

NIOSH RECOMMENDED PROCEDURES FOR ASBESTOS BRAKE AND CLUTCH SERVICING

1. All procedures performed in a restricted area of facility. Entrances posted with an asbestos exposure warning sign.
2. Respiratory protection during all servicing operations. MESA and NIOSH approved air purifying respirators.
3. Loose wear dust to be removed by well maintained shop vacuum. After vacuum cleaning, remaining material removed with water soaked rag.
4. All new lining grinding machines provided with local exhaust ventilation.
5. All floor and equipment cleaning performed with high efficiency shop vacuum.
6. Vacuum cleaner bag and all other waste sealed in plastic bags and labeled asbestos warning label.

PRELIMINARY

Sumas 7-20

*Y-20
(14)*

PRELIMINARY

TYPES OF FACILITIES PERFORMING AUTOMOTIVE BRAKE REPAIR

GARAGE TYPE	APPROXIMATE # FACILITIES	PERCENTAGE OF BRAKE WORK PERFORMED
Service Stations	195,000	~ 50
Independent Gar- ages	108,000	~ 30
New Car Shops	39,000	~ 18
Fleet Shops	21,000	1-2

NIOSH Estimates That More Than 900,000 U.S. Workers
Are Potentially Exposed To Brake Wear Dust

PRELIMINARY

SUMMARY OF BRAKE REPAIR JOBS FOR 1975

VEHICLE AND JOB TYPE	MILLIONS OF WHEELS SERVICED
<u>Automobiles</u>	
New Shoes Installed	12.7
Relined Shoes Installed	38.3
Disc Brake Pad Sets Re- placed	16.9
<u>Trucks</u>	
Brakes Relined	7.4
New Brakes Installed	2.5

SUMMARY OF FIBER EXPOSURES IN GARAGES AS
DETERMINED BY OPTICAL MICROSCOPY

PRELIMINARY

FIBER CONCENTRATION (FIBERS > 5µm/cc)					
EXPOSURE SUMMARY	GARAGE SURVEYED				
	A	B	C	D	E
<u>Mechanic's Exposure</u>					
Mean Daily TWA*	0.11	0.13	0.12	0.10	0.12
Range of Daily TWA	0.08+0	0.11+0	0.05+0	0.04+0	---
Values	0.12	0.15	0.19	0.18	---
<u>Garage General Air</u>					
<u>Concentrations</u>					
Mean Daily TWA	0.07	0.09	0.05	0.07	0.04
Range of Daily TWA	---	---	---	---	---
Values					
Highest Peak Concentration Observed	0.58	2.33	0.72	15.33	0.16

*TWA = Time-weighted-average. NIOSH Recommended TWA = 0.10
fibers > 5µm/cc

PRELIMINARY

SUMMARY OF FIBER CONCENTRATIONS

RENEWING USED BRAKE AND CLUTCH ASSEMBLIES

FIBER CONCENTRATION(FIBERS > 5 um/cc)					
FACILITY	RECEIVING & CLEANING	BONDING & RIVETING	CUTTING & GRINDING	INSPECTION & PACKAGING	
A					
MEAN CONCENTRATION	1.1	0.6	1.1	0.7	
RANGE	0.4-4.8	0.2-1.4	0.8-1.6	6.8-1.1	
# SAMPLES ()	(15)	(20)	(6)	(4)	
B					
MEAN CONCENTRATION	4.0	2.7	5.0		
RANGE	1.0-7.6	1.1-5.8	1.5-9.3	-----	
# SAMPLES ()	(5)	(6)	(6)		
C					
MEAN CONCENTRATION	1.3		0.8		
RANGE	1.2-1.3	-----	0.6-1.3	-----	
# SAMPLES ()	(2)		(2)		

NIOSH Recommended Standard = 0.10 fibers >5µm/cc

**SUMMARY OF ASBESTOS FIBER EXPOSURES IN FRICTION PRODUCT
PRODUCTION FACILITIES AS DETERMINED BY OPTICAL MICROSCOPY**

FIBER CONCENTRATION (FIBERS > 5µm/cc)					
PLANT	MIXING & FORMING	HOT PRESS- ING & CURING	GRINDING, CUTTING & DRILLING	BONDING & RIVETING	INSPECTION & PACKAGING
^A MEAN CONC RANGE # SAMPLES ()	0.7 0.0-2.5 (29)	0.6 0.0-3.8 (19)	0.8 0.0-3.6 (39)	0.4 0.0-1.3 (9)	2.3 0.0-10.3 (32)
^B MEAN CONC RANGE # SAMPLES ()	1.7 0.0-8.4 (59)	1.2 0.2-7.0 (44)	2.2 0.0-17.5 (72)	1.5 0.3-5.7 (13)	1.2 0.1-4.6 (32)
^C MEAN CONC RANGE # SAMPLES ()	9.9 1.5-18.4 (19)	5.2 2.7-7.4 (10)	6.6 1.1-22.1 (40)	-----	5.1 0.7-11.1 (4)
^D MEAN CONC RANGE # SAMPLES ()	0.8 0.1-2.0 (5)	1.1 1.0-1.3 (2)	2.3 0.4-20.5 (15)	0.2 ----- (1)	0.9 0.1-3.4 (6)

SUMMARY OF ASBESTOS FIBER EXPOSURES IN FRICTION PRODUCT
PRODUCTION FACILITIES AS DETERMINED BY OPTICAL MICROSCOPY

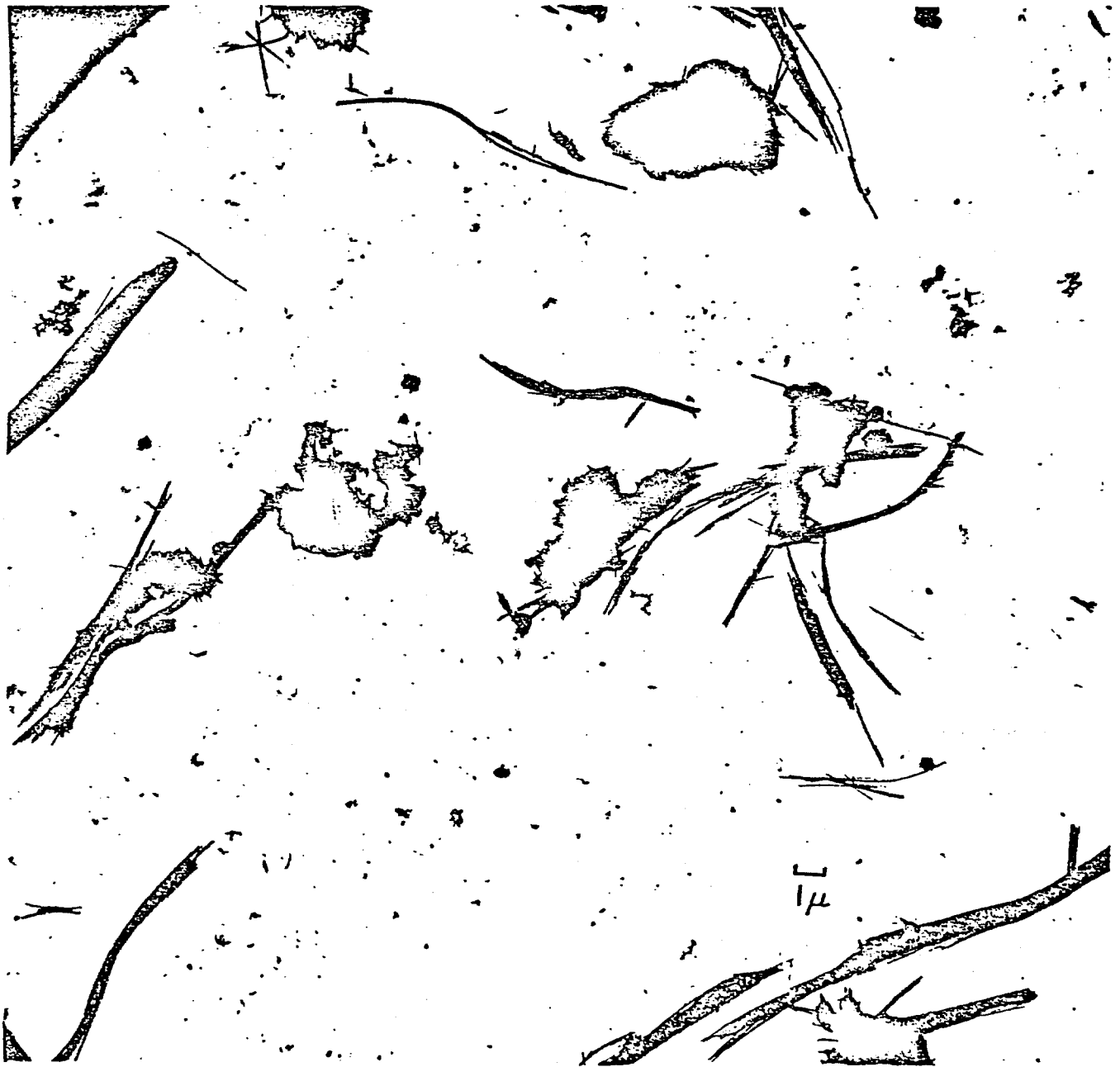
FIBER CONCENTRATION (FIBER > 5µm/cc)					
PLANT	MIXING & FORMING	HOT PRESS- ING & CURING	GRINDING, CUTTING & DRILLING	BONDING & RIVETING	INSPECTION & PACKAGING
^E MEAN CONC RANGE # SAMPLES ()	4.5 0.6-16.2 (10)	1.8 0.3-3.7 (14)	5.8 0.6-14.4 (11)	-----	2.9 0.5-5.4 (7)
^F MEAN CONC RANGE # SAMPLES ()	7.1 0.3-77.5 (23)	11.9 0.1-3.6 (20)	9.2 0.2-61.8 (14)	0.21 ----- (1)	19.0 0.5-105.0 (14)

NIOSH Recommended TWA = 0.1 Fibers > 5µm/cc

COMPARISON OF AIRBORNE FIBER LENGTHS IN **PRELIMINARY**
FRICTION PRODUCT OPERATIONS

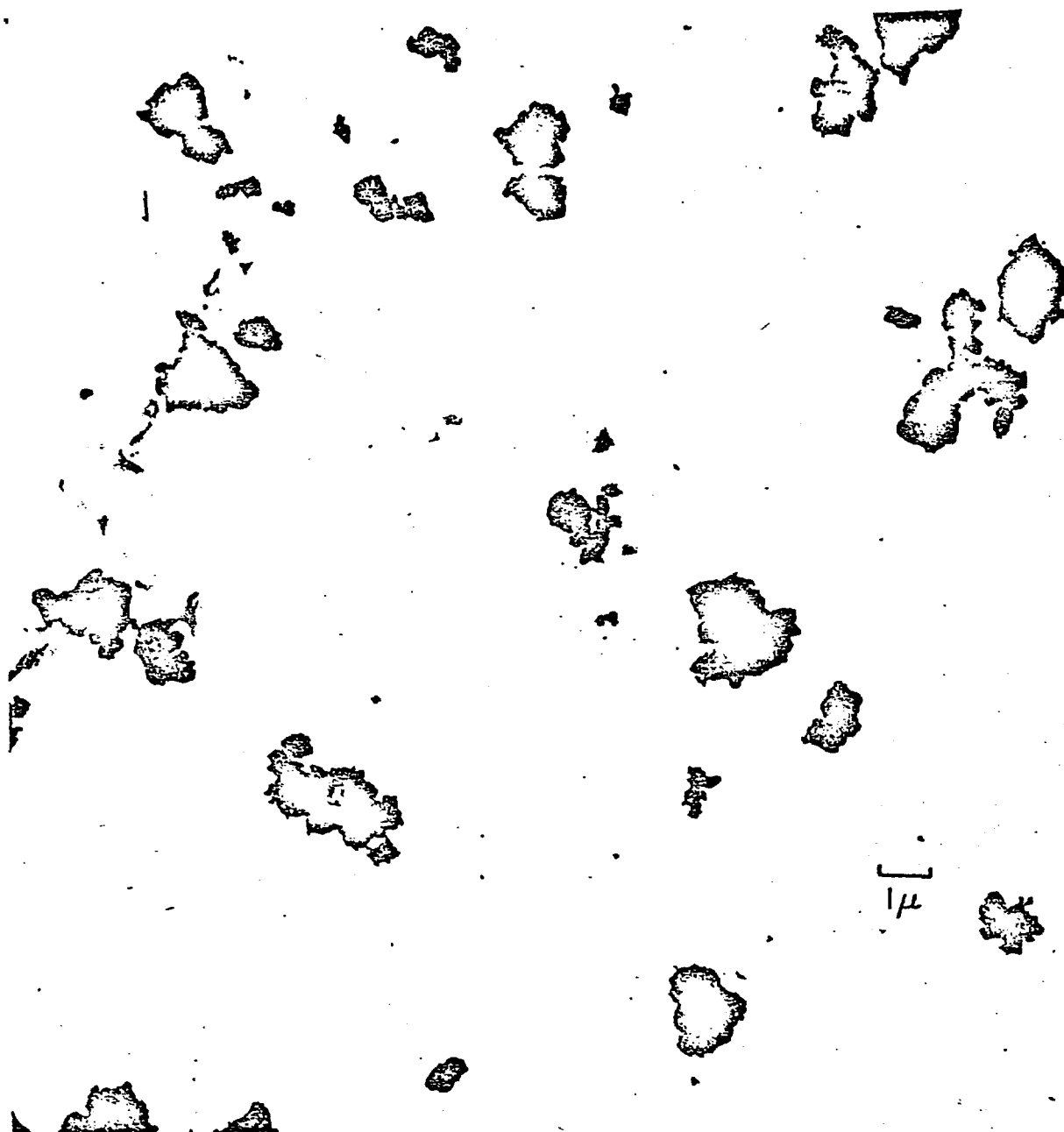
INDUSTRY AND OPERATION	GEOMETRIC MEAN μM	% OF FIBERS > $5\mu\text{M}$
PRODUCT MFG.		
RAW MATERIAL MIXING	1.3	9.8
PRODUCT FORMING	1.4	9.2
FINISHING	1.8	17.2
GARAGE REPAIR OPERATIONS		
BRAKE MECHANIC	<1.0	<1

AIRBORNE PARTICULATES IN FRICTION
PRODUCT PRODUCTION FACILITY



PRELIMINARY.

AIRBORNE PARTICULATE IN GARAGE
PERFORMING BRAKE REPAIR



PRELIMINARY

PRELIMINARY

**PRELIMINARY RESULTS OF GARAGE
LEAD EXPOSURE STUDIES**

	LEAD CONCENTRATION $\mu\text{g}/\text{m}^3$
Peak Exposure Using Compressed Air For Cleaning Wear Dust	2,660*
Brake Reassembly	20
Garage General Air	10

* - These values do not represent time-weighted-
average exposures

OSHA Proposed Lead TWA = $100 \mu\text{g}/\text{m}^3$

SUMMARY OF LEAD EXPOSURES IN FRICTION
PRODUCT PRODUCTION FACILITIES

PRELIMINARY

LEAD CONCENTRATION ($\mu\text{g}/\text{m}^3$)					
PLANT	MIXING & FORMING	HOT PRESS- ING & CURING	GRINDING, CUTTING & DRILLING	BONDING & RIVETING	INSPECTION & PACKAGING
A MEAN CONC RANGE # SAMPLES ()	28 <1-89 (4)	2 <1-3 (4)	8 4-15 (6)	4 2-6 (2)	5 <1-8 (4)
B MEAN CONC RANGE # SAMPLES ()	7 2-11 (6)	19 2-55 (4)	4 3-7 (6)	4 2-6 (2)	3 <1-5 (4)
C MEAN CONC RANGE # SAMPLES ()	729 2-7000 (22)	8 3-16 (4)	6 1-11 (7)	-----	6 2-10 (2)

Proposed OSHA Lead TWA = $100 \mu\text{g}/\text{m}^3$

SUMMARY OF LEAD EXPOSURES IN FACILITIES
PRELIMINARY RENEWING USED BRAKE AND CLUTCH ASSEMBLIES

LEAD CONCENTRATION ($\mu\text{g}/\text{m}^3$)				
FACILITY	RECEIVING & CLEANING	BONDING & RIVETING	CUTTING & GRINDING	INSPECTION & PACKAGING
A MEAN CONCENTRATION RANGE # SAMPLES ()	187 60-700 (15)	79 40-170 (20)	77 50-100 (6)	77 40-70 (4)
B MEAN CONCENTRATION RANGE # SAMPLES ()	34 6-80 (5)	9 2-41 (6)	16 2-57 (5)	-----
C MEAN CONCENTRATION RANGE # SAMPLES ()	3 2-4 (2)	-----	3 2-4 (2)	-----

OSHA Proposed TWA = 100 $\mu\text{g}/\text{m}^3$

SUMMARY OF LEAD EXPOSURES IN FRICTION PRELIMINARY
PRODUCT PRODUCTION FACILITIES

LEAD CONCENTRATION ($\mu\text{g}/\text{m}^3$)					
PLANT	MIXING & FORMING	HOT PRESS- ING & CURING	GRINDING, CUTTING & DRILLING	BONDING & RIVETING	INSPECTION & PACKAGING
D MEAN CONC RANGE # SAMPLES ()	4 1-12 (4)	3 2-4 (3)	14 1-77 (6)	<2 1-3 (4)	-----
E MEAN CONC RANGE # SAMPLES ()	17 3-45 (4)	2 2-2 (3)	5 <1-17 (4)	-----	3 1-5 (4)
F MEAN CONC RANGE # SAMPLES ()	3 1-4 (2)	<1 <1-1 (4)	1 1-2 (5)	-----	3 <1-8 (4)

Proposed OSHA Lead TWA = 100 $\mu\text{g}/\text{m}^3$