Monsanto

FROM (NAME LOCATION PHONE) J. J. Murphy Dept. of Medicine & Environmental Health A2SC (4-2746)

DATE November 3, 1980

SUBJECT Transite

REFERENCE Asbestos Exposure

TO J. E. Fox, 1890

cc C. Buckley - 1740
P. Easterday - 1740
J. Edwards - 1200
D. Farnes - 1850
J. Fox - 1890
C. Harada - 1090
R. Martin - 1220
J. Williams - 1200
J. Wolfsberger - 1760
B. W. Eley - A2SG
H. M. Keating - G4WA
DMEH Central File

Per your request, attached is a MSDS on Transite manufactured by Johns-Manville and a booklet on "Recommended Work Practices for Field Fabriaction of Asbestos Cement Sheet".

As indicated on the MSDS, this specific Transite material contains from 35-40% Chrysotile Asbestos Fiber by weight. The Director of Johns-Manville's industrial hygiene section indicated they have done quite a bit of sampling during the fabrication of their product (cutting, drilling, sanding, etc.) to determine what were the normal ranges of personnel exposures. He indicated the following were "ball park" personnel exposures for the various tasks:

Transite Fabrication with No Wetting and No Ventilation

Job Task	Normal Range of Exposures
1. Skil Power sawing with masonry blade	10-15 fibers/cc
2. Drilling horizontally (produces chips rather than dust)	<2 fibers/cc
3. Filing of a cut edge	
By hand w/coarse file	<2 fibers/cc
With power sander	10-15 fibers/cc

I would recommend that you write to the Asbestos Information Association and purchase additional booklets to provide the appropriate maintenance, CED and contractors who would be field fabricating Transite.

If you have any questions, call.

James J. Murphy

PLAINTIFF'S EXHIBIT

MON-2545

JJM:sml

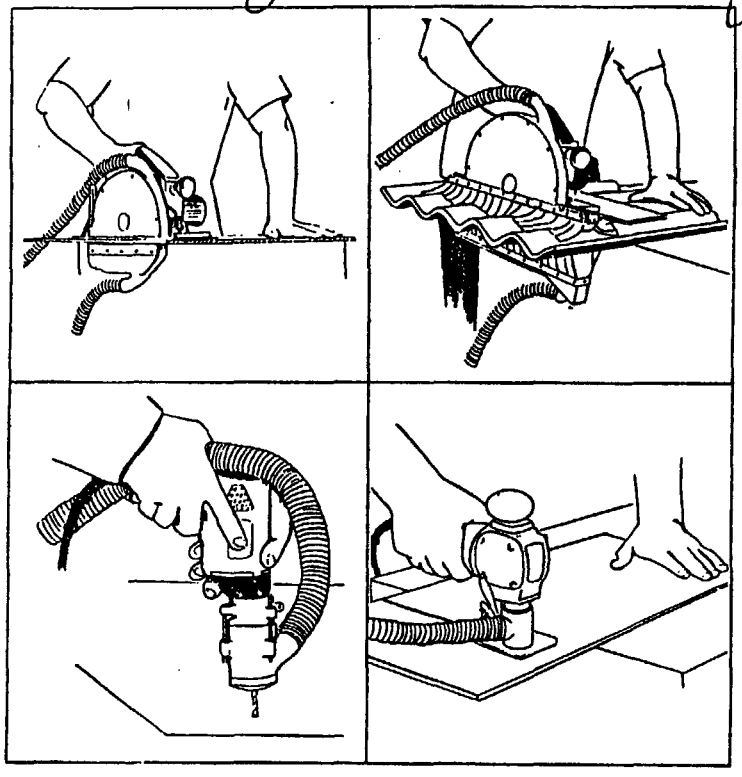
Enclosure: MSDS on Transite
Copy of booklet on Asbestos-Cement Sheet

IN-10M (REV 2/78) 163

C 003270

LAM022930

ASBESTOS INFORMATION ASSOCIATION
1745 Jefferson Davis Highway,
Arlington, Virginia 22202



Recommended Work Practices for Field Fabrication of Asbestos-Cement Sheet

Contents

Introduction

The Occupational Safety and Health Act in the United States and similar laws in Canada and other countries were enacted to ensure every worker, as far as possible, a safe and healthy work place. This legislation is far-reaching. It covers millions of employees and nearly every employer.

To assist in assuring compliance with these laws, the asbestos-cement industry is disseminating information regarding the hazards of exposure to airborne asbestos. One means of reducing hazards of exposure is to reduce the exposure through good work practices.

Good work practices is what this booklet is about. The recommendations that appear on the following pages were developed through study and field testing. They are designed to achieve safer and more healthful job site conditions when working with asbestos-cement (A/C) sheet products. Since field conditions will vary, adherence to these work practices will not necessarily guarantee compliance with national, state or local regulations. Questions relating to compliance should be directed to appropriate regulatory agencies.

The Asbestos Information Association/North America believes this booklet will help engineers, superintendents, contractors, foremen and crews to understand procedures for the safer handling and fabrication of A/C sheet products.

This booklet supersedes AIA/NA recommended work practices for field fabrication of asbestos sheet products previously distributed in 1975.

January 25, 1980

Asbestos and Health

Airborne asbestos fiber has been indentified as a possible health hazard. Inhalation of these fibers in excessive quantities may cause pulmonary disease. But like the automobile, electricity and x-rays, there are non-harmful ways to use potentially harmful things.

Asbestos-cement (A/C) sheet products contain 15% to 40% asbestos. The asbestos fibers are not free, but "locked-in" the cement binder, like reinforcing rods in concrete. The distinction between "free" and "bound" asbestos is extremely important. First of all, it determines the probability of fiber release, which in turn, directly relates to the probability of risk. More importantly, it explains clearly and simply why A/C sheet is a proper use of asbestos.

The present state of scientific learning on asbestos shows that minimizing exposure to airborne asbestos dust reduces the hazards of asbestos-related disease. During the use and handling of A/C sheet, the only time that fibers may be released in significant quantities from a health standpoint, is during fabrication operations when sufficient mechanical energy is applied to the product to literally "tear" the fibers from the cement binder. One means of reducing airborne fiber generation is through good work practices.

Summary of OSHA Asbestos Standard

Under the current OSHA standard for occupational exposures to asbestos, it is the employer's responsibility to assure that exposure of employees to airborne concentrations of asbestos fibers does not exceed the following "permissible exposure levels":

a. Eight-hour time-weighted average: Two fibers, longer than 5 micrometers, per cubic centimeter.
b. Ceiling concentrations: Ten fibers, longer than 5 micrometers, per cubic centimeter.

In October 1975, OSHA proposed a revision to the current standard which would reduce the eight-hour time-weighted average exposure to 0.5 fibers per cubic centimeter of air and ceiling concentrations to 5.0 fibers per cubic centimeter. OSHA specifically excluded the construction industry from coverage within that proposal. In their notice, OSHA stated that a separate standard would be proposed to cover workers who handle asbestos-containing products in the construction industry.

The work practices recommended in this booklet are based on data for "peak dust concentrations" representing short time periods of maximum exposure. Field fabricating operations involving the cutting of A/C sheet are normally infrequent and of short duration. Using these recommended work practices, which will maintain fiber levels below OSHA allowable ceiling concentrations, it is improbable that field personnel would be exposed in a typical working day to levels exceeding the current OSHA eight-hour time-weighted average permissible exposure limit.

For full text of OSHA standard for occupational exposure to asbestos dust (29 CFR 1910.1001) refer to Appendix B.

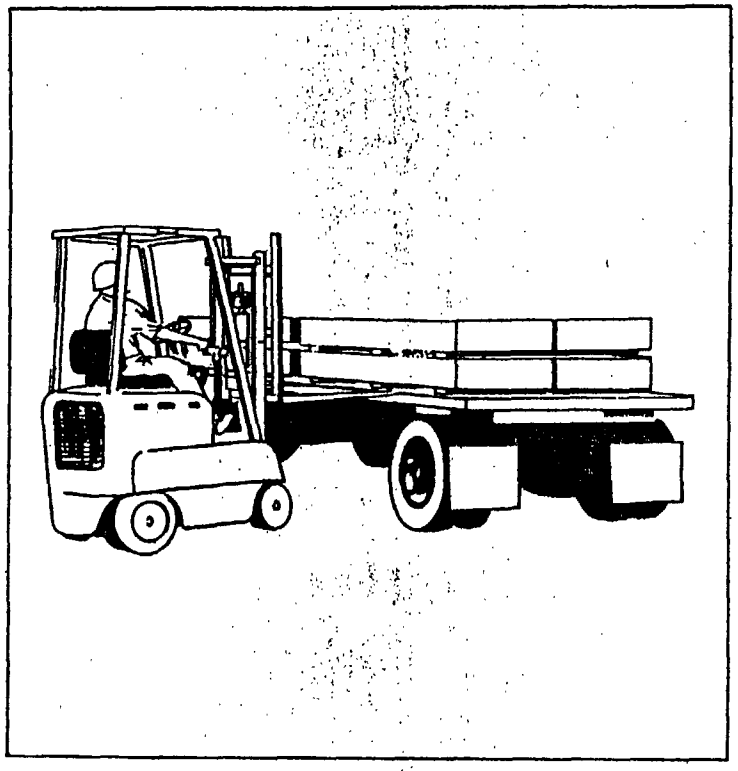
Products and Operations

The following work practices are applicable to flat and corrugated A/C sheet products:

Operations to which these work practices apply include:
Shipping, Receiving and Handling
Cutting
Drilling
Hole Cutting and Cutouts
Housekeeping and Waste Disposal

Equipment used with these work practices is available from the sources shown in the equipment list (page 17).

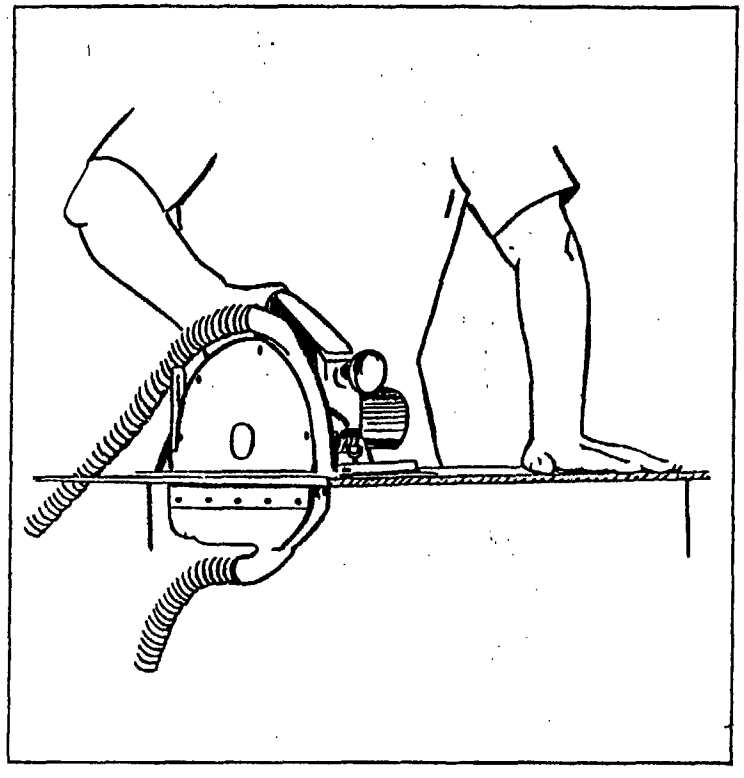
Shipping, Receiving and Handling



A/C sheet is shipped from the factory with clean surfaces, generally in pallet loads, using shipping methods acceptable to the producer and the customer.

All unloading operations should be carefully performed to avoid sheet damage. Pallet loads are normally unloaded by fork truck. Small shipments may require manual unloading.

Cutting — Flat Sheets Circular Saw



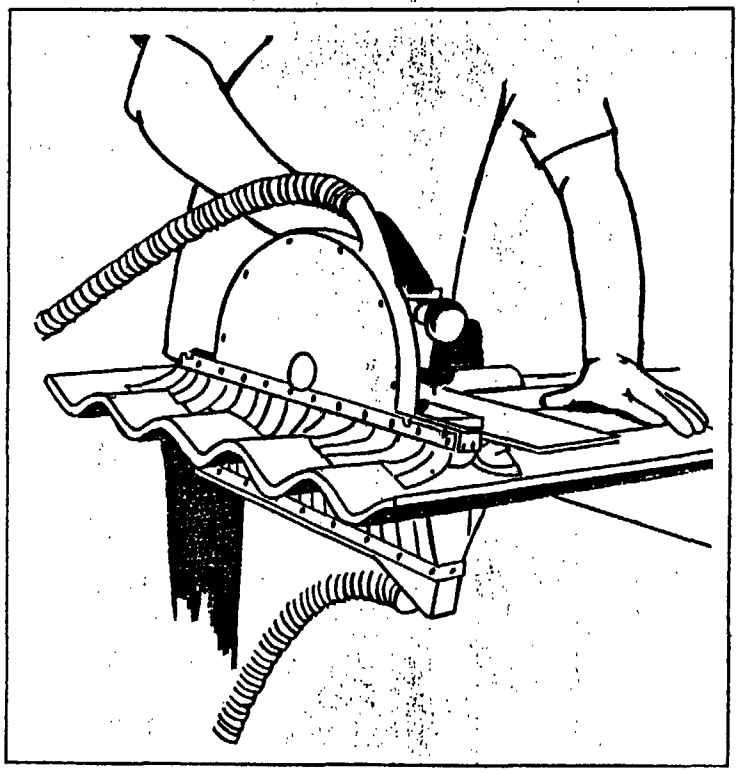
Circular Saw With Dust Collection Hood

Circular saws for cutting flat sheets should be used *only* when equipped with the specific dust collection hoods pictured above. Exhaust ventilation and dust collection is provided by a vacuum cleaner as described in the specifications (page 15).

A circular saw cuts by a "pulverizing" action which releases asbestos fibers and fine particulate. The combination of hood and vacuum source is highly effective in capturing and collecting these particles and fibers. Saw operating techniques are those normally employed. No special procedures are required except adjustment of the lower hood section to suit thickness of sheet being cut. Saw design requires the use of blades recommended by the tool supplier (abrasive disc or diamond).

For additional information on saw operation, refer to the supplier's instructions in Appendix A.

Cutting — Corrugated Sheets
Circular Saw



Circular Saw With Dust Collection Hood

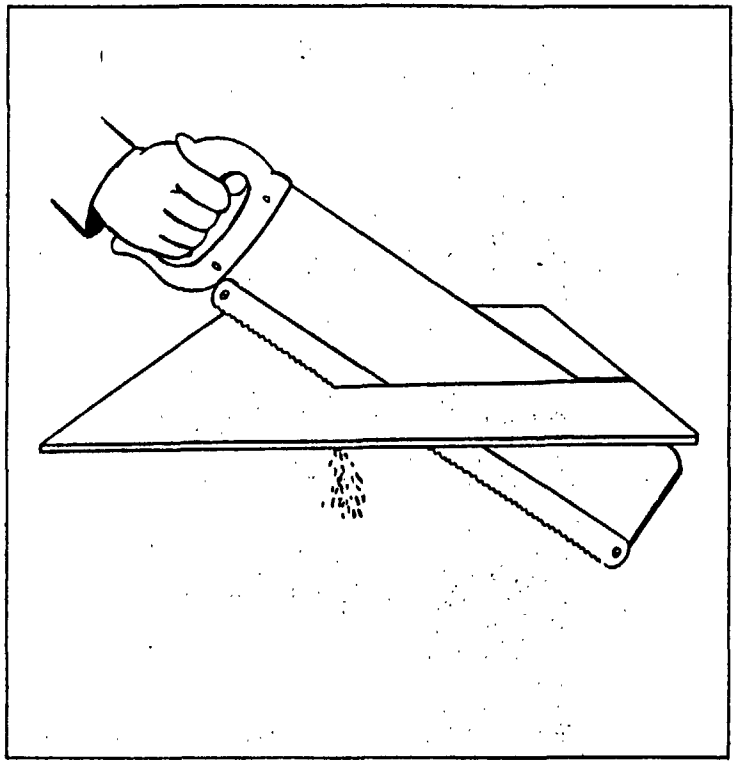
Circular saws for cutting corrugated sheets should be used *only* when equipped with the specific dust collection hood pictured above. Exhaust ventilation and dust collection is provided by a vacuum cleaner as described in the specifications (page 15).

A circular saw cuts by a "pulverizing" action which releases asbestos fibers and fine particulate. The combination of hood and vacuum source is highly effective in capturing and collecting these particles and fibers. Saw operating techniques are those normally employed. Saw design requires the use of blades recommended by the tool supplier (abrasive disc or diamond).

This tool depends on pliable "fingers" to seal the cutting zone and is designed for use on sheets with 1½" deep corrugations. For cutting sheets with deeper or irregular corrugations, consult the tool supplier.

For additional information on saw operation, refer to the supplier's instructions in Appendix A.

Cutting
Handsaw

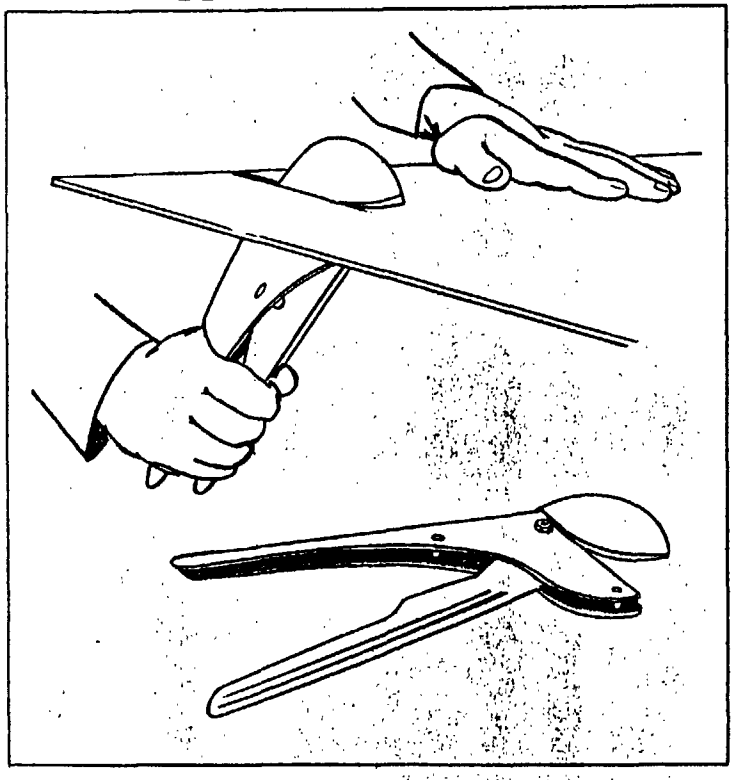


Handtools — Handsaw

This is a handsaw equipped with a carbide blade designed for cutting asbestos-cement sheet. Practical use of this saw is limited by its slow cutting speed. It is most useful in operations where cutting is infrequent and of short duration.

Because of the slow cutting speed, saw operation generates course particles of asbestos-cement with few airborne fibers. Its use does not require dust collection equipment for compliance with present exposure limits.

Cutting — Flat Sheets
Hand Clippers

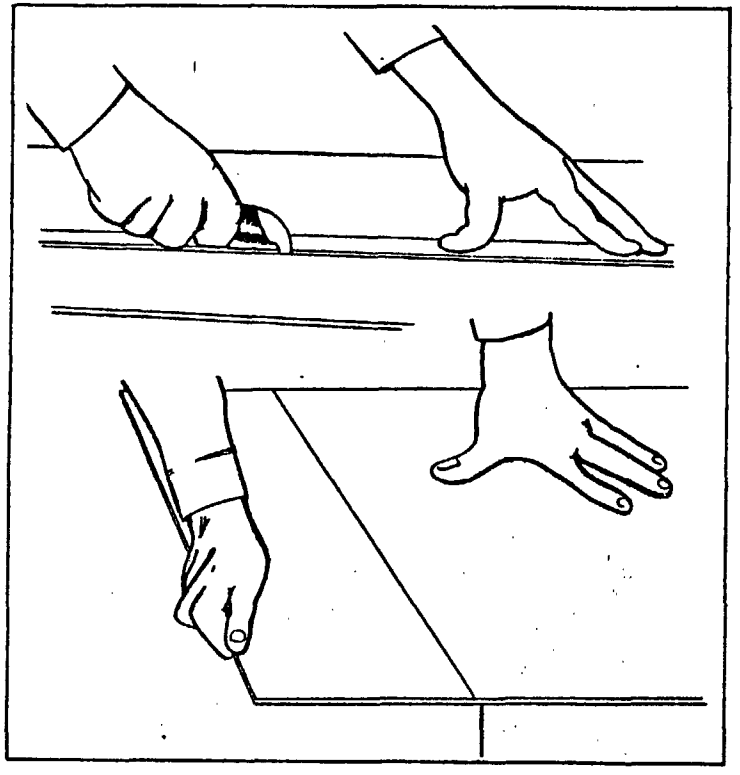


Handtools — Hand Clippers

These hand clippers are designed for cutting sheet material up to ¼" in thickness. Practical use is limited by slow cutting speed. It is most useful in operations where cutting is infrequent and of short duration.

The clipper cutting action generates coarse particles of asbestos-cement with few airborne fibers. Its use does not require dust collection equipment for compliance with present exposure limits.

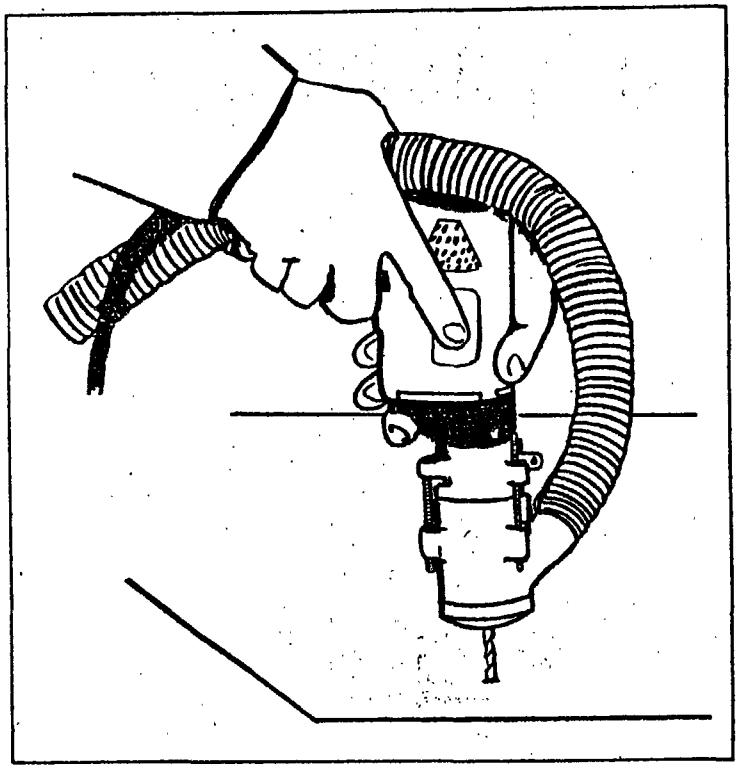
Cutting — Flat Sheets
Score & Snap Knife



Handtools — Scoring Knife

The scoring knife can be used with sheets up to ¼" in thickness. However, it performs best with sheets 1/8" and 3/16" thick. The sheet is placed on a worktable or saw horses. A suitable guide bar is placed or clamped along the cut line and the sheet scored repeatedly. After scoring, the sheet is hand snapped along the score line. This cutting procedure generates little dust and few airborne fibers. Its use does not require dust collection equipment for compliance with present exposure limits.

Drilling
Power Drill



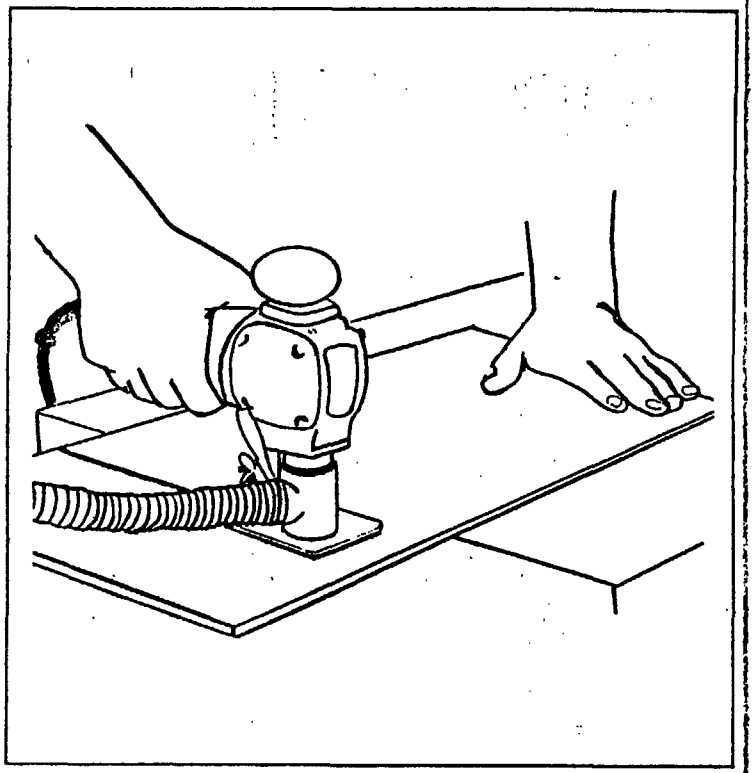
Drill With Dust Collection Hood

Drilling of small holes (¼" or less) on vertical surfaces, or downward usually can be done without dust collection equipment and in compliance with present exposure limits.

Drilling of larger holes, and drilling overhead, requires dust collection equipment on the drill in order to achieve compliance. Equipment includes a hood (Cape Universal Building Products, Ltd.) and vacuum cleaner to provide exhaust ventilation and dust collection. Vacuum cleaner should be as described in specifications (page 15).

Drilling techniques are those normally employed. No special procedures are required.

Hole Cutting and Cutouts
Flat Sheets — Sabre Saw



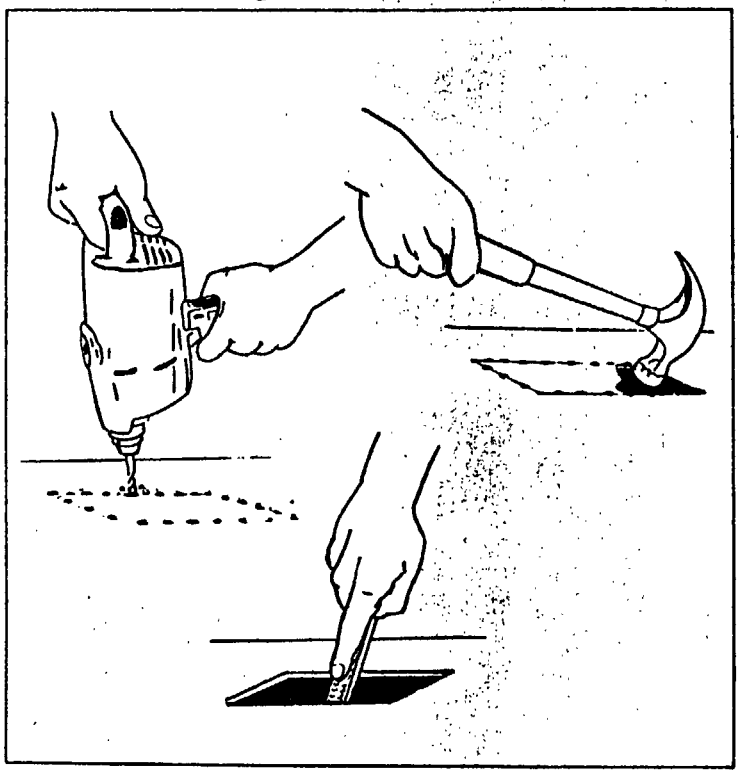
Sabre Saw With Dust Collection Hood

Sabre saws should be used *only* when equipped with the specific dust collection hood pictured above. Exhaust ventilation and dust collection is provided by a vacuum cleaner as described in the specifications (page 15).

Saw operating techniques are those normally employed. No special procedures are required.

For additional information on saw operation, refer to supplier's instructions in Appendix A.

Hole Cutting and Cutouts Drill and Rasp



A simple method of making cutouts is to drill small holes around the edge of the opening to be cut and knocking out the material to be removed with a hammer. A rasp is used to dress or bevel edges of the cut.

This procedure does not require dust collection equipment for compliance with present exposure limits.

Housekeeping and Waste Disposal

Housekeeping is an essential part of any safe construction operation. It is even more essential when airborne dust created by the *lack* of good housekeeping has the potential for harm to employees and others.

EQUIPMENT: All external surfaces of equipment should be maintained free of dust accumulations that might, if dispersed, create asbestos fiber concentrations above permissible exposure limits.

WASTE DISPOSAL: Asbestos-cement dust chips and cuttings from the field operations described in this booklet must be collected in a manner that will not contribute airborne asbestos dust to the atmosphere. *Loose material should never be dry swept.* When vacuum equipment is available, it should be used. Water or other dust suppressants should be applied in those circumstances where sweeping is unavoidable. DO NOT BLOW WASTE MATERIAL WITH COMPRESSED AIR.

No visible emissions to the atmosphere are permitted from the collection, processing, packaging, transporting or deposition of any asbestos-containing material. Wastes must be collected and disposed in accordance with the requirements of the U.S. Environmental Protection Agency. For full text of EPA waste disposal requirements (40 CFR, Chapter 1, Part 61) refer to Appendix C.

Vacuum Cleaner Specifications

(Values shown below are minimum recommended)

Circular Saw — Flat and Corrugated Sheet Cutting

Vacuum (lift):	59" W.G. (water gage)
Airflow:	175 SCFM (standard cubic feet per minute)
Filtration System:	Multi-stage, designed for use with asbestos-containing dusts.
Dust Collection:	Unit must be provided with, or capable of using, a disposable plastic or paper bag for collecting and removing dust.

Sabre Saw and Drill

Vacuum (lift):	59" W.G.
Airflow:	65 SCFM
Filtration System:	See Above
Dust Collection:	See Above

Equipment Suppliers

Tools shown in this pamphlet are available from:

Wheeler-Pilot International
P. O. Box 3128
20433 Earl Street
Torrance, CA 90510
(213) 371-1238

Nilfisk of America, Inc.
201 King Manor Drive
King of Prussia, PA 19406
(215) 277-3900

Suppliers claiming to have vacuum cleaning units suitable for use with asbestos-containing dusts are:

American Cleaning Equipment Corp., 111 South Route 53, Addison, IL 60101

Beamco, Inc., 707 Stierlin Road, Mountain View, CA 94040

Breauer Electric Manufacturing Co., 5100 No. Ravenswood Ave., Chicago, IL 60640

Hild Floor Machine Co., Inc., 5339 West Lake St., Chicago, IL 60644

Kari-Vac Inc., 4360 W. 127th St., Alsip, IL 60658

Nilfisk of America, 201 King Manor Drive, King of Prussia, PA 19466

Pullman/Holt Products, 10702 46th Street, Tampa, FL 33617

Vac-U-Max, 227 Main St., Belleville, NJ 07109

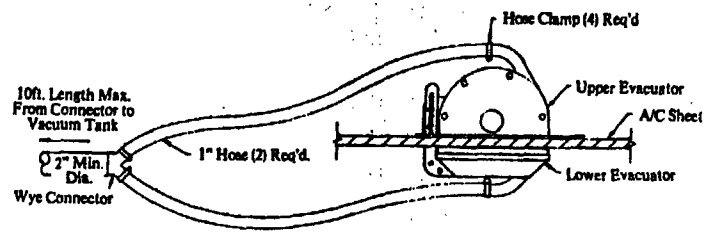
Wheeler-Pilot International, 20433 Earl Street, Torrance, CA 90510

NOTE:

It is recognized that equipment suppliers other than those listed above may be available. Mention of any company is not to be considered an endorsement by AIA/NA.

Appendix A

Operating Instructions Wheeler-Pilot Flat Sheet Circular Saw Model 888



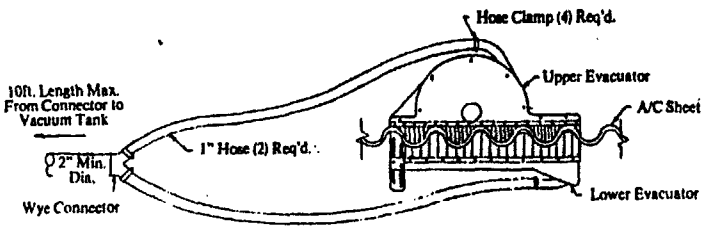
1. The WPI Model 888 uses the Black & Decker Model 3037 Circular Saw. Black & Decker operating instructions for Model 3037 must be read and understood prior to operation.
2. Only vacuum cleaners certified by the manufacturer for use with asbestos dust and having a capability of 175 CFM minimum are to be used with this tool. A vacuum hose of not less than 2 inches in diameter and not more than 10 feet long is to be used between the Wye Connector and vacuum tank. The vacuum manufacturer's operating instructions must be read and understood before operation.
3. Inspect all system elements for cracks, punctures or openings, i.e. hood, vacuum hose and connectors. Repair or replace any faulty item or part.
4. Connect the vacuum hoses as shown, insuring all connections and clamps are tight.
5. Turn on vacuum and check for any stopages or air leaks in the vacuum line or hood and insure adequate air flow in the open area of the saw.
6. If any leaks or stoppages are located, change or repair faulty item.
7. Adjust lower evacuator so that the rubber skirt contacts the underside of the sheet to be cut.
8. Connect circular saw to electrical outlet and feed into work. There should be virtually no visible dust or debris. If excess dust is visible, (a) check vacuum cleaner bag for overload-per manufacturer's instructions, (b) check lines for air leaks and (c) check proper adjustment of lower evacuator.
9. Avoid using excessive force feeding saw into work. If great force is required, stop and check tool for proper operation.

BLADE REPLACEMENT

(In addition to Black & Decker operating instructions)

1. Disconnect unit from electrical outlet.
2. Lower or remove lower evacuating hood.
3. Remove (4) screws and cover to expose blade.
4. Grasp the exposed lower portion of the blade and remove hub screw with wrench.
5. Blade can be removed or replaced (caution: silicon carbide blades must be mounted with appropriate side out, the blades are marked accordingly).

Operating Instructions Wheeler-Pilot Corrugated Sheet Circular Saw — Model 898



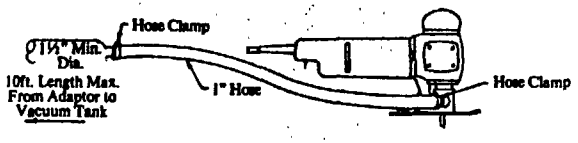
1. The WPI Model 898 uses the Black & Decker Model 3037 Circular Saw. Black & Decker operating instructions for Model 3037 Must be read and understood prior to operation.
2. Only vacuum cleaners certified by the manufacturer for use with asbestos dust and having a capability of 175 CFM minimum are to be used with this tool. A vacuum hose of not less than 2 inches in diameter and not more than 10 feet long is to be used between the Wye Connector and vacuum tank. The vacuum manufacturer's operating instructions must be read and understood before operation.
3. Inspect all system elements for cracks, punctures or openings, i.e., hood, vacuum hose and connectors. Repair or replace any faulty item or part.
4. Connect the vacuum hoses as shown, insuring all connections and clamps are tight.
5. Turn on vacuum and check for any stopages or air leaks in the vacuum line or hood and insure adequate air flow in the open area of the saw.
6. If any leaks or stoppage are located, change or repair faulty item.
7. Adjust lower evacuator so that the runners on the inside of the skirt fingers are approximately ¼ inch from the bottom of the sheet.
8. Connect circular saw to electrical outlet and feed into work. There should be virtually no visible dust or debris. If excess dust is visible, (a) check vacuum cleaner bag for overload-per manufacturer's instructions, (b) check lines for air leaks and (c) check proper adjustment of lower evacuator.
9. Avoid using excessive force feeding saw into work. If great force is required, stop and check tool for proper operation.

BLADE REPLACEMENT

(In addition to Black & Decker operating instructions)

1. Disconnect unit from electrical outlet.
2. Lower or remove lower evacuating hood.
3. Remove (8) screws and cover to expose blade.
4. Grasp the exposed lower portion of the blade and remove hub screw with wrench.
5. Blade can be removed or replaced (caution: Silicon carbide blades must be mounted with appropriate side out, the blades are marked accordingly).

Operating Instructions
Wheeler-Pilot Saber Saw
Model 878



1. The WPI Model 878 uses the Black & Decker Model 3155 Saber (JIG) Saw. Black & Decker operating instructions for Model 3155 must be read and understood prior to operating this unit.

2. Only vacuum cleaners certified by the manufacturers for use with asbestos dust and having a capability of 65 CFM minimum are to be used with this tool. A vacuum hose of not less than 1½ inches in diameter and not more than 10 feet long is to be used. The vacuum manufacturer's operating instructions must be read and understood before operation.

3. Inspect all system elements for cracks, punctures or openings, i.e., hood, vacuum hose and connectors. Repair or replace any faulty item.

4. Assemble vacuum hose as shown above, insuring all connections and clamps are tight.

5. Turn on vacuum and check for any stoppages or air leaks in the vacuum line or hood and insure adequate air flow in the open area of the saw.

6. If any leaks or stopages are located, change or repair faulty item.

7. Connect saber saw to electrical outlet and feed into work. There should be no visible dust or debris. If excess dust is visible, (a) check vacuum cleaner bag for overload-per manufacturer's instructions, (b) check lines for air leaks.

TO INSTALL OR REMOVE BLADE

(In addition to Black & Decker operating instructions)

1. Disconnect unit from electrical outlet.
2. Remove the two screws which retain the shield.
3. Pull shield straight down (shield fits firmly in position. A soft tap may be necessary).
4. Remove blade (see Black & Decker operating instructions).
5. Reassemble.

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Appendix B
OSHA Standard For
Occupational Exposure
to Asbestos

NOTE: Federal Register, Vol. 40, No. 103, May 28, 1975 announced that the OSHA standard for exposure to asbestos dust was recodified from 1910.93a to 1910.1001. This change simplifies the reference system for toxic substance standards in Subpart Z, Part 1910, Occupational Safety & Health Standards.

§ 1910.93a Asbestos.

(a) *Definitions.* For the purpose of this section, (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) *Permissible exposure to airborne concentrations of asbestos fibers*—(1) *Standard effective July 7, 1972.* The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) *Standard effective July 1, 1976.* The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) *Ceiling concentration.* No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(c) *Methods of compliance*—(1) *Engineering methods.* (i) *Engineering controls.* Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) *Local exhaust ventilation.* (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) *Particular tools.* All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) *Work practices*—(i) *Wet methods.* Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) *Particular products and operations.* No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) *Spraying, demolition, or removal.* Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) *Personal protective equipment*—(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 F.R. 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) *Air purifying respirators.* A reusable or single use air purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) *Powered air purifying respirators.* A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) *Type "C" supplied-air respirators, continuous flow or pressure-demand class.* A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) *Establishment of a respirator program.* (a) The employer shall establish a respirator program in accordance with the requirements of the American National Standards Practices for Respiratory Protection, ANSI Z88.2–1969, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z88.2–1969 and the maintenance of an historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(c) No employee shall be assigned to tasks requiring the use of respirators if, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his use of a respirator. Such employee shall be rotated to another job or given the opportunity to transfer to a different position whose duties he is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer, if such a different position is available.

(2) *Special clothing:* The employer shall provide, and require the use of, special clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos fibers, which exceed the ceiling level prescribed in paragraph (b) of this section.

(4) *Change rooms:* (i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, the employer shall provide change rooms for employees working regularly at the place.

(ii) *Clothes lockers:* The employer shall provide two separate ockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes.

(iii) *Laundering:* (a) Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(b) Any employer who gives asbestos-contaminated clothing to another person for laundering shall inform such person of the requirement in (a) of this subdivision to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(c) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (g) of this section.

(e) *Method of measurement.* All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400–450 × (magnification) (4 millimeter objective) with phase contrast illumination.

(f) *Monitoring*—(1) *Initial determinations.* Within 6 months of the publication of this section, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in paragraph (b) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with paragraph (e) of this section.

(2) *Personal monitoring*—(i) Samples shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by subparagraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by paragraph (b) of this section.

(3) *Environmental monitoring*—(i) *Location of samples.* Samples shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) *Sampling frequency and patterns.* After the initial determinations required by subparagraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in paragraph (b) of this section.

(4) *Employee observation of monitoring.* Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this paragraph and shall have access to the records thereof.

(g) *Caution signs and labels.* (1) *Caution signs.* (i) *Posting.* Caution signs shall be provided and displayed at each location where airborne concentrations of asbestos fibers may be in excess of the exposure limits prescribed in paragraph (b) of this section. Signs shall be posted at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Signs shall be posted at all approaches to areas containing excessive concentrations of airborne asbestos fibers.

(ii) *Sign specifications.* The warning signs required by subdivision (i) of this subparagraph shall conform to the requirements of 20" x 14" vertical format signs specified in § 1910.145(d)(4), and to this subdivision. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

Legend	*Notation*
Asbestos	1" Sans Serif, Gothic or Block.
Dust Hazard	¾" Sans Serif, Gothic or Block.
Avoid Breathing Dust	½" Gothic.
Wear Assigned Protective Equipment.	½" Gothic.
Do Not Remain In Area Unless Your Work Requires It.	½" Gothic.
Breathing Asbestos Dust May Be Hazardous To Your Health.	14 point Gothic.

Spacing between lines shall be at least equal to the height of the upper of any two lines.

(2) *Caution labels*—(i) *Labeling.* Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.

(ii) *Label specifications.* The caution labels required by subdivision (i) of this subparagraph shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust May Cause Serious Bodily Harm

(h) *Housekeeping*—(1) *Cleaning.* All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) *Waste disposal.* Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal, or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) *Recordkeeping*—(1) *Exposure records.* Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 3 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health, and to authorized representatives of either.

(2) *Employee access.* Every employee and former employee shall have reasonable access to any record required to be maintained by subparagraph (1) of this paragraph, which indicates the employee's own exposure to asbestos fibers.

(3) *Employee notification.* Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b) of this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) *Medical examinations*—(1) *General.* The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) *Preplacement.* The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(3) *Annual examinations.* On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(4) *Termination of employment.* The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(5) *Recent examinations.* No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(6) *Medical records*—(i) *Maintenance.* Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least 20 years.

(ii) *Access.* The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.

§ 1910.19 Asbestos dust.

Section 1910.93a shall apply to the exposure of every employee to asbestos dust in every employment and place of employment covered by § 1910.12, § 1910.13, § 1910.14, § 1910.15, or § 1910.16, in lieu of any different standard on exposure to asbestos dust which would otherwise be applicable by virtue of any of those sections.

NOTE: Following defines additional occupational areas affected by section 1910.19 above:

1910.12 - Construction Work (construction, alteration, and/or repair, including painting and decorating)
1910.13 - Ship repairing
1910.14 - Shipbuilding
1910.15 - Shipbreaking
1910.16 - Longshoring

Appendix C

U.S. Environmental Protection Agency

Regulations for Disposal of Asbestos-Containing Wastes

(j) Waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations: The owner or operator of any source covered under the provisions of paragraphs (c), (d), (e), or (h) of this section shall meet the following standards:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (j)(3) of this section, during the collection; processing, including incineration; packaging; transporting; or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section shall be labeled with a warning label that states:

CAUTION

Contains Asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous to Your Health

Alternatively, warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.-93a(g)(2)(ii) may be used.

(ii) Processing of asbestos-containing waste material into non-friable forms:

(A) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(B) There shall be no visible emissions to the outside air from the collection and processing of asbestos-containing waste material, except as specified in paragraph (f) of this section.

(4) For the purposes of this paragraph (j), the term all asbestos-containing waste material as applied to demolition and renovation operations covered by paragraph (d) of this section includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills: The owner or operator of any source covered under the provisions of paragraph (a) of this section shall meet the following standard:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (k)(3) of this section, during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3)(i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(i) There shall be no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in paragraph (f) of this section. Such waste shall be subsequently processed either as specified in paragraph (k)(3)(ii) of this section or as specified in paragraph (j)(3) of this section.

(ii) All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. Such agent shall be used as recommended for the particular dust by the manufacturer of the agent. There shall be no discharge of visible emissions to the outside air from the wetting operation except as specified in paragraph (f) of this section. Wetting may be suspended when the ambient

temperature at the waste disposal site is less than −9.5°C (ca. 15°F). The ambient air temperature shall be determined by an appropriate measurement method with an accuracy of ±1°C (±2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of such temperature measurements shall be retained at the source for a minimum of two years and made available for inspection by the Administrator.

(i) The owner of any inactive waste disposal site, which was operated by sources covered under § 61.22 (a), (c) or (h) and where asbestos-containing waste material produced by such sources was deposited, shall meet the following standards:

(1) There shall be no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in paragraph (i)(5) of this section.

(2) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca. 330 ft) or less, except as specified in paragraph (i)(4) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos is Hazardous to Your Health

Notation

1" Sans Serif, Gothic or Block

¾" Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (i)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of paragraphs (i)(2) (i) or (ii) of this section are met, or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirement of paragraph (i)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which has received prior approval by the Administrator.

(i) The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

(ii) The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of the asbestos-containing waste; or

(iii) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. Such agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

7. The first sentence in § 61.23 is revised as follows:

§ 61.23 Air-Cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.23(d)(4)(iv), the requirements of this section must be met.

* * *

8. The first sentence in § 61.24 is revised and redesignated as paragraph (e) and new paragraphs (c) and (d) are added as follows:

§ 61.24 Reporting.

* * * * *

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(d) For sources subject to § 61.22(j):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used.

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part.

9. A new section 61.25 is added to subpart B as follows:

§ 61.25 Waste disposal sites.

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in paragraph (a) of this section.

(b) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 m (ca. 330 ft) or less except as specified in paragraph (d) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos is Hazardous to Your Health

Notation

1" Sans Serif, Gothic or Block

¾" Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (c)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. Such agent shall be used as recommended for the particular dust by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Johns-Manville Corp. & Subsidiaries	303/979-1000 Ext. 3119
ADDRESS (Number, Street, City, State, and ZIP Code) Ken-Caryl Ranch, Denver, Colorado 80217	
CHEMICAL NAME AND SYNONYMS Asbestos-Cement Board	TRADE NAME AND SYNONYMS TRANSITE
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Chrysotile Asbestos Fiber by weight approx.	35	*
Portland Cement	65	50 mppcf
*For TLV see attached copy of Federal Register of 6/7/72		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	1.6
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR	Solid Grey Sheet - No Odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
Non-flammable			

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

C 003286

LAM022946

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
See Section II

EFFECTS OF OVEREXPOSURE
Overexposure to excessive concentrations of asbestos fiber may cause pulmonary disease.

EMERGENCY AND FIRST AID PROCEDURES
Avoid breathing excessive dust when cutting, drilling & sanding.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Vacuum clean loose dust and chips. If sweeping is necessary, use dust suppressant.

WASTE DISPOSAL METHOD
Follow requirements of 40 CFR Chapter 1, Part 61

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
NIOSH approved for protection against pneumoconiosis-producing dusts.

VENTILATION	LOCAL EXHAUST Control dust generated by fabricating operations to within TLV by use of mechanical	SPECIAL
	MECHANICAL *(General)*	OTHER exhaust ventilation systems.

PROTECTIVE GLOVES	EYE PROTECTION Recommended during fabricating operations.

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Maintain good housekeeping practices. Vacuum or wet down waste when cleaning.

OTHER PRECAUTIONS

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, JOHNS-MANVILLE CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

C 003287

§ 1910.93 Air contaminants.

• • • • •

TABLE G-3—MINERAL DUSTS

Substance	Mppcf	Mg/M³
Silica:		
Crystalline:		
Quartz (respirable)	250 [1]	10mg/M³ [5]
	%SiO₂+5	%SiO₂+2
Quartz (total dust)		30mg/M³
		%SiO₂+2
Cristobalite: Use ½ the value calculated from the count or mass formulae for quartz.		
Tridymite: Use ½ the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth	20	80mg/M³
		%SiO₂
Silicates (less than 1% crystalline silica):		
Mica	20	
Soapstone	20	
Talc	20	
Portland cement	50	
Graphite (natural)	15	
Coal dust (respirable fraction less than 5% SiO₂)		2.4mg/M³ or
For more than 5% SiO₂		10mg/M³
		%SiO₂+2
Inert or Nuisance Dust:		
Respirable fraction	15	5mg/M³
Total dust	50	15mg/M³

NOTE: Conversion factors—
mppcf×35.3=million particles per cubic meter
=particles per c.c.

[1] Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

[2] The percentage of crystalline silica in the formula is the amount determined from air-borne samples, except in those instances in which other methods have been shown to be applicable.

[3] As determined by the membrane filter method at 43× phase contrast magnification.

[4] Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

[5] The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of 2.4 Mg./M³ in the table for coal dust is 4.5 Mg./M³.

2. A new § 1910.93a is added to Part 1910. reading as follows:

§ 1910.93a Asbestos.

(a) *Definitions.* For the purpose of this section. (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) *Permissible exposure to airborne concentrations of asbestos fibers*—(1) *Standard effective July 7, 1972.* The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) *Standard effective July 1, 1976.* The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) *Ceiling concentration.* No employee shall be exposed at any time to airborne cencentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(c) *Methods of compliance*—(1) *Engineering methods.* (i) *Engineering controls.* Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) *Local exhaust ventilation.* (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2–1971, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z9.2–1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) *Particular tools.* All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) *Work practices*—(i) *Wet methods.* Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) *Particular products and operations.* No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) *Spraying, demolition, or removal.* Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) *Personal protective equipment*—(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 F.R. 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) *Air purifying respirators.* A reusable or single use air purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) *Powered air purifying respirators.* A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) *Type "C" supplied-air respirators, continuous flow or pressure-demand class.* A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) *Establishment of a respirator program.* (a) The employer shall establish a respirator program in accordance with