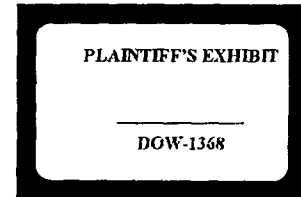




DOW CHEMICAL U.S.A.

MICHIGAN DIVISION
September 2, 1987

MIDLAND MICHIGAN 48674



ST0006441

RE: REVISED ASBESTOS-CONTAINING MATERIAL STANDARD (S-140)

This standard has been completely revised to reflect both State and Federal regulations for "General Industry" in the handling of asbestos-containing materials. It outlines procedures to be followed in identification, removal and disposal of these materials when the job is done by Dow employees.

PLEASE NOTE Asbestos handling by contractors falls under separate governmental regulations, and these procedures are not reflected in this standard. For contract jobs consult with your DOW OWNER REPRESENTATIVE.

Jack
Jack Thompson
ACPD - Safety
834 Building

SAFETY STANDARD S-140

ASBESTOS-CONTAINING MATERIAL

24490001S

I. POLICY

The handling of asbestos-containing materials will be done in a manner that will not endanger the health of our employees or other persons.

II. SCOPE

This standard defines procedures for the identification, safe handling, and good industrial hygiene practices for asbestos. These procedures shall apply to the handling of all asbestos-containing materials, including the removal of small quantities of material; i.e., removing short sections of insulation during routine maintenance. This standard is intended to augment Environmental Standard E-500. Additional regulatory rules governing asbestos removal operations by contractors are not included in this standard.

III. IDENTIFICATION

Prior to the removal of any material which has the physical appearance of asbestos, representative samples shall be taken to Industrial Hygiene Services for testing. Suspect material not tested as described above will be treated as if it were asbestos.

IV. DEFINITIONS

ACTION LEVEL:

An airborne concentration of asbestos fibers of 0.1 fiber/cc of air, calculated as an eight (8) hour time weighted average.

PERMISSIBLE EXPOSURE LIMIT (PEL):

An airborne concentration of asbestos fibers of 0.2 fiber/cc of air, calculated as an eight (8) hour time weighted average.

SAFETY STANDARD S-140

REGULATED AREA:

Area established by the employer to demarcate areas where airborne concentrations of asbestos fibers exceed or could reasonably be expected to exceed the PEL.

V. RESPONSIBILITIES

A. Supervision shall:

1. Comply with Environmental Standard E-500 which defines the regulatory requirements for demolition and disposal of asbestos containing waste.
2. Ensure employees who handle asbestos-containing materials are informed annually of the health hazards associated with exposure to asbestos and of the availability of an annual medical examination. In addition, general information concerning asbestos as contained in Appendix A shall be communicated.
3. Ensure that employees use the protective devices and work practices established for the job.
4. Establish a regulated area in the work area where asbestos concentration can be reasonably expected to exceed the PEL by demarcating the area and limiting access to authorized protected personnel only.
5. Ensure that an appropriate monitoring program is carried out, for operations involving asbestos-containing materials, and that employees are informed of the survey data.

B. The employee shall:

1. Use the protective equipment and work practices required for the job. See Section VIII.

ST0006443

E

SAFETY STANDARD S-140

2. Clean the respirator and replace respirator cartridges daily. See Section VII C.

C. Industrial Hygiene shall:

1. Provide consultation as to protective devices necessary and available.
2. Provide analysis.
3. Provide monitoring.
4. Provide training.

D. Medical Department shall:

1. Provide annual examinations to monitor the health of Dow employees working with asbestos-containing materials.
2. Conduct respiratory fit testing at 6 month intervals.

VI. EDUCATION

- A. Two short video tape presentations concerning the hazards of asbestos are available from Industrial Hygiene or Division Cable TV for viewing. The showing of these programs to all employees, prior to working with asbestos, is mandatory.
- B. Employees who may alter, disturb, or remove less than 25 linear feet or 50 square feet of asbestos material during an asbestos abatement project shall have two (2) hours of asbestos awareness training.
- C. Employees who may alter, disturb, or remove more than 25 linear feet or 50 square feet of asbestos material during an asbestos abatement project, shall have five (5) hours of asbestos awareness training.
- D. Refresher training shall be conducted annually.

SAFETY STANDARD S-140

VII. SAFE HANDLING PRACTICES

The primary concern in handling asbestos-containing materials is the danger of inhaling airborne fibers. The following procedures shall be carried out to reduce the potential for generating and/or exposing personnel to airborne levels of asbestos fibers.

- A. Access Control: Caution signs and barricades shall be erected to keep personnel from entering the removal area without proper protective equipment. Signs are available from the Sign Shop, 49 Building; ask for sign No. 77.
- B. Minimize Asbestos Fibers Becoming Airborne
 - 1. Asbestos-containing material shall be thoroughly wetted before removal. This may require subsequent wetting as layers of material are removed.
 - 2. Loose asbestos material shall not be swept unless wetted. Vacuum cleaners equipped with HEPA filters shall be used.
- C. Respiratory Protection
 - 1. Safety Standard S-745 shall be followed when wearing respiratory protection.
 - 2. Approved respirators, available from DVS, shall be worn during all asbestos handling operations. As a minimum, respirator protection in the form of a 1/2 mask with high efficiency filter cartridges shall be worn.
 - 3. Fit testing shall be conducted at least every six (6) months for employees wearing a negative pressure respirator.

ST0006445

SAFETY STANDARD 8-140

D. Disposal

1. All loose asbestos waste shall be placed in properly labeled impermeable containers (6 mil yellow plastic bags or other containers approved by Environmental Services) prior to Dow landfill disposal. Yellow bags are available on DVS, (135-900018) and are to be used for asbestos disposal only.
2. Asbestos labels (Stock No. 062230) for containers other than specified yellow bags are available from F. P. Horak Co. (Phone 695-6027).
3. Dow landfill tags are available from designated Environmental Services personnel.

E. Protective Clothing

1. Required protective clothing includes full disposable suit, head covering, gloves, and foot covering. Tyvek suits are available under a blanket order from S&E Sales (496-3756), ask for No. 1414.
2. Work clothing (other than disposable) contaminated with asbestos fibers shall be sent to the Dow Laundry in a properly tagged (see D. 2.) plastic bag. Do not use the yellow bag noted in Section D. 1.

F. Monitoring

1. Daily monitoring will be conducted in each regulated area until measurements indicate employee exposures are below the action level.
2. A post abatement air sample will be collected for every asbestos abatement project exceeding 25 linear feet or 50 sq. feet.

ST0006446
944900015

SAFETY STANDARD S-140

VIII. REMOVAL OF SMALL AMOUNT OF ASBESTOS-CONTAINING MATERIALS

Several methods can be used to remove small amounts of asbestos-containing materials during small scale, short-duration renovation or maintenance tasks.

- A. Glove Bags: Training program related to the use of glove bag techniques is conducted by Technical Training, 294 Building.
- B. Removal of entire asbestos-covered pipe or structure:
 - 1. Entire structure or pipe is encased in a 6 mil polyethylene plastic sheeting which is sealed with duct tape.
 - 2. Asbestos covering at connections are removed by the glove bag technique.
 - 3. Structure or pipe is removed to a mini-enclosure for final removal operations.
- C. Mini-enclosure
 - 1. A six mil polyethylene enclosure is constructed around the work area with a small change room adjacent to the enclosure.
 - 2. Removal operation is conducted inside the enclosure with appropriate protective equipment and work practices including wetting of the insulation prior to removal.
 - 3. Employee shall HEPA-Vacuum off protective coveralls prior to leaving work area and remove coveralls in the adjacent change room.
 - 4. Respirator shall be removed only after leaving the change room.

ST0006447

SAFETY STANDARD S-140

IX. ASBESTOS-RELATED EMERGENCIES

In the event of an asbestos-related emergency which results in separation or detachment of asbestos-containing material due to weathering or physical damage, the following procedure shall be implemented:

A. Isolate area:

1. Employees wearing protective equipment shall barrier-off area affected and place warning signs on barriers.
2. Within facilities, disconnect and/or seal ventilation units to other areas of the facility.

B. Communicate:

1. Inform employees within facility of situation and to avoid entering affected area.
2. Contact Industrial Hygiene Services to determine regulatory requirements and appropriate clean-up procedures.

C. Clean-up operations:

1. Conduct clean-up operations as per regulatory requirement, ensuring that workers are trained and protected with appropriate respiratory and protective equipment.
2. Damaged material shall be removed, collected, and disposed of in accordance with S-140 and E-500.
3. Damaged surfaces or adjoining members shall be encapsulated and/or sealed in plastic sheeting prior to re-insulation.

ST0006448

SAFETY STANDARD S-140

X. APPLICATION WITH LIMITED SUBSTITUTES

It is the goal of the Michigan Division to discontinue the use of asbestos-containing materials as quickly as adequate substitutes can be found. Supervision shall not place new asbestos-bearing materials in service without consultation with Materials Engineering and Industrial Hygiene Services.

ST0006449

APPENDIX A.

HANDLING OF ASBESTOS-CONTAINING MATERIALS

1. WHAT IS ASBESTOS?

ASBESTOS IS A CRYSTALLINE FORM OF IMPURE MAGNESIUM SILICATE MINERALS IN THE FORM OF FIBERS. IT CAN BE ANY COLOR. MATERIALS MAY CONTAIN A WHOLE RANGE OF ASBESTOS CONCENTRATIONS --- UP TO 100%.

2. WHERE CAN ASBESTOS BE FOUND?

ASBESTOS HAS BEEN USED IN INSULATING MATERIALS, AS A BINDER MATERIAL, GASKETS, ROOFING, FLOOR TILES, WALL BOARD (TRANSITE), PIPING, CEILING TILES, BRAKE LININGS, AND MANY OTHER APPLICATIONS. THE MOST COMMON DIVISION APPLICATIONS INCLUDE INSULATION AND TRANSITE SIDING.

3. HOW IS ASBESTOS IDENTIFIED?

SINCE ACCURATE VISUAL IDENTIFICATION OF ASBESTOS IN MATERIALS IS NOT DONE EASILY, IT IS VERY IMPORTANT THAT IDENTIFICATION BE DONE PRIOR TO HANDLING POTENTIAL ASBESTOS-CONTAINING MATERIALS. CHEMICAL OR PHYSICAL TESTS THROUGH MICHIGAN DIVISION INDUSTRIAL HYGIENE SERVICES OR MAS&TL ANALYTICAL LABORATORIES (1602 BUILDING) ARE REQUIRED FOR ASSURANCE OF ACCURATE DETERMINATION.

4. HOW IS ASBESTOS TO BE HANDLED?

THE PROCEDURES FOR THE SAFE REMOVAL AND/OR DISPOSAL OF ASBESTOS-CONTAINING MATERIALS ARE FOUND IN SAFETY STANDARD S-140 AND ENVIRONMENTAL STANDARD E-500. PROCEDURES INCLUDE THOROUGHLY WETTING THE MATERIAL TO MINIMIZE DUST, THE USE OF APPROPRIATE RESPIRATORY PROTECTION, POSTING OF APPROPRIATE SIGNS AND BARRICADING THE WORK AREA, AND DISPOSAL OF MATERIAL TO LANDFILL IN AN IMPERMEABLE CONTAINER (i.e., TIED, LABELED PLASTIC BAGS).

MICHIGAN DIVISION
February 6, 1985

TO: ALL HOLDERS OF THE MICHIGAN DIVISION SAFETY STANDARD
MANUALS

A newly revised TS-140, "Asbestos" safety standard is attached. Please insert it in your Safety Standard Manual and discard the old S-140.

Some changes include:

1. A policy change to treat asbestos-like material as if it were asbestos unless it is identified as not being/containing asbestos.
2. An appendix of information to communicate to workers handling asbestos.

Review this standard carefully for its full content. Also, note that it has been re-classified as a Technical Standard.

An updated Safety Standard Index is also enclosed. Please include it in your Manual. If more updated copies of this standard, or other standards are needed, drop a note to the Safety Department, 47 Building and give the standard number and amount of copies needed.

Safety Department
47 Building

Encl: Revised Safety Standard Index

ST0006451

SAFETY STANDARD TS-140

ASBESTOS CONTAINING MATERIAL

I. POLICY

The handling of asbestos containing materials will be done in an environmentally safe manner.

II. SCOPE

This standard defines procedures for the identification, safe handling and good industrial hygiene practices for asbestos. These procedures shall apply to the handling of all asbestos containing materials, including the removal of small quantities of material; i.e. short sections of insulation during routine maintenance. This standard is intended to augment Environmental Standard E-500.

III. IDENTIFICATION

Prior to the removal of all material which has the physical appearance of asbestos, a sample shall be sent to either Industrial Hygiene Services or Michigan Division Analytical Laboratories for testing. Suspect material not tested as above will be treated as if it were asbestos.

IV. RESPONSIBILITIES

A. Supervision shall:

1. Comply with Environmental Standard E-500 which defines the regulatory requirements for demolition and disposal involving asbestos waste.
2. Ensure employees who handle asbestos containing materials are informed annually of the health hazards associated with exposures to asbestos and the availability of an annual medical examination. In addition, general information concerning asbestos as contained in Appendix A shall be communicated.
3. Ensure that employees use the protective devices and work practices established for the job.
4. Ensure that an appropriate monitoring program is carried out for operations involving asbestos containing materials. If sampling studies have been conducted, employees shall be informed of survey data.

SAFETY STANDARD TS-140

B. The employee shall:

1. Use the protective equipment and work practices required for the job.
2. Clean or replace respirators daily.

C. Industrial Hygiene shall:

1. Provide consultation as to protective devices necessary and available.
2. Provide analysis.
3. Provide monitoring.

D. Medical Department shall: Provide periodic examinations to monitor the health of Dow employees working with asbestos containing materials.

V. EDUCATION

A short video tape presentation concerning the hazards of asbestos is available from Industrial Hygiene or Division Cable TV for showing. The showing of this program to all employees, prior to working with asbestos, is encouraged.

VI. SAFE HANDLING PRACTICES

The primary consideration in the handling of asbestos containing materials is the danger of inhalation resulting from the generation of airborne fibers during demolition and/or renovation. The following procedures shall be carried out. These are minimum requirements and comply with MIOSHA Standards.

A. Access Control: Caution signs and barricades shall be posted to prevent employees from entering the area without proper protective equipment. Signs are available from the Paint Shop 416 Building, ask for sign number 77.

B. Minimize Asbestos Fibers Becoming Airborne

1. Asbestos containing material shall be thoroughly wetted before removal. This may require subsequent wetting as layers of material are removed.

Effective Date: 2-6-85

Page 2 of 4

ST0006453

SAFETY STANDARD TS-140

2. Loose asbestos material shall not be swept unless wetted.

C. Respiratory Protection

1. Approved dust respirators, available from Industrial Hygiene Services, shall be worn during all friable asbestos handling operations. Friable asbestos is material which is not encapsulated and can be broken free by finger pressure.
2. Safety Standard TS-745 shall be followed when wearing respiratory protection.

D. Disposal

1. All loose asbestos waste shall be placed in properly labeled impermeable containers (6 mil yellow plastic bags or other containers approved by Environmental Services) prior to Dow landfill disposal. Yellow bags are available on DVS, (135-900018) and are to be used for asbestos disposal only.
2. Asbestos labels (Stock #062230) are available from P.P. Horak Co. (Phone 695-6027) for containers other than specified yellow bags.
3. Dow landfill tags are available from designated Environmental Services personnel.

E. Protective Clothing

1. Protective clothing is not required unless excessive contamination may occur.
2. Outer clothing contaminated with asbestos fibers shall be sent to the laundry in a properly tagged (See D. 2) plastic bag. Do not use yellow bag noted in Section D. 1.

- F. Monitoring: Demolition and renovation jobs shall be monitored by Industrial Hygiene Services.

VII. APPLICATION WITH LIMITED SUBSTITUTES

- A. It is the goal of the Michigan Division to discontinue the use of asbestos containing materials as quickly as adequate substitutes are found. Supervision shall not place new asbestos bearing materials in service without consultation with Materials Engineering and Industrial Hygiene Services.

APPENDIX A.

HANDLING OF ASBESTOS CONTAINING MATERIALS

1. WHAT IS ASBESTOS?

A CRYSTALLINE FORM OF IMPURE MAGNESIUM SILICATE MINERALS IN THE FORM OF FIBERS. IT CAN BE ANY COLOR. MATERIALS MAY CONTAIN A WHOLE RANGE OF ASBESTOS CONCENTRATIONS---UP TO 100%.

2. WHERE CAN ASBESTOS BE FOUND?

ASBESTOS HAS BEEN USED IN INSULATING MATERIALS, AS A BINDER MATERIAL, GASKETS, ROOFING, FLOOR TILES, WALL BOARD (TRANSITE), PIPING, CEILING TILES, BRAKE LININGS, AND MANY OTHER APPLICATIONS. THE MOST COMMON DIVISION APPLICATIONS INCLUDE INSULATIONS AND TRANSITE SIDINGS, AMONG OTHERS.

3. HOW IS ASBESTOS IDENTIFIED?

SINCE ACCURATE VISUAL IDENTIFICATION OF ASBESTOS IN MATERIALS IS NOT DONE EASILY, IT IS VERY IMPORTANT THAT IDENTIFICATION BE DONE PRIOR TO HANDLING POTENTIAL ASBESTOS-CONTAINING MATERIALS. CHEMICAL OR PHYSICAL TESTS THROUGH MICHIGAN DIVISION INDUSTRIAL HYGIENE SERVICES OR MAS&TL ANALYTICAL LABORATORIES (1602 BUIDLING) ARE REQUIRED FOR ASSURANCE OF ACCURATE DETERMINATION.

4. HOW IS ASBESTOS TO BE HANDLED?

THE PROCEDURES FOR THE SAFE REMOVAL AND/OR DISPOSAL OF ASBESTOS-CONTAINING MATERIALS ARE FOUND IN SAFETY STANDARD GS-140 AND ENVIRONMENTAL STANDARD E-500. PROCEDURES INCLUDE THOROUGHLY WETTING THE MATERIAL TO MINIMIZE DUST, THE USE OF APPROPRIATE RESPIRATORY PROTECTION, POSTING OF APPROPRIATE SIGNS AND BARRICADING OF WORK AREA, AND DISPOSAL OF MATERIAL TO LANDFILL IN AN IMPERMEABLE CONTAINER (i.e., TIED, LABELED PLASTIC BAGS).

SAFETY STANDARD

S-140

ASBESTOS

I. POLICY

The Michigan Division will discontinue using asbestos-containing materials as quickly as adequate substitutes are found.

II. SCOPE

This standard defines procedures for the safe handling and good Industrial Hygiene Practices for asbestos. It is intended to augment Environmental Standard E-500.

III. EXPOSURE GUIDELINE

The eight-hour time-weighted average (TWA) standard for exposure to asbestos fibers is 2 fibers per cubic centimeter (cc) equal to or greater than 5 microns long. The maximum exposure allowable is 10 fibers per cc, longer than 5 micron, providing the eight-hour TWA is less than or equal to 2 fibers per cc.

IV. RESPONSIBILITIES

- A. Purchasing shall: Remove from all sources of supply, all asbestos-containing materials when user approved substitutes are found.
- B. Supervision shall:
 - 1. Comply with Environmental Standard E-500 which defines the regulatory requirements for the demolition and disposal involving asbestos waste.
 - 2. Inform employees of health hazards associated with the handling of asbestos and the availability of an annual medical examination.
 - 3. Ensure employees use the protective devices and work practices established for the job.
 - 4. Ensure that an appropriate monitoring program is

ST0006456

APPRO. Div. Safety Committee	DATE 1-30-81	REV. DATE 8-18-83	S-140
------------------------------------	-----------------	----------------------	-------

carried out for operations involving asbestos-containing materials and that employees are informed of survey data.

- C. The employee shall: Use the protective equipment and work practices required for the job.
- D. Industrial Hygiene Services shall:
 - 1. Provide consultation as to protective devices necessary and available.
 - 2. Provide monitoring.
- E. Medical Department shall: Provide periodic examination to monitor the health of Dow employees working with asbestos-containing materials.

V. EDUCATION

A 15 minute slide/tape presentation is available for showing concerning the hazards of asbestos. The showing of this program to all employees, prior to working with asbestos, is encouraged. This presentation is available from Industrial Hygiene Services.

VI. SUBSTITUTES FOR ASBESTOS

Acceptable substitutes for asbestos will change depending on suppliers, supply, application, etc. The Appendix lists substitutes which are recommended.

VII. SAFE HANDLING PRACTICES

Asbestos insulation which was installed prior to 1969 will be encountered during demolition or renovation. The following procedures shall be followed. These are minimum requirements and comply with MIOSHA standards.

A. Access Control

- 1. Caution signs and barricades shall be posted to prevent employees from entering the area without proper respiratory protection.
- 2. Signs, #77, are available from the Paint Shop, 416 Building.

B. Minimize Asbestos Fibers Becoming Airborne

- 1. Asbestos covering and the adjacent area should be thoroughly wetted before removal.

DATE	1-30-81	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	S-140
REV.	8-18-83		PAGE 2 OF 4

ST0006457

2. Do not sweep up dry fibers of asbestos.

3. A filtered local exhaust system or vacuum equipped with high efficiency filters should be used, whenever feasible, to collect the loose fibers.

C. Respiratory Protection

1. Approved dust respirators, available from Industrial Hygiene Services, shall be worn during all friable asbestos handling operations.

2. Respirators shall be replaced (if disposable) or cleaned daily and filters replaced as needed by the users (if non-disposable).

D. Disposal

1. All loose asbestos waste shall be placed in properly labeled impermeable containers (4 mil plastic bags or other containers approved by Environmental Services) prior to Dow landfill disposal.

2. Asbestos labels (Stock #062230) and tags (Stock #M53340) are available from F. P. Horak Co. (Phone: 695-6027).

3. Bags are available from General Stock (136-800299).

4. Dow landfill tags are available from designated Environmental Services personnel.

E. Protective Clothing

1. Protective clothing is not required unless excessive contamination may occur.

2. Outer clothing contaminated with asbestos fibers shall be sent to the laundry in a properly identified impermeable bag.

F. Monitoring: Major demolition jobs shall be monitored by Industrial Hygiene Services.

ST0006458

DATE:	1-30-81	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	S-140 3 of 4
REV.	8-18-83		

APPENDIX

I. SUBSTITUTE MATERIALS RECOMMENDED

- A. Insulation: Careytemp 1500, Thermo 12, Kaylo 10, Fiberglass, Foamglass, Styrofoam, Urethane.
- B. Insulation Weatherproofing: Alpha TGH-1000 VB or 1500, GAF Corp. T/NA 100 jacketing, Tuf-jac metal jacketing, Lascolite-T FRP sheeting, and JM Zeston PVC jacket.
- C. Tracing Sock: Fiberglass sock or Refrasil insulation.
- D. Asbestos Blankets: Cera blankets, Fiberglass blankets, Temp-Mat glass fiber and Kaowool ceramic fiber.
- E. Transite or Haveg Pipe and Transite Siding: Reinforced plastic sheeting, metal sheeting and lined pipe.

II. APPLICATIONS WITH LIMITED SUBSTITUTES

Use of asbestos in the following applications is acceptable upon consultations with Division Engineering Tech Center or Industrial Hygiene Services.

- A. Chlorine and Caustic Production: No substitutes are available at present for use in production cells.
- B. Reinforced Plastics
 - 1. Limited use of asbestos fibers as a filler may be required for certain applications.
 - 2. Fiberfrax is an acceptable substitute for many applications.
- C. Asbestos Gaskets: Asbestos gaskets are used in pipe flanges of lines carrying hot and/or corrosive solvents. No acceptable substitutes are available at this time.
- D. Valve Packing: Valves for high temperature operations are packed with a graphite impregnated asbestos packing such as John Crane 1871.

DATE	1-30-81	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	S-140
REV.	8-18-83		PAGE 4 OF 4

ST0006459

MICHIGAN DIVISION
February 16, 1981

ST0006460

TO: ALL HOLDERS OF THE MICHIGAN DIVISION SAFETY STANDARD
MANUALS

Please replace your existing Safety Standard S-140,
"Asbestos" with this latest revision.

This revision updates phone numbers, respirator types
etc.

Safety Department
47 Building

SAFETY STANDARD

S- 140

ASBESTOS

I. POLICY

The Michigan Division will discontinue using asbestos-containing materials as quickly as adequate substitutes are found.

II. SCOPE

This standard defines procedures for the safe handling and good Industrial Hygiene Practices for asbestos. It is intended to augment Environmental Standard E-500. This standard covers, but is not limited to:

1. Demolition
2. Loose asbestos fibers
3. Insulation
4. Tracing sock
5. Asbestos blankets
6. Transite or Haveg pipe
- 7. Transite siding

III. STANDARD

The 8 hour Time-Weighted Average (TWA) standard for exposure to asbestos fibers is 2 fibers per cubic centimeter (cc) equal to or greater than 5 microns long. The maximum exposure allowable is 10 fibers per cc, longer than 5 microns, providing the 8 hour average TWA is less than or equal to 2 fibers.

IV. RESPONSIBILITIES

- A. Purchasing shall remove from all sources of supply all asbestos-containing materials when user approved substitutes are found.
- B. Supervision shall ensure that employees use the protective devices and work practices established for a job. They must use engineering procedures, such as filtered ventilation, if feasible, to reduce exposures to asbestos. Supervision shall

→ indicates change
or addition from
previous issue

APPD: Div. Safety Committee	DATE 6-21-77	REV. DATE 1-30-81	S- 140
-----------------------------------	-----------------	----------------------	--------

19490001S

ensure that a monitoring program is carried out for operations involving asbestos-containing materials and shall ensure that employees are informed of the survey data, as soon as practical, after it is available.

- C. The employee shall use the protective equipment and work practices required for his job when working with asbestos-containing materials (see Appendix).
- D. Industrial Hygiene Services and the Safety Department shall provide consultation as to protective devices necessary and available. Industrial Hygiene Services shall provide monitoring to define asbestos exposures.
- E. Medical Department shall provide periodic examinations to monitor the health of Dow employees working with asbestos-containing materials.

→ V. EDUCATION

A 15 minute slide-tape presentation is available for showing concerning the hazards of asbestos. The showing of this program to all employees prior to working with asbestos is encouraged. This presentation is available from Industrial Hygiene Services (636-6663).

VI. SUBSTITUTES FOR ASBESTOS

Acceptable substitutes for asbestos will change depending on suppliers, supply, application, etc. The Appendix lists substitutes which are recommended.

ST0006462

DATE: 6-21-77

DOW CHEMICAL U.S.A., MICHIGAN DIVISION

REV. 1-30-81

PAGE 2 OF 5

APPENDIX

This appendix has been added to the Asbestos Safety Standard to comment on some specific asbestos uses and to list some materials which may be used in the Michigan Division. Care should be taken in the selection of these materials to ensure they will fit the application without introducing other hazards.

I. DEMOLITION AND/OR MAINTENANCE

Installation of asbestos insulation is prohibited in the Michigan Division. Some, which was installed prior to 1969, will be encountered during demolition or maintenance operations. The following procedures shall be followed during these operations. These are minimum requirements and comply with OSHA standards.

- A. Proper caution signs shall be posted at all asbestos demolition jobs to prevent employees from entering the area without proper respiratory protection. Signs, #77, are available from the Paint Shop, 416 Building (636-1420).
- B. Minimize asbestos fibers becoming airborne.. Asbestos covering and the adjacent area should be thoroughly wetted before removal to reduce the spread of dust. Do not sweep up dry fibers of asbestos. A filtered local exhaust system or vacuum equipped with high efficiency filters should be used, whenever feasible, to collect the loose fibers.
- C. Approved dust respirators, for instance Dustfoe 88, 3M 8710 or 3M 9920 shall be worn during all asbestos handling operations. They shall be optional where levels have been proven by monitoring to be within the standard. Respirators should be replaced (if disposable) or cleaned daily and filters replaced as needed by the users (if non-disposable). Respirators are available from Safety Stock, 47 Building (636-5842).
- D. Prior to Dow landfill disposal, all loose asbestos waste should be placed in properly labeled impermeable containers. This means minimum 4 mil plastic bags or other containers approved by Environmental Services (636-2338). Asbestos labels and tags are available from F. P. Horak Company (695-6027). Bags and Dow landfill tags are available from General Stock (636-4624). Labels are Stock #M62230. Tags are Stock #M53340. Bags are Stock #136-800299. Dow landfill tags are Stock #615-067000.
- E. Clothing excessively contaminated with asbestos, as in demolition, shall be sent for laundering in a properly identified impermeable bag. Disposable clothing taped closed at the ankles and sleeves is recommended, when

ST0006463

DATE: 6-21-77
REV. 1-30-81

DOW CHEMICAL U.S.A., MICHIGAN DIVISION

PAGE 3 OF 5

practicable, and where contamination may occur.

- F. Major demolition jobs shall be monitored by Industrial Hygiene to determine the amount of asbestos fibers in the work environment.

II. INSULATION

Some recommended substitutes for asbestos insulation are the following or combination of the following: Careytemp 1500, Thermo 12, Kaylo 10, Fiberglass, Foamglass, Styrofoam, Urethane.

III. INSULATION WEATHERPROOFING

- A. Phillip Carey and Johns-Manville insulation weatherproofing is no longer available from DVS. Upon weathering and if agitated, these weatherproofings allow asbestos fibers to become airborne.
- B. Some recommended substitutes are: Alpha TGH-1000 VB or 1500, GAF Corporation T/NA 100 jacketing, Tuf-jac metal jacketing, or Lascolite-T FRP sheeting.

IV. TRACING SOCK

- A. Asbestos tracing sock is not acceptable.
- B. Some recommended substitutes are: Fiberglass sock or Refrasil insulation.

V. ASBESTOS BLANKETS

- A. Blankets other than asbestos should be used whenever possible.
- B. Some recommended substitutes are: Cera blankets, Fiberglass blankets, Temp-Mat glass fiber, Kaowool ceramic fiber.
- C. When stress relieving welds the above substitutes are recommended.

VI. TRANSITE OR HAVEG PIPE AND TRANSITE SIDING

- A. Dust raised by working with these materials can be hazardous. Whenever possible, non-asbestos containing substitutes for these materials shall be used.
- B. Some recommended substitutes are: reinforced plastic sheeting, metal sheeting, and lined pipe.

DATE: 6-21-77	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	PAGE 4 OF 5
REV. 1-30-81		

ST0006464

VII. LOOSE ASBESTOS FIBERS

- A. Asbestos fibers are used in the production of chlorine and caustic. No substitute is available at present.
- B. Asbestos fibers are used in reinforced plastics. No substitute is available at present.

ST0006465

DATE:	6-21-77	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	PAGE 5 OF 5
REV.	1-30-81		

SAFETY STANDARD

S- 140

ASBESTOS

I. POLICY

Michigan Division will replace the use of asbestos-containing materials as quickly as adequate substitutes can be found.

II. SCOPE

→ This standard defines procedures for the safe handling and good Industrial Hygiene Practices for asbestos. It is intended to augment Environmental Standard E-500. This standard covers the following, but does not exclude others.

1. Demolition
2. Loose asbestos fibers
3. Insulation
4. Tracing sock
5. Asbestos blankets
6. Transite or Haveg pipe

III. STANDARD

The 8 hour Time-Weighted-Average (TWA) standard for exposure to asbestos fibers is 2 fibers per cubic centimeter (cc) equal to or greater than 5 microns long. The maximum exposure allowable is 10 fibers per cc, longer than 5 microns, providing the 8 hour average TWA is less than or equal to 2 fibers.

IV. RESPONSIBILITIES

- A. Purchasing shall remove from all sources of supply all asbestos-containing materials as soon as adequate substitutes can be found.
- B. Supervision shall ensure that employees use the protective devices and work practices established for a job. They must use engineering procedures, such as filtered ventilation, if feasible, to reduce exposures to asbestos. Supervision shall ensure that a monitoring program is carried out for operations involving asbestos-containing materials and shall ensure that employees are informed of the survey data as soon as practical after it is available.

APPD: Safety Network	DATE 4-7-76	REV. DATE 6-21-77	S- 140
----------------------------	----------------	----------------------	--------

S70006466

- C. The employee shall use the protective equipment and work practices required for his job when working with asbestos-containing materials.
- D. Industrial Hygiene Services and Safety Department shall provide consultation as to protective devices necessary and available. Industrial Hygiene Services shall provide monitoring to define asbestos exposures.
- E. Medical Department shall provide periodic examinations to monitor the health of Dow employees working with asbestos-containing materials.

V. EDUCATION

A 15 minute slide-tape presentation has been prepared concerning the hazards of asbestos. We encourage the showing of this program to all employees prior to working with asbestos. This presentation is available from Industrial Hygiene Services, 6-0609.

VI. SUBSTITUTES FOR ASBESTOS

Acceptable substitutes for asbestos will change depending on suppliers, supply, application etc. The appendix lists substitutes which are recommended.

ST00006467

DATE: 4-7-76
REV. 6-21-77

DOW CHEMICAL U.S.A., MICHIGAN DIVISION

S-140
PAGE 2 OF 4

APPENDIX

This appendix has been added to the Asbestos Safety Standard to comment on some specific asbestos uses and to list some materials which may be used in the Michigan Division. Care should be taken in the selection of these materials to ensure they will fit the application without introducing other hazards.

I. DEMOLITION AND/OR MAINTENANCE

Installation of asbestos insulation is prohibited in the Michigan Division. Some which was installed prior to 1969 will be encountered during demolition or maintenance operations. The following procedures shall be followed during these operations. These are minimum requirements and comply with OSHA standards.

- A. Proper caution signs shall be posted at all asbestos demolition jobs to prevent employees from entering the area without proper respiratory protection. (Signs #77, are available from the Paint Shop, 416 Bldg., 636-1420).
- B. Minimize asbestos fibers becoming air-borne. Asbestos covering and the adjacent area should be thoroughly wetted before removal to reduce the spread of dust. Do not sweep up dry fibers of asbestos. A filtered local exhaust system or vacuum should be used whenever feasible to collect the loose fibers.
- C. Approved dust respirators, for instance Dustfoe 88 or 3M 8710, (available from Safety Stock, 256 Bldg., 636-5842) shall be worn during all asbestos handling operations. Except they shall be optional where levels have been proven by monitoring to be within the standard. Respirators should be replaced (if disposable) or cleaned daily and filters replaced as needed by the users (if non-disposable).
- D. All loose asbestos waste shall be placed in properly labelled impermeable containers (at least 4 mil plastic bags) for Dow land fill disposal. When loose asbestos waste in containers is sent to landfill, special notification shall be given to Environmental Services Burner, 636-0542. Labels, bags, and tags are available from General Stock 636-3121. (Labels stock #070205; tags, stock # 070210; bags, stock #800299).
- E. Clothing excessively contaminated with asbestos, as it may be in demolition, should be sent for laundering in a properly identified impermeable bag. Disposable clothing taped closed at the ankles and sleeves is recommended where practicable where contamination may occur.
- F. Major demolition jobs shall be monitored by Industrial Hygiene to determine the amount of asbestos fibers in the work environment.

II. INSULATION

Some recommended substitutes for asbestos insulation are the following or combinations of the following: Careytemp 1500, Thermo 12, Kaylo 10,

DATE: 4-7-76	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	S-140
REV. 6-21-77		PAGE 3 OF 4

ST0006468

Fiberglass, Foamglass, Styrofoam, Urthane.

III. INSULATION WEATHERPROOFING

- A. Philip Carey and Johns-Manville insulation weatherproofing is no longer available from DVS. Upon weathering these, allow asbestos fibers to become air-borne if agitated.
- B. Some recommended substitutes are Johns-Manville Du-All jacketing, GAF Corporation T/NA 100 jacketing, Tuf-jac metal jacketing, or Filon reinforced plastic sheeting.

IV. TRACING SOCK

- A. Asbestos tracing sock is no longer available.
- B. Some recommended substitutes are: Fiberglass Sock

V. ASBESTOS BLANKETS

- A. Blankets other than asbestos should be used whenever possible.
Some recommended substitutes are:
Fiberglass blankets
Temp-Mat glass fiber
Kao wool ceramic fiber
Cleanguard coated asbestos blankets-experimental
- B. Temp mat 1200°F and Kao wool 3200°F are being used instead of asbestos when stress relieving welds.

VI. TRANSITE SIDING OR HAVEG PIPE

- A. Whenever possible non-asbestos containing substitutes for these materials shall be used. They do contain asbestos and dust raised by working with these materials can be hazardous.
Some recommended substitutes are:
Reinforced plastic sheeting
Metal sheeting
Lined pipe

VII. LOOSE ASBESTOS FIBERS

- A. Chlor-Alkali uses asbestos fibers as an integral part of the production of chlorine and caustic. No substitute is available at this time.
- B. Asbestos fibers are used in reinforced plastics. No substitute is available at present which has the acceptable properties of "wetting" that they have.

DATE: 4-7-76

DOW CHEMICAL U.S.A., MICHIGAN DIVISION

S-140

REV. 6-21-77

PAGE 4 OF 4

69490001S

SAFETY STANDARD

S- 140

ASBESTOS

INDEX

SCOPE - Page 1, Item II

STANDARD-TWA - Page 1, Item III

RESPONSIBILITIES - Page 1,2, Item IV, A,B,C,D&E

EDUCATION - Page 2, Item V

SUBSTITUTES - Page 2, Item VI

APPENDIX -

DEMOLITION AND/OR MAINTENANCE - Page 3,4, Item I,II,III,
IV,V,VI,VII

ST00006470

APPROVED Safety Network	DATE 4-7-76	REV. DATE	S- 140
-------------------------------	----------------	-----------	--------

SAFETY STANDARD

S- 140

ASBESTOS

I. POLICY

Michigan Division will replace the use of asbestos-containing materials as quickly as adequate substitutes can be found.

II. SCOPE

This standard defines procedures for the safe handling and good Industrial Hygiene Practices for asbestos-containing materials. This includes the following, but does not exclude others.

1. Demolition
2. Loose asbestos fibers
3. Insulation
4. Tracing sock
5. Asbestos blankets
6. Transite or Haveg pipe

III. STANDARD

The 8 hour Time-Weighted-Average (TWA) standard for exposure to asbestos fibers is 2 fibers per cubic centimeter (cc) equal to or greater than 5 microns long. The maximum exposure allowable is 10 fibers per cc, longer than 5 microns, providing the 8 hour average TWA is less than or equal to 2 fibers.

IV. RESPONSIBILITIES

- A. Purchasing shall remove from all sources of supply all asbestos-containing materials as soon as adequate substitutes can be found.

ST00006471

APPD. SAFETY NETWORK	DATE 4-7-76	REV. DATE	S- 140
----------------------------	----------------	-----------	--------

- B. Supervision shall ensure that employees use the protective devices and work practices established for a job. They must use engineering procedures, such as filtered ventilation, if feasible, to reduce exposures to asbestos. Supervision shall ensure that a monitoring program is carried out for operations involving asbestos-containing materials and shall ensure that employees are informed of the survey data as soon as practical after it is available.
- C. The employee shall use the protective equipment and work practices required for their job when working with asbestos-containing materials.
- D. Industrial Hygiene Services and Safety Department shall provide consultation as to protective devices necessary and available Industrial Hygiene Services shall provide monitoring to define asbestos exposures.
- E. Medical Department shall provide periodic examinations to monitor the health of Dow employees working with asbestos-containing materials.

V. EDUCATION

A 15 minute slide-tape presentation has been prepared concerning the hazards of asbestos. We encourage the showing of this program to all employees prior to working with asbestos. This presentation is available from Industrial Hygiene Services, 607 Building.

VI. SUBSTITUTES FOR ASBESTOS

Acceptable substitutes for asbestos will change depending on suppliers, supply, application etc. The appendix lists substitutes which are recommended.

Standards committee:

R. W. McBay, Chlor-Alkali, 851	T. G. Jezowski, CCP, 572
E. E. Priem, MAPS, 821	R. D. Olson, Ind. Hyg., 607
	M. F. Stevenson, USA
	Ind. Hyg., 1803

ST0006472

APPENDIX

This appendix has been added to the asbestos safety standard to comment on some specific asbestos uses and to list some materials which may be used in the Michigan Division. Care should be taken in the selection of these materials to ensure they will fit the application without introducing other hazards.

I. DEMOLITION AND/OR MAINTENANCE

Installation of asbestos insulation is prohibited in the Michigan Division. Some which was installed prior to 1969 will be encountered during demolition or maintenance operations. The following procedures shall be followed during these operations. These are minimum requirements and comply with OSHA standards.

- A. Proper caution signs shall be posted at all asbestos demolition jobs to prevent employees from entering the area without proper respiratory protection. (Signs #77, are available from the Paint Shop, 416 Building, 636-1420).
- B. Minimize asbestos fibers becoming air-borne. Asbestos covering and the adjacent area should be thoroughly wetted before removal to reduce the spread of dust. Do not sweep up dry fibers of asbestos. A filtered local exhaust system or vacuum should be used whenever feasible to collect the loose fibers.
- C. Approved dust respirators (available from Safety Stock, 256 Building, 636-5842) shall be worn during all asbestos handling operations. Respirators should be replaced (if disposable) or cleaned daily and filters replaced as needed by the users (if non-disposable).
- D. All loose asbestos waste shall be placed in properly labelled impermeable containers (at least 4 mil plastic bags) for Dow land fill disposal. Labels, bags, and tags are available from General Stock 636-3121. (Labels, stock #070205; tags, stock #070210; bags, stock # 800299).
- E. Any asbestos contaminated clothing sent for laundering must be placed in a properly identified impermeable bag.
- F. Major demolition jobs shall be monitored by Industrial Hygiene to determine the amount of asbestos fibers in the work environment.

II. INSULATION

Some recommended substitutes for asbestos insulation are the following or combinations of the following: Careytemp 1500, Thermo 12, Kaylo 10, Fiberglass, Foamglass, Styrofoam, Urethane.

DATE 4/7/76	DOW CHEMICAL U.S.A., MICHIGAN DIVISION	PAGE 3 OF 4
REV.		

ST0006473

III. INSULATION WEATHERPROOFING

- A. Philip Carey and Johns-Manville insulation weatherproofing is no longer available from DVS. Upon weathering these, allow asbestos fibers to become air-borne if agitated.
- B. Some recommended substitutes are Johns-Manville Du-All jacketing, GAF Corporation T/NA 100 jacketing, Tuf-jac metal jacketing, or Filon reinforced plastics sheeting.

IV. TRACING SOCK

- A. Asbestos tracing sock is no longer available.
- B. Some recommended substitutes are:
Fiberglass Sock

V. ASBESTOS BLANKETS

- A. Blankets other than asbestos should be used whenever possible.
Some recommended substitutes are:
Fiberglass blankets
Temp - Mat glass fiber
Kaowool ceramic fiber
Cleanguard coated asbestos blankets - experimental
- B. Temp mat 1200°F. and Kaowool 3200°F. are being used instead of asbestos when stress relieving welds.

VI. TRANSITE SIDING OR HAVEG PIPE

- A. Whenever possible non-asbestos containing substitutes for these materials shall be used. They do contain asbestos and dust raised by working with these materials can be hazardous.
- B. Some recommended substitutes are:
Reinforced plastic sheeting
Metal sheeting
Lined pipe

VII. LOOSE ASBESTOS FIBERS

- A. Chlor-Alkali uses asbestos fibers as an integral part of the production of chlorine and caustic. No substitute is available at this time.
- B. Asbestos fibers are used in reinforced plastics. No substitute is available at present which has the acceptable properties of "wetting" that they have.

Filed 4/26/77
CME

1. Who is responsible to ensure that protective devices and work practices are followed on the job?
 - a. Supervisor
 - b. Workmen
 - c. Both
2. Asbestos waste may be disposed of through regular dumpster service for burner.
 - a. Yes
 - b. No
3. Asbestos contaminated clothing should be sent to laundry in regular laundry bags and tagged properly.
 - a. Yes
 - b. No
4. Who monitors major demolition jobs to determine the amount of asbestos fibers in the work area?
 - a. O.S.H.A.
 - b. Industrial Hygiene
 - c. Supervisor
5. Is Philip Carey or Johns-Manville overwrap acceptable for weatherproofing insulation?
 - a. Yes
 - b. No
6. Asbestos sock is still acceptable for covering tracer lines?
 - a. Yes
 - b. No
7. Is asbestos blanket the recommended material for use as a fire blanket?
 - a. Yes
 - b. No
8. Does havey pipe pose a health hazard because of asbestos fibers?
 - a. Yes
 - b. No
9. There is a good substitute for use in the Dow Chlorine and Caustic Production Cells?
 - a. yes
 - b. No
10. The 8-hour time weighted average Standard for exposure to asbestos fibers is:
 - a. 2 fibers per cubic centimeter
 - b. 5 fibers per cubic centimeter
 - c. 10 fibers per cubic centimeter

ST00006475

ANSWER SHEET

QUIZ S-140 ASBESTOS

1. C
2. B
3. B
4. B
5. B
6. B
7. B
8. A
9. B
10. A

ST0006476

ENVIRONMENTAL STANDARD

E-500

ASBESTOS

I. POLICY

The Michigan Division personnel will manage the removal, disposal and general handling of friable asbestos in accordance with governmental regulations and take all other appropriate action to protect workers and the general public from asbestos hazards.

II. SCOPE

This standard covers procedures for handling, transport, and disposal of asbestos as well as the required governmental reporting. It is intended to augment not replace Safety Standard S-140.

III. RESPONSIBILITY

1. Notification

A. The EPA regulations on asbestos require notification shall be made ten (10) days prior to the start of a demolition or renovation project where asbestos removal is involved.

1) Notification is required by the company actually doing the work.

2) Where the Dow Michigan Division is doing the work notification should be made in the format shown in Attachment A and this should be taken to Environmental Services who will, in turn, notify the U.S. EPA Region V and the Michigan Department of Natural Resources.

B. The requirement that notification be made shall be a part of all contracts the Michigan Division lets for demolition or renovation where asbestos is involved.

ST0006138

Dow Confidential

11/82

2. Renovation and demolition.

A. Definitions.

- 1) Demolition - The wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos material.
- 2) Renovation - The removing or stripping of friable asbestos material used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load supporting structure members are wrecked or taken out are excluded. See demolition definition.
- 3) Friable Asbestos - The determination of whether asbestos is present or not can be made easily by the surface analysis group in the Analytical Laboratories, 574 Building. "Friable" simply means that the material breaks apart readily and can thus release its fiber content.

B. Application

- 1) All demolition jobs involving friable asbestos require notification.
- 2) Renovation jobs involving > 260 lineal ~~feet of asbestos covered pipe or~~ 160 ft² of asbestos insulation require notification. Jobs must not be split up to get "less than" amounts.

C. Operating standards.

- 1) There shall be no visible emission to the outside air.
- 2) Where pipes, reactors, etc. are insulated with friable asbestos, the asbestos or the units will be removed from buildings and structures before wrecking or dismantling of any structure.
- 3) Adequate wetting down to prevent visible emissions will be used at all times in dis-assembly, transport and disposal.

4) Visible emissions must be prevented even if wetting down is not practical. Suggested alternatives are:

- a) Remove large unstripped pipe sections, tanks, reactors and other equipment and strip them in areas where wetting or ventilation control is feasible.
- b) Use a non-freezing fluid such as brine for "wetting".

3. Asbestos disposal sites.

- A. Inactive and active asbestos disposal sites will be maintained in accordance with EPA Standards 40-CFR Part 61.22L and Part 61.25 respectively. The Michigan Division landfill is maintained according to these regulations.
- B. Requirements for disposition of asbestos materials are described in Environmental Standard E-110, Disposal of Demolition Materials, and Safety Standard S-140, Asbestos.

4. Compliance status reports.

Compliance status reports for existing asbestos emission sources must be filed with the U.S. EPA Region V and the Michigan Department of Natural Resources. The Environmental Services Department should be contacted for content and format.

The reports cover new sources and existing sources and must only be filed once unless there is a change in the emission reported.

discuss

ST0006440