BUSINESS CONFIDENTIAL

PLAINTIFF'S EXHIBIT

UC-2426

UNION CARBIDE CORPORATION
ENGINEERING AND HYDROCARBONS DIVISION
CENTRAL ENGINEERING
SOUTH CHARLESTON, WEST VIRGINIA

MEMORANDUM

February 13, 1987

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MOC

FROM: H. G. Clem

SUBJECT: IDENTIFICATION CODE FOR ASBESTOS-FREE INSULATION

This report is in response to your letter on asbestos identification concerns with insulation in our plants. Three primary issues, integral asbestos-free visual coding for insulation materials, weather barrier coding, and asbestos identification tests are discussed under separate headings:

1. Integral Non-Asbestos Identification of Calcium Silicate Pipe and Block Insulation

All of our approved vendors for calcium silicate pipe and block insulation have visual identification dispersed throughout the white product in the form of either gold colored mica flakes or black fibrous material to indicate that the insulation is asbestos-free as shown below:

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Calcium Silicate Insulation	Manufacturer	Asbestos-Free Identification
Kaylo 10-AF	Owens-Corning Fiberglas Corp.	Mica Flakes
Thermo-12	Manville Corp.	Mica Flakes
Super Caltemp NA	PABCO	Black Fibers

Manufactuers of expanded perlite, Material Spec. 4, also have asbestos-free visual identification. The current approved material, Goodtemp 1500 from the Howred Corporation, has a uniform pink color throughout the material. Celotemp 1500, a formerly approved insulation that is no longer being manufactured, contained mica flakes like the current calcium silicates.

Since apparently only solid white compositions like the early calcium silicates, 85% magnesia, and insulating cements for steam piping and boilers contained significant percentages of asbestos fibers, manufacturers of most other insulation materials have not adopted an asbestos-free coding system. Insulations with distinctive characteristics or appearance like cellular glass (UCC Spec. 1), polyurethane foam (UCC Spec. 3 and 7), performed fiber glass (UCC Spec. 6), flexible plastic foam (UCC Spec. 12), and mineral wool (UCC Spec. 14 and 40) never contained asbestos.

Of course, since the use of mica flakes and other visual coding was not widespread until the mid 1970's, most insulation in older units may require laboratory testing for possible asbestos content before replacement or modification.

2. Asbestos-Free Visual Indicator for Metallic and Mastic Weather Barriers

You asked for a durable visual indicator for metallic and mastic weather barriers to indicate that the insulation underneath did not contain asbestos. I have found that several methods are being used in the petrochemical industry, but there is no universal standard on this important subject. A summary of asbestos-free identification methods related to weather barriers is listed below:

Surface Texture Variations:

Reportedly, Tennessee Eastman, Eastman Kodak, and Amoco have adopted the use of a "stucco embossed" texture finish in either flat or 3/16" corrugated configuration for aluminum or stainless steel weather barriers on all insulation replacement projects. This method provides a distinctive visual coding that contrasts with the older smooth finish metal weather barrier sheet material.

Surface Texture Variations - Cont.

Only minor changes are required in installation procedures with this approach, and planned or inadvertent painting of the weather barrier will not affect the visual identification characteristics. The method is not applicable to mastics or plastic weather barriers, however.

Color Coding:

This procedure involves the use of factory finished weather barrier in a specific color to indicate that the insulation is asbestos-free. The colors most used for this purpose are white, green and blue. To be effective, this method would require coordination with existing UCC safety color coding in the plants.

Identification Tapes:

This method utilizes making tapes applied over standard weather barrier materials to indicate that the insulation either contains asbestos or is asbestos-free. E.I. DuPont de Nemours & Co. (Inc.) uses this method. A copy of the DuPont specification entitled "Identification for Installed Asbestos-Bearing Insulation" is attached for reference.

This type of identification tape is available from several suppliers. The DuPont tape features fade proof ink lettering and background with a clear polypropylene coating for chemical resistance and durability. The asbestos code lettering is combined with arrows to show the direction in which the indicated insulation runs.

The primary advantage of identification tapes is that any type of weather barrier may be marked whether new or existing. Entire sections of plant units can be defined as asbestos-free with this technique. The main disadvantage of tapes is that they may be inadvertently painted over or removed during routine maintenance activities.

Various versions of asbestos-free identification tapes are available from graphics label suppliers. In most cases, pressure sensitive vinyl is used for the tape material. Unlike the DuPont specification tape, the "ASBESTOS FREE INSULATION" labels and direction arrow tape are usually separate items, not combined. The blue background/white lettering is the same in most instances.

3. Asbestos Identification Methods

The identification and monitoring of asbestos fibers from insulation or other sources is the responsibility of UCC Industrial Hygiene Groups at our various locations. According to Mr. Manhel Patel at the Tech Center, several test methods are available to identify asbestos including colorametric test kits, microscopic examination with polarized light, scanning electron microscopy and transmission electron microscopy.

However, the colorametric technique is not as reliable as the microscopic methods because it only detects iron and magnesium from bulk samples; interference from related compounds can affect test results. The microscopic methods are approved by OSHA, EPA and NIOSH and represent the best current procedures available.

It is apparent that devising a better way to identify asbestos that meets government approval will be difficult. If quicker results are needed at our plants on insulation replacement jobs, consideration should be given to pre-sampling the existing insulation well ahead of any planned work.

Conclusions and Recommendations

The visual asbestos-free coding methods of our calcium silicate and expanded perlite suppliers, ie mica flakes, black fibers, etc., will be included in our UCC Material Specifications 2 and 4 as suggested by Don Miller of the Institute Plant. This may provide some valuable assistance in the field identification of insulation materials.

Concerning the visual asbestos-free coding of weather barriers, it appears that no single identification procedure may be suitable for all conditions in our plants and other facilities such as laboratory buildings. One of the main problems is the diverse types of weather barriers encountered; aluminum, stainless steel, PVC, fiberglass laminate sheet, and mastics. Some differences are also evident in our options when we are replacing asbestos containing insulation versus simply labeling or marking a "good" existing asbestos-free system.

Current asbestos and asbestos-free insulation coding procedures at UCC locations range from no identification marking to marking all asbestos containing insulation with labeling tape and entering a code for asbestos replacement jobs in the computerized work orders for storage and retrieval. Before we introduce a UCC recommended practice or standard on weather barrier

identification coding, a poll or request for comments should be solicited from plant insulation representatives and other responsible parties. To assist in the proposed poll, actual samples of identification tapes and embossed metal weather barrier would also be sent to each respondent.

If there are further questions or comments, please call me.

H. G. Clem

HGC:es

ATTACHMENT

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IDENTIFICATION FOR INSTALLED ASBESTOS-BEARING INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	JULY 1975
THIS PAGE REVISED	APRIL 1984
STANDARD REAFFIRMED	APRIL 1984

[redacted]

1. SCOPE

1.1 This specification provides information for a standardized method of placing identification on installed insulation which contains free asbestos fibers or insulation of unknown asbestos content.

1.2 This specification is applicable only for identifying installed insulation which has a questionable free asbestos fiber content. Obviously, materials such as cellular glass, glass fiber, mineral wool, polyurethane foam, and polystyrene foam do not contain asbestos fibers and, therefore, do not need to be marked for identification.

1.3 Follow this specification only at locations where such identification is required by the operating department and the plant does not have a conflicting established identification procedure.

2. CONDITIONS

2.1 From an installed insulation viewpoint, specific areas on a site are classified as follows:

2.1.1 **Condition I.** New facilities on which no insulation containing free asbestos fibers was installed. This could be an entire site or a segregated building on a site.

2.1.2 **Condition II.** New additions to existing buildings which can be clearly defined by designated column lines or a defined plane through the building. The addition does not contain any insulation containing free asbestos fibers.

2.1.3 **Condition III.** Existing areas which are modified by the addition of insulated lines or equipment.

2.1.4 **Condition IV.** Existing areas in which existing insulation is being replaced.

3. TYPE OF IDENTIFICATION

For identification, place strategically located strips of appropriately marked tape around the circumference of the pipe finish or on the equipment finish. Position the tape so as to indicate the type of insulation used with the arrows pointing down the line in the direction in which the indicated insulation runs (see Figure 1).

4. PLACEMENT OF IDENTIFICATION – WHEN REQUIRED

4.1 **Condition I.** Individual insulated lines or equipment pieces in new facilities or segregated buildings in which no insulation containing free asbestos was installed, do not require identification. At turnover, the local construction organization is to notify the plant that the facility is free of materials containing free asbestos fibers.

4.2 **Condition II.** Individual insulated lines or equipment pieces in clearly defined additions in which no insulation containing free asbestos fibers was installed, do not require identification. In lieu of marking individual lines or equipment pieces, place strips of tape strategically along the plane that defines the building addition. Locate the tape on selected columns, beams, walls, or ceilings, to clearly identify the plane at which the asbestos-free insulation starts. Apply two parallel strips of tape. Position one piece of tape with the arrows orientated to indicate that, from that point on, all insulation is nonasbestos. Position a second piece of tape with the arrows orientated to indicate that, from that point back, the insulation may contain free asbestos fibers.

4.3 **Condition III.** Individually mark all new insulated lines and equipment pieces installed as additions or modifications in existing areas to indicate insulation asbestos content. Where asbestos-free insulation is installed on a pipeline, place a strip of tape around the circumference of the finish at the points where the pipe goes through a wall or partition. Orient the arrows to indicate that the line inside the room has asbestos-free insulation. Where a tie-in is made to a line insulated with a material of unknown asbestos content, identify the junction of the insulation by parallel pieces of tape around the circumference of the finish. Position one piece of tape to indicate that, from that point on, the insulation is asbestos-free. Place a second piece of tape with the arrows orientated to indicate that, from that point on, the insulation may contain free asbestos fibers.

4.4 **Condition IV.** Where insulation is being replaced in an area of unknown asbestos content, by asbestos-free insulation, identify the replacement insulation by a strip of tape placed around the circumference of the pipe finish or at strategic locations on equipment pieces. Where a line running from wall-to-wall is reinsulated, place a piece of tape at the points where the pipe goes through a wall or partition. Orient the arrows to indicate that the line inside the room has asbestos-free insulation. Where a portion of the insulation is replaced, identify the junction of the existing and replacement insulation by parallel pieces of tape around the circumference of the finish. Place one piece of tape to indicate that, from that point on, the insulation is asbestos-free. Place a second piece of tape with the arrows orientated to indicate that, from that point on, the insulation may contain free asbestos fibers.

5. HANDLING INSULATION

When handling, fabricating, or removing insulation in the absence of positive knowledge that it is asbestos-free, assume that it contains free asbestos fibers, and follow S4T.

6. TAPE

6.1 Specifications (see Figure 1)

a. Supplied in rolls.

b. Pressure-sensitive contact cement backing – developed for aircraft use.

c. M–90 tape material – developed for aircraft use.

d. Provide slit in release paper for easy removal.

e. ASB letters and arrow red, repeated on 3-inch intervals, on white background. NA letters and arrow blue, repeated on 3-inch intervals, on white background. Letters are approximately 1-inch high.

7. TAPE SUPPLIERS (PARTIAL LIST)

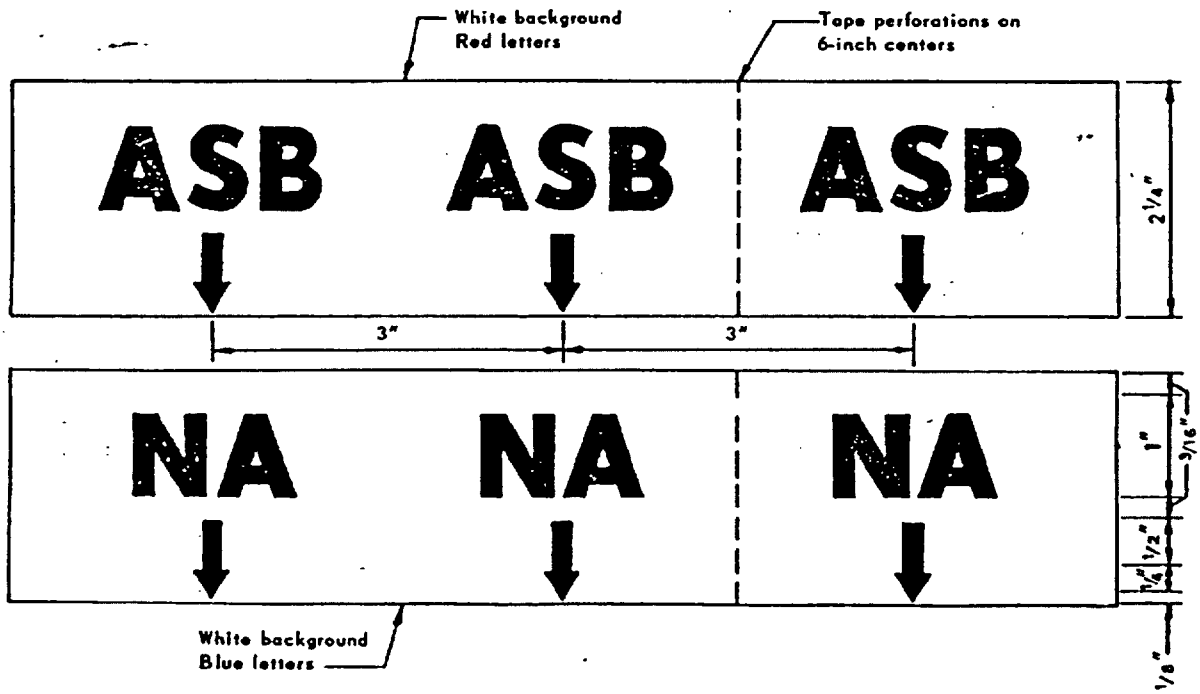
Davis Printing Co
P. O. Box 696
Camden, SC 29029
(803) 432–1901

Top Flight Corp
165 East 9th Avenue
York, PA 17404
(717) 843–9901

T & B Westline
Division of Thomas & Betts Corp
220 South Rose Street
Los Angeles, CA 90012
(800) 421–8618

Sheriden Safety Supply
7029 Huntley Road
Suite E
Columbus, OH 43229
(614) 888–8040

York Tape and Label Corp
P. O. Box 6805
Columbia, SC 29260
(803) 788–2635



Tape Legend: ASB = Asbestos Bearing
NA = Nonasbestos Bearing

FIGURE 1 – TAPE FOR IDENTIFICATION