EN-1012

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

ENGINEERING DEPARTMENT

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August 2, 1972

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FROM: C. E. MARSH - STANDARDS SECTION C. E. Marsh

STANDARDS SECTION - SAFETY & FIRE PROTECTION SUBCOMMITTEE
S4T - MEASUREMENT AND CONTROL OF ASBESTOS DUST EXPOSURE

At the request of D. G. Windsor and J. A. Sigman, Engineering Standards Committee, we will resubmit S4T to the Engineering Standards Committee for comments and approval. We expect the masters to be corrected and serial letter issued by August 15, 1972. Copies of the marked standard showing the changes to be made are attached to the copies marked by asterisk for their information.

CEM:kjk
Attachment

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DUP 0902850

SC-DP-03810

TOXICITY

MEASUREMENT AND CONTROL OF ASBESTOS DUST EXPOSURE

SAFETY ENGINEERING STANDARD

ISSUED

THIS PAGE REVISED

S 4-T

Any portion of this or referenced document printed in red is a mandatory requirement of the Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA) as published in the Federal Register.

TENTATIVE 8-1-72

1. SCOPE

This standard presents the permissible exposure limits to asbestos dust, general information on methods of controlling asbestos dust exposures, and describes an acceptable method of sampling asbestos dust concentrations in the work area.

2. GENERAL

2.1 Asbestosis and lung cancer have long been associated with exposure to asbestos. Historically, the incidence of these diseases has been significantly higher among asbestos workers than among the general population.

2.2 Principal sources of exposure to airborne asbestos dust in Company operations have been:

a. Cutting insulation by power saws in fabrication shops

b. Opening boxes and removal of new insulation

c. Removing old insulation from lines and vessels

d. Mixing asbestos to form cement

e. Removal of clothing after completing insulating duties

f. Cutting asbestos shingles, Transite, etc.

g. Spraying insulation or fireproofing

h. Ingredient in Company products

2.3 Permissible Exposure Limits. Asbestos dust concentrations in air shall not exceed an 8-hour time-weighted average (TWA) of 5 fibers longer than 5 microns per cubic centimeter (cc) of air. At no time may the concentration exceed a ceiling of 10 fibers longer than 5 microns per cc. The 8-hour time-weighted average (TWA) is the average concentration occuring over a period of 8 consecutive hours.

2.3.1

2.3.2 After July 1, 1976, the TWA is reduced from 5 to 2 fibers longer than 5 microns per cc.

2.4 Control methods, such as but not limited to, enclosure, vacuum sweeping, and local exhaust ventilation, shall be used to meet the permissible exposure limits, see section 3.

2.5 Respiratory protective devices, shall be provided and used where such control methods are not feasible, or do not otherwise reduce the concentrations below the permissible exposure limits, see section 4.

2.6 Hygiene Requirements are included in section 5.

2.7 Sampling. For sampling equipment, monitoring, analysis record keeping, and warning signs, see section 6.

2.8 Nonasbestos bearing materials should be substituted where asbestos contributes to a dust concentration exceeding the permissible exposure limits.

3. CONTROL OF ASBESTOS DUSTS

3.1 Handling Asbestos Insulation

3.1.1 Cartons of block insulation are a potential source of severe dust exposure and should be handled with care. The rough, abrasive nature of the block material creates dust within the cartons.

3.1.2 Cartons of new insulation should be vacuumed upon opening, and prior to removal of blocks, to remove dust.

3.1.3 Asbestos blocks must be handled with care at all times to minimize dusting.

3.1.4 Purchase of block insulation with a glaze coating is recommended. This makes it virtually dust free for handling purposes.

3.2 Asbestos Cutting Operations

3.2.1 All hand-operated or power-operated tools which may produce or release asbestos fibers in excess of the permissible exposure limits shall be provided with a dust collection system, see 3.6.

3.2.2 All major power-cutting machines should be isolated in a separate working area.

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3.4.2.1 The removal of insulation fabricated and protected to withstand repeated removal and reinstallation for equipment maintenance or other reasons is not considered "disturbing".

3.2.3 The work area shall have a vacuum cleanup system. This can be a system of hoses connected to a central vacuum system. All parts of the room must have daily vacuum cleanup of ledges, shelves, floors, and machines.

CAUTION: No dry sweeping shall be performed. Air hose is not to be used as an aid in cleanup.

3.3 Asbestos-Cement Mixing

3.3.1 Asbestos cement, mortar, coatings, grout, and plaster shall be mixed in closed bags or other containers.

3.3.2 Any dried-out cement should be discarded. Do not attempt to rework it.

3.4 Removal of Asbestos Insulation

3.4.1 Insulation to be removed and discarded should be dampened prior to and during removal wherever possible.

Add 9

3.4.2 Employees engaged in dismantling asbestos insulation shall wear atmosphere supplying respirators, see 4.1.1.

→ 3.4.2.1 labeled and

3.4.3 Scrap insulation shall be collected and disposed of in sealed bags or other containers according to plant and local government regulations. For caution labels, see 6.6.

3.5 Asbestos spraying. Employees engaged in spraying asbestos for insulation or fireproofing shall wear atmosphere supplying respirators, see 4.1.1.

3.6 Exhaust ventilation and dust collection system shall be in accordance with ANSI Z9.2, Fundamentals Governing the Design and Operation of Local Exhaust Systems.

3.6.1 Caps or dampers should be provided in each intake hose and machine connection to maintain capacity of the system. However, care should be taken to assure that connections are open at the equipment being operated.

3.6.2 Discharge should be into bag filters which meet the following criteria:

a. Cotton bag filter having air flow permeability not exceeding 20 cfm/sq ft

b. No bypass devices

c. No leakage of unfiltered air

d. Ability to empty hoppers without creating visible emissions of particulate matter

e. No torn or ruptured bags

f. No worn or threadbare bags

g. No improperly positioned bags

4. RESPIRATORY EQUIPMENT

4.1 Respiratory protection shall be provided to all personnel in areas where the permissible exposure limits may be exceeded. Refer to S211 for general description of equipment.

4.1.1 Atmosphere supplying respirators (Type "C" supplied-air or self-contained), Bureau of Mines Schedule 19B, will provide complete protection. They are required for dismantling and spraying asbestos, or when the concentration can be expected to exceed the TWA or ceiling limit of 2.3 by 10 times the ___.

4.1.2 In lower concentration cases, and where ambient oxygen does not fall below 18 percent, a mechanical filter type respirator, Bureau of Mines Schedule 21B, will afford adequate protection. They are required when the concentration can be expected to exceed 1 to 10 times the TWA or ceiling limit of 2.3. Manufacturers recommendations for their application and maintenance must be followed.

4.2 Each employee shall be instructed in testing respiratory devices for proper fit and be required to do so prior to each use.

5. HYGIENE

5.1 Respirators and masks must be kept clean and sterilized prior to reissue.

5.2 Special clothing, a change room, and duplicate lockers must be provided for employees exposed to concentrations which exceed the ceiling limit of 2.3. This is to prevent contamination of employees' street clothes from their work clothes.

5.3 Food, gum, tobacco, or other material placed in the mouth should not be kept or consumed in work areas.

6. SAMPLING

6.1 Monitoring. Sampling of each operation must be for at least 15 minutes duration and taken in a frequency and pattern to accurately represent the employee's exposure over his work period. If results indicate a level of asbestos dust in excess of the limit, the operation should be reviewed to reduce exposure, see 2.1, and resampled. The initial sampling program must determine

Portions printed in red meet OSHA regulations, Section 1910.93.

the 8-hour time weighted average. Intervals between samples shall not exceed six (6) months.

6.2 Equipment. Samples may be taken with a portable battery-operated air sampler attached to an employee's belt or placed in the work area. Samples may not be collected in hazardous areas, as defined in DE ID, without a permit to use a sparks producing device.

Bold → caution.

6.2.1 Pump

Micronaire or Model C115
Bendix Corp
~~Southfield, Michigan 48075~~ disregard (ins)

or

Gravimetric or Monitaire
Mine Safety Appliances Co
230 N. Braddock Ave
Pittsburgh, Pennsylvania 15208

Either unit must include battery charger and battery; carrying case is optional.

6.2.2 Filter

Millipore No: MAWP—037—AO filters
white, nongridded,
0.8 micron pore
Millipore Corporation
Bedford, Massachusetts 01730

indent as indicated

Red

6.3 Procedure

6.3.1 Flow through the pump should be calibrated, with the filter in line for each pump.

6.3.2 Clip filter holder to lapel or shirt pocket as close as possible to the person's mouth. This method of personnel sampling is preferred.

6.3.3 If a sampler is affixed permanently in a work area, suspend the filter as close as possible to the person's breathing zone at the job to be monitored.

6.3.4 Remove top section of the filter to expose the full filter face.

6.3.5 Turn on pump and set at approximately two (2) liters per minute rate. Check rate periodically. When finished sampling, turn off pump and record elapsed sampling time. Sampling record forms, EN—2731, (see Figure 3) are available from Stationery Stores, Eng Dept, Wilmington, Del.

6.3.6 Replace filter top after sample is collected and seal with tape prior to shipment.

6.4 Analysis. Completed samples (exposed filters) are placed in a mailing tube, sealed, and sent to a qualified laboratory with two copies of the sampling record. Include an unexposed filter with the sample which has been handled in the same fashion without drawing air through it. Qualified laboratory information is available from Haskell Laboratory.

6.4.1 All determinations shall be made by the membrane filter method at 400—450X (magnification) (4mm objective) with phase contrast illumination.

6.5 Record Keeping. Records of personnel and environmental monitoring shall be maintained for three (3) years and made available upon the request of authorized representatives of OSHA and NIOSH (National Institute of Occupational Safety and Health).

6.6 Warning signs conforming to Figure 1 shall be posted at all approaches to areas where asbestos concentrations may be above permissible exposure limits at a sufficient distance to permit an employee to read the signs and take necessary precautions before entering the area. Caution labels conforming to Figure 2 shall be used to identify containers of raw materials, scrap, waste, other products containing asbestos, and asbestos contaminated clothing.

Portions printed in red meet OSHA regulations, Section 1910.93.

DUP 0902853

MEASUREMENT AND CONTROL OF ASBESTOS DUST EXPOSURE

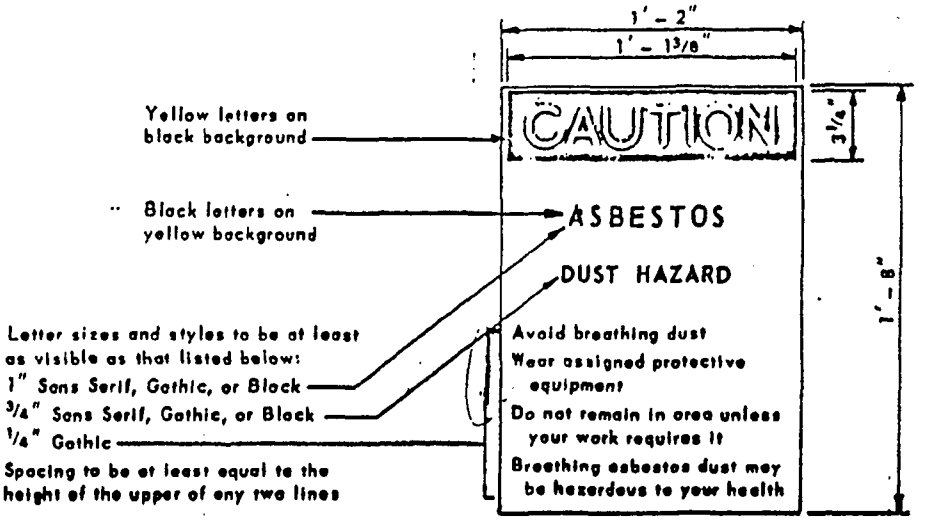

FIGURE 1 – CAUTION SIGN – ASBESTOS DUST

CAUTION

Contains asbestos fibers

Avoid creating dust

Breathing asbestos dust may cause serious bodily harm

Label size and printing to be readily visible and legible.

FIGURE 2 – TYPICAL CAUTION LABEL

Figures 1 and 2 meet OSHA requirements, Section 1910.93.

DUPONT

DUP 0902854

E. I. DU PONT DE NEMOURS & CO.—CONSTRUCTION DIVISION
AIRBORNE DUST SAMPLE WORK SHEET

SITE: _____ DATE SAMPLED: _____
WEATHER: _____ TEMP.: _____ R.H.: _____
INSTRUMENT NUMBER: _____ WORK LOCATION: _____
SAMPLE TOTAL TIME: _____ HRS. VOL. SAMPLED: _____ CF

1. PUMP RATE: _____ CC/M TIME: _____ CHECKED BY: _____
   SPECIFIC PRODUCT AND MATERIAL:
   OPERATION:
   VENTILATING CONTROL:
   DRAFTS:

2. PUMP RATE: _____ CC/M TIME: _____ CHECKED BY: _____
   SPECIFIC PRODUCT AND MATERIAL:
   OPERATION:
   VENTILATING CONTROL:
   DRAFTS:

3. PUMP RATE: _____ CC/M TIME: _____ CHECKED BY: _____
   SPECIFIC PRODUCT AND MATERIAL:
   OPERATION:
   VENTILATING CONTROL:
   DRAFTS:

4. PUMP RATE: _____ CC/M TIME: _____ CHECKED BY: _____
   SPECIFIC PRODUCT AND MATERIAL:
   OPERATION:
   VENTILATING CONTROL:
   DRAFTS:

5. PUMP RATE: _____ CC/M TIME: _____ CHECKED BY: _____

6. PUMP RATE: _____ CC/M TIME: _____ CHECKED BY: _____
   SPECIFIC PRODUCT AND MATERIAL:
   OPERATION:
   VENTILATING CONTROL:
   DRAFTS:

SAMPLE BY: _____ _____ DATE: _____
SIGNATURE

3 - TYPE SAMPLING RECORD FORM

← Orig. 13" Form To be reduced to 11" →