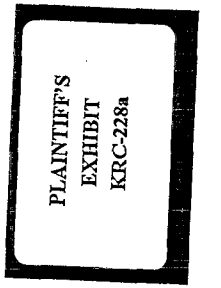
ASSESSMENT

1A 187331



Assessment

I. Asbestos and Its Uses

A. General Information

B. Characteristics

C. Types of Asbestos

D. Common Uses

II. Methods of Application

A. Friable — >1% - CAN CRUMBLED, PULVERIZED, OR REDUCED TO POWDER BY HAND PRESSURE WHEN DRY.

B. Non-Friable — WELL BOUND - WILL NOT RELEASE FIBERS IN XS OF CONTROL LIMIT DURING HANDLING, DEMOLITION ETC.

C. Sprayed-On — FRIABLE

D. Pipe and Boiler Wrap

III. Abatement Methods

A. Removal

1. Advantages
2. Disadvantages
3. Appropriate locations
4. Inappropriate locations
5. Comments

B. Enclosure

1. Advantages
2. Disadvantages
3. Appropriate locations
4. Inappropriate locations
5. Comments

C. Encapsulation

1. Advantages
2. Disadvantages
3. Appropriate locations
4. Inappropriate locations
5. Comments

NAMES AND CHARACTERISTICS OF ASBESTOS

CHRYSOTILE	WHITE ASBESTOS ACCOUNTS FOR 90% OF USE FINE SILKY FIBERS FLEXIBLE AND HIGH TENSILE STRENGTH	SOURCE: CANADA USSR
AMOSITE	BROWN ASBESTOS USED FREQUENTLY IN HEAT INSULATION MATERIALS BRITTLE FIBERS BONDS WELL WITH PLASTICS	SOURCE: SOUTH AFRI
CROCIDOLITE	BLUE ASBESTOS MOST DANGEROUS FORM STRONGEST OF THE ASBESTOS FIBERS BRITTLE FIBERS FOUND IN COMBINATION WITH CHRYSOTILE ON PIPES AND SHEETING OCCASIONALLY FOUND WITH AMOSITE AND CHRYSOTILE ON PIPE AND BOILER WRAP FOUND AS A DECORATIVE MATERIAL	SOURCE: SOUTH AFRI
TREMOLITE	RARELY FOUND IN BUILDING AND COMMERCIAL PRODUCTS	
ACTINOLITE	RARELY FOUND IN BUILDING AND COMMERCIAL PRODUCTS	
ANTHOPHYLLITE	RARELY FOUND IN BUILDING AND COMMERCIAL PRODUCTS	

Summary of Asbestos-Containing Products

Product	Average percent asbestos	Binder	Dates used
Friction products	50	Various polymers	1910-present
Plastic products			
Floor tile and sheet	20	PVC, asphalt	1950-present
Coatings and sealants	10	Asphalt	1900-present
Rigid plastics	<50	Phenolic resin	?-present
Cement pipe and sheet	20	Portland cement	1930-present
Paper products			
Roofing felt	15	Asphalt	1910-present
Gaskets	80	Various polymers	?-present
Corrugated paper pipe wrap	80	Starches, sodium silicate	1910-present
Other paper	80	Polymers, starches, silicates	1910-present
Textile products	90	Cotton, wool	1910-present
Insulating and decorative products			
Sprayed coating	50	Portland cement, silicates, organic binders	1935-1978
Trowelled coating	70	Portland cement, silicates	1935-1978
Preformed pipe wrap	50	Magnesium carbonate, calcium silicate	1926-1975
Insulation board	30	Silicates	Unknown
Boiler insulation	10	Magnesium carbonate, calcium silicate	1890-1978
Other uses	<50	Many types	1900-present

1A 187335

TRADE NAMES

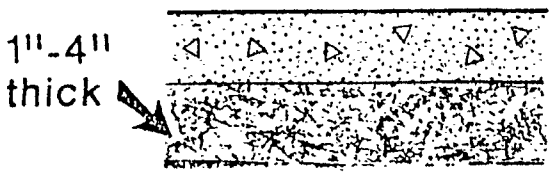
APPLICATION TYPE	TRADE NAME		
Sprayed-On	Asbestos-Spray	Limpet	Spraycraft
	Monokote-MK III	Sabinite	Kilnoise Plaster
	Cafco-Soundshield	Spraydon	
	Cafco-Blaze Shield	Audi-Cote	
	Cafeco-Type D	Cafco-Heat Shield	
	Cafco-Type I		
Pipe and Boiler Wrap	Johns Manville (JM) and Newells 85% Magnesia Blocks, Pipe Covering, and Cements		
	JM Suprex Blocks		
	JM Marinite		
	JM and Atlas Spongefelt Pipe Covering		
	JM Thermo-Wrap and Thermo-Tape		
	JM Asbestos Sponge		
	JM 302 and 352 Insulating Cements		
	JM Thermobestos Blocks		
	JM Asbestocell		
	JM Newtherm		
	JM Fibrofil		
	Atlas 650, 660, 250, 280, 18 Cold Water Paste		
	Atlas Aircell and Finecell		
	Atlasite, Caposite		
	"Newalls" Newtempheit		
	JM and Atlas Rope Lagging		

1A 187336

FIGURE 1.

DESCRIPTION OF SPRAY-APPLIED ASBESTOS-CONTAINING MATERIAL

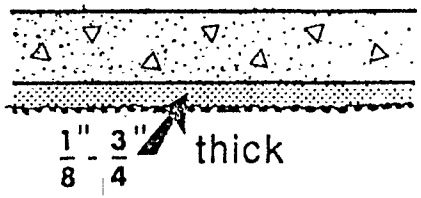
FIBROUS



ASBESTOS IS:

1. Highly Friable
2. Very soft
3. Fluffy & Spongy
4. Loosely bonded together
5. Composed almost entirely of fibers
6. Cotton candy/Spanish Moss appearance
7. Usually contains more than 10% asbestos

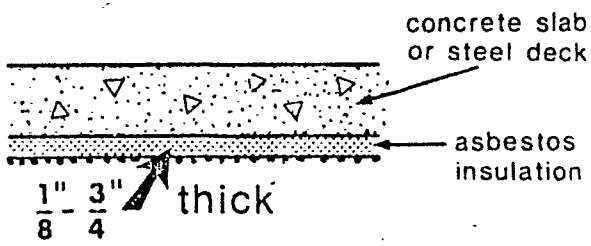
GRANULAR CEMENTITIOUS



ASBESTOS IS:

1. Friable
2. Soft, easily indented by hand pressure
3. Easily rubbed off as powder by hand pressure
4. Non-fibrous mixture of granular material, (only fibrous components are the few asbestos fibers)
5. Densely packed
6. Coarse sand, textured appearance
7. Usually contains less than 10% asbestos
8. Commonly referred to as acoustical plaster

CONCRETE LIKE



ASBESTOS IS:

1. Hard
2. Not friable; can not be damaged by hand pressure
3. Requires mechanical device to penetrate surface
4. Non-fibrous mixture of granular material, (only fibrous components are the asbestos fibers)
5. Densely packed
6. Coarse sand, textured appearance

1A 187337

Comparison of Asbestos Abatement Methods

Method	Advantages	Disadvantages	Appropriate applications	Inappropriate applications	General comments
Removal	Eliminates asbestos source Eliminates need for special operations and maintenance program	Replacement with substitute material may be necessary Porous surfaces also may require encapsulation Improper removal may raise fiber levels more expensive method more time consuming	Can be used in most situations material is poorly bonded to substrate material is water damaged material is easily accessible		Containment barriers needed Worker protection required Wet removal is required for all types of asbestos. (amosite will not absorb water or water with traditional wetting agents) Disposal may be a problem in some areas Unusual circumstances, complex surfaces, and the presence of utilities may require special removal techniques
Enclosure	Reduces exposure in area outside enclosure Initial costs may be lower than for removal unless utilities need relocating or major changes Usually does not require replacement of material	Asbestos source remains and must be removed eventually Fiber release continues behind enclosure Special operations program required to control access to enclosure for maintenance and renovation Periodic reinspection required to check for damage Repair of damaged enclosure necessary Fibers released in dry form during construction of enclosure Long-term costs could be higher than for removal	ACM is located in a small area (e.g., a column) Disturbance or entry into enclosed area unlikely	Damaged or deteriorating materials causing rapid fiber release Water damage evident Damage or entry into enclosure likely Ceiling to be enclosed is low	Containment barriers needed Use of tools with HEPA-filtered vacuum attachments advisable Worker protection needed

1A 187338

Method	Advantages	Disadvantages	Appropriate applications	Inappropriate applications	General comments
Encapsulation	Reduces asbestos fiber release from material Initial costs may be lower than for removal Does not require replacement of material	Asbestos source remains and must be removed later If material is not in good condition, sealant may cause material to delaminate Periodic reinspection required to check for damage or deterioration Repair of damaged or deteriorating encapsulated surface required Encapsulated surface is difficult to remove and may require dry techniques for eventual removal Long-term costs may be higher than removal	Material still retains bonding integrity Damage to material not likely Material not highly accessible Material granular, cementitious After removal of ACM, if the substrate is porous	Material does not adhere well to substrate Material is deteriorating or damaged, or damage is likely Water damage is evident Material is fibrous, fluffy	Containment barriers needed Worker protection needed Airless sprayers should be used Previously encapsulated materials may have to be re-encapsulated

1A 187339

RANKING SCHEME

RANK	DESCRIPTION
1	Friable asbestos-containing materials in poor condition: < Water damage, physical damage, or deterioration.
2	Friable materials in good condition, but with a significant potential for disturbance: < No water damage, physical damage, or deterioration. < Exposed or accessible, or in air plenum or airstream.
3	Friable materials in good condition and with low potential for disturbance: < No water damage, physical damage, or deterioration. < Not exposed or accessible. < Not in air plenum or airstream.
4	Only nonfriable materials present (such as floor tiles, wallboard).

1A 187340

FACTORS FOR ASSESSING THE POTENTIAL FOR FIBER RELEASE

Condition of the Asbestos-Containing Material:

> Evidence of deterioration or delamination from the underlying surface (substrate).

> Evidence of physical damage.

> Evidence of water damage.

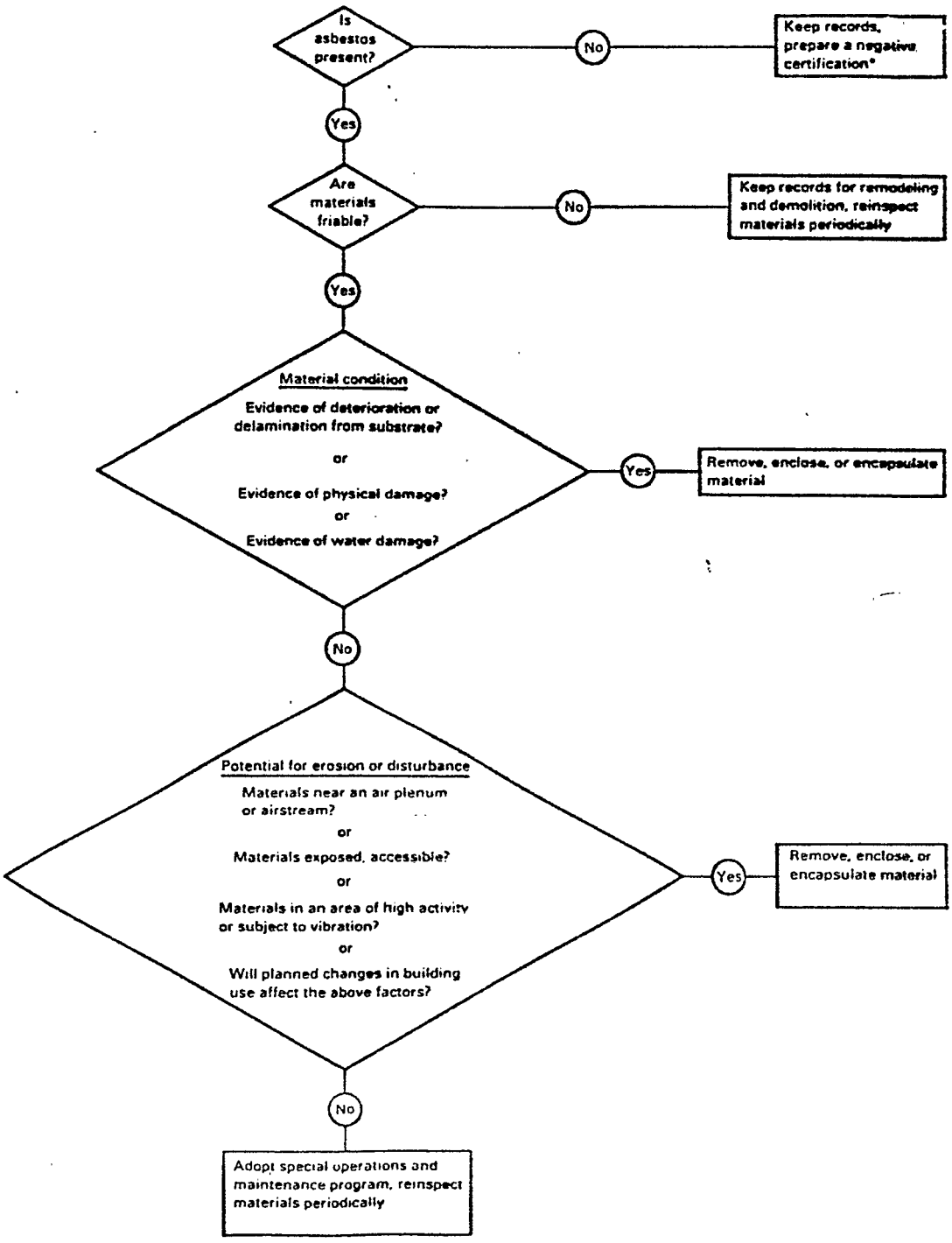
Potential for Disturbance or Erosion:

> Proximity to air plenum or direct airstream.

> Exposure (visibility), accessibility (to building occupants and maintenance personnel), and degree of activity (air movement, vibration, movement of building occupants).

> Change in building use.

A guide to selecting a course of action.



*A statement certifying that friable asbestos-containing materials are not present.

TABLE 3-1. COMPARISON OF METHODS FOR MEASURING AIRBORNE ASBESTOS

	PCM	SEM	TEM
Standard Methods	NIOSH P&CAM 239 Method*	No standard method.	EPA provisional method & update**
Quality Assurance	Proficiency Analytical Testing Program; no NBS reference materials.	No lab testing, or NBS reference materials.	Limited lab testing, NBS reference materials available.
Cost	$25-50	$50-300	$200-600
Availability	Most available.	Less available.	Least available.
Time Requirements	1 hr preparation & analysis, <6 hrs. turnaround	4 hr preparation & analysis, 6-24 hrs. turnaround	4-24 hr preparation & analysis, 2-7 days turnaround
Sensitivity (Thinnest Fiber Visible)	0.15 μm at best; 0.25 μm typical.	0.05 μm at best; 0.20 μm typical.	0.0002 μm at best; 0.0025 μm typical.
Specificity	Not specific for asbestos.	More specific than PCM but not definitive for asbestos (SEM with EDXA)	Definitive for asbestos (Level III -- TEM with EDXA & SAED)
Collection Filters	0.8-1.2 μm cellulose ester.	0.4-0.8 μm polycarbonate best, cellulose ester also used.	0.4 μm polycarbonate, or 0.45 μm cellulose ester if organic contaminants present.

* Leidel et al., 1979. NIOSH 7400 (NIOSH, 1984) is an alternative.

** Samudra et al., 1978; Yamate, 1984.

Source: Based on information from the EPA/NBS conference on post-abatement air monitoring (NBS/EPA, 1985), the open literature, and government reports, and on peer review comments.

1A 187343