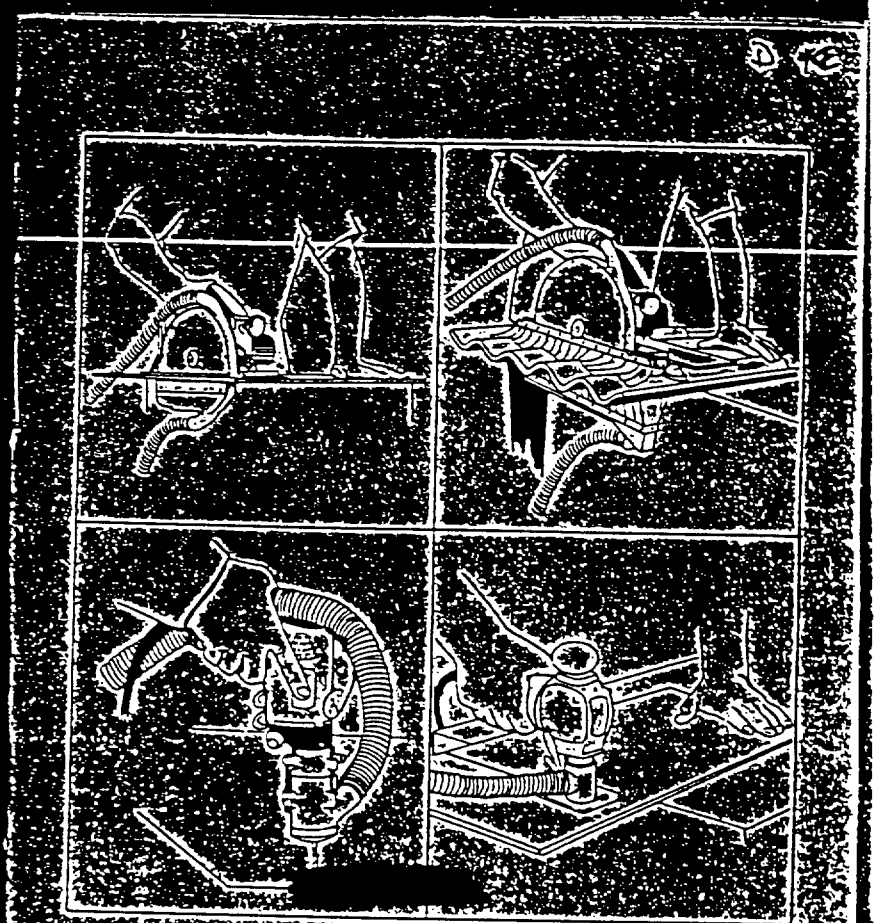
PLAINTIFF'S EXHIBIT
UC-110



Recommended Work Practices for Field Fabrication of Asbestos-Cement Sheet

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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.

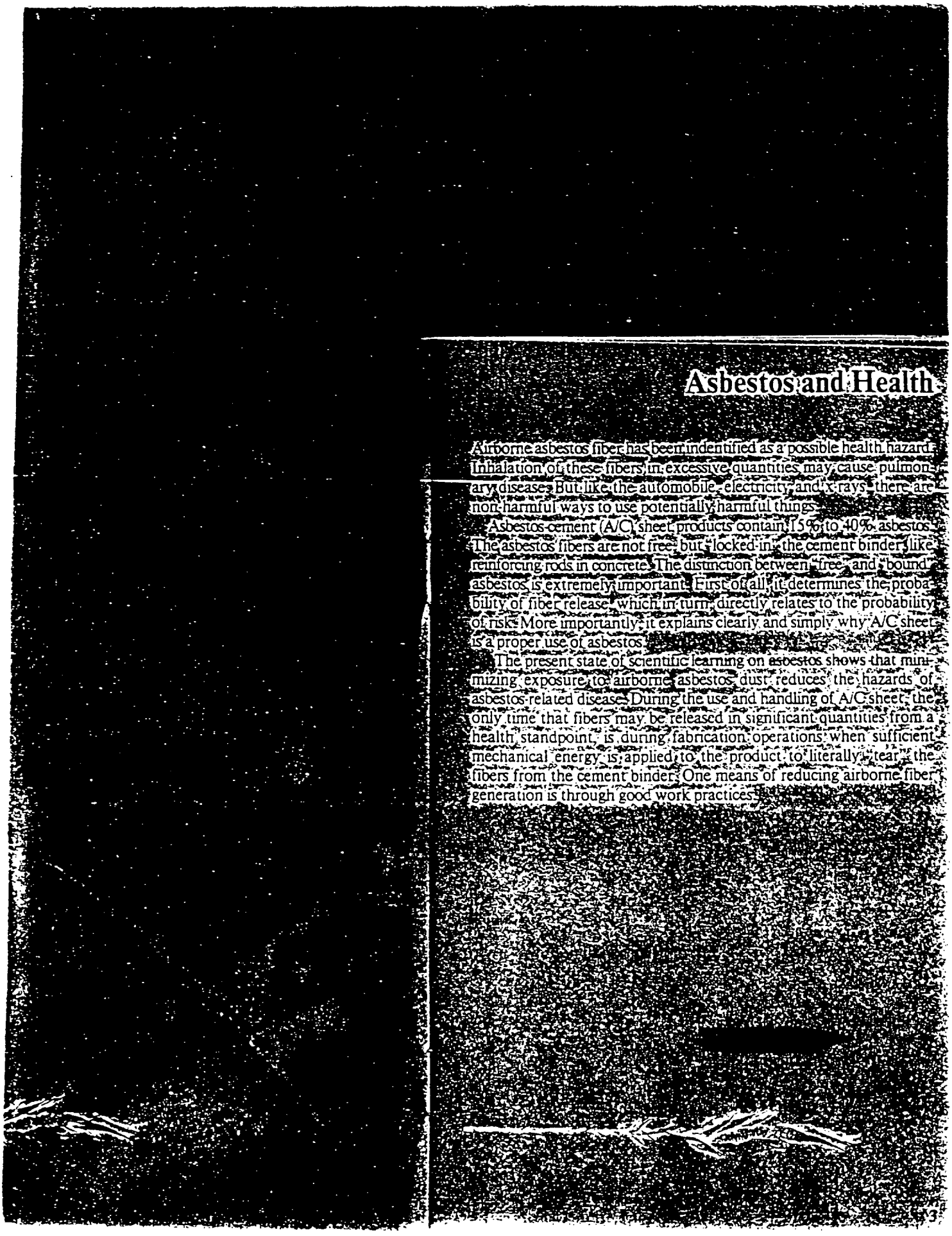
Good work practices is what this booklet is about. The recommendations that appear on the following pages were developed through study and field testing. They are designed to achieve safer and more healthful job site conditions when working with asbestos-cement (A/C) sheet products. Since field conditions 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

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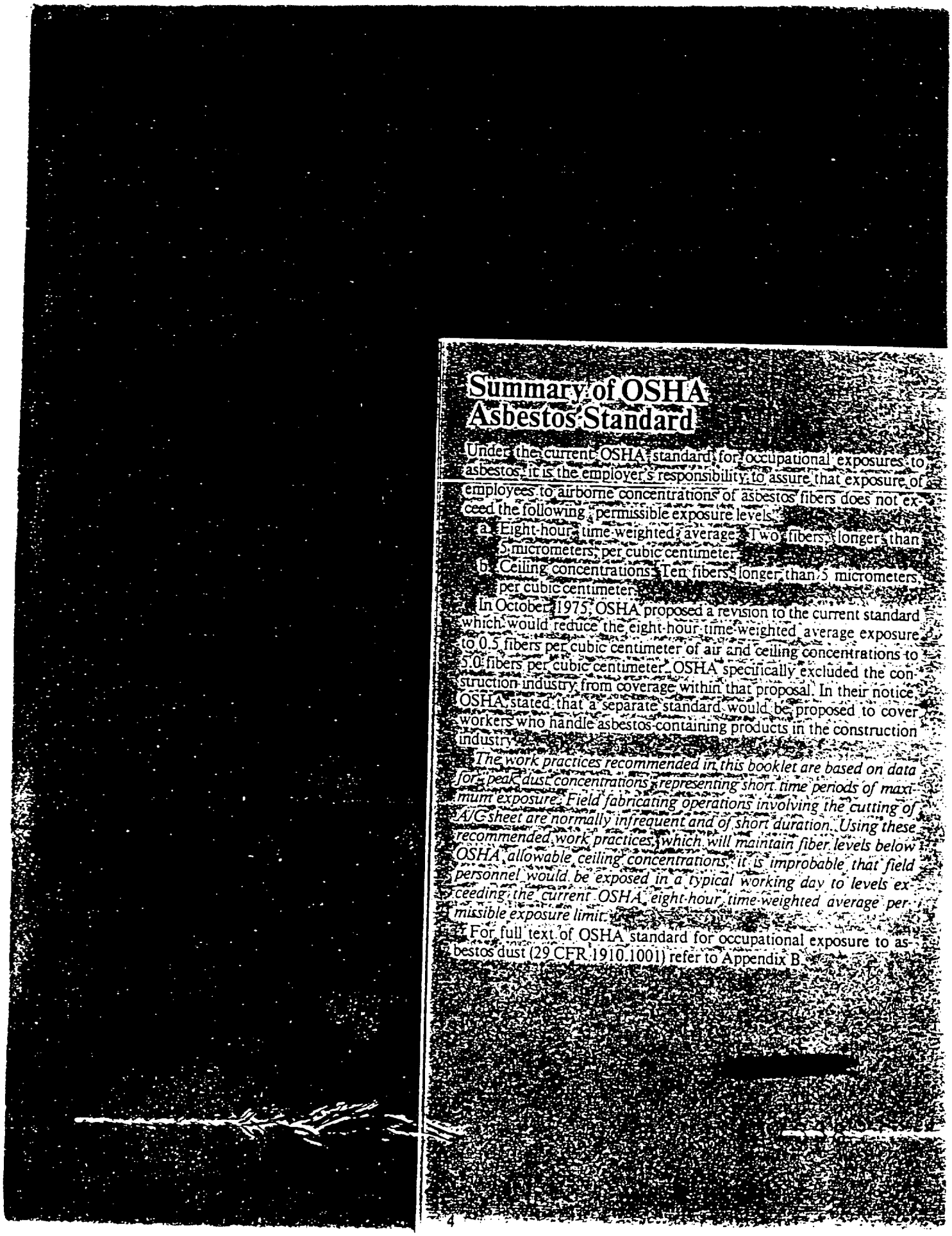
Asbestos and Health

Airborne asbestos fiber has been indentified as a possible health hazard. Inhalation of these fibers in excessive quantities may cause pulmonary diseases. 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.

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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.

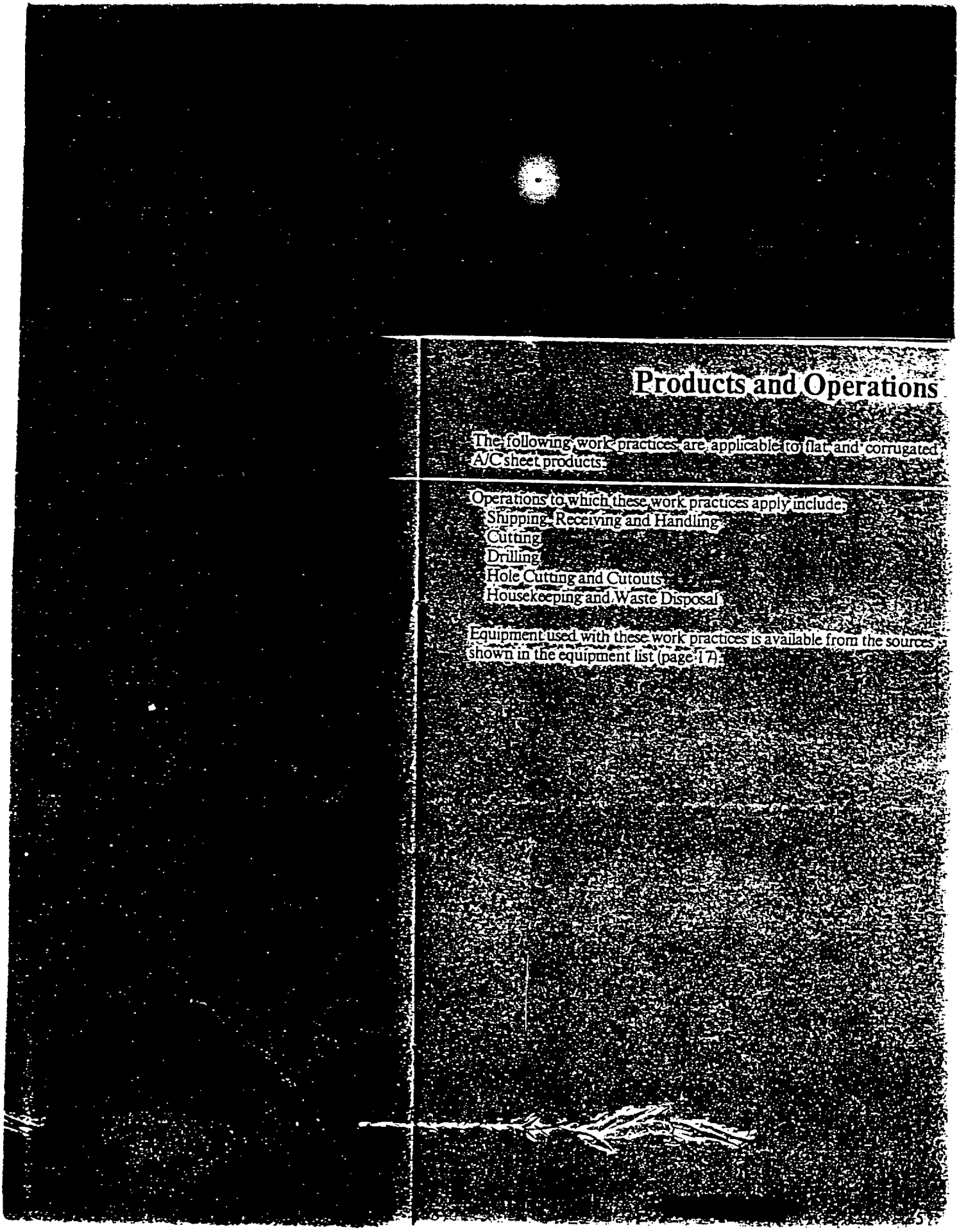
b. Ceiling concentrations: Ten fibers longer than 5 micrometers, per cubic centimeter.

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.

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Products and Operations

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

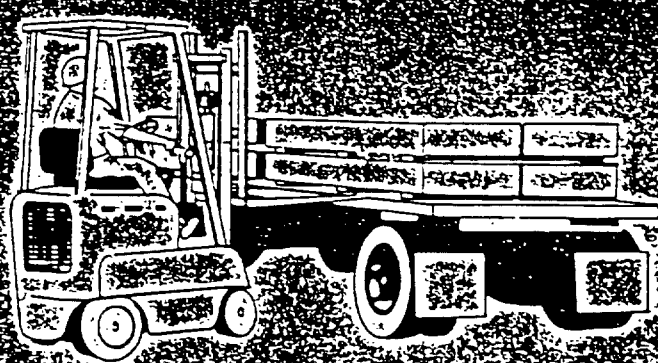
Operations to which these work practices apply include:

- 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).

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Shipping, Receiving and Handling

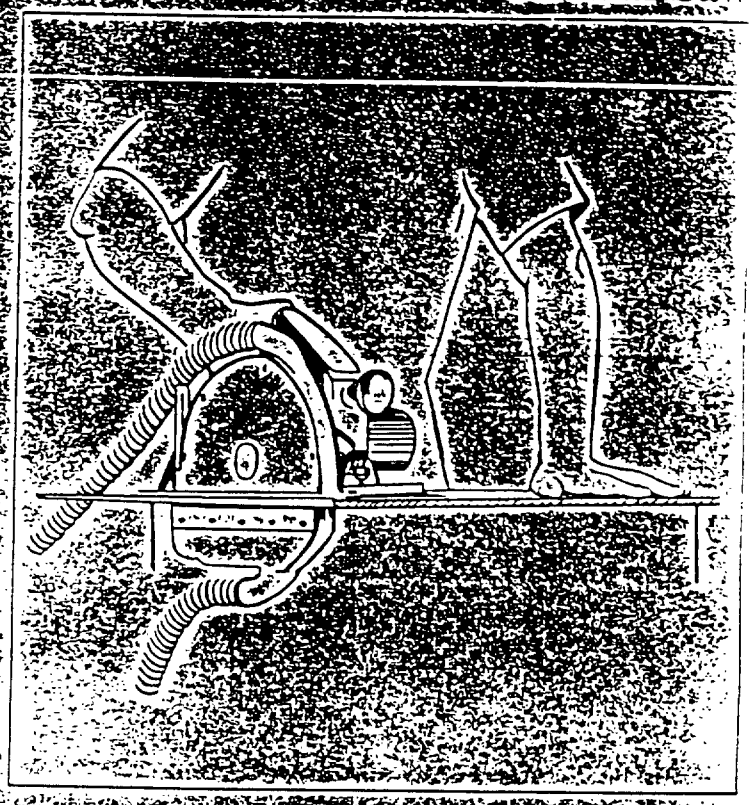


A/C sheet is shipped from the factory with clean surfaces, generally in pallet loads, using shipping methods acceptable to the producer and the customer.

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.

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Cutting — Flat Sheets
Circular Saw



Circular Saw With Dust Collection Hood

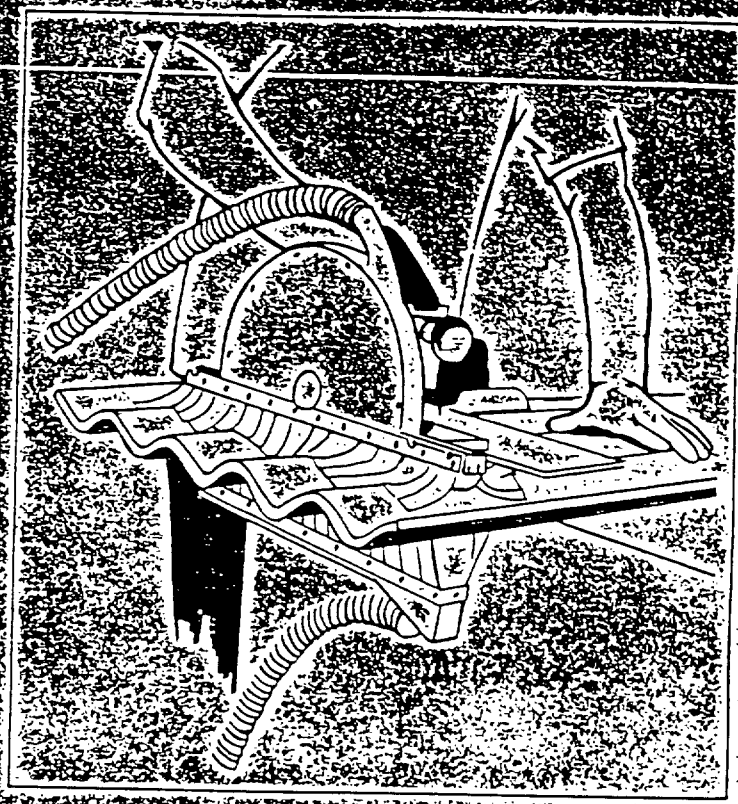
Circular saws for cutting flat sheets should be used *only* when equipped with the specific dust collection hoods pictured above. Exhaust ventilation and dust collection is provided by a vacuum cleaner as described in the specifications (page 15).

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.

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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).

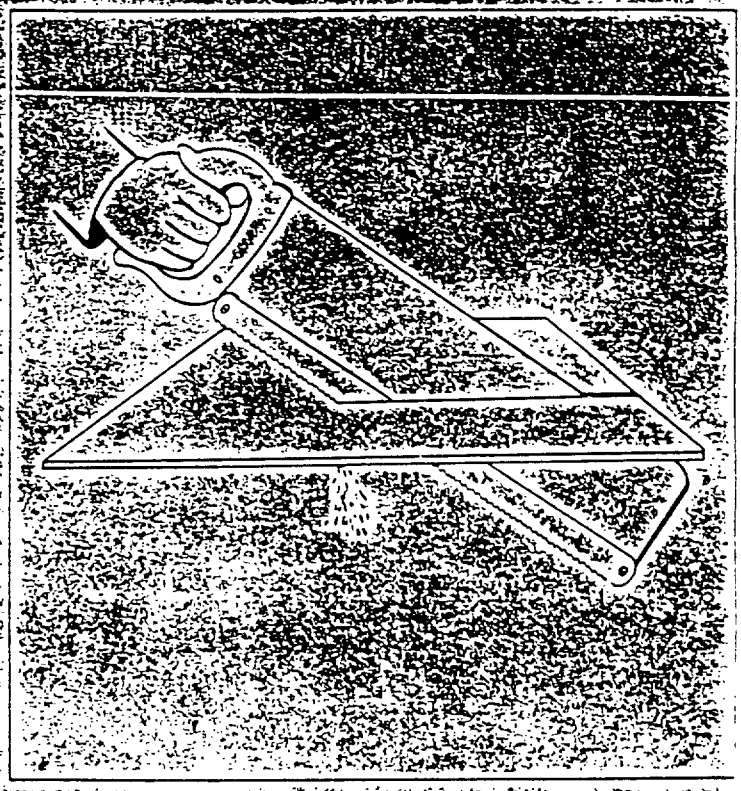
A circular saw cuts by a "pulverizing" action which releases asbestos fibers and fine particulate. The combination of hood and vacuum source is highly effective in capturing and collecting these particles and fibers. Saw operating techniques are those normally employed. Saw design requires the use of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

This tool depends on pliable flaps to seal the cutting zone and is designed for use on sheets with 1¼" 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.

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Cutting Handsaw

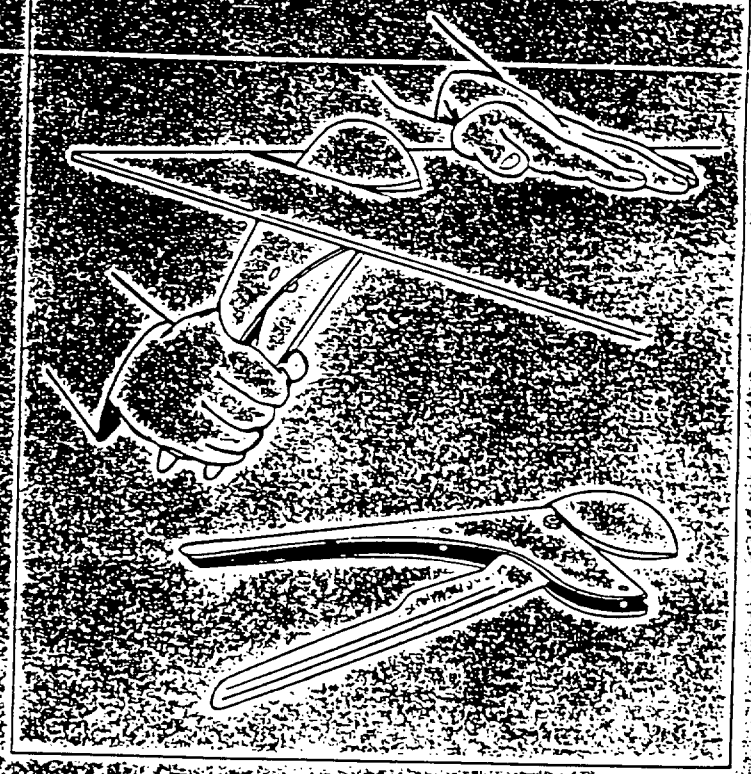


Handtools — Handsaw

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



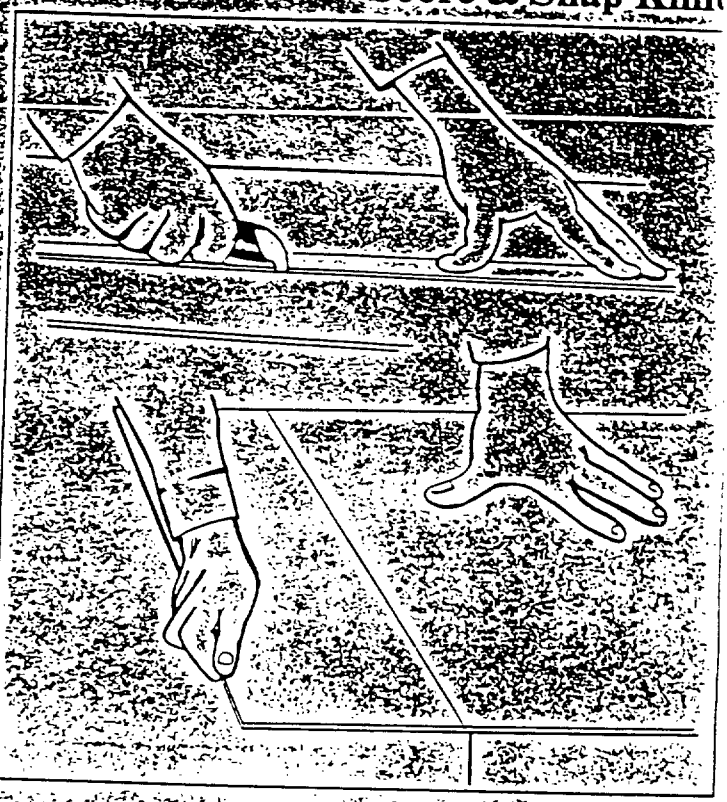
Handtools — Hand Clippers

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.

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Cutting — Flat Sheet
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.

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Drilling
Power Drill
Hole Cutting and Cutou
Flat Sheets—Sabre Sav
Drill With Dust Collection Hood
Sabre Saw With Dust Collection Hood
Drilling of small holes (1/4" or less) on vertical surfaces, of 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 (Clipe 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.
Sabre saws should be used *only* when equipped with the specific dust collection hoo 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 ar required.
For additional information on saw operation, refer to supplier's instructions i Appendix A
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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.

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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.
Saber 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 Sterlin Road
Mountain View, CA 94040

Breuer 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:

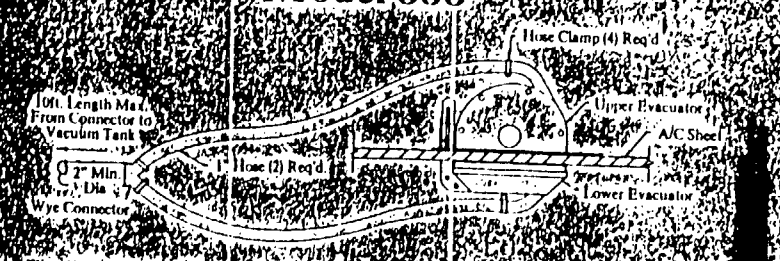
It is recognized that equipment suppliers other than those listed above may be available. Mention of any company is not to be considered an endorsement by AIA/NAB.

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Appendix A

Operating Instructions Wheeler-Pilot Flat Sheet Circular Saw Model 888



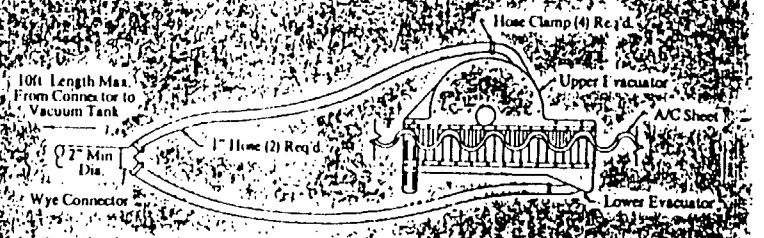
1. The WPI Model 888 uses the Black & Decker Model 3037 Circular Saw. Black & Decker operating instructions for Model 3037 must be read and understood prior to operation.
2. Only vacuum cleaners certified by the manufacturer for use with asbestos dust and having a capability of 175 CFM minimum are to 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 adeqliate 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

Appendix B
OSHA Standard For
Occupational Exposure
to Asbestos

NOTE: Federal Register, Vol. 40, No. 107, 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 asbestos, 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 1, 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.

(c) *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.

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

(2) *Local exhaust ventilation.* (i) 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. A copy of this standard may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.

(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 in emergencies, (iii) Where both respirators and personnel rotation are allowed by subparagraph (1) of this paragraph, and both are practicable, personnel rotation shall be preferred and used.

(iv) 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. 8244, Mar. 26, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(B)

FEDERAL REGISTER, VOL. 39, NO. 125—THURSDAY, JUNE 27, 1974

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(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.

23505

§ 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.

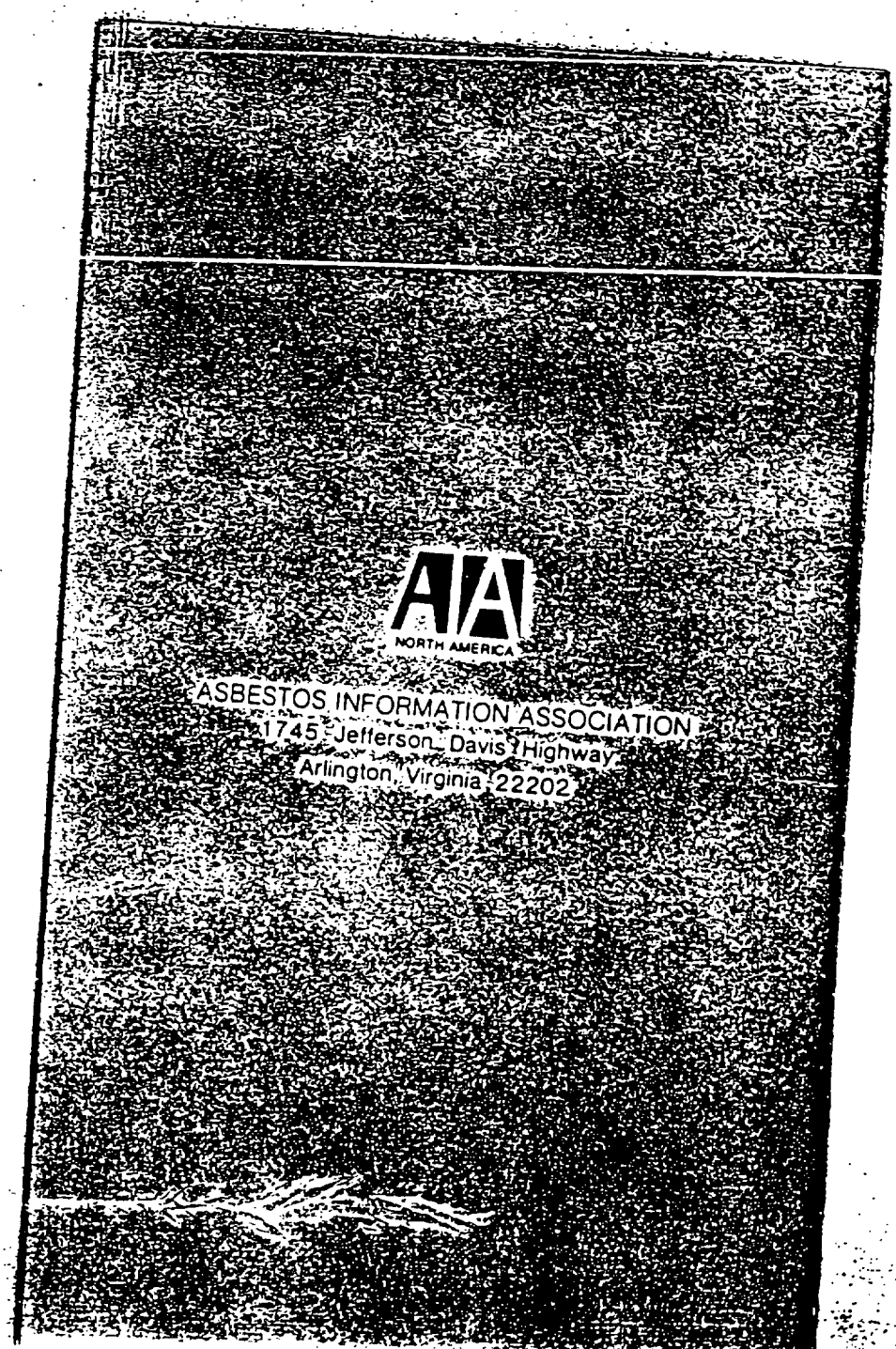
(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3)(i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(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

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