GEN 55 REV. 2 (5/74)

Interoffice Memorandum

TO (Name and Location)	DATE
As Listed	July 25, 1980
FROM (Name and Location)	REFERENCE NO.
M. R. Stenzel	MRS-134-80

Subject: Asbestos - Screening Test for Unidentified Insulation

Attached is a letter from Ernie Ramey relating to an analytical method to determine if unidentified insulation contains asbestos. No false negatives were observed in 198 field samples. Presently, each Plant must handle unidentified insulation as if it contained asbestos. With this method, you may be able to reduce the number of situations where unidentified insulation must be treated as if it contains asbestos.

Mark R. Stenzel

MRS:gl
Attachment

002170

PLAINTIFF'S EXHIBIT
tabbies
CEL-183

GEN 55 (REV 6/74)

Interoffice Memorandum

TO (Name and Location)	DATE
Mr. M. R. Stenzel - Dallas	July 14, 1980
FROM (Name and Location)	REFERENCE NO.
Mr. E. S. Ramey	ESR-396-80

ANALYTICAL METHOD FOR ASBESTOS FOR FIELD USE

Attached is an analytical method for screening unidentified insulation or other building materials for the presence of Asbestos (a small pea size sample must be pulverized). The method is suitable for use in the field and is simple and inexpensive.

Presence of Iron (Fe^{+2}) and/or magnesium (Mg^{+2}) develops identifiable colors for a positive test. The absence of Fe and Mg in a test sample indicates the absence of asbestos. False positive results can be obtained due to other Fe^{+2} and Mg^{+2} containing material which is not asbestos since this simple test is not specific for asbestos.

The method, recently developed by NIOSH, is Coloimetric. It was described in the June 1980 issue of National Safety News, page 20, as "an inexpensive and simple method for quickly determining whether asbestos is present in building materials."

Kits using the above analytical scheme are now marketed by Sipin and SKC with availability unknown. Home made kits are easily made for much less than the asking price of Sipin and SKC.

Mr. Cody Milburn of Suntide Refinery (Corpus Christi) demonstrated his home made kit (cost about $50.00 including fishing tackle box) at an informal meeting of local Safety and Health people which was sponsored by the local Vallen people. Mr. Cody has his laboratory technician using this test method in the field with an estimated analysis time of 30 minutes or less.

I obtained a copy of the method from Mr. Cody. Included in the method is a list of reagents required.

If our people use this method, they should be properly informed of the hazardous chemicals present and the safe handling of the more dangerous reagents such as 50% Hydrofluoric Acid, 10N Sodium Hydroxide, and concentrated Phosphoric and Sulforic Acids.

If I can be of further help, let me know.

E. S. Ramey

ejv

002180

cc: Dr. R. F. Stubbeman (without attachment)
Mr. P. J. Volpe " "
Mr. Grover Vos - Dallas " "
Mr. C. D. Barrett " " "

Uniterms
Asbestos Analysis
Colorimetric Analysis
Workplace Screen
NIOSH Method

1980

563

002181

Cody Fibrous (SUNTIDE)

TEST FOR SCREENING ASBESTOS

SKC & SIPIN HAVE THESE ON THE MARKET

LOCAL SUNTIDE USES A HOME MADE KIT WHICH THE USE FOR IN THE FIELD USE

—BR—

WALTER S. KIM
JAMES W. CARTER, II
RICHARD E. KUPEL

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
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OCTOBER 1979

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TEST FOR SCREENING ASBESTOS

I. SCOPE AND APPLICATION

This colorimetric test is applicable to the detection of magnesium (II) and iron (II) from asbestos in bulk samples. These samples include sprayed on asbestos as well as ceiling tiles. The test is simple and can be readily used in the field to screen for the presence or absence of asbestos. The amount of the sample needed for the test is only about the size of a large pea.

II. PRINCIPLE

The test is based upon the formation of color complexes with Mg^{+2} and Fe^{+2} released from asbestos. The Mg^{+2} from chrysotile is complexed with p-nitrophenylazo-α-naphthol. The Fe^{+2} from crocidolite and amosite is complexed with 1, 10-phenanthroline. A positive test is indicated by the formation of colored complex for Mg^{+2} and/or Fe^{+2}, and it indicates possible presence of asbestos.

III. INTERFERENCES

The test is a colorimetric spot test for Mg^{+2} and Fe^{+2}, and is not specific for asbestos.

A bulk sample may contain Mg and Fe compounds other than asbestos. Without treating the sample as in the Procedure, a few drops of color forming reagents are added directly to the sample. If either color forms, an interferring substance is present and the sample must be cleaned before the test is conducted to eliminate the interference. In this cleaning process, plaster, mineral wool, fiberglass, and soluble Mg and Fe compounds are removed before the screening test, preventing their interference.

IV. SENSITIVITY, PRECISION, AND ACCURACY

A sample containing more than 1% asbestos gives a positive color reaction.

A total of 198 various field samples were tested before the Acid Wash steps were added to the Iron Test procedure. Results are listed below:

Results of the screening test without the Acid Wash.

	True Positive	False Positive	True Negative	False Negative
No. of Samples	79	50	69	0
% of Total	40	25	35	0

With the Acid Wash, the following results were obtained from 13 samples.

Results of the screening test with the Acid Wash.

	True Positive	False Positive	True Negative	False Negative
No. of Samples	5	0	8	0
% of Total	38	0	62	0

V. APPARATUS

1. Teflon dish or white plastic plate
2. Plastic or glass rod
3. Dropping plastic pipet
4. 15 mL disposable plastic beaker
5. 25 mm size 0.8 μm mixed cellulose ester filter
6. 25 mm size polyvinyl chloride filter
7. 25 mm Swinnex filter holder and gasket
8. 10 mL disposable plastic syringe

VI. REAGENTS (Reagent Grade)

1. Phosphoric acid, concentrated. H_3PO_4 heated decomp to dangerous POx TLV(10) = 100 mg/m³ = 48.9 PPM

2. 10 N sodium hydroxide – Dissolve 40 g of NaOH in 100 mL of water. caustic (acids)

3. Mg Reagent – Dissolve 1 mg of p-nitrophenylazo-α-naphthol in 100 mL of 2 N NaOH. Age at least a day. This reagent is stable over a month.

4. Hydrofluoric acid – Dilute 20 mL of HF with 20 mL of water. Add 0.6 mL of concentrated HCl.

5. Fe Reagent – Dissolve 2 g of 1,10-phenanthroline in 50 mL of ethanol. This reagent is stable over a month.

6. Glycerin, reagent grade.

7. Acetic acid, concentrated glacial.

8. Sulfuric acid, concentrated.

9. Double de-ionized water.

VII. PROCEDURE

A. Magnesium Test

1. Add a few drops of Mg Reagent directly to the sample. If blue color appears, wash the sample with glycerin before the test. Any sample containing plaster is also washed with glycerin.

Glycerin Wash

a. Place a small portion of sample, about the size of a large pea, in a plastic beaker.

b. Add 5 drops of glycerin and mix well with a plastic rod or spatula.

c. Rinse the plastic rod with a small amount of water into the beaker.

d. Filter the sample through the filtration assembly consisting of a syringe attached to the Swinnex filter holder loaded with a mixed cellulose ester filter and a gasket.

e. Filter with a minimum of 5 washings or about 50 mL of water.

f. Transfer the filter to a Teflon dish for the Magnesium test.

2. Add a drop of H_3PO_4 and mix well by grinding the sample with a plastic rod.

3. Add 2 drops of 10 N NaOH and mix well.

4. Add 5 drops of Mg Reagent and stir briefly. Note any color change.

5. Add 5 more drops of Mg Reagent and observe the final color.

6. A blue color indicates that chrysotile may be present.

7. Samples giving a positive test may be sent to a laboratory for confirmation. If the magnesium test is negative, the sample must be tested for iron.

B. Iron Test

1. Add few drops of Fe Reagent directly to the sample. If a red color appears, wash the sample with the acetic--sulfuric acid mixture before the test. Samples containing fiberglass or mineral wool are also washed with the acid mixture.

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Acid Wash

1. Place a small portion of the sample, about the size of a large pea, in a plastic beaker.

2. Add 5 drops of concentrated acetic acid.

3. Add 5 drops of concentrated sulfuric acid.

4. Mix well and ultrasonicate if available for 5 minutes.

5. Filter the sample through a polyvinyl chloride filter with a minimum of 5 washings or about 50 mL of water.

6. Transfer the filter to a Teflon dish and proceed with the Iron Test.

2. Add a drop of HF solution and mix well.

3. Add 5 drops of Fe Reagent and observe the development of red color.

4. The red color indicates that amosite or crocidolite may be present.

C. Notes

If both parts of the test give negative responses, there is a low probability that any asbestos is present. Once the presence of magnesium and/or iron is indicated, further analysis, if needed, is done in the laboratory to confirm, identify the type, and quantitate the percentage of asbestos.

VIII. REFERENCE

1. Caution: Asbestos Dust. A scriptographic booklet by Channing L. Bete Co., Inc., Greenfield, Mass. Prepared in cooperation with U.S. DHEW, PHS, CDC, National Institute for Occupational Safety and Health, Cincinnati, Ohio (1973).

2. Fritz Feigl: Spot Tests - In Inorganic Analysis. Translated by Ralph E. Oesper. 5th Edition. Elsevier Publishing Company, Amsterdam. (1958) p. 225-227.

3. Walter S. Kim, James W. Carter, II, and Richard E. Kupel: Quick Screening Test for Asbestos. U.S. DHEW, PHS, CDC, NIOSH, Cincinnati, Ohio. To be published in AIHAJ.