With compliments

'Asbestos in Building' revised to include new control limits etc.

The Asbestos Information Centre Limited

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London W1V 9PA
Telephone: 01 439 9231/2/3
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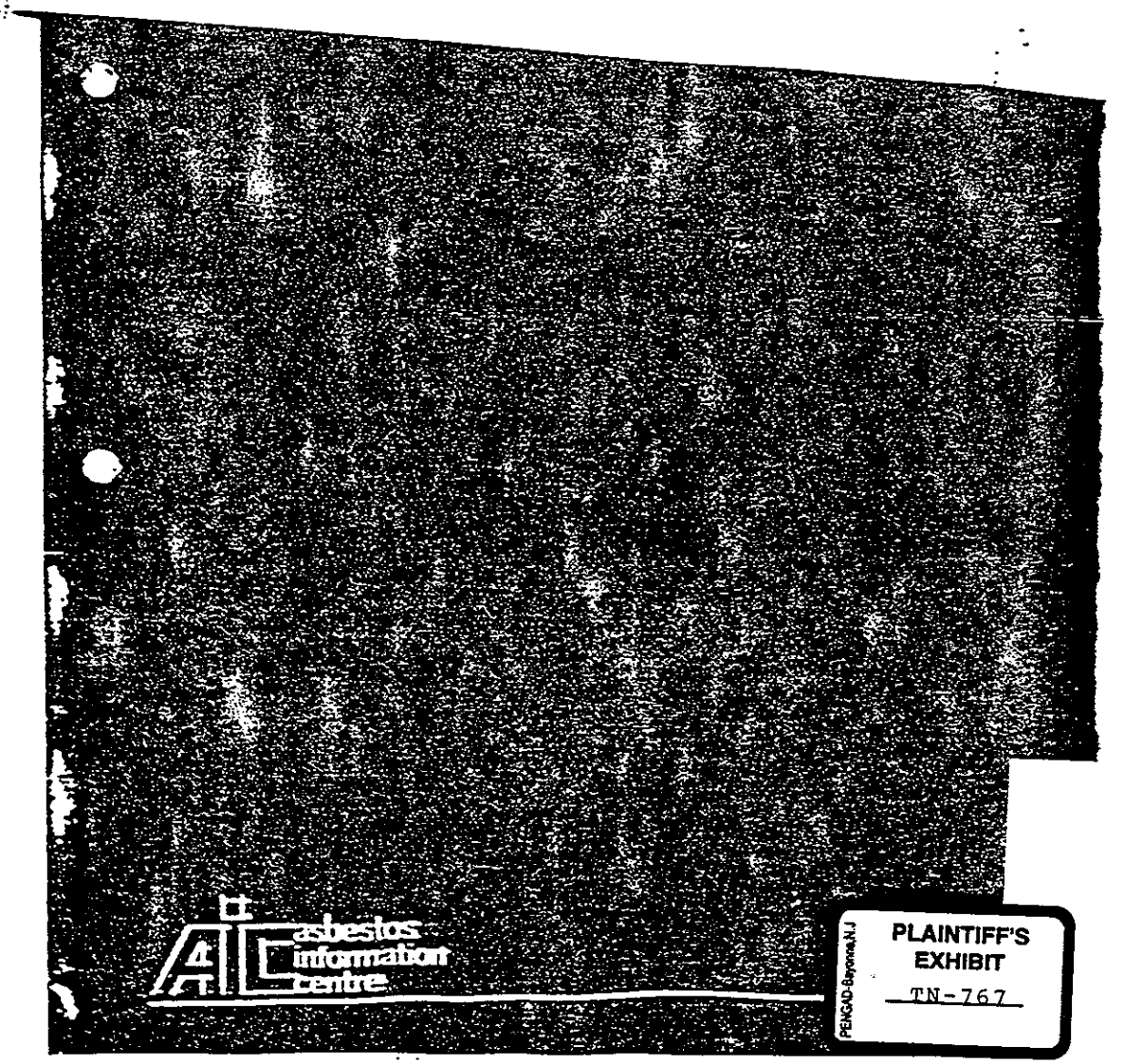
Copy for PLC CEO

asbestos information centre



PENGAD-Bayonne,N.J

PLAINTIFF'S EXHIBIT
TN-767

Introduction

Asbestos is a strong, durable, non-combustible fibre the unique properties of which make it ideal for reinforcing cement, vinyl and other materials used in making building products. It has the added property of providing insulation and protecting structures from the effects of fire. As a result, asbestos containing materials can be found in buildings of all types.

The introduction of controls on the levels of asbestos dust acceptable in the working atmosphere has meant that some products, which were difficult to work within the controls, have been discontinued and are no longer used in new building work. Other products, which are easy to work within the controls, continue to be manufactured and used.

The recent growth in knowledge of asbestos related disease may cause people to be concerned regarding the presence, and the continued use of products containing asbestos. Others may need to know what action they should take when they are required to carry out work on these products.

This publication is designed to provide information on the main asbestos based products found in building. Its purpose is to identify and to classify products according to the risks to building occupants and the precautions which will be required in maintenance work. The publication does not include details of minor, or relatively little-used asbestos containing building materials, but, if required, specific advice can be obtained from the Asbestos Information Centre.

Asbestos Information Centre

The Asbestos Information Centre is sponsored by the asbestos industry to provide advice and assistance on asbestos to anyone who requires it, both on the technical performance of products and on health and safety aspects. The Asbestos Information Centre liaises with government departments and other official bodies, trade unions, industry associations, scientific research bodies and the like on matters relating to asbestos.

The Centre is a member of the Asbestos International Association and is involved in consultation during the preparation of regulations on the use of asbestos within the EEC.

If further information is required, please contact:
The Asbestos Information Centre,
Sackville House, 40 [illegible].
London W1V 9PA. Tel: 01-[illegible] 9231

March 1993

Controls on exposure to asbestos

There are three main types of asbestos used in building materials. These are chrysotile (white), amosite (brown) and crocidolite (blue).

Work with products containing asbestos in the United Kingdom is governed by The Asbestos Regulations 1969. In order to assist people to interpret the requirements of the Asbestos Regulations, the Health and Safety Executive uses hygiene standards for asbestos dust in the working environment of 2 fibres per millilitre of air for chrysotile and amosite (white and brown) and 0.2 fibres per millilitre of air for crocidolite (blue) asbestos.

In May 1978 the Government appointed an Advisory Committee on Asbestos charged to consider all aspects relating to asbestos and to make recommendations where it considered there was a need for improved precautions.

The committee published its final report in October 1979. It felt there was no quantitative evidence of a risk to the general public, or to the occupants of buildings, but it did recommend a ban on the use of crocidolite (blue) asbestos, and on the use of asbestos as lagging or as sprayed insulation.

The committee further recommended there should be an overriding legal requirement to reduce exposure to asbestos dust to the minimum that is reasonably practicable. On 1 January 1983 the control limits were revised to 1.0 fibres per millilitre of air for chrysotile, 0.5 fibres per millilitre of air for amosite, with the control limit of 0.2 fibres per millilitre for crocidolite remaining unchanged.

The new control limits are compared with the original requirements in the tables below.

Summary of controls

Chrysotile (white)

Health and Safety Executive under The Asbestos Regulations 1969: Technical Data Note 13 followed by Guidance Note EH10

2.0 fibres per millilitre of air

Revision following the Advisory Committee on Asbestos Guidance Note EH10 (revised). Effective 1 January 1983

1.0 fibres per millilitre of air

The new limits represent the upper limits to the minimum reasonably practicable.

Crocidolite (blue)

0.2 fibres per millilitre of air

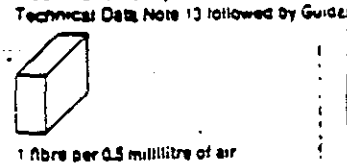
0.2 fibres per millilitre of air

...ty on everyone to reduce exposure

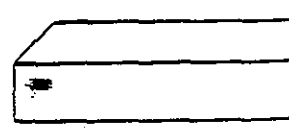
Notify the Health and Safety Executive before initiating work on crocidolite containing products.

Volume of air permitted to carry 1 fibre

Health and Safety Executive under The Asbestos Regulations 1969: Technical Data Note 13 followed by Guidance Note EH10

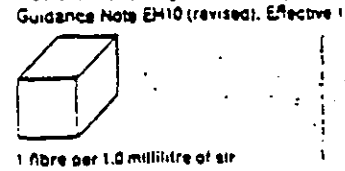


1 fibre per 0.5 millilitre of air

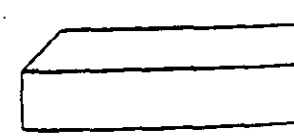


1 fibre per 5.0 millilitre of air

Revision following the Advisory Committee on Asbestos Guidance Note EH10 (revised). Effective 1 January 1983



1 fibre per 1.0 millilitre of air



1 fibre per 5.0 millilitre of air

Asbestos in building products

Chrysotile (white) was the asbestos most commonly used in the past for the manufacture of building materials and is virtually the only one used in currently available materials. It is therefore the type most likely to be found throughout the complete range of asbestos containing building products.

Amosite (brown) was used in thermal insulation lagging up to the late 1960's and in sprayed applications up to 1974. After those dates asbestos was no longer used. The most important use of amosite during the 25 years up to 1979 was in asbestos insulating boards used for fire protection.

Crocidolite (blue) was used in thermal insulation lagging and sprayed coatings but usually as the minor constituent in combination with chrysotile and/or amosite. The use of crocidolite in building applications was never extensive. It declined steadily during the 1960's and ceased altogether some time before 1970.

Details of the main asbestos-based building materials and their approximate fibre content are given below.

Materials found in existing buildings and used in new work (approximate asbestos fibre content).

Asbestos cement	10 to 12% - chrysotile (white)
Asbestos/vinyl floor tiles	1% - chrysotile (white)
Asbestos roofing felts	5% - chrysotile (white)

Materials found in existing buildings but not used in new work

Asbestos insulating board	*6-25% - amosite (brown) or amosite and chrysotile (white). Dependent on brand *One brand which was produced between 1955 and 1962 also contained 1 to 2% crocidolite (blue)
Thermal insulation lagging	5-55% chrysotile (white), amosite (brown) or crocidolite (blue) or any permutation
Sprayed coatings for fire protection, thermal or acoustic insulation	55-85% chrysotile (white), amosite (brown) or crocidolite (blue) or any permutation

Asbestos dust levels in buildings

The risk of exposure to respirable asbestos dust for the building occupant is negligible. The risk when working with asbestos building materials depends on the nature and fibre content of the material allied to the type of work being done.

Certain products such as asbestos-cement sheeting have a small asbestos content and the asbestos that is present is bonded into the structure of the material. Such products are regarded as presenting very little risk to health providing simple rules are followed when working the material. Other products, notably lagging and spray coatings, have high asbestos content coupled to low density. Such products are likely to present a risk, but only when they are being worked or some form of mechanical damage is occurring.

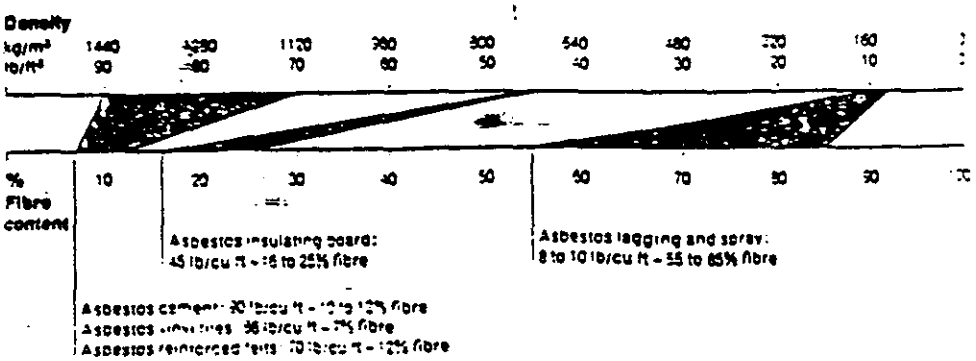
The tables below show the main asbestos containing building products on scales of density and fibre content to indicate the levels of asbestos dust likely when working to the recommendations given in this manual.

Extensive dust count surveys to determine the levels of asbestos dust present in all types of building have been carried out by various authorities and scientific groups, particularly in the United Kingdom and the United States of America.

Density/fibre content/asbestos dust

Products	asbestos cement asbestos vinyl tiles asbestos reinforced felts	asbestos insulating board	asbestos lagging sprayed asbestos coatings
Density	high	medium	low
Fibre content	low	medium	high
Working dust levels	very low	moderate	high

Density/fibre content scale



These surveys show that asbestos containing materials and asbestos coatings do not release hazardous fibres into the atmosphere unless there is some form of mechanical disturbance.

The ease of disturbance is related to the location of the product within the building and the amount of fibre released is dependent on the severity of the disturbance related to the hardness/friability of the product and the amount of asbestos fibre it contains.

Low density, high fibre content, friable materials such as lagging or spray coatings can be disturbed by vibration or relatively low mechanical impact or abrasion. Medium density, low to medium fibre content, non-friable material such as asbestos insulating board will be disturbed only by mechanical impact or abrasion. High density, low fibre content, non-friable materials such as asbestos cement require extreme mechanical disturbance to produce excessive fibre dust levels.

The results of three typical surveys are given below. The first two surveys were carried out in the United Kingdom and covered all types of products. The third survey was carried out in the United States and covered lagging and spray installations only.

At the foot of the page is a scale relating the dust count measurements obtained to the control levels currently in force.

Dust survey results

Asbestosis Research Council
Survey of 60 buildings in UK.
Buildings: industrial, commercial, official and domestic.

Products: spray coatings, insulation board and asbestos cement.

Percentage of count	fibres per ml of air
4%	0.08 to 0.08
50%	0.005 to 0.08
46%	0 to 0.005

Advisory Committee on Asbestos
Results of survey carried out through local authorities.

Birmingham
Number of counts: 758

Percentage of count	fibres per ml of air
0.4%	> 0.08
1.1%	0.005 to 0.08
98.5%	0 to 0.005

Other local authorities
Number of counts: 246

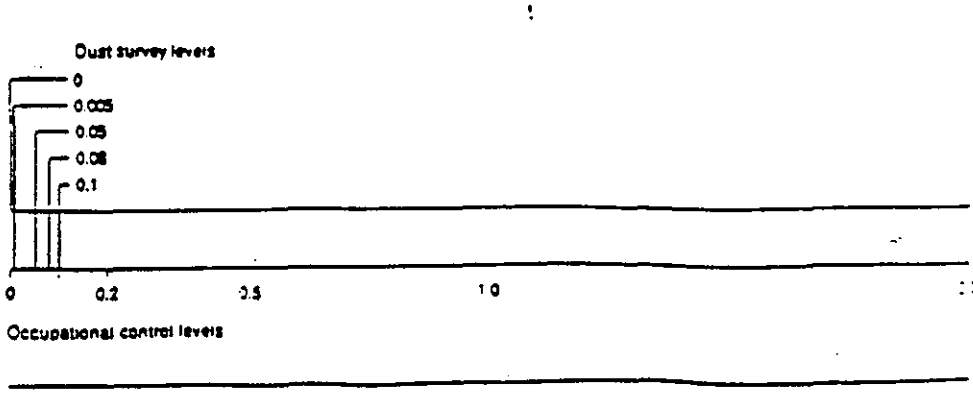
Percentage of count	fibres per ml of air
3%	> 0.08
25%	0.005 to 0.08
52%	0 to 0.005

Industrial Hygienics (US)
Survey of 36 industrial, commercial and official buildings and 4 ships.

[illegible] lagging and spray coatings.
Number of counts: 400

Percentage of count	fibres per ml of air
12.5%	0.1 to [illegible]
42.5%	[illegible]
22.5%	[illegible] to 0.01
2.5%	0 to 0.005

Dust survey levels relative to occupational control levels



Asbestos cement

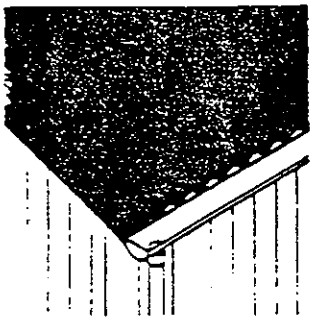
The products in this group will be found in existing buildings and in new work under construction. The nature of these materials make them easy and economic to use within current and proposed control limits.

Asbestos cement

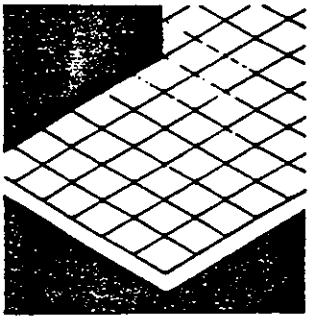
Identification
Used in the United Kingdom for 75 years, asbestos cement is the most common and widely used asbestos based material. It contains approximately 10 to 12% asbestos fibre, normally chrysotile (white) and 88 to 90% Portland cement mixed with water. Asbestos cement is normally grey in colour though sometimes it is coloured by pigmentation or by surface coating. The material is hard and non-friable. The most common forms are: flat or corrugated roofing and cladding sheets, decking tiles, soffit strips, rainwater gutters and downpipes, flue pipes, cold water cisterns, slates and shingles. Asbestos cement is also available as a fully compressed sheet which may have an embossed decorative surface or an applied colour coating.

Working
General: wherever possible work should be carried out at floor level.
Cutting: use conventional hand tools or a Millers Falls SP450 reciprocating power saw with blade numbers 6034 or 10034.
Drilling: use conventional hand or power drills. Work downwards or with the drill held horizontally. If forced to work overhead, wear an approved respirator.
Fixing and decorating: use conventional tools for nailing, screwing and decorating.

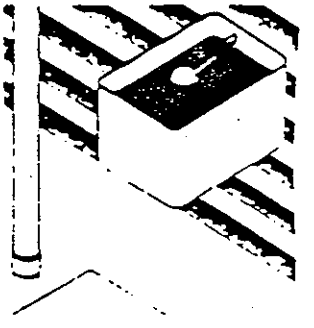
Applications



Roof and wall cladding systems. Rainwater gutters and downpipes.

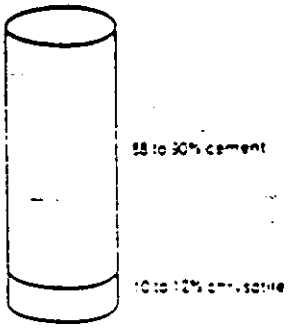


Flat roof decking tiles. Flat roof troughed sections.

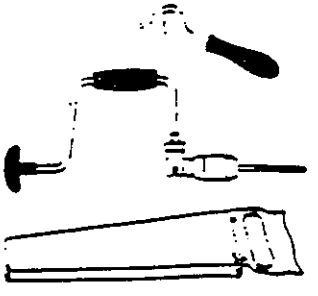


Flue pipes and cold water cisterns.

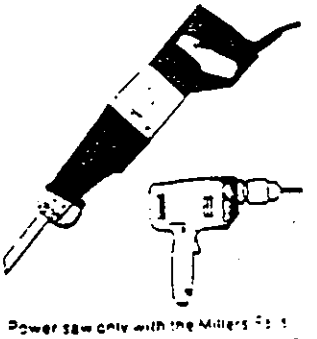
Working



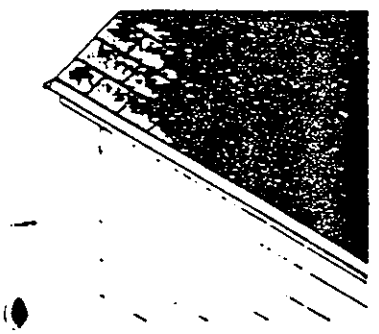
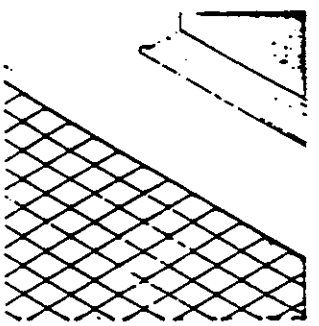
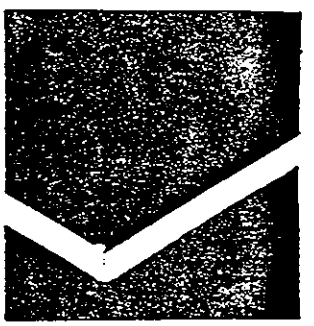
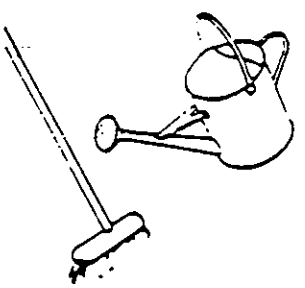
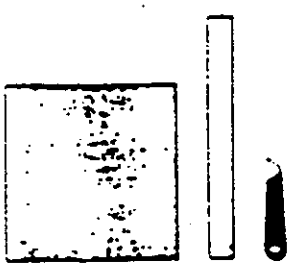
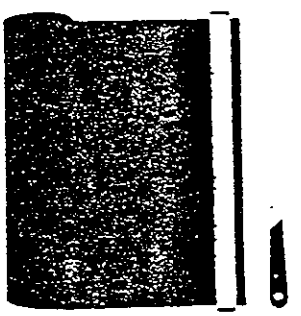
Asbestos cement is reinforced with chrysotile (white) asbestos.



Holes at floor level using hand tools to reduce the need for special precautions.



Power saw only with the Millers Falls saw, power drill downwards or normally. Wear mask and protective clothing if drilling overhead.

	Thermoplastic and vinyl floor tiles	Asbestos reinforced roofing felts
Housekeeping Dust and swarf from cutting and drilling must be damped down before sweeping into a strong plastic bag which should be sealed and placed for disposal, together with any offcuts, in a separate sack. Disposal should then be to the requirements of the local Waste Disposal Authority. **Maintenance** Replace existing sheets by removing or cutting away the fixings, avoid breaking the material unnecessarily, use old sheets where possible as a template to mark for mitring or drilling new sheets, operations which should be carried out at floor level.	**Identification** 5% to 15% chrysotile (white) asbestos reinforcing mineral aspect, thermoplastic resin or vinyl chloride polymer or co polymer. These tiles are extensively used as low cost, easily maintained floor covering. **Working** Cut with a knife, preferably with the tile warm. As the tiles are normally laid using adhesive no other working should be necessary. **Housekeeping** No special requirements. Offcuts and discarded tiles can be disposed of with normal site rubble.	**Identification** Class 2 felts to BS 747 which may be saturated, fine sand finished, self-finished or mineral surfaced. Widely used in built up roof finishes, the asbestos content is dispersed in the body of the felt and will not generate asbestos dust when handled and worked in the normal manner. **Working and housekeeping** No special requirements. **Asbestos reinforced damp courses** As roofing felts.
 Roof slates, wall sidings and shingles. Soffit linings and verge tile undercloaking.	 Floors in domestic, industrial, commercial and institutional buildings.	 Built-up roof weathering systems.
 Wet dust before sweeping into a strong plastic bag. Seal bag and dispose with offcuts in separate sack.	 Cut tiles with normal hand tools. No special precautions are required.	 Cut felts and decks with normal hand tools. No special precautions are required.

Asbestos insulating board

This product may be found in existing buildings, but as manufacture in the UK has now ceased, it is unlikely to be used in new construction work.

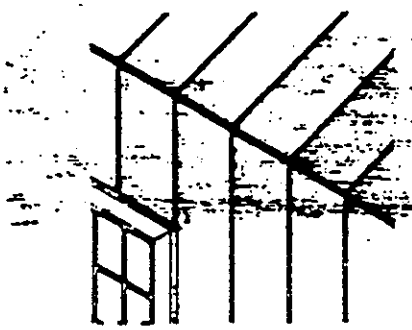
Identification
Medium density boards, the majority of which contained 16% to 25% amosite, or chrysotile mixed with a calcium silicate or cement base.
One brand of board, produced between 1955 and 1982 also contained 1% to 2% crocidolite. This brand was not widely used and its presence is therefore limited. If its presence is suspected a sample should be analysed, and, if confirmed, the Health and Safety Executive must be informed before any work is started. Asbestos insulating boards were also converted into ceiling panels for screwing up, or for laying into grid systems.

General
Asbestos insulating boards in situ should not be a cause for concern and unless they are being damaged by abrasion or impact they should not be removed, particularly as they are very often providing fire protection. If asbestos insulating boards are removed they should be replaced immediately with a product of similar fire resisting performance unless checks have first been made that they have no fire resisting function under the requirements of the building regulations, Fire Precautions Act, similar legislation or insurance requirements.

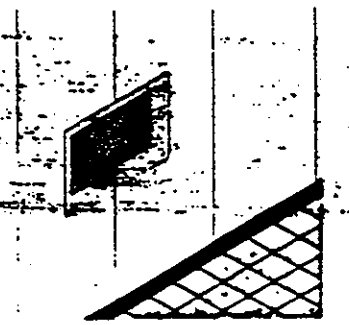
Cleaning
Asbestos insulating board in its undecorated state is difficult to clean. Vigorous scrubbing or sanding can result in asbestos fibre emission. It is therefore best to paint all visible internal surfaces.

Painting
Surface dirt can be removed by washing. The nature of the board will mean that some dirt will be absorbed into the

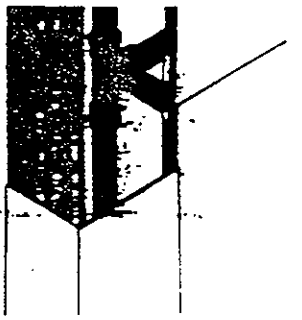
Applications



Industrial wall and roof linings, to provide fire protection, condensation control or both.

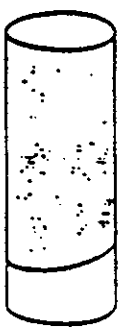


Internal partitions which may be providing fire protection.

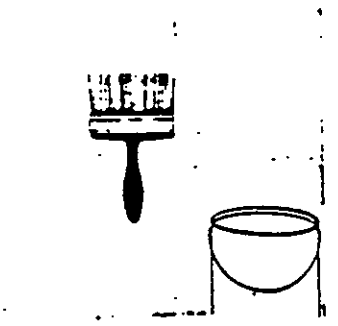


Duct and pipe covers and other applications where board needs to resist changing temperatures

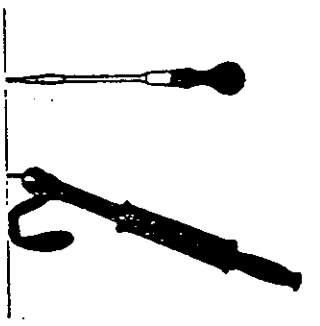
Maintenance



Asbestos insulating boards normally contain amosite or chrysotile asbestos. One brand contained some crocidolite



Paint undecorated board to keep it clean. Do not scrub or sand the surface.



Unscrew screws or draw nails to remove boards or panels. Do not smash boards out.

surface. The simplest decoration is achieved by applying a diluted coat followed by a neat coat of pva emulsion. Oil bound paints may be used over the dilute pva emulsion priming coat or over suitable anti-suction primers.

Maintenance
The Health and Safety Executive requirements must be followed for any work on boards containing crocidolite. For work on other boards, approved respirators and protective clothing must be worn, but minor work may be carried out wearing a respirator of the disposable type.

To remove boards or ceiling panels for access to services etc:

Wear protective equipment.

Do not smash out panels, but unscrew screws, or prize out nails.

Avoid disturbance of original fixing dust on the back of panels.

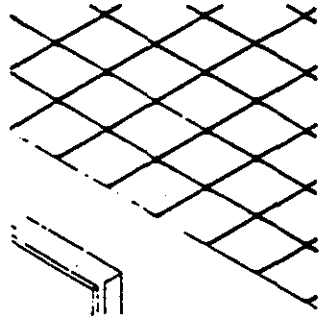
Place removed panels on the ground away from traffic.

Replace panels by fixing through original positions.

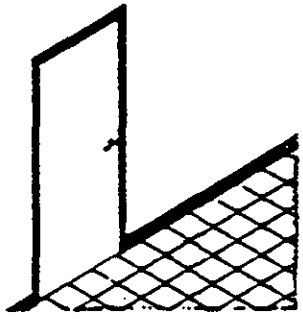
Seek the advice of the asbestos Information Centre when major maintenance or removal work is to be carried out as this may result in dust levels which require the work to be segregated.

Non-asbestos board can be used if it is necessary to replace the asbestos insulating board. Once decorated this will not be significantly different in appearance.

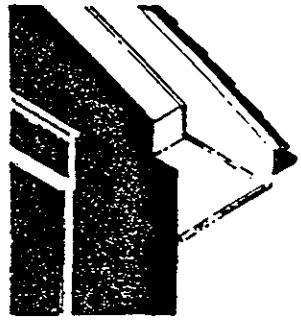
Housekeeping
Damp down any dust before sweeping into a plastic bag, or use an approved vacuum cleaner fitted with an appropriate filter.
Bags containing dust must be sealed. Disposal, together with any debris, must be to the requirements of the local Waste Disposal Authority.



Suspended ceilings, either screwed up to metal grids or as lay-in panels in exposed grid systems.



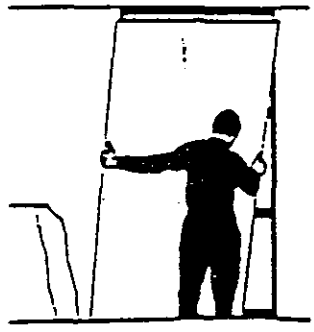
Fire door conversion. Do not remove facing or door until a replacement has been obtained.



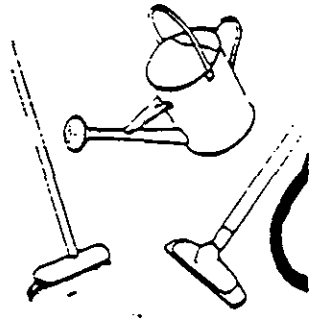
Soffit, porch and canopy linings and other semi-exposed areas.



Wear a respirator whether using hand tools or power tools which may abrade the board.



Replace damaged boards which provide fire resistance with a non-asbestos equivalent.



Sweep only after wetting dust, preferably use an approved vacuum cleaner. Dispose of dust in plastic bags

Sprayed asbestos coatings and insulation lagging

Sprayed asbestos coatings

These were used to provide fire protection, acoustic control and condensation control to structural surfaces in buildings. Sprayed asbestos coatings are recognisable as a reasonably open layer of material which follows the contours of the structure beneath.

The minimum fibre content was 35%. Up to 1970 any of the three main types of asbestos may have been used.

During the period 1970 to 1974 only chrysotile (white) and amosite (brown) were used. No asbestos sprayed coatings were applied after 1974.

Insulation lagging

Used to insulate pipes and equipment in heat and steam raising plant, and to insulate storage vessels in industrial plant.

The asbestos fibre content can vary considerably but was usually between 5% and 85%. Any of the three main types of asbestos may have been used but crocidolite (blue) was very seldom used on its own.

A typical specification would be an inner core containing chrysotile (white) or amosite (brown), or a mixture of the two, mixed with heat resisting binders, and an outer hard surfacing coat made up primarily of binders reinforced with a small quantity of crocidolite (blue) asbestos.

Identification of fibre type

The type of fibre used in sprayed coatings and insulation lagging can only be determined by specialist laboratory analysis.

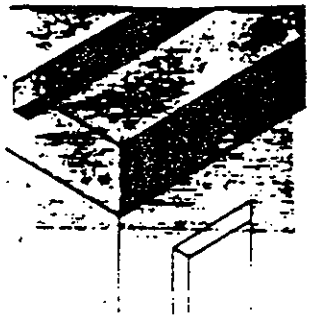
Health risks

Many people have been concerned about the risk to health for the occupants of buildings where asbestos spray or lagging is present. Dust surveys show that installations which are in good condition do not emit

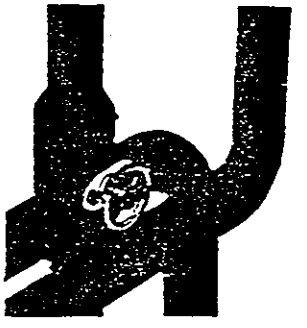
Applications



Spray coatings provide structural fire protection. Remove only when ready to replace with an alternative.



Spray coatings may also cover roof and ceiling areas, and sometimes internal wall surfaces.



Insulation lagging to pipes and storage vessels.

Maintenance



Sprayed coatings and insulation lagging may contain any of the three main types of asbestos.



Small quantities of spray coating and lagging may be removed wearing full overalls and an air fed respirator



If possible, thoroughly wet by can or water prior to stripping.

hazardous fibres unless subjected to positive mechanical disturbance. As stripping out would generate more fibres than leaving it alone, it is best in these circumstances to clad or seal the surface to prevent damage occurring, and to strip out only if the material is unrepairable and/or its condition is liable to deteriorate.

A summary of recommended action for the person responsible for a building in which asbestos spray or lagging is present is shown below.

Maintenance

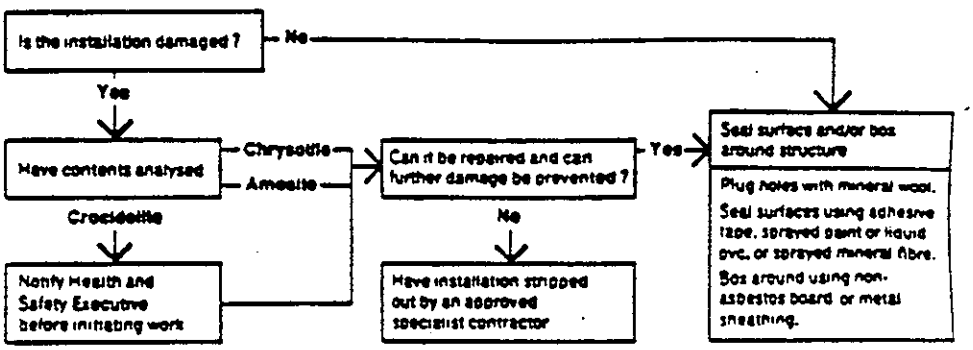
Minor work such as the removal of a small area of lagging to facilitate repairs to pipework etc can be carried out wearing protective clothing and an approved respirator which may be of the en-nasal type.

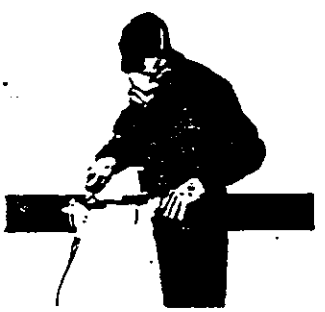
The material must be thoroughly wetted before starting work. A plastic bag must be positioned as close as possible to collect the falling debris. When practicable the bag should be taped to the installation adjacent to the area where work is to be done. Any material falling on the floor should be wetted and swept into a plastic bag.

Bags containing debris must be sealed and disposed of by arrangement with the Local Waste Disposal Authority.

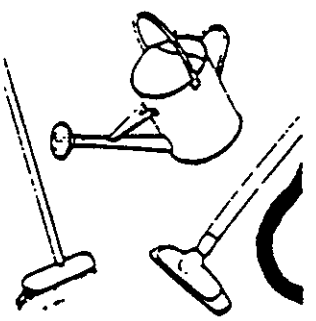
Major maintenance work should be treated the same way as for stripping out. This requires specialist knowledge and equipment. The advice of the Health and Safety Executive should be sought and an approved specialist contractor consulted.

Recommended action





Stripped materials should be placed directly into plastic bags and should not be allowed to drop onto the floor



Always wet surfaces before sweeping or preferably use an approved vacuum cleaner



On completion of work, all places that could harbour dust must be cleaned using an approved vacuum cleaner

REFERENCES

Work with asbestos insulation and sprayed coatings

The Health and Safety Commission published, in July 1981, 'Approved Code of Practice and Guidance Note: Work with asbestos insulation and asbestos coating' (HMSO £2).

The Code of Practice came into force on 1 October 1981 and provides practical guidance on the requirements of health and safety legislation for work of this type. The Guidance Note gives general advice and information helpful to owners and anyone responsible for buildings which include asbestos lagging or sprayed insulations.

Protective equipment

The Health and Safety Executive publish a list of respirators approved for work with asbestos entitled 'Certificate of Approval (Respiratory Protective Equipment)'. The list is updated annually. Copies are obtainable from Her Majesty's Stationery Office.

Details of protective clothing are available from the Asbestos Information Centre.

Asbestos waste disposal

Work on the disposal of asbestos waste must be carried out in accordance with the requirements of the Asbestos Regulations 1969, which is the controlling legislation for all work on asbestos.

Recommended disposal procedures are given in Department of the Environment Waste Management Paper No. 18, Asbestos Wastes, which was published in April 1979 and replaced the Asbestosis Research Council Recommended Code of Practice for the Handling and Disposal of Asbestos Waste Materials.

The authorities responsible for asbestos waste disposal are the County Councils in England and the District Councils in Wales and Scotland.

The Asbestos Information Centre publish an asbestos waste disposal directory which details the County Councils which are the responsible authorities in England. For advice on disposal in Scotland and Wales contact the relevant District Council.

The asbestos waste disposal directory also lists waste disposal contractors in England, Wales and Scotland who undertake the disposal of asbestos waste.

Copies of this directory are available from the Asbestos Information Centre

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