires May 12, 2014

EXHIBIT A



VERMONT CONTAINER CORPORATION

MANUFACTURERS OF
CORRUGATED FINE SHIPPING CONTAINERS

P. O. BOX 448

BERNINGTON, VERMONT 05201

OUR ORDER

NO.

BILL TO
(if diff)

BENDIX CORP
FRICTION MATERIALS DIV.
P O BOX 238
TROY, NEW YORK

DATE OF INVOICE	INVOICE NO.
12/6/72	12-077

TELEPHONE: 802-442-3435
TWX - 710-340-1743

SHIP &
BILL TO
(if same)

SHIP TO (if different)

CUSTOMER ORDER NO.	DATE OF ORDER	DELIVERY DATE	QUANTITY	PRICE PER UNIT	AMOUNT
		596			
1 DIE	TO INVOICE YOU FOR PRINTING DIES CAUTION CONTAINS ASBESTOS FIBERS AVOID CREATING DUST BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BOILY HARM FOR USE ON YOUR PR 31 TAPERED TUBE CTR. 100% N-1 MATERIALS SEE 8 9 10 11 12 RECEIVED RECEIVED				13.60
			12	3X19	

Under no circumstances shall the company be held responsible for any loss or damage to the contents of the container.

1/6/73 12-077

EXHIBIT B

Endix

Friction Materials Division

(Form 100-1000)
Rev. 10-1-70

Purchase Order

No. 86610

Vendor's Name
in Duplicate

Deliver To
Receiving Dept.

Delivery Required
Prompt

To : **Quaid City Printing**
161 Hoesick Street
Troy, New York 12181

Quantity	Date	Del. Code	Terms	F.O.B.	Destination	Ship To	Your Man
1000	4/6/78	See Below	Net				

Quantity	Description	Account	Price
1000	Caution Labels Yellow With Black Letters	993	28-5
1000	FM-377 Hatch Label (As Per Sample)	929	T-2
2000	Returnable Drum Labels Per Sample	929	T-4

PLEASE FURNISH THE FOLLOWING STATEMENT ON ALL INVOICES:

add 7% Tax

J. E. Connors

The Bendis Corporation
Friction Materials Division

G. H. Long

Director of Purchases

4,592

447.80

Bendix Friction Materials Division

1000 Broadway
 New York 10011

Purchase Order
 No. 86828

From

6082 City
 163 B
 Troy, New York 12180

Req. No.
 20079

78

Date
 4/28/79

Mat. Code
 70-3

Part No.

1000

Qty.

1000

Unit

1000

Price

1000

Total

1000

Quantity

1000

1000

Castor Tablets, Yellow with black centers

PLEASE TURN IN ALL RECEIPTS TO THE
 PROGRESS

J. E. Connors

PL 9765
 RECEIVING REPORT NO.



**Friction Materials
Division**

Order Used Print
Rev. 1-66 (Rev. 1-1-66)

**Purchase Order
No. 86826**

Sender Invoices
in Duplicate



Deliver To
Receiving Dept.

Delivery Required
Exempt

To

**Grand City Printing
63 Boosick Street
Troy, New York 12181**

Req'n. No.	Date	Del. Code	Term	ROA	Destination	Ship Via	Trans. Method
20079 RS	4/18/79	PO-5	Net				
Enter order for material in accordance with conditions and instructions following:							
Quantity	Description	Account	Price				
1000	Caution Labels, Yellow With Black Letters	829					
PLEASE FURNISH THE FOLLOWING STATEMENT ON ALL INVOICES:							
ADD 7% TAX							
The Bendix Corporation Friction Materials Division							
S. H. Longene							
Order Officer							
5-291							
41.20							

E. J. Connors

INVOICE **Quad City Printing & Photography**

162 HOBBS STREET, YONK, NEW YORK 10460 (914) 241-7072

FORMS
 FLIGHTS
 BOOKLETS
 STATIONERY
 BUSINESS CARDS
 WEDDING INVITATIONS
 35MM SLIDES
 DUPLICATE SLIDES
 DISPLAY TRANSPARENCIES
 COLOR TRANSPARENCIES
 COLOR TRANSPARENCIES
 BLACK/WHITE POSITIVE OVERLAYS
 COLOR - BLACK/WHITE PHOTOGRAPHY

The Bendix Corp.
 Friction Materials Division
 P. O. Box 238
 Troy, N. Y. 12181

DATE RECEIVED	INVOICE DATE	OUR ORDER	YOUR ORDER	VIA	DATE
April 19, 1973	May 9, 1972	1409	86825		
1000 Caution Labels on yellow pressure sensitive Material 4" x 5-1/2"		\$38.50	\$2.70	TOTAL \$41.20	
PLEASE PAY FROM THIS INVOICE Monthly Statements Issued On Request Only					

Purchase Order
 No. 86610

Bendix
 Friction Materials
 Division

Berdik
Environ
Materials

Purchase Order



From

இந்த

7. E. ~~Chapman~~

RECEIVING REPORT NO.



Friction Materials Division

Circle 1000 (Rev. 1-1-61)

To: **Quad City Printing**
163 Rodwell Street
Troy, New York 12181

Purchase No. **87608**

Reorder Inventory
in Duplicate

↓ ↓
Deliver To
Receiving Dept.
Delivery Required

Buyer's No.	Date	Del. Code	Type	FOI	Destination	Ship Via
18633	5/7/73	See Below	Reg.			YOUR Man
Enter order for material in accordance with conditions and instructions following						
Quantity	Description					

1000	Canton Labels, Yellow with Black Borders (As Supplied on RO 24822)	529	38.50/lot
------	---	-----	-----------

Ship To: **Bendix Corp.**
Friction Materials Div.
3000 Broadway Road
Clarks Summit, Penn.

PLEASE FURNISH THE FOLLOWING STATEMENT ON ALL INVOICES:

ADD 7% TAX

J. E. Connor *JS*

The Bendix Corporation
Friction Materials Division
G. H. Langone
Director of Purchasing

6-1041 4287

INVOICE **Quad City Printing & Photography**

163 HOOSICK STREET @ TROY, NEW YORK 12180 @ TEL: 34-3073

FORMS
 FLEERS
 BOOKLETS
 BROCHURES
 STATIONERY
 BUSINESS CARDS
 WEDDING INVITATIONS
 DISPLAY SLIDES
 TRAVEL SLIDES
 DISPLAY TRANSPARENTS
 COLOR WEDDING PHOTOGRAPHS
 COLOR TRANSPARENTS OF ART
 BLACK/WHITE PHOTOGRAPHY
 COLOR or BLACK/WHITE PHOTOGRAPHY

The Randix Corporation
 Friction Materials Division
 P. O. Box 238
 Troy, New York 12181

DATE RECEIVED	INVOICE DATE	OUR ORDER	YOUR ORDER	TAX	TOTAL
JUNE 7, 1973	JUNE 29, 1973	1478	87608		
1000 Pressure Sensitive Yellow Labels			141.00		
INVOICE TOTAL					
PAID BY DEBIT					
DATE PAID					
BY					
PLEASE PAY FROM THIS INVOICE					
Monthly Statement Based On Receipt Only					

818173

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Received By:

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10

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100

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1. The first part of the document is a title page. It contains the title "THE HISTORY OF THE UNITED STATES OF AMERICA" and the author "BY JAMES M. SMITH".

Garrett, Henry
New York 1961

Quad City Printing
163 Boosick Street
Troy, New York

12160

24007 Inva: .
- Duplication

Delivered To
Receiving Dept.

**Delivery Required
By 0900**

Req'n. No.	Date	Del. Code	Term	F.O.R.	Destination	Ship Via
20833 80	8/17/73	GO-4	Net			Your Man

Enter order for material in accordance with conditions and instructions following			
Quantity	Lot #	Description	Accession

3M

Caution Labels To Read As Follows:

429

CAUTION
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Health Harm

PLEASE FURNISH THE FOLLOWING STATEMENT ALL
INVOICES:

add 7% Tax

***The Bandit Carpenters Has
Friction Material Division**

G. M. Lawrence
Director Of Fisheries

25-3-

~~CONFIDENTIAL~~

9-577

83. 17

183 HUDSON STREET • TROY, NEW YORK 12180 • (516) 274-3002

FORMS
FLICKS
BOOKLETS
BROCHURES
STATEMENTS
BUSINESS CARDS
WEDDING INVITATIONS

SLIDESHOW SLIDES
DIAP. SLIDE SLIDES
35MM. TRANSPARENCIES
COLOR WEDDING PHOTOGRAPHY
COLOR TRANSPARENCIES OF ART
BLACK/WHITE POSITIVE OVERLAYS
COLOR + BLACK/WHITE PHOTOGRAPHY

HWCP10000242

EXHIBIT C

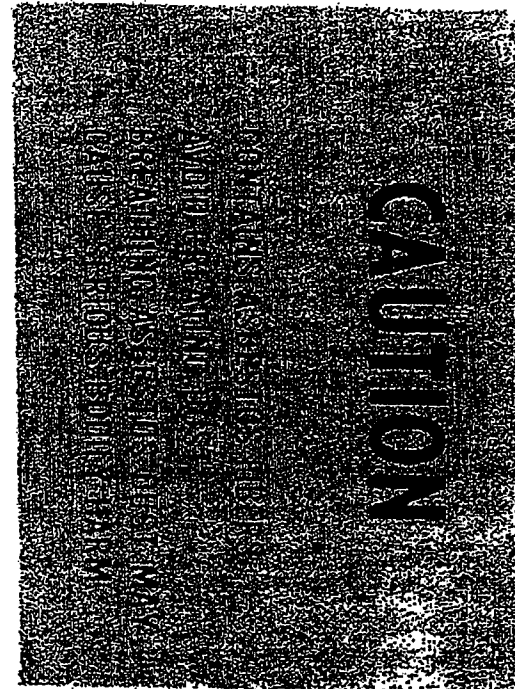


EXHIBIT D

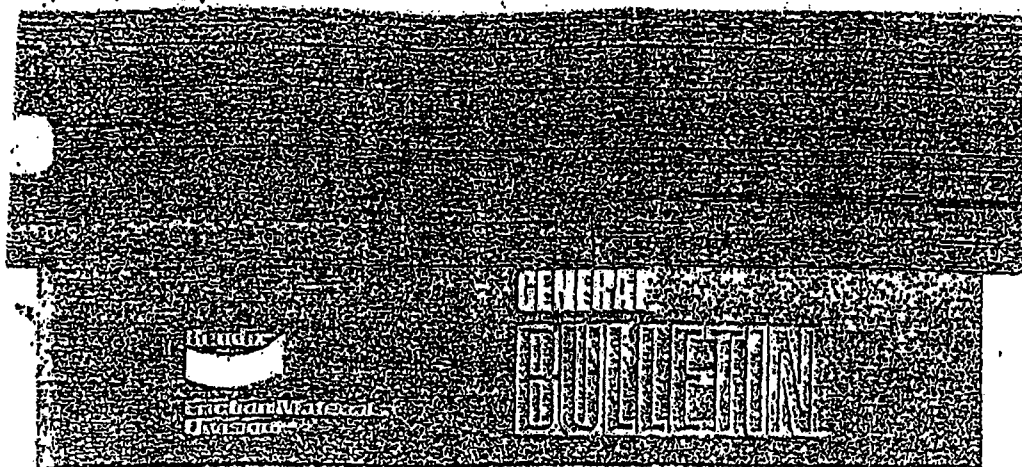
CAUTION

CONTAINS ASBESTOS FIBERS
AVOID BREATHING DUST.
BREATHING ASBESTOS DUST MAY
CAUSE SERIOUS BODILY HARM.

CAUTION

CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST.
BREATHING ASBESTOS DUST MAY
CAUSE SERIOUS BODILY HARM.

EXHIBIT E



Date: June, 1973 Bulletin No: G-73-6 Subject: O.S.H.A. Standards - Re: Asbestos

TO: All Rebuilders

The Occupational Safety and Health Administration (O.S.H.A.) is continuing its study of asbestos dust exposure. One cannot dispute that exposure to asbestos dust of high enough intensity and long duration constitutes a cause related to asbestosis and/or cancers.

It has been pointed out that protection against asbestos fibers and dust is best obtained by controlling the generation of fibers first, and secondly by controlling the dispersion of released fibers into the ambient air of work places. This would require using exhaust ventilation devices where work such as grinding, drilling and chamfering of brake lining occurs.

It is also recommended that operators of such grinders, at all, be supplied with and wear protective equipment such as respirators, coveralls, gloves and foot coverings. The latter especially where the employee is exposed to exceedingly high level concentration of asbestos fibers.

Caution signs should also be displayed at each location where airborne concentrations are at a high level. These signs should be large enough for a person to read at a good distance, forewarning of a concentrated area. W. H. Brady Company, Milwaukee, Wisconsin, manufactures various type signs conforming to requirements of O.S.H.A. standards.

Caution labels or lettering should be affixed to any carton or box that may have its contents reground, reading:

WARNING
CAUTION, CONTAINS ASBESTOS FIBERS, AVOID BREATHING DUST, BREATHING
ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM.

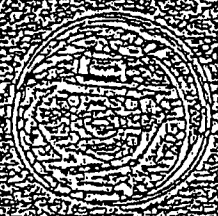
The Friction Materials Division, Bendix Corporation urges all users of its asbestos products to show good faith in complying to the various request of O.S.H.A. We all must realize the health, safety and lives of our employees are at stake.

EXHIBIT F

Attachment 1

F E M S I

FEDERAL MATERIALS STANDARDS INSTITUTE



1977

BRAKE LINING & CLUTCH FACING AUTOMOTIVE DATA BOOK

PLAINTIFF'S
EXHIBIT
11/18/89 42

This book contains information on the properties and performance of brake linings and clutch facings. It includes data on the physical and chemical properties of the materials, as well as information on the manufacturing process and the testing methods used to evaluate the materials. The book is intended for use by engineers, designers, and manufacturers in the automotive industry.

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

cause studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard. OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remove In Area Unless Your Work
Requires It
Breathing Asbestos Dust May Be Hazardous
To Your Health

The amount of asbestos in the dust from brake lining wear is usually at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear an air purifying respirator, either a throwaway or one with replaceable particulate filters, as approved by the Mining Enforcement and Safety Administration or NIOSH. It should be worn during all procedures starting with the removal of the wheels and including reassembly.

3. During disassembly, all parts should be carefully placed on the floor to minimize the possibility of creating airborne dust. Dust should first be cleaned from the brake drums, brake backing plates and brake assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system. After vacuum cleaning, any remaining dust should be removed by using a rag soaked in water and wrung until nearly dry. Under no circumstances should compressed air or dry brushing be used for cleaning.

4. Of extreme importance are the precautions which must be taken during machining of friction material. This is the operation in brake servicing when exposure to asbestos dust is at its highest. In addition to the approved respirator, there must

be local exhaust ventilation such that the worker exposures are maintained at least below the 1976 OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious
Bodily Harm

All asbestos waste should be disposed of in accordance with the OSHA asbestos regulation. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. All floor cleaning in areas where brakes are repaired should be done with the high efficiency industrial vacuum cleaner as described in (3) above. Under no circumstances should dry sweeping take place. Grinding (arcing) machines should also be cleaned with such a vacuum cleaner and any remaining dust wiped with a damp cloth. An approved respirator, as described previously should be used during this cleaning.

7. Although adherence to the above procedures should minimize any contamination of work clothing, it is necessary that the appropriate sections of the OSHA regulations on asbestos be followed when ceiling levels on asbestos dust exceed current standards. This could involve special clothing, change rooms, etc. At the very least the work clothes should not be taken home but should remain at work for industrial laundering.

8. Proper hygiene practices will help minimize exposure to asbestos dust. Wash thoroughly before eating and do not eat in the work area. Remember, smoking is harmful to the health, and smoking coupled with breathing asbestos dust is extremely dangerous.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

Because studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard, OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

**Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work
Requires It
Breathing Asbestos Dust May Be Hazardous
To Your Health**

2. The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear an air purifying respirator, either a throwaway or one with replaceable particulate filter(s), as approved by the Mining Enforcement and Safety Administration or NIOSH. It should be worn during all procedures starting with the removal of the wheels and including reassembly.

3. During disassembly, all parts should be carefully placed on the floor to minimize the possibility of creating airborne dust. Dust should first be cleaned from the brake drums, brake backing plates, and brake assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system. After vacuum cleaning, any remaining dust should be removed by using a wet sponge or water and wrung until nearly dry. Under no circumstances should compressed air or dry brushing be used for cleaning.

4. Of extreme importance are the precautions which must be taken during machining of friction material. This is the operation in brake

servicing when exposure to asbestos dust is at its highest. In addition to the approved respirator, there must be local exhaust ventilation such that the worker exposures are maintained at least below the 1976 OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

**Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious
Bodily Harm**

All asbestos waste should be disposed of in accordance with the OSHA asbestos regulation. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. All floor cleaning in areas where brakes are repaired should be done with the high efficiency industrial vacuum cleaner as described in (3) above. Under no circumstances should dry sweeping take place. Grinding (sanding) machines should also be cleaned with such a vacuum cleaner and any remaining dust wiped with a damp cloth. An approved respirator, as described previously should be used during this cleaning.

7. Although adherence to the above procedures should minimize any contamination of work clothing, it is necessary that the appropriate sections of the OSHA regulations on asbestos be followed when calling levels on asbestos dust exceed current standards. This could involve special clothing, change room, etc. At the very least the work clothes should not be taken home but should remain at work for industrial laundering.

8. Proper hygiene practices will help minimize exposure to asbestos dust. Wash thoroughly before eating and do not eat in the work area. Remember, smoking is harmful to the health, and smoking coupled with breathing asbestos dust is extremely dangerous.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

Because studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard, OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

1. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

**Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work
Requires It
Breathing Asbestos Dust May Be Hazardous
To Your Health**

The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures with minimum exposure. During brake servicing, the mechanic should wear an air purifying respirator, either a throwaway or one with replaceable particulate filter(s), as approved by the Mining (Education) and Safety Administration or NIOSH. It should be worn during all procedures starting with the removal of the wheels and including reassembly.

3. During disassembly, all parts should be carefully placed on the floor to minimize the possibility of creating airborne dust. Dust should first be cleaned from the brake drums, brake backing plates and brake assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system. After vacuum cleaning, any remaining dust should be removed by using a rag soaked in water and wrung until nearly dry. Under no circumstances should compressed air or dry brushing be used for cleaning.
4. Of extreme importance are the precautions which must be taken during machining of friction material. This is the operation in brake

servicing when exposure to asbestos dust is at its highest. In addition to the approved respirator, there must be local exhaust ventilation such that the worker exposures are maintained at least below the 1976 OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible

**Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious
Bodily Harm**

All asbestos waste should be disposed of in accordance with the OSHA asbestos regulation. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. All floor cleaning in areas where brakes are repaired should be done with the high efficiency industrial vacuum cleaner as described in (3) above. Under no circumstances should dry sweeping take place. Grinding (welding) machines should also be cleaned with such a vacuum cleaner and any remaining dust wiped with a damp cloth. An approved respirator, as described previously should be used during this cleaning.
7. Although adherence to the above procedures should minimize any contamination of work clothing, it is necessary that the appropriate sections of the OSHA regulations on asbestos be followed when ceiling levels of asbestos dust exceed current standards. This could involve special clothing, change rooms, etc. At the very least the work clothes should not be taken home but should remain at work for industrial laundering.
8. Proper hygiene practices will help minimize exposure to asbestos dust. Wash thoroughly before eating and do not eat in the work area. Remember, smoking is harmful to the health, and smoking coupled with breathing asbestos dust is extremely dangerous.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

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1. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

**Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Retain In Area Unless Your Work
Requires It
Breathing Asbestos Dust May Be Hazardous
To Your Health**

2. The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear an air purifying respirator, either a throwaway or one with replaceable particulate filter(s), as approved by the Mining Enforcement and Safety Administration or NIOSH. It should be worn during all procedures starting with the removal of the wheels and including reassembly.

3. During disassembly, all parts should be carefully placed on the floor to minimize the possibility of creating airborne dust. Dust should first be cleaned from the brake drums, brake backing plates and brake assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system. After vacuum cleaning, any remaining dust should be removed by using a rag soaked in water and wrung until nearly dry. Under no circumstances should compressed air or dry brushing be used for cleaning.

Of extreme importance are the precautions which must be taken during machining of friction material. This is the operation in brake

servicing when exposure to asbestos dust is at its highest. In addition to the approved respirator, there must be local exhaust ventilation such that the worker exposures are maintained at least below the 1976 OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

**Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious
Bodily Harm**

All asbestos waste should be disposed of in accordance with the OSHA asbestos regulation. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. All floor cleaning in areas where brakes are repaired should be done with the high efficiency industrial vacuum cleaner as described in (3) above. Under no circumstances should dry sweeping take place. Grinding (sanding) machines should also be cleaned with such a vacuum cleaner and any remaining dust wiped with a damp cloth. An approved respirator, as described previously should be used during this cleaning.

7. Although adherence to the above procedures should minimize any contamination of work clothing, it is necessary that the appropriate sections of the OSHA regulations on asbestos be followed when ceiling levels on asbestos dust exceed current standards. This could involve special clothing, change rooms, etc. At the very least the work clothes should not be taken home but should remain at work for industrial laundering.

8. Proper hygiene practices will help minimize exposure to asbestos dust. Wash thoroughly before eating and do not eat in the work area. Remember, smoking is harmful to the health, and smoking coupled with breathing asbestos dust is extremely dangerous.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

Recent studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard. OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

1. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

**Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work
Requires It
Breathing Asbestos Dust May Be Hazardous
To Your Health**

The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear a respirator approved by NIOSH for asbestos dust. It should be worn during all procedures starting with the removal of wheels and including reassembly.

3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.
4. Whenever possible, purchase friction materials preground and ready for installation. If machining is necessary, the precautions which must be taken are of extreme importance. This is the operation in brake service

when exposure to asbestos dust may be at its highest. This increases the difficulty in complying with the OSHA standards. In addition to the approved respirator, there must be local exhaust ventilation such that worker exposures are maintained below the OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible.

**Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

5. Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.
7. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the exposure limits.

**CAUTION: DO NOT BREATHE ASBESTOS
DUST**

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

Because studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard, OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

1. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

**Asbestos
Dust Hazard
Avoid Breathing Dust
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Do Not Remain in Area Unless Your Work
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Breathing Asbestos Dust May Be Hazardous
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2. The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear a respirator approved by NIOSH for asbestos dust. It should be worn during all procedures starting with the removal of wheels and including reassembly.
3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.
4. Whenever possible, purchase friction materials preground and ready for installation. If machining is necessary, the precautions which must be taken are of extreme importance. This is the operation in brake service

when exposure to asbestos dust may be at its highest. This increases the difficulty in complying with the OSHA standards. In addition to the approved respirator, there must be local exhaust ventilation such that worker exposures are maintained below the OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible.

**Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.
7. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the exposure limits.

**CAUTION: DO NOT BREATHE ASBESTOS
DUST**

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

Use studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard. OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

1. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work
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Breathing Asbestos Dust May Be Hazardous
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2. The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear a respirator approved by NIOSH for asbestos dust. It should be worn during all procedures starting with the removal of wheels and, including reassembly.
3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.
4. Whenever possible, purchase friction materials preground and ready for installation. If machining is necessary, the precautions which must be taken are of extreme importance. This is the operation in brake service

when exposure to asbestos dust may be at its highest. This increases the difficulty in complying with the OSHA standards. In addition to the approved respirator, there must be local exhaust ventilation such that worker exposures are maintained below the OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible.

Caution
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Avoid Creating Dust
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All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.
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3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.

4. Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is necessary, the precautions which must be taken are of extreme importance. This is the operation in brake service when exposure to asbestos dust may

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be at its highest. This increases the difficulty in complying with the OSHA standards. In addition to the approved respirator, there must be local exhaust ventilation such that worker exposures are maintained below the OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

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Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

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Dust Hazard
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Do Not Remain in Area Unless Your Work
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3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.

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Bodily Harm**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

7. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the exposure limits.

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RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

Because studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard, OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

1. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

**Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work
Requires It
Breathing Asbestos Dust May Be Hazardous
To Your Health**

Amount of asbestos in the dust from brake linings is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear a respirator approved by NIOSH for asbestos dust. It should be worn during all procedures starting with the removal of wheels and including reassembly.

3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.
4. Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is necessary, the precautions which must be taken are of extreme importance. This is the operation in brake service when exposure to asbestos dust may be at its highest. This increases the difficulty in com-

plying with the OSHA standards. In addition to the approved respirator, there must be local exhaust ventilation such that worker exposures are maintained below the OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible.

**Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious
Bodily Harm**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.
7. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the exposure limits.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

most friction materials used for brake service still contain asbestos, many suppliers are now replacing asbestos with steel, mineral, and/or synthetic fibers. The OSHA regulations refer directly to the asbestos used in friction materials. However, since the long term medical effects of the non-asbestos fibers are unknown, it is suggested that exposure levels be controlled for all replacement friction materials.

1. The OSHA regulations on asbestos exposure emphasize two levels for airborne concentrations of asbestos. These levels determine (1) if the workplace is in compliance with the regulations, and (2) if not, what action must be taken.

(1) The Permissible Exposure Level (PEL): 0.2 fiber per cc, 8 hour time weighted average (TWA).

(2) The Action Level: 0.1 fiber per cc 8 hour TWA. (This regulation is not activated if fiber exposure remains below 0.1 fiber per cc).

If certain precautions are taken, it is believed that the workplace can be maintained at levels below the Action Level, and if this is the case, several requirements of the OSHA regulations may be avoided. Monitoring of these levels is required where exposure is or may be expected to exceed the Action Level.

2. Areas where brakes are serviced should be set aside. If concentrations exceed the permissible exposure level (PEL), a "regulated area" must be established which restricts occupancy to authorized personnel. Where a "regulated area" is designated a warning sign must be displayed at each entrance to the area:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

3. When removing worn friction materials or cleaning used brake parts, remove the accumulated dust with a vacuum cleaner equipped with a High Efficiency Particulate Air (HEPA) filter. If removing accumulated dust or other debris from the brake assembly, alternate wet methods may be used: (a) Compressed air/solvent bottle system where parts are sprayed with a mist and the wetted particles are removed with a wet rag, or (b) Solvent spray-mist with final clean-up with a wet rag. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted. (Refer to OSHA Asbestos Regulations, CFR Title 29, Part 1910.1001, Appendix F).

4. Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is

necessary, there is the possibility that the permissible exposure level (PEL) may be exceeded, in which case respirator protection is required. There must be local exhaust ventilation such that worker exposures are maintained below the PEL. Local exhaust ventilation consists of dust collection hoods or enclosures connected by duct or piping to a collection filter and suction source.

5. In certain grinding operations, where concentrations cannot be reduced below the permissible exposure level (PEL), a respirator program shall be used. The respirator must be one approved by the National Institute for Occupational Safety and Health (NIOSH) for the concentrations encountered. Respirators may also be required during certain maintenance, start-up or emergency situations where engineering controls cannot maintain concentrations below the PEL. Where a regulated area is designated for concentrations exceeding the PEL, approved respirators with high efficiency filters must be worn.

6. Industrial vacuum cleaner bags containing asbestos dust, cloths used for wiping brake assemblies, used cartridges from respirators, and disposable work clothing should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations and local ordinances.

7. Good housekeeping is essential in a workplace where asbestos-containing materials are handled. Industrial vacuum cleaners equipped with High Efficiency Particulate Air (HEPA) filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

8. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. If the PEL is exceeded, protective clothing must be worn. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Do not take work clothing home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the permitted exposure level.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

While most friction materials used for brake service still contain asbestos, many suppliers are now replacing asbestos with steel, mineral, and/or synthetic fibers. The OSHA regulations refer directly to the asbestos used in friction materials. However, since the long term medical effects of the non-asbestos fibers are unknown, it is suggested that exposure levels be controlled for all replacement friction materials.

1. The OSHA regulations on asbestos exposure emphasize two levels for airborne concentrations of asbestos. These levels determine (1) if the workplace is in compliance with the regulations, and (2) if not, what action must be taken.

(1) The Permissible Exposure Level (PEL): 0.2 fiber per cc, 8 hour time weighted average (TWA).

(2) The Action Level: 0.1 fiber per cc 8 hour TWA. (The regulation is not activated if fiber exposure remains below 0.1 fiber per cc).

If certain precautions are taken, it is believed that the workplace can be maintained at levels below the Action Level, and if this is the case, several requirements of the OSHA regulations may be avoided. Monitoring of these levels is required where exposure is or may be expected to exceed the Action Level.

Areas where brakes are serviced should be sealed. If concentrations exceed the permissible exposure level (PEL), a "regulated area" must be established which restricts occupancy to authorized personnel. Where a "regulated area" is designated a warning sign must be displayed at each entrance to the area:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

3. When removing worn friction materials or cleaning used brake parts, remove the accumulated dust with a vacuum cleaner equipped with a High Efficiency Particulate Air (HEPA) filter. If removing accumulated dust or other debris from the brake assembly, alternate wet methods may be used: (a) Compressed air/solvent bottle system where parts are sprayed with a mist and the wetted particles are removed with a wet rag, or (b) Solvent spray-mist with final clean-up with a wet rag. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted. (Refer to OSHA Asbestos Regulations, CFR Title 29, Part 1910, 1001, Appendix F).

Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is

necessary, there is the possibility that the permissible exposure level (PEL) may be exceeded, in which case respirator protection is required. There must be local exhaust ventilation such that worker exposures are maintained below the PEL. Local exhaust ventilation consists of dust collection hoods or enclosures connected by duct or piping to a collection filter and suction source.

5. In certain grinding operations, where concentrations cannot be reduced below the permissible exposure level (PEL), a respirator program shall be used. The respirator must be one approved by the National Institute for Occupational Safety and Health (NIOSH) for the concentrations encountered. Respirators may also be required during certain maintenance, start-up or emergency situations where engineering controls cannot maintain concentrations below the PEL. Where a regulated area is designated for concentrations exceeding the PEL, approved respirators with high efficiency filters must be worn.

6. Industrial vacuum cleaner bags containing asbestos dust, cloths used for wiping brake assemblies, used cartridges from respirators, and disposable work clothing should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations and local ordinances.

7. Good housekeeping is essential in a workplace where asbestos-containing materials are handled. Industrial vacuum cleaners equipped with High Efficiency Particulate Air (HEPA) filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

8. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. If the PEL is exceeded, protective clothing must be worn. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Do not take work clothing home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the permitted exposure level.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

While most friction materials used for brake service still contain asbestos, many suppliers are now using asbestos with steel, mineral, and/or synthetic fibers. The OSHA regulations refer directly to the asbestos used in friction materials. However, since the long term medical effects of the non-asbestos fibers are unknown, it is suggested that exposure levels be involved for all replacement friction materials.

The OSHA regulations on asbestos exposure emphasize two levels for airborne concentrations of asbestos. These levels determine (1) if the workplace is in compliance with the regulations, and (2) if not, what action must be taken.

- (1) The Permissible Exposure Level (PEL): 0.2 fiber per cc, 8 hour time weighted average (TWA).
- (2) The Action Level: 0.1 fiber per cc 8 hour TWA. (The regulation is not activated if fiber exposure remains below 0.1 fiber per cc).

If certain precautions are taken, it is believed that the workplace can be maintained at levels below the Action Level, and if this is the case, several requirements of the OSHA regulations may be avoided. Monitoring of these levels is required where exposure is or may be expected to exceed the Action Level.

As where brakes are serviced should be set up. If concentrations exceed the permissible exposure level (PEL), a "regulated area" must be established which restricts occupancy to authorized personnel. Where a "regulated area" is designated a warning sign must be displayed at each entrance to the area:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

3. When removing worn friction materials or cleaning used brake parts, remove the accumulated dust with a vacuum cleaner equipped with a High Efficiency Particulate Air (HEPA) filter. If removing accumulated dust or other debris from the brake assembly, alternate wet methods may be used: (a) Compressed air/solvent bottle system where parts are sprayed with a mist and the wetted particles are removed with a wet rag, or (b) Solvent spray-mist with final clean-up with a wet rag. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted. (Refer to OSHA Asbestos Regulations, CFR Title 29, Part 1910.1001, Appendix F).

4. Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is

necessary, there is the possibility that the permissible exposure level (PEL) may be exceeded, in which case respirator protection is required. There must be local exhaust ventilation such that worker exposures are maintained below the PEL. Local exhaust ventilation consists of dust collection hoods or enclosures connected by duct or piping to a collection filter and suction source.

5. In certain grinding operations, where concentrations cannot be reduced below the permissible exposure level (PEL), a respirator program shall be used. The respirator must be one approved by the National Institute for Occupational Safety and Health (NIOSH) for the concentrations encountered. Respirators may also be required during certain maintenance, start-up or emergency situations where engineering controls cannot maintain concentrations below the PEL. Where a regulated area is designated for concentrations exceeding the PEL, approved respirators with high efficiency filters must be worn.

6. Industrial vacuum cleaner bags containing asbestos dust, cloths used for wiping brake assemblies, used cartridges from respirators, and disposable work clothing should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations and local ordinances.

7. Good housekeeping is essential in a workplace where asbestos-containing materials are handled. Industrial vacuum cleaners equipped with High Efficiency Particulate Air (HEPA) filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.
8. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. If the PEL is exceeded, protective clothing must be worn. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Do not take work clothing home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the permitted exposure level.

CAUTION: DO NOT BREATHE ASBESTOS DUST

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING.

Recent studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard. OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings and clutch facings understand the nature of the problem and know the precautions to be taken.

1. In regulated areas where brake work is done and the air quality standard exceeds the OSHA limit, entrances should be posted with a warning sign as follows:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

2. The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear a respirator approved by NIOSH for asbestos dust. It should be worn during all procedures starting with the removal of wheels and including reassembly.

3. When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted.

4. Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is necessary, the precautions which must be taken are of extreme importance. This is the operation in brake service when exposure to asbestos dust may be at its highest. This increases the difficulty in complying with the OSHA standards. In addition to the approved respirator, there must be local exhaust ventilation such that worker exposures are maintained below the OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the manufacturer should be contacted.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake assemblies should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible.

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations. During removal of vacuum bags, an approved respirator, as described in (2) above should be worn.

6. Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

7. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the exposure limits.

CAUTION: DO NOT BREATHE ASBESTOS DUST

Produced from the 1986 Friction Materials Standards Institute Automotive Data Book with the warning sign in paragraph 1 and the warning label in paragraph 5 revised to conform to OSHA Standard effective July 21, 1986.

EXHIBIT G

#7

Bentley Automotive Aftermarket

1824 Avenue D
Detroit, Michigan 48201

Rebuilder Customers

Subject "Friction Materials Work Practices Guide"

In this era we are consistently striving to make the environment, and in particular the work place, as free of products that might be harmful to our health, as is humanly possible.

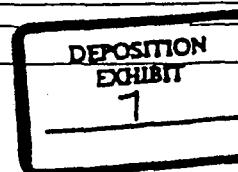
One of the elements identified as a potentially harmful product is asbestos, commonly used in the composition of brake linings. As a manufacturer of brake linings and disc pads we make every conceivable effort within the limits of available technology, to keep the workplace for our workers as free of asbestos emissions as possible. The responsibility does not end here however. Our customers and your customers should also be fully aware of the necessity to inform the workers of the necessary precautions when handling or working with brake linings, disc pads and clutch facings.

The Friction Materials Standards Institute, which is an association of the brake lining manufacturers, has published a Work Practices Guide. It is aimed at the brake shops and any other areas where the workers are engaged in handling, grinding, etc., brake linings, disc pads and clutch facings. The least amount of grinding you and your customers do, greatly helps reduce the amount of asbestos emissions in the environment.

We believe it is a fine publication and it carries a vital message. As a matter of fact, we will be incorporating it into our brake clinic program. After reviewing the enclosed copy, give consideration to distributing the booklets to your customers. Determine your requirements and let us know your needs. These booklets cost us approximately 10 cents each, however, we are happy to supply reasonable quantities without charge.

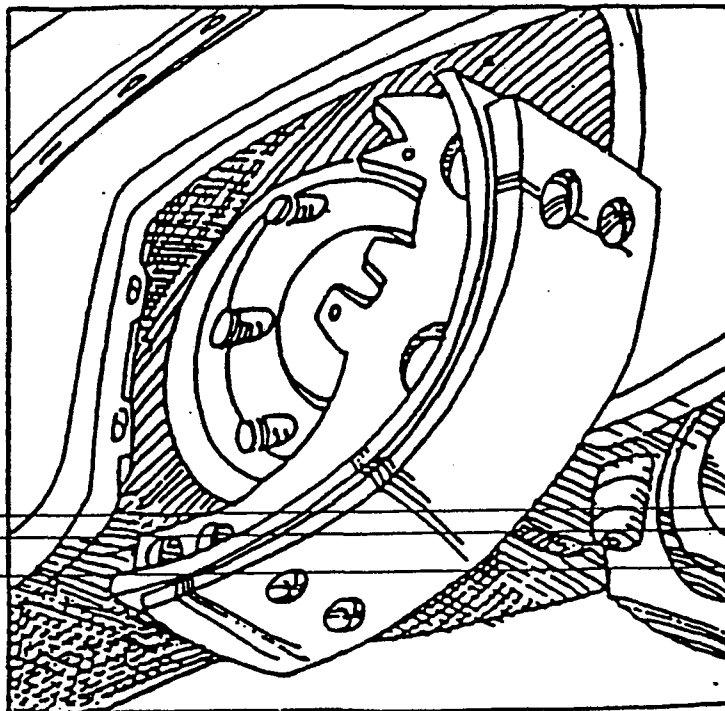
THE BENDIX CORPORATION
AUTOMOTIVE AFTERMARKET

Letter No. 791



October 1978

FRICTION MATERIALS WORK PRACTICES GUIDE



Friction Materials Standards Institute, Inc.

USE DUST COLLECTION EQUIPMENT WHEN MACHINING



INTRODUCTION

The purpose of this booklet is to provide practical guidelines for brake and clutch service mechanics in the handling and processing of asbestos containing friction materials and in the maintenance and repair of brake and clutch assemblies on which the materials are installed.

Adherence to the recommended work practices will reduce employee exposure to airborne concentrations of asbestos dust and will assist employers in complying with government regulations.

This area is regulated by federal, state and local authorities. We caution that you may not rely on strict adherence to the work practices recommended herein as assuring compliance with these regulations, because (a) they are subject to amendment; (b) there are on-going administrative interpretations of these regulations; and (c) particular field conditions may vary. You should direct all questions relating to compliance with regulations to the appropriate regulatory agencies.

ASBESTOS AND FRICTION MATERIALS

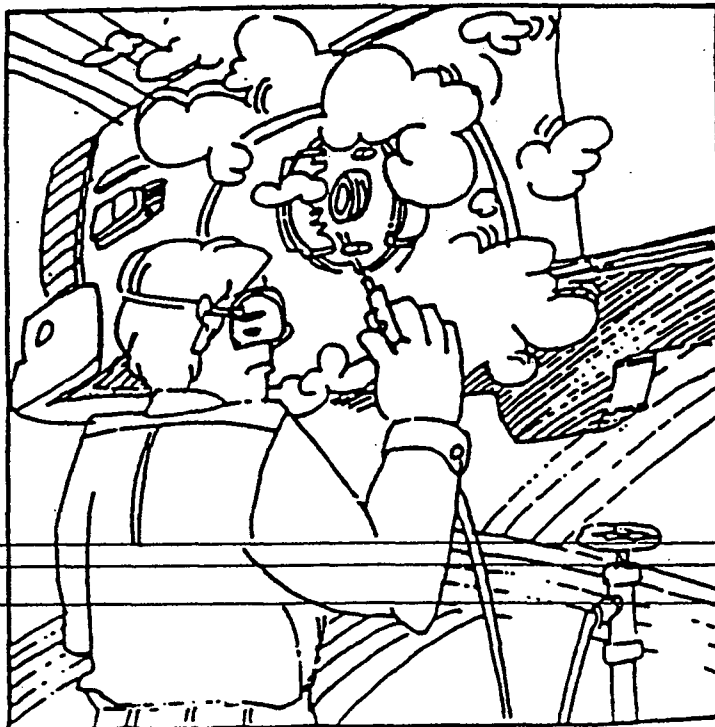
Most molded friction materials contain about 50% asbestos - some woven materials over 90%. In molded materials, resin binders prevent the release of asbestos fibers during normal handling. Woven friction materials, normally used only in construction and industrial applications, must be handled with care to avoid creating dust as the asbestos fibers are less firmly bound into the product.

Potentially hazardous airborne concentrations of asbestos dust can be created by improper cleaning and handling of worn brake and clutch assemblies, uncontrolled machining operations and poor housekeeping.

Breathing excessive quantities of asbestos fiber can cause respiratory disease and cancer. Smoking greatly increases the risk of lung cancer among asbestos workers. Prevention of asbestos dust exposure is the only known method of eliminating asbestos-related disease among those working with asbestos containing products.

Proper work practices offer the best assurance of providing exposure safeguards for workers removing, installing and machining asbestos containing friction materials.

**DO NOT USE
AN AIR HOSE
FOR CLEANING**



WHY?

SUMMARY OF OSHA ASBESTOS STANDARD EFFECTIVE JULY 1, 1976

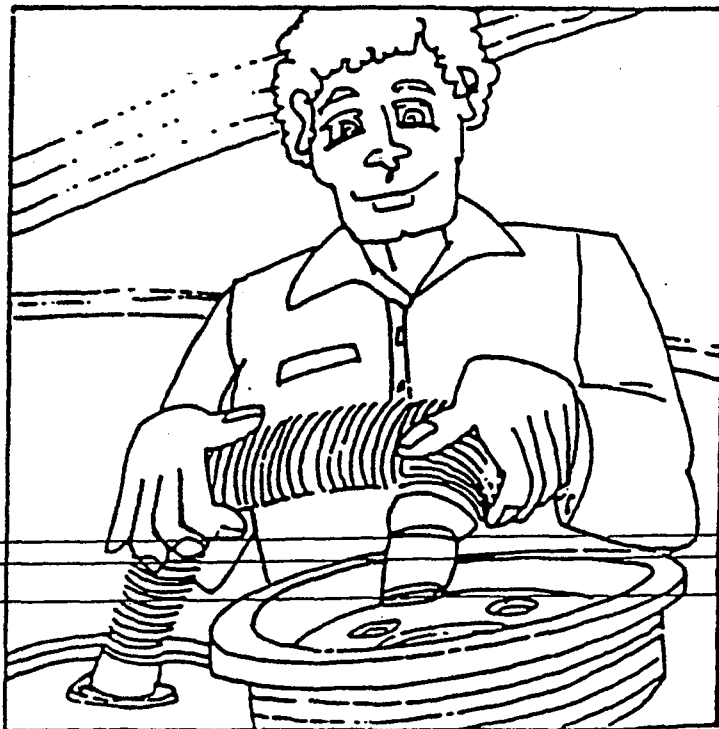
Under the current standard, it is the employer's responsibility to assure that exposure of employees does not exceed the following permissible exposure levels.

- a. Eight-hour time-weighted average: Two fibers, longer than five micrometers, per cubic centimeter.
- b. Ceiling (Peak) concentrations: Ten fibers, longer than five micrometers, per cubic centimeter.

Engineering controls such as isolation, enclosure, exhaust ventilation and dust collection are the preferred methods for meeting the prescribed exposure limits. All external surfaces must be maintained free of asbestos fiber accumulation.

Respiratory protection is required whenever airborne fiber concentrations exceed either the permissible time weighted average level or the permissible ceiling concentration. Protective clothing is required whenever airborne fiber concentrations exceed the permissible ceiling level. Caution signs, change rooms and employee notification are required where asbestos fiber concentrations exceed permissible exposure limits. The standard requires that all workplaces where asbestos fibers may be released shall be monitored to determine exposure levels, and regular monitoring is required where exposure levels are expected to exceed permissible limits. Employers must maintain records of monitoring required by the standard. They must also provide or make available medical examinations for employees exposed to airborne concentrations of asbestos fibers.

USE VACUUM OR WET METHODS FOR CLEANING



HANDLING NEW FRICTION MATERIALS

Handling new disc brake assemblies, lined brake shoes, clutch facings and brake blocks purchased in individual boxed sets is unlikely to create significant airborne concentrations of asbestos dust. If the parts are purchased in bulk quantities, abrasion during shipment may result in the accumulation of dust in shipping containers. Dust should be removed by vacuuming or cleaning with a damp cloth.

Whenever possible, purchase friction materials preground and ready for installation. This may keep dust levels below OSHA maximums and eliminate the need for respiratory protection, restricted areas, regular monitoring, special clothing, change rooms and employee notification.

REMOVING WORN FRICTION MATERIALS

Asbestos fibers in disc brake linings, drum brake linings, blocks and dry clutch facings are locked into the product with resin binders which prevent the release of asbestos fiber during normal installation. Heat and abrasion during normal use may generate dust containing asbestos. Some dust will accumulate in brake and clutch assemblies.

When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning.

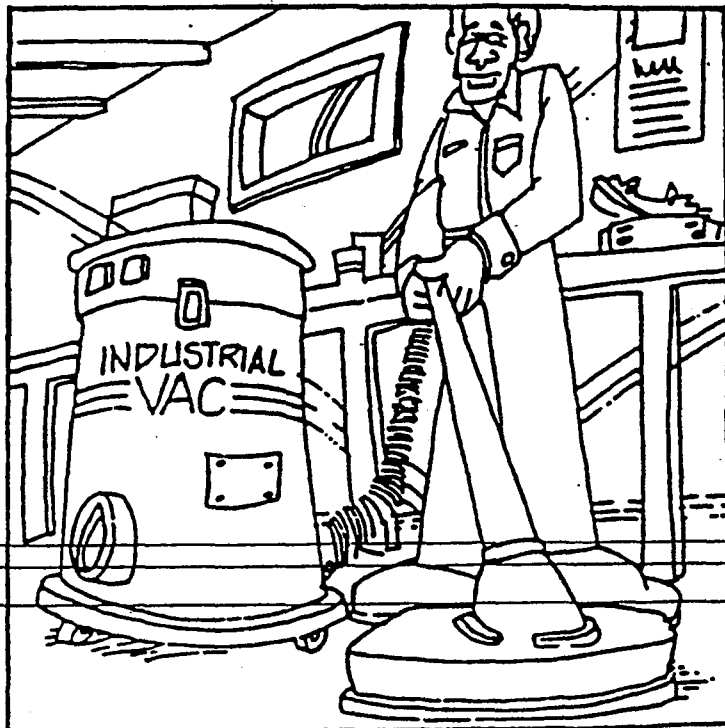
Use a NIOSH approved respirator when removing worn friction materials, or cleaning brake or clutch assemblies.

MACHINING FRICTION MATERIALS

There is an increasing trend for manufacturers and rebuilders to provide brake lining and clutch facings pre-drilled and pre-ground in final assembly form. In the case of truck brake blocks, various oversize thicknesses are available. However, there are some instances where field machining is necessary. This is particularly true for construction and industrial equipment applications which may require machining of blocks, slab stock or roll lining.

Dust generation can be minimized or eliminated during arcing of brake blocks by lathe turning at low speed rather than grinding. Whenever possible friction materials should be cut to length with a shear rather than a saw or abrasive cut-off wheel.

DO NOT
SWEEP IN
WORK AREA - USE
VACUUM METHOD



DUST COLLECTION METHODS

When asbestos-containing friction materials are machined, i.e., drilled, ground, grooved, cut or beveled, the dust created contains asbestos fibers which may become airborne unless adequate dust controls are employed. The preferred method for minimizing airborne dust from machining operations is local exhaust ventilation. A local exhaust ventilation system consists of dust collection hoods or enclosures connected by duct work or piping to a dust collection filter and a suction source.

The two operations that offer the greatest potential for generation of excessive amounts of airborne asbestos fiber are arc grinding and beveling of lined brake shoes and linings or brake blocks. Grinding machines used for these operations must be provided with exhaust ventilation to maintain worker exposures within permissible levels.

If a central exhaust system is not available, NIOSH (National Institute for Occupational Safety and Health) has stated that, at a minimum, the dust bag of the arcing machine shall be removed and replaced with the hose from a high efficiency industrial vacuum.

For large volume machining operations that operate on a continuous basis, the preferred dust collection device is a fabric filter or baghouse, with a heavy-duty exhaust fan as the suction source. The dust collector must meet the air-cleaning requirements of the Federal Environmental Protection Agency Emission Standard for Asbestos. Approval must be obtained from EPA for installation and operation of each system.

OTHER METHODS OF MINIMIZING DUST EXPOSURE

Whenever possible machining and repair operations should be isolated from other work areas in a restricted area to prevent unnecessary exposure of other workers. Entrances to restricted areas shall be posted with asbestos exposure warning signs as follows:

Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Re-enter In Area Unless Your Work Requires It
Breathing Asbestos Dust
May Be Hazardous To Your Health

**WEAR
AN APPROVED
RESPIRATOR
IF UNABLE TO
AVOID DUST**



Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste.

Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits.

DISPOSAL OF FRICTION MATERIAL DUST AND WASTE

Dispose of vacuum cleaner waste and asbestos containing cleaning materials in plastic bags or other sealed containers, with the following warning label printed on the container:

Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious Bodily Harm

Use a NIOSH approved respirator when servicing vacuum cleaners, dust collectors, or handling any asbestos-containing waste materials.

Asbestos-containing waste materials must be collected, processed, packaged, transported and deposited in such fashion that no visible emissions are generated to the atmosphere. All wastes must be disposed of at sites operated in accordance with applicable laws and regulations.

SOURCES OF ADDITIONAL INFORMATION

"Standard for Exposure to Asbestos Dust" (Code of Federal Regulations, Title 29, 1910.1001)—OSHA

"National Emissions Standards for Hazardous Air Pollutants—Asbestos and Mercury" (Code of Federal Regulations Title 40, Chapter 1, Subchapter C, Part 61, Subparts A, B)—EPA

"Fundamentals Governing the Design and Operation of Local Exhaust Systems," ANSI Z9.2-1971 (\$7.00) and "Practices for Respiratory Protection," ANSI Z88.2-1969 (\$5.50)—ANSI

"Industrial Ventilation Manual" (\$8.00)—ACGIH

For other information, a user may contact the manufacturer supplying his friction materials, the Asbestos Information Association or the Friction Materials Standards Institute.

ACGIH
American Conference of Governmental
Industrial Hygienists
Committee on Industrial Ventilation
P.O. Box 16153
Lansing, MI 48901

EPA
Environmental Protection Agency
Public Information Center
401 M Street SW
Washington, DC 20460

ANSI
American National Standards Institute
1430 Broadway
New York, NY 10018

FMSI
Friction Materials Standards
Institute
East 210 Route 4
Paramus, NJ 07652

AIA
Asbestos Information Association
1745 Jefferson Davis Highway
Arlington, VA 22202

OSHA
Occupational Safety and Health
Administration
Office of Information
Washington, DC 20210

October 1978

EXHIBIT H

PRODUCT FACT SHEET

Compiled: April 1984 by Allied Corporation, Automotive Sector
• Bendix Automotive Brake Division, 1084 Bendix Drive, Jackson, TN 38301

PRODUCTS — Bendix Friction Materials covered by this Product Fact Sheet can be identified as follows:

Drum Brake Segments and Blocks — "Friction King", "FK", "FKD", "D", "FKL", "L", "M", "E", "ED", "EM", "HP", "ST" and "S-1100".

Disc Brake Pads — "Organic" and "FK I" (semi-metallic).

Note: There is no asbestos in the "wearing surface" of "FK I" disc pads. However, there are chrysotile asbestos fibers in the "backing layer" which is "sandwiched" between the friction material and the steel shoe plate.

Health and Safety Information

Health — Inhalation of excessive concentrations of free asbestos fibers can cause certain serious health problems such as asbestosis, lung cancer or mesothelioma. These diseases may not be recognized until many years after exposure. Medical literature indicates that people who smoke are at significantly increased health risk when working with free asbestos.

No Threshold Limit Value (TLV) has been established for chrysotile asbestos fibers coated with phenolic resin. However, OSHA has established a TLV for free asbestos fibers of 2.0 fibers/cc of air. OSHA has proposed a reduction in this TLV to 0.2 fibers/cc.

Fire and Explosion — Product is classified as non-combustible, requires no special fire fighting procedures, and does not present any unusual fire, explosion or reactivity hazard. Small fires may be extinguished with carbon dioxide or dry chemical. Large fires may be extinguished with foam and water.

Recommended Waste Disposal — Dispose of in proper receptacles appropriately labeled in accordance with applicable federal, state and local laws and regulations.

Recommended Precaution — If airborne asbestos fiber concentrations exceed OSHA limits, NIOSH approved respirators should be worn and proper engineering controls implemented. If product is ground or machined, local ventilation to control exposure to asbestos fibers is recommended (see reverse side).

The work environment should be monitored to determine whether employee exposure exceeds OSHA threshold limit value in accordance with OSHA regulation 29 CFR Part 1910.1001.

Packages containing the Product should be labelled in accordance with OSHA regulation 29 CFR Part 1910.1001 (d) (2) as follows:

CAUTION
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

Standard industrial hygiene practices, including good housekeeping and vacuuming or wet cleaning work surfaces to prevent asbestos fibers from becoming airborne, should be instituted or implemented and maintained.

The foregoing data is submitted solely for your information, consideration, and investigation. Bendix makes no warranties, either express or implied, and assumes no responsibility for accuracy of the foregoing data.

See reverse side for Friction Material Standards Institute's recommended procedure for reducing asbestos dust during brake servicing.

PRODUCTS — Bendix Friction Materials covered by this Product Fact Sheet can be identified as follows:

Drum Brake Elements and Blocks — "Friction King", "FK", "FKD", "D", "FKL", "L", "W", "E", "ED", "EM", "HP", "ST" and "S-1100".

Disc Brake Pads — "Organic" and "FK" (semi-metallic).

Note: There is no asbestos in the "wearing surface" of "FK" disc pads. However, there are chrysotile asbestos fibers in the "backing layer" which is "sandwiched" between the friction material and the steel shoe plate.

Health and Safety Information

Health — Inhalation of excessive concentrations of free asbestos fibers can cause certain serious health problems such as asbestosis, lung cancer or mesothelioma. These diseases may not be recognized until many years after exposure. Medical literature indicates that people who smoke are at significantly increased health risk when working with free asbestos.

No Threshold Limit Value (TLV) has been established for chrysotile asbestos fibers coated with phenolic resin. However, OSHA has established a TLV for free asbestos fibers of 2.0 fibers/cc of air; OSHA has proposed a reduction in this TLV to 0.2 fibers/cc.

Fire and Explosion — Product is classified as non-combustible, requires no special fire fighting procedures, and does not present any unusual fire, explosion or reactivity hazard. Small fires may be extinguished with carbon dioxide or dry chemical. Large fires may be extinguished with foam and water.

Recommended Waste Disposal — Dispose of in proper receptacles, appropriately labeled in accordance with applicable federal, state and local laws and regulations.

Recommended Precaution — If airborne asbestos fiber concentrations exceed OSHA limits, NIOSH approved respirators should be worn and proper engineering controls implemented. If product is ground or machined, local ventilation to control exposure to asbestos fibers is recommended (see reverse side).

The work environment should be monitored to determine whether employee exposure exceeds OSHA threshold limit value in accordance with OSHA regulation 29 CFR Part 1910.1001.

Packages containing the Product should be labelled in accordance with OSHA regulation 29 CFR Part 1910.1001 (g) (2) as follows:

CAUTION
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

Standard industrial hygiene practices, including good housekeeping and vacuuming or wet cleaning work surfaces to prevent asbestos fibers from becoming airborne, should be instituted or implemented and maintained.

The foregoing data is submitted solely for your information, consideration, and investigation. Bendix makes no warranties, either express or implied, and assumes no responsibility for accuracy of the foregoing data.

See reverse side for Friction Materials Standards Institute's recommended procedures for reducing asbestos dust during brake servicing.

Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste.

Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits.

DISPOSAL OF FRICTION MATERIAL DUST AND WASTE

Dispose of vacuum cleaner waste and asbestos containing cleaning materials in plastic bags or other sealed containers, with the following warning label printed on the container:

Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious Bodily Harm

Use a NIOSH approved respirator when servicing vacuum cleaners, dust collectors, or handling any asbestos-containing waste materials.

Asbestos-containing waste materials must be collected, processed, packaged, transported and deposited in such fashion that no visible emissions are generated to the atmosphere. All wastes must be disposed of at sites operated in accordance with applicable laws and regulations.

EXHIBIT I

MATERIAL SAFETY DATA SHEET (1986)



**ALLIED CORPORATION
BENDIX FRICTION MATERIALS DIVISION
MATERIAL SAFETY DATA SHEET**

The following data may be used to comply with OSHA's Hazard Communication Standards 29 CFR 1910.1200. The OSHA Standards must, however, be consulted for specific requirements.

The Friction Material products identified in this Sheet meet the OSHA definition of an "article" and are exempt from the Hazard Communication Standard as to all reasonable uses. Some potential may, however, exist for exposure to asbestos dust.

The ingredients in these Friction Material products are resin-bonded and cured. Hazards normally associated with exposure to or contact with pure dusts of the listed ingredients are not expected to be significant. Allied has listed all of the essential ingredients present in a series of Friction Material products of this general description. All Friction Material products identified on this MSDS contain processed chrysotile asbestos fibers, but may contain some of the other materials shown. The recommended exposure limits are those for the most hazardous substance in a class of substances. Exact formulations are proprietary and therefore confidential. Precise product information will not be disclosed, other than in accordance with applicable laws and regulations, or without a written Secrecy Agreement.

Allied shall in no event be responsible for any damages of whatever nature or kind directly or indirectly resulting from or arising out of the publication or use of or reliance upon data contained herein. No express or implied warranty of any kind, including warranties of merchantability or fitness for use, with respect to the Friction Material products or to the data herein is made hereunder.

PRODUCTS — Bendix Friction Materials covered by this Material Safety Data Sheet can be identified from box labels or price lists as follows:

Drum Brake Segments and Blocks — "Friction King", "FK", "FKD", "D", "FKL", "L", "M", "AE", "E", "ED", "EM", "HP", "ST" and "S-1100".

Disc Brake Pads — "Organic" and "FK II" (semi-metallic).

Note: The "wearing surface" of "FK II" disc pads does not contain processed chrysotile asbestos fiber. However, processed chrysotile asbestos fibers may be included in the "backing layer" which is "sandwiched" between the friction material and the steel shoe plate.

SECTION I

Manufacturer's Name: **ALLIED CORPORATION**
Bendix Friction Materials Division
Address: P.O. Box 238
Troy, New York 12181

Emergency Telephone Number: **516-273-8550**
Date Prepared: **July 30, 1986**
Prepared by: **E.L. Rogers**

SECTION II — Hazardous Ingredients/Identity Information

Hazardous Component (Specify Chemical Identity Common Name(s))	OSHA	PEL	ACGIH	TLV
Asbestos (Chrysotile)	0.2 fiber/c.c.		2 fibers/c.c.	
Silica (as quartz)				
Silicate(s)	10 mg/m ³		10 mg/m ³	
Carbon Black	3.5 mg/m ³		3.5 mg/m ³	
Coke (Petroleum derived)	NA		NA	
Cured phenolic and cashew resins	10 mg/m ³		10 mg/m ³	
Graphite				
Iron, Zinc, Aluminum and their oxides				
* = Respirable Fraction as based upon the formula				
10 mg/m ³				
% Silica = 2 (See OSHA table Z-1000)				

SECTION III — Physical/Chemical Characteristics

Boiling Point	NA	Specific Gravity (H ₂ O = 1)	1.6 - 3.7
Vapor Pressure (mm Hg)	NA	Melting Point	NA
Vapor Density (Air = 1)	NA	Evaporation Rate	0
Solubility in Water	ND		
Appearance and Odor: Solid, Odorless, Light Tan to Dark Gray Color			

SECTION IV — Fire and Explosion Hazard Data

Flash Point (Method Used): NA Flammable Limits: NA LEL: NA UEL: NA
 Extinguishing Media: Water, (Class A, B, or C), Fog or Foam
 Special Fire Fighting Procedures: NA
 Unusual Fire and Explosion Hazards: NA

SECTION V — Reactivity Data

Stability

Unstable:	Conditions to Avoid: None Known
Stable: X	

Incompatibility (Materials to Avoid): None Known

Hazardous Decomposition or Byproducts: Incomplete combustion will create carbon monoxide and carbon dioxide

Hazardous Polymerization

May Occur	Conditions to Avoid: None Known
Will Not Occur: X	

SECTION VI — Health Hazard Data

Route(s) of Exposure:

Inhalation? Yes

Skin? Yes

Ingestion? Yes

Health Hazards (Acute and Chronic)

Some persons may be sensitive to partially cured phenolic or cashew resins and develop dermatitis-type reactions. Dusts of crystalline silica may produce silicosis. Metal dusts can be irritants of the eyes and upper respiratory system. There is little known evidence of chronic industrial poisoning from iron, aluminum, and zinc dusts.

Inhalation of concentrations of airborne asbestos fibers in excess of the OSHA limits may be hazardous to health and may cause serious bodily harm, such as asbestosis, lung cancer or mesothelioma. These diseases may not be recognized until many years after exposure. Medical literature indicates that people who smoke are of a significantly increased health risk when working with airborne asbestos fibers.

Carcinogenicity Listing:
Asbestos fibers

HTPP?
Yes

IARC Monographs?
Yes

OSHA Registered?
Yes

Signs and Symptoms of Exposure:

Partially Cured Cashew Resins — skin eruptions similar in appearance to poison ivy. Lung Effects from asbestos and crystalline silica — coughing, wheezing, shortness of breath, impaired pulmonary function. Dusts in eye may cause irritation. Gastrointestinal disturbances possible from ingestion.

Emergency and First Aid Procedures —

Should not be necessary from a proper handling of this Friction Material product.

SECTION VII — SPILL OR LEAK PROCEDURES

to be taken in case material is released or spilled:

Refer to Section IX (Special Precautions) below and "Recommended Procedures" on Page 4.

Waste Disposal Method:

Dispose of in proper receptacles appropriately labelled in accordance with applicable federal, state and local laws and regulations.

Place receptacles in an "Authorized Landfill" as designated by federal or state authorities.

SECTION VIII — Special Protection Information

Respiratory Protection (Specify Type): Not Required under normal conditions.

However, if concentration of airborne asbestos fibers in excess of the OSHA standard is created, respirators approved by NIOSH for asbestos fibers should be used.

Ventilation:

(during machining — including grinding and drilling)

Local Exhaust: Preferred

Mechanical (General): Not applicable

Protective Gloves Recommended

Eye Protection: Safety Glasses Suggested

Other Protective Equipment:

See paragraph 7 of Recommended Procedures on Page 4

SECTION IX — SPECIAL PRECAUTIONS

The Friction Material product, as shipped, is not considered hazardous, but machining (grinding and drilling) and/or normal use may create asbestos dust or airborne asbestos fibers in excess of OSHA standard and should be considered hazardous.

Recommended Precaution — If airborne asbestos fiber concentrations exceed OSHA limits, NIOSH approved respirators should be worn and proper engineering controls implemented. If product is ground or machined, local exhaust to control exposure to airborne asbestos fibers or dust is recommended. (See "Recommended Procedures" on Page 4.)

The work environment should be monitored to determine whether employee exposure exceeds OSHA permissible exposure level in accordance with OSHA regulation 29 CFR Part 1910.1001.

Packages containing the Friction Material Product should be labelled in accordance with OSHA regulation 29 CFR Part 1910.1001 (j) (2) as follows:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE
HAZARD**

Standard industrial hygiene practices, including good housekeeping and vacuuming or wet cleaning work surfaces to prevent asbestos fibers or dust from becoming airborne, should be instituted or implemented and maintained.

SEE REVERSE SIDE FOR FRICTION MATERIALS STANDARDS INSTITUTE'S RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING.

MATERIAL SAFETY DATA SHEET (1988)



ALLIED-SIGNAL INC.
BENDIX FRICTION MATERIALS DIVISION
MATERIAL SAFETY DATA SHEET

The following data may be used to comply with OSHA's Hazard Communication Standard 29 CFR 1910.1200. The OSHA Standard must, however, be consulted for specific requirements.

The Friction Material products identified in this Sheet meet the OSHA definition of an "article" and are exempt from the Hazard Communication Standard as to all reasonable uses. Some potential may, however, exist for exposure to asbestos dust.

The ingredients in these Friction Material products are resin-bonded and cured. Hazards normally associated with exposure to or contact with pure dusts of the listed ingredients are not expected to be significant. Allied-Signal has listed in Section II significant ingredients present in a series of friction material products identified below. All Friction Material products identified on this MSDS contain processed chrysotile asbestos fibers, but may contain some of the other materials shown. The recommended exposure limits are those for the most hazardous substance in a class of substances. Exact formulations are proprietary and therefore confidential. Precise product composition will not be disclosed, other than in accordance with applicable laws and regulations, or with a written Secrecy Agreement.

ALLIED-SIGNAL INC. MAKES NO EXPRESS OR IMPLIED WARRANTIES OF ANY KIND, INCLUDING WARRANTIES OF MERCHANTABILITY OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO THE FRICTION MATERIAL PRODUCTS OR DATA DESCRIBED HEREIN. Under no circumstances shall Allied-Signal, Inc. be responsible for damages of any nature whatsoever directly or indirectly resulting from or arising out of the publication, use or reliance upon the data contained herein.

PRODUCTS - Bendix Friction Materials covered by this Material Safety Data Sheet can be identified from box labels or price lists as follows:

Drum Brake Segments and Blocks - "Friction King", "FK", "FKO", "D", "FKL", "LT", "M", "AE", "E", "ED", "EM", "HP", "ST" and "S-1100".

Disc Brake Pads - "Organic" and "FK II" (semi-metallic).

Note: The "wearing surface" of "FK II" disc pads does not contain processed chrysotile asbestos fiber. However, processed chrysotile asbestos fibers may be included in the "backing layer" which is "sandwiched" between the friction material and the steel shoe plate.

SECTION I

Manufacturer's Name: ALLIED-SIGNAL INC.
Bendix Friction Materials Division
Address: P.O. Box 238
Troy, New York 12181

Emergency Telephone Number 518-270-0200
Date Prepared: July 30, 1986
Date Revised: March 1, 1988
Prepared: E.L. Rogers

SECTION II - Hazardous Ingredients/Identify Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA	FEL ACGIH	TLV
Asbestos (Chrysotile)	0.2 fiber/c.c.	2 fiber/c.c.	
Silica (as quartz)			
Silicates	10 mg/m ³	10 mg/m ³	
Carbon Black	3.5 mg/m ³	3.5 mg/m ³	
Coke (Petroleum derived)	NA	NA	
Cured phenolic and cashew resins	10 mg/m ³	10 mg/m ³	
Graphite			
Iron, Zinc, Aluminum and their oxides			
* Respirable Fraction as based upon the formula % Silica = 2 (See OSHA table Z-1000)			

SECTION III - Physical/Chemical Characteristics

Boiling Point	NA	Specific Gravity (H ₂ O = 1)	1.5 - 3.7
Vapor Pressure (mm Hg.)	NA	Melting Point	NA
Vapor Density (Air = 1)	NA	Evaporation Rate	0
Solubility in Water	NO		
Appearance and Odor: Solid, Odorless, Light Tan to Dark Grey Color			

SECTION IV — Fire and Explosion Hazard Data

Flash Point (Method Used): NA Flammable Limits: NA LEL: NA UEL: NA
 Extinguishing Media: Water (ABC Extinguisher), Fog or Foam
 Special Fire Fighting Procedures: NA
 Unusual Fire and Explosion Hazards: NA

SECTION V — Reactivity Data

Stability

Unstable

Conditions to Avoid: None Known

Stable

X

Incompatibility (Materials to Avoid): None Known

Hazardous Decomposition or Byproducts: Incomplete combustion will create carbon monoxide and carbon dioxide

Hazardous Polymerization

May Occur

Conditions to Avoid: None Known

Will Not Occur

X

SECTION VI — Health Hazard Data

Route(s) of Exposure:

Inhalation? Yes

Skin? Yes

Ingestion? Yes

Health Hazards (Acute and Chronic)

Some persons may be sensitive to partially cured phenolic or cashew resins and develop dermatitis-type reactions. Dusts of crystalline silica may produce silicosis. IARC has classified pure crystalline silica as a possible carcinogen. Metal dusts can be irritants of the eyes and upper respiratory system. There is little known evidence of chronic industrial poisoning from iron, aluminum, and zinc dusts.

Inhalation of concentrations of airborne asbestos fibers in excess of the OSHA limits may be hazardous to health and may cause serious bodily harm, such as asbestosis, lung cancer or mesothelioma. These diseases may not be recognized until many years after exposure. Medical literature indicates that people who smoke are at a significantly increased health risk when working with airborne asbestos fibers.

Carcinogenicity Listing:

NTP?

IARC Monographs?

OSHA Regulated?

Asbestos fibers
Crystalline silica

Yes
No

Yes
Yes

Yes
No

Signs and Symptoms of Exposure:

Partially Cured Cashew Resins — skin eruptions similar in appearance to poison ivy. Lung Effects from asbestos and crystalline silica — coughing, wheezing, shortness of breath, impaired pulmonary function. Dusts in eye may cause irritation. Gastrointestinal disturbances possible from ingestion.

Emergency and First Aid Procedures —

Should not be necessary from a proper handling of this Friction Material product.

SECTION VII — SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Refer to Section IX (Special Precautions) below and "Recommended Procedures" on Page 4.

Waste Disposal Method:

Dispose of in proper receptacles appropriately labelled in accordance with applicable federal, state and local laws and regulations.

Place receptacles in an "Authorized Landfill" as designated by federal or state authorities.

SECTION VIII — Special Protection Information

Respiratory Protection (Specify Type): Not Required under normal conditions.

However, if concentration of airborne asbestos fibers in excess of the OSHA standard is created, respirators approved by NIOSH for asbestos fibers should be used.

Ventilation:

(during all operations which might generate dust—
including grinding and drilling)

Local Exhaust: Preferred

Mechanical (General): Not applicable

Protective Gloves (e.g., cotton, canvas, etc.) should be worn

Eye Protection: Safety Glasses should be worn

Protective Equipment:

See paragraph 7 of Recommended Procedures on Page 4

SECTION IX — SPECIAL PRECAUTIONS

The Friction Material product, as shipped, is not considered hazardous, but machining (grinding and drilling) and/or normal use may create asbestos dust or airborne asbestos fibers in excess of OSHA standard and should be considered hazardous.

Recommended Precaution — If airborne asbestos fiber concentrations exceed OSHA limits, NIOSH approved respirators should be worn and proper engineering controls implemented. If product is ground or machined, local exhaust to control exposure to airborne asbestos fibers or dust is recommended. (See "Recommended Procedures" on Page 4.)

The work environment should be monitored to determine whether employee exposure exceeds OSHA permissible exposure level in accordance with OSHA regulation 29 CFR Part 1910.1001.

Packages containing the Friction Material Product should be labelled in accordance with OSHA regulation 29 CFR Part 1910.1001

(1) (2) as follows:

HAZARD
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE
HAZARD

Standard industrial hygiene practices, including good housekeeping and vacuuming or wet cleaning work surfaces to prevent asbestos fibers or dust from becoming airborne, should be instituted or implemented and maintained.

SEE REVERSE SIDE FOR FRICTION MATERIALS STANDARDS INSTITUTE'S RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING.

RECOMMENDED PROCEDURES FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

While most friction materials used for brake service may still contain asbestos, many suppliers are now replacing asbestos with steel, mineral, and/or synthetic fibers. The OSHA regulations refer directly to the asbestos used in friction materials. However, since the long term medical effects of the non-asbestos fibers are unknown, it is suggested that exposure levels be controlled for all replacement friction materials.

1. The OSHA regulations on asbestos exposure emphasize two levels for airborne concentrations of asbestos. These levels determine (1) if the workplace is in compliance with the regulations, and (2) if not, what action must be taken.

(1) The Permissible Exposure Level (PEL): 0.2 fiber per cc, 8 hour time weighted average (TWA).

(2) The Action Level: 0.1 fiber per cc 8 hour TWA. (The regulation is not activated if fiber exposure remains below 0.1 fiber per cc).

If certain precautions are taken, it is believed that the workplace can be maintained at levels below the Action Level, and if this is the case, several requirements of the OSHA regulations may be avoided. Monitoring of these levels is required where exposure is or may be expected to exceed the Action Level.

2. Areas where brakes are serviced should be set aside. If concentrations exceed the permissible exposure level (PEL), a "regulated area" must be established which restricts occupancy to authorized personnel. Where a "regulated area" is designated a warning sign must be displayed at each entrance to the area:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

3. When removing worn friction materials or cleaning used brake parts, remove the accumulated dust with a vacuum cleaner equipped with a High Efficiency Particulate Air (HEPA) filter. If removing accumulated dust or other debris from the brake assembly, alternate wet methods may be used: (a) Compressed air solvent bottle system where parts are sprayed with a mist and the wetted particles are removed with a wet rag, or (b) Solvent spray-mist with final clean-up with a wet rag. Do not use compressed air or dry brushing for cleaning unless the assembly is enclosed and properly exhausted. (Refer to OSHA Asbestos Regulations, CFR Title 29, Part 1910.1001, Appendix F).

4. Whenever possible, purchase friction materials pre-ground and ready for installation. If machining is

necessary, there is the possibility that the permissible exposure level (PEL) may be exceeded, in which case respirator protection is required. There must be local exhaust ventilation such that worker exposures are maintained below the PEL. Local exhaust ventilation consists of dust collection hoods or enclosures connected by duct or piping to a collection filter and suction source.

5. In certain grinding operations, where concentrations cannot be reduced below the permissible exposure level (PEL), a respirator program shall be used. The respirator must be one approved by the National Institute for Occupational Safety and Health (NIOSH) for the concentrations encountered. Respirators may also be required during certain maintenance, start-up or emergency situations where engineering controls cannot maintain concentrations below the PEL. Where a regulated area is designated for concentrations exceeding the PEL, approved respirators with high efficiency filters must be worn.

6. Industrial vacuum cleaner bags containing asbestos dust, cloths used for wiping brake assemblies, used cartridges from respirators, and disposable work clothing should be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

All asbestos waste should be disposed of in accordance with OSHA and EPA asbestos regulations and local ordinances.

7. Good housekeeping is essential in a workplace where asbestos-containing materials are handled. Industrial vacuum cleaners equipped with High Efficiency Particulate Air (HEPA) filters should be used for removing accumulations of asbestos dust and waste. Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

8. Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. If the PEL is exceeded, protective clothing must be worn. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Do not take work clothes home. Laundering of asbestos contaminated clothing shall be done so as to prevent release of airborne asbestos fibers in excess of the permitted exposure level.

CAUTION: DO NOT BREATHE ASBESTOS DUST

EXHIBIT J

DANGER
CONTAINS ASBESTOS
FIBERS
AVOID CREATING DUST
CANCER AND LUNG
DISEASE HAZARD



AlliedSignal

FRICTION MATERIALS
Green Island, N.Y. 12183

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD