Code of Practice on Asbestos Control

Asbestos Work Using
Full Containment or
Mini Containment Method

Issued by the Secretary for the Environment
Under Section 37 of the Air Pollution Control Ordinance (CAP 311)

<PREFACE>

The Code of Practice on Asbestos Control, in four sets, is issued by the Secretary for the Environment, Transport and Works under Section 37 of the Air Pollution Control Ordinance (Chapter 311) after consultation with the Advisory Council on the Environment. It provides advice on matters relating to asbestos control to registered asbestos consultants, registered asbestos contractors, registered asbestos supervisors and registered asbestos laboratories registered in the relevant registers kept and maintained by the Authority under Section 51 of the Ordinance.

The four sets of Codes of Practice provide advice on matters relating to:

1) preparation of asbestos investigation report, asbestos management plan and asbestos abatement plan;
2) asbestos work using full containment or mini containment method;
3) asbestos work using glove bag method; and
4) safe handling of low risk asbestos containing material.

Although these Codes of Practice are not legally binding, compliance with the advice given could be used as evidence of good practice in the course of disciplinary and legal proceedings. It should be noted that the guidance given in these Codes is believed to be the best practice at the time of publication. With advancement in technology and with more experience, it is conceivable that these Codes may require amendment in the future to incorporate new developments. Registered personnel are therefore encouraged to adopt prevailing standards and control measures if such standards are higher than those given in these Codes, and if such control measures are more effective in controlling environmental asbestos.

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1 Introduction

1.1 This Code of Practice provides guidance and advice to registered asbestos consultants, contractors, supervisors and laboratories on asbestos work using full containment or mini containment method.

1.2 Full containment method is generally used for large scale asbestos abatement work or work which involves the use or handling of asbestos containing material. The work area within the containment is maintained at a negative air pressure throughout by means of specialised air moving equipment to prevent any airborne contaminants from escaping to the environment. When the work can be completed in a shift, a mini containment approach may be adopted operating on a similar principle but on a smaller scale.

1.3 The measures and procedures described in this Code are the minimum requirements necessary for safeguarding the environment and the health of occupants of areas where asbestos abatement work has been carried out. Additional precautionary measures may be necessary for certain operations and this Code should not be interpreted as precluding the adoption of such measures. The requirements of the Factories and Industrial Undertakings Ordinance for worker safety are particularly relevant in this regard.

2 Materials and Equipment

2.1 The materials and equipment used in a full containment or mini containment should conform to the following.

- For construction of the containment, transparent plastic sheets of 0.15mm thickness manufactured from extruded low-density polythene to B.S. 4932:1973 or equivalent, in sizes to minimize the frequency of joints, should be employed.

- Duct tape, foam agent and spray adhesive should be capable of sealing joints of adjacent sheets of polythene, facilitating attachment of polythene sheets to finished and unfinished surfaces, and adhering under both wet and dry conditions, including during the use of amended water.

- Wetting agent for preparing amended water to enhance penetration should be 50% polyoxyethylene ester and 50% polyoxyethylene ether or equivalent, and diluted to a specific concentration in accordance with the manufacturer's instructions.

- HEPA-filtered appliance means an appliance such as an air mover or a vacuum cleaner fitted with a high efficiency particulate air filter capable of trapping and retaining 99.97% of particles (asbestos fibres) greater than 0.3μm mass median aerodynamic equivalent diameter.

- Water-based polyvinyl acetate (PVA) adhesives for spraying onto exposed surfaces during final clean-up of work area should be able to bind traces of asbestos that may still be on the exposed surfaces. The adhesives should be dyed, say red, to indicate where (and whether) they have been applied to facilitate cross-checking at a later stage.

- Polythene sheet, transparent or colour-coded bags and containers used for packing of asbestos waste should meet the specifications given in the Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste issued by the Secretary for the Environment, Transport and Works.

- Respiratory protective equipment and protective clothing used for asbestos abatement work should comply with the requirements of the Factories and Industrial Undertakings (Asbestos) Regulation enforced by the Labour Department.

- Joints and ends of ladders and scaffolds used in the contaminated work area should be sealed with tape to prevent incursion of asbestos fibres.

- When the asbestos containing material which has been used for fire-proofing or insulation is removed, the replacement material should comply with the relevant Regulations and Codes of Practice issued by the Hong Kong Government.

- Portable water sprayer for applying amended water in a fine mist should be of airless type and with capacity of 10 to 20 litres.

2.2 Documentary proof on the safety and specifications of the above materials and equipment may be required for submission to the Authority for endorsement.

3 Site Preparation

3.1 The proposed work area (area containing asbestos containing material to be abated or worked on and where a containment will be constructed) should be vacated prior to any site preparation work. Warning notices in English and Chinese (see Appendix 1) should be displayed outside the work site in a conspicuous place on the first day of site possession and should remain posted until final clearance air testing is satisfactorily concluded.

3.2 Electric power to the work area should be shut down and locked out while safe temporary water supply, power and lighting (through residual current circuit breaker) should be brought in from outside. Electrical equipment within the work area which must remain in service should be adequately enclosed and ventilated. All heating, ventilation and air-conditioning (HVAC) systems affecting the work area should be shut down and locked out.

3.3 A designated secure place outside the work area should be identified solely for transit storage of bagged asbestos wastes. This place should bear adequate warning notices and particular attention should be given to maintain good fire safety measures.

4 Decontamination Facility

4.1 A 3-chamber decontamination unit should be constructed to isolate the work area and permit safe access and egress of authorised working personnel. In the case when provision of a separate debris port is not possible (strong justifications must be given), this 3-chamber unit may also be used for the exit of bagged asbestos wastes and equipment. Construction details of a decontamination unit are as follows.

- The decontamination unit will consist of three sealable compartments of progressively lower fibre burden, namely the dirty room, the shower room and the clean room. Each compartment should have a minimum size of 2m (height) x 1m (width) x 1m (length). Floor area of the shower room should be $1m^2$ for every shower head provided.

- The unit may either be of a prefabricated design which should have been thoroughly cleaned and decontaminated before re-use, or be constructed on site with 3 individual layers of plastic sheet with sealed taped joints supported on suitable framing.

- Each compartment should be separated by a curtained doorway consisting of a polythene sheet with an I-shaped slit opening covered by a plastic flap which hangs and lifts in the direction of access. The plastic flap should have an overlap of at least 100mm on each side of the slit opening and be weighted at the bottom.

- The shower room should be constructed and tested against water leakage and fitted with a tray of adequate size to collect waste water. Hot and cold water adjustable at the shower should be provided at a minimum of one shower head per 6 workers calculated on the basis of the largest shift. All waste water should be taken by a sump pump through pipework and hosing to an aquarium type filter unit to remove suspended particles down to 5µm before being discharged to covered soil drainage system or drummed and then properly disposed. The sump pump should be switched on while the facility is in use to prevent overflow of waste water. The electrical fittings and installations should be so installed and protected as to eliminate any possibility of electrocution.

- The shower room should be wet cleaned and HEPA vacuumed before each shift change and meal break.

- Correct procedures for entering and leaving each compartment are summarised in Appendix 2. A warning sign to approved details as given in Appendix 3 should be posted at eye level at the clean entrance of the unit.

4.2 Where practicable, a separate, 2-chamber debris port consisting of a clean room and a washing room fitted with cold water supply and waste water filtration facility should be constructed for controlled transfer of bagged wastes and equipment. Each compartment should have a minimum size of 2m (height) x 1m (width) x 1m (length). This debris port is normally sealed and used only during the period of active waste and equipment transfer. A warning sign (see Appendix 3) should be posted conspicuously at the entrance of the clean end.

4.3 The procedures for waste and equipment transfer are as follows:

- Before entering the debris port, external surface of the bagged waste or the bagged equipment should be cleaned by HEPA vacuuming and wet-wiping in the work area. The bag should be further decontaminated in the washing room by ‘flushing' with a fine water spray followed by wet-wiping. Worker in the clean room, who must have entered from the uncontaminated side wearing appropriate respirator, gloves and protective clothing, should receive the bag in a 0.15mm thick transparent plastic bag which should then be vacuum packed and

goose-neck sealed with tape. The doubled bagged waste should be transferred immediately to the waste transit store and should not be stacked more than 3 bags high.

- Worker in the clean room must not enter the washing room. Upon completion of work, he should discard his protective clothing and gloves as contaminated waste and exit by the clean room.

- Every time the debris port is in use, the main decontamination unit (for personnel access) should be closed and kept airtight so as to maintain the negative air pressure of the work area and to facilitate favourable ingress of fresh air through the debris port for dust control purposes.

- The washing room should be wet cleaned twice with amended water upon completion of waste and equipment transfer. When the main decontamination unit alternates as a debris port, the shower room should be washed immediately with cloth saturated with a detergent solution prior to wet cleaning.

5 Preliminary Decontamination

5.1 The work area should be pre-cleaned systematically by HEPA-vacuuming and wet-wiping methods. Workers should wear appropriate respirators and depending on the extent of contamination, full-body protective clothing and a negative air pressure environment may be required. Leakage air test may also be needed during the process to ensure that the environment is not being contaminated. Immediate repair to seriously damaged asbestos containing material to curb further deterioration may be imperative in certain circumstances but care must be taken not to disturb any of the asbestos containing material unnecessarily until a suitable containment is constructed and its integrity fully tested. In the case when asbestos containing material is found in the ceiling void above a false ceiling, the ceiling tiles should only be disturbed after erection of a full containment and the tiles should be deemed contaminated.

5.2 All openings of the work area such as windows, corridors, doors, grilles, floor drains and power points should be individually sealed off with 2 layers of polythene sheet securely taped in place. HVAC ducting or other system components that pass through the work area should be enclosed with 2 layers of polythene sheet. All used filters as well as contaminated curtains, drapery and carpets should be removed and packed for disposal as asbestos waste. Movable objects within the work area should be decontaminated before being removed. Those objects which will remain should be

decontaminated and sealed with a minimum of 2 layers of polythene sheet to protect them from re-contamination.

5.3 The work area should be vacated for 12 hours to allow fibres to settle and then all objects and surfaces in the area should be HEPA vacuumed and wet cleaned a second time. A visual inspection should be carried out by a registered asbestos consultant who should verify that preliminary decontamination has been satisfactorily completed and the area deemed temporarily uncontaminated. Any HEPA-filtered air movers which may have been used to provide a negative air pressure environment can be switched off and their air intakes properly sealed by 2 layers of polythene sheet. A background air test for the work site should then proceed (see para. 10).

6 Construction of Containment

6.1 The work area should be segregated from the remainder of the work site by construction of temporary structural partition (and raised platform where appropriate) in a manner specified below. The containment volume should be of a manageable size and should not exceed 2800m^3 unless strong justifications are provided to and accepted by the Authority. HEPA vacuum cleaner should be provided on standby to immediately remove any asbestos debris that may be accidentally dislodged. Workers should wear appropriate respirators in performing the work. Every effort should be made to reduce the amount of construction waste to a minimum. Re-use of materials such as plywood boards and wood struts is permitted but the onus of proof to the effect that these materials are free from asbestos contamination at the end of the work rests with the registered asbestos consultant. The registered asbestos consultant is also responsible for the structural safety of the containment, and for the provision of safe means of access as well as alternative escape route for emergency situations.

- Partitions should be constructed of wood strut framing or other material of sufficient strength (maximum spacing 400mm) to support plastic barrier sheet on all openings larger than 2.9m^2, except where one dimension is 0.3m or less or where openings are for emergency exit. As a general rule, each expanse of plastic sheet should not exceed 2.9m^2, without adequate continuous support.

- A solid construction material such as plywood of at least 9.5mm thickness should be applied to the work side of the framing. In secure interior areas where partitions are not subject to access by the public, an additional layer of polythene sheet (giving a total of 3 layers) may be substituted for the solid construction material.

- The partition should be caulked or sealed at the floor, ceiling, walls, joints and fixtures to form an air-tight seal.

- Individual polythene sheet may be fixed to the timber frame by running a length of duct tape on the sheet along a line of support provided by the frame, then stapling through the duct tape and applying another length of tape on top to strengthen the grip. Timber battens (say, 25mm x 50mm) or equivalent material may be used instead but they should be dyed red for easy identification later on as contaminated items.

- Metal scaffolding should be used as a general rule for construction of any raised platform. The design and construction details should meet the requirements of the Labour Department.

- Bamboo scaffolding as the basic frame structure may be acceptable when the construction of a timber partition or metal platform is not practicable due to site constraints. In that case, sufficient timber battens should be added to hold a total of 4 layers of polythene sheet that can be peeled off individually at various stages of work acceptance test. Scaffolding components that are exposed inside the containment should be dyed red and later on disposed of as contaminated waste.

6.2 Lifts running through the work area should have the lift doors in the area enclosed with wood strut framing or other material of sufficient strength and covered with 9.5mm plywood board sealed at all edges and seams. The board should then be covered and lapped for 150mm with 2 layers of polythene sheet adhered individually with edges taped for air-tightness.

6.3 All floor and wall surfaces, new partitions, stairs, railings and tubular support inside the containment which are not covered by asbestos containing material should be masked and sealed with polythene sheets to give a smooth and impervious exterior. The polythene sheets should be applied as follows. If the containment is set up on temporary platform, 2 layers of polythene sheet should first be laid on the temporary platform. If temporary partition wall is used as part of the containment's partition and the wall is at a secure indoors location, one layer of polythene sheet should first be laid on the temporary partition wall. These layers of polythene sheet on the temporary platform or partition wall are used as peripheral barriers of the containment. The remaining layers of polythene sheet should be laid after the peripheral barrier sheets are in place. Floor sheet should be applied first and followed by wall sheet, and then alternately until the required number of layers are met. The minimum number of layers required is as follows (including peripheral barriers):

- 2 layers to solid wall
- 2 layers to solid floor
- 3 layers to temporary partition wall
- 4 layers to temporary platform

The polythene sheets on the floor should extend at least 300mm up all wall surfaces to form a continuous skirting while polythene sheets on the walls should overlap this floor skirting by a minimum of 300mm. Joints throughout should be lapped for at least 150mm and securely sealed with moisture resistant duct tape. Floor and stair sheets should be covered with hardboards (dyed red) to protect them from excessive wear and tear and to make them less slippery.

6.4 Sufficient number of clear viewing panels (300mm x 450mm with the lower edge no more than 1.2m above floor level) should be provided in the barrier walls of the containment at strategic locations and complete with proper means of access to facilitate observation of the asbestos removal work from outside. The panel should comprise one 2mm thick clear acrylic sheet, have at least 50mm overlap with the polythene sheet at the edges, and be securely fixed with 50mm wide duct tape.

6.5 When the containment is sited outdoors, due consideration should be given to wind loading effects on the structure. Where appropriate, tarpaulin sheets should be added to improve weatherproofing of the containment.

7 Negative Air Filtration System

7.1 A negative air filtration system should be used to minimise escape of airborne asbestos fibres to the surroundings. The system should operate continuously from satisfactory testing of the containment through successful clearance air testing, and maintain a static negative air pressure of 1.5 to 4mm (approximately 0.05 to 0.15 inch) water gauge inside the containment across all faces. The negative pressure should be monitored continuously at location suspected of having the lowest pressure differential. Monitoring equipment should be fitted with an audible alarm to give early warning of insufficient pressure differential. The equipment should also produce hard copy time record of pressure differential on a continuous basis and the records (in the form of chart recording) should be kept on site for inspection by the Authority.

7.2 A minimum of six air changes per hour should be provided, except during clearance air testing when at least two air changes per hour should be maintained. The number of HEPA-filtered air movers required to achieve the specified air changes can be calculated as follows :-

$$\text{number of air movers required} = \frac{\text{6 air changes/hr x volume of containment } (m^3)}{\text{capacity of single air mover } (m^3/hr)}$$

This calculation is based on 100% flow capacity of the air movers to be installed. Experience however shows that most as-installed air movers only work to around 60-75% of the capacity claimed by the manufacturer. It is therefore important that spare capacity is allowed in the calculation for the discrepancy. Also, an additional air mover should be installed to function as a standby when other units break down. The flow capacity of the standby unit should match that of the largest unit in use. Maintenance records, utilization log and certification (subject to the availability of a recognized laboratory to perform testing to the method in Appendix 4) for each of the air movers in use should be kept on site for inspection by the Authority.

7.3 Openings made in the containment to accommodate the air movers must be made airtight. The air movers should be so located as to provide an air flow across the containment and away from the decontamination unit. When air movers are positioned inside the containment, the section of the exhaust ducting inside must be sealed with 2 layers of 0.15mm polythene sheet. Also, flexible ducting found inside the containment for air intake of the air movers should be dyed red for identification, and later on thoroughly decontaminated or disposed of as contaminated wastes. No air mover should be added to or disconnected from the containment after commencement of removal of the asbestos containing material.

7.4 Exhaust of the air movers should be ducted to the outside of the building or structure and away from occupied areas. All ducting should be properly sealed and supported to maintain air-tight joints. Where ducting to the outside is not possible, a second air mover compatible with the primary one's capacity should be connected in series and located outside the containment.

7.5 On loss of negative pressure or power to the air movers, the asbestos removal work should be stopped immediately until power is restored and the air movers are operating again. When loss of negative pressure or power failure is expected to last for more than 30 minutes, the decontamination unit should be sealed air-tight after evacuation of the work personnel. All adjacent areas should be monitored for increases in the airborne fibre level.

8 Testing of Containment

8.1 A portable, purpose-built smoke generator should be used to test for air-tightness and integrity of the containment before any asbestos abatement work commences. Smoke pellets should not be used as they may shorten the working life of absolute filters in the air movers. The entire volume of the containment, including various chambers of the decontamination unit, should be filled with sufficient amount of smoke to reduce the visibility inside to no more than 2m. When this condition is achieved, the smoke generator can be switched off and a thorough check for smoke leakage can proceed from outside the containment. Any leaks spotted should be immediately rectified.

8.2 When integrity of the containment has been ensured, the air movers (other than the ones on standby which should be tested separately) should be switched on and timed to find out how long it would take to clear the smoke - it normally takes no more than 30 minutes to clear 90% of the smoke for 6 air changes per hour. Meanwhile, filtration efficiency of individual air movers can be checked qualitatively by looking for traces of white fume (against a dark background) at their exhausts. It is deemed to be a serious violation on the part of the registered asbestos contractor for poor maintenance and handling of air mover should smoke be seen emitting from the exhaust. Any stagnant air pockets spotted inside the containment should be eliminated by re-positioning the intakes of the air movers. Additional timber battens may be required to hold down and reinforce the polythene sheets if it is sucked in excessively.

9 Maintenance of Containment

9.1 The containment and the decontamination unit should be thoroughly checked for leaks by the registered asbestos supervisor with the aid of smoke tubes at least twice per work shift. It is important that the asbestos removal work should stop immediately upon detection of elevated fibre counts outside the containment, or damage to the containment, or visible emission of debris, and the asbestos removal work should not resume until all defects have been corrected and an approval has been obtained from the registered asbestos consultant.

9.2 Inspections, observations and unusual incidents such as equipment malfunction and contamination outside the containment, should be documented in the daily project log (see Appendix 5) by the registered asbestos supervisor.

10 Air Monitoring

Air sampling, monitoring and analysis for asbestos abatement works should only be performed by a registered asbestos laboratory. Analysis results should be made available within 24 hours of sampling. As a minimum, air sampling should be conducted in accordance with the following schedule.

- Background air test

  After preliminary decontamination and prior to commencement of any asbestos abatement activities, a background air test comprising a minimum of 5 samples should be taken during normal occupancy activities and circumstances at the work site. Sampling points should be within the building or structure and at the periphery of the proposed work area.

- Leakage air test

  Frequency and duration of the leakage air test during asbestos abatement work should be representative of the actual conditions during the abatement. The following schedule of sampling, however, should be performed daily as a minimum:

  - Two area samples should be taken outside the containment in uncontaminated areas of the building or structure but remote from the decontamination unit. Sampling points should be within 3m of the containment. Where exhaust ducting of air movers pass through the uncontaminated areas, one of the sampling points should be located in these areas to monitor any potential fibre release. Where adjacent non-work areas do not exist, an external area sample should be taken.

  - One area sample should be taken inside the clean room of the decontamination unit (or debris port where appropriate).

  - One area sample should be taken within 1.5m of the unobstructed exhaust of an air mover for instances of indoor discharging.

  If air samples collected outside the containment during asbestos abatement work indicate fibre counts as determined by phase contrast microscopy greater than the original background levels or greater than 0.01 fibre/ml, whichever is larger, work should be stopped immediately. The cause for elevated fibre counts should

be identified. Remedial action, such as cleanup of surfaces outside but within 6m of the containment by HEPA vacuuming and wet-wiping methods, should then be carried out prior to resuming the asbestos abatement work.

It must be borne in mind that air sampling has limitations and is not meant to be a substitute for frequent, thorough visual inspection of the containment and the surroundings.

- Penultimate air test

After removal of asbestos containing material and a thorough cleaning of all surfaces inside the work area (the innermost plastic sheet should have been PVA sprayed and removed), a penultimate air test should be performed. The test should have at least two samples, unless the volume of the containment is less than $10m^3$ when only one sample would suffice. With that overriding condition, the number of samples required should be at least the whole number next below ($\sqrt[3]{A} - 1$), where A is determined as follows:

- if the containment is less than 3m high, or in containments which are taller but where exposure is only likely to be at ground level, A is the area of the containment in square metres;

- in other cases A is one third of the containment volume in cubic metres. If there are large items of plant (e.g. boiler) in the containment, their volume may be subtracted from the gross volume before calculating A.

More samples may be needed, however, for example when the containment is obviously subdivided, as when a whole floor of a building, comprising many small rooms, constitutes the containment.

Air sampling should be carried out only after a thorough visual inspection of the containment to establish that it is clean, dry and free from any visible debris. A black cloth should be used to wet-wipe exposed surfaces such as the rear of pipes and ducts and folds in the polythene sheet, to detect traces of debris and dust. Aggressive sampling technique should be used to agitate any dust deposit that may be present inside the containment.

Penultimate air testing is considered satisfactory only when every collected sample is less than 0.01 fibre/ml as determined by phase contrast microscopy. Each homogeneous work area which does not meet this criterion should be

thoroughly recleaned using HEPA-filtered vacuum cleaner and wet-wiping method. This process should be repeated until the containment passes the test.

- Final clearance air test

  After satisfactory visual inspection by a registered asbestos consultant and removal of second layer of polythene sheet (except peripheral barrier sheet and decontamination unit), a further thorough wet cleaning and HEPA-vacuuming of all surfaces should be carried out. A final clearance air test should then be conducted in the same manner as for a penultimate air test. Final clearance air test is considered satisfactory only when every collected sample is less than 0.01 fibre/ml as determined by phase contrast microscopy.

11 Asbestos Removal

11.1 Removal of asbestos containing material should be by wet methods. Dry removal of asbestos containing material is prohibited unless strong justifications are provided to, and accepted by, the Authority. The asbestos containing material should firstly be sprayed (by means of airless spray equipment) in a fine mist with amended water with sufficient frequency and quantity for enhanced penetration. The spray should be generous but without excessive dripping and delamination of the material. Sufficient time should be allowed for penetration to occur prior to removal action or other disturbance taking place.

11.2 When handling thick asbestos containing material where penetration by wet spraying may not be effective, soaking method by injection should be adopted. Holes should be cut, under a fine spray, into the asbestos containing material at appropriate spacing to allow hollow pins to be inserted for injection of amended water. Again, sufficient time should be allowed for penetration to the substrate without causing excessive dripping or delamination of the material.

11.3 Following inspection as to the suitability for removal, the soaked asbestos containing material should be removed in small sections systematically from the end where the decontamination unit is located towards the other end where the air movers are installed. No asbestos containing material should be allowed to drop from a height greater than 5m, otherwise enclosed inclined chutes (maximum inclination 60 degrees to horizontal) should be provided to collect the dislodged asbestos containing material at the point of action. Care must be taken to minimize breakage of the asbestos containing material at the lower, receiving end of the chute. As small sections of the asbestos containing material are removed, they should be placed directly into suitably

labelled containers, vacuum packed and sealed (debris with sharp edges should be first placed in a nylon woven bag to prevent the plastic bags from being damaged). In-situ asbestos containing material should be sprayed repeatedly during the asbestos removal work to maintain a wet condition and to minimise asbestos fibre release. A fibre level of not more than 1 fibre/ml should be maintained inside the containment throughout the asbestos removal work, otherwise the area should be sprayed with a fine mist of amended water to facilitate deposition of airborne dust to the floor for subsequent removal by vacuuming and wet-wiping. A FAM (Fibrous Aerosol Monitor) may be used to monitor the situation.

11.4 Large components removed intact which cannot be containerised should be maintained wet, wrapped in two layers of 0.15mm polythene sheet, labelled and decontaminated when passing out of the containment, following procedures similar to para. 4.3.

11.5 After completion of all stripping work, surfaces from which asbestos containing material has been removed should be wire-brushed and wiped to remove all visible residue. During this process, the surfaces being cleaned must be kept wet. Only non-powered hand tools should be used and all debris should be removed by wet-wiping and HEPA vacuuming as soon as it is produced. The containment should be cleaned up thoroughly at the end of each work shift.

11.6 If during the course of asbestos abatement work asbestos debris is spilled outside the containment, all activities should be stopped immediately to avoid producing more debris. The affected area and debris should be sprayed with amended water in a fine mist and all loose debris immediately bagged. The area should then be wipe-cleaned by wet cloth followed by HEPA vacuuming once the surfaces become dry. The registered asbestos supervisor should verify that these measures have been carried out and an approval of the registered asbestos consultant has been obtained before work is allowed to resume.

12 Final Clean-up and Acceptance of Work

12.1 Upon completion of wire-brushing of surfaces previously covered with asbestos containing material, final clean-up of the containment can start (see Appendix 6 for steps of work acceptance test). A HEPA vacuuming followed by wet-wiping should be performed on all surfaces from top to bottom and in a direction from the decontamination unit towards the air movers. Wet-wiping materials such as rags, mops and sponges must be discarded after a single use to avoid re-contamination. Particular attention should be given to

- rough, textured surfaces;
- the rear of pipes, ducting and services;
- folds in the plastic sheet;
- brackets, bolts and nuts of flanges and flange gaps;
- air intake casing of air mover and underside of plant items.

12.2 All exposed plastic surfaces inside the containment including the decontamination unit should be sprayed with a PVA solution, allowed to dry, peeled off (only the innermost layer of the containment) and placed in approved plastic bags for disposal as asbestos waste. Other contaminated items, as distinguished by colour coding such as timber battens and hardboards should also be bagged for disposal as asbestos waste. The 'new' plastic surfaces i.e. the second plastic layer, should be HEPA vacuumed and wet-wiped to remove any visible debris. The containment should by then be clean and ready for a penultimate air test to check on the effectiveness of cleaning. If the result of the penultimate air test is below 0.01 fibre/ml as determined by phase contrast microscopy, a thorough visual inspection should be made by a registered asbestos consultant to certify that all visible asbestos containing material has been removed to a satisfactory standard and no debris or dust deposits are present. The use of black cloth to wet-wipe exposed surfaces to detect the presence of any dust deposit is strongly recommended.

12.3 Upon approval by the registered asbestos consultant, all surfaces stripped of asbestos containing material should be sealed with PVA or other suitable sealing materials. The second layer of plastic sheet should be PVA sprayed and removed for disposal as asbestos waste. Peripheral barrier sheet (the 2 layers of polythene sheet sealing all openings in the work area, the remaining one layer on the temporary partition wall, or the remaining 2 layers on the temporary platform) including the decontamination unit and the air movers should remain in place so that the work area remains segregated from the environment. The area should be vacated for 12 hours to allow fibres to settle and then all objects and surfaces in the work area should be HEPA vacuumed and wet-cleaned systematically from top to bottom and in a general direction from the decontamination unit towards the air movers.

12.4 A final clearance air test should be performed to confirm that an air quality of no more than 0.01 fibre/ml is attained inside the work area or else the work area should

be recleaned and a further clearance air test be carried out. Upon a satisfactory clearance air test result, all remaining plastic sheet, decontamination facility and air movers may be dismantled under direct supervision of the registered asbestos consultant himself. All used plastic sheets and the like should be disposed of as contaminated waste. The registered asbestos consultant should immediately carry out another reassurance visual inspection to certify the absence of any visible asbestos debris and proper decontamination of hand tools. Particular attention should be paid to the area used for transit storage of asbestos wastes which should have been thoroughly cleaned by HEPA vacuuming and wet-wiping before the asbestos abatement work is declared complete.

13 Decontamination of Tools and Equipment

13.1 Tools and equipment should be HEPA vacuumed and wet-wiped in the work area before being taken into the debris port for further processing. Certain equipment such as vacuum cleaners which cannot be thoroughly decontaminated must be vacuum packed and sealed in double plastic bags (transparent and properly labelled) for transport to the next project. Items which may puncture or tear plastic bags or sheets must be placed in hardwall containers that are properly labelled and sealed.

13.2 The waste water filtration system including the sump pump, aquarium type filter and the pipework and hosing should be wet-wiped and generously flushed with clean water. The used filter and waste water so produced should be disposed of as contaminated waste.

13.3 Metal scaffolds and ladders must be wire-brushed and cleaned to a condition of no visible debris before they are PVA sprayed all over inside the debris port to lock in any residual fibres. Pre-filters of air movers should be properly disposed of and the air intakes sealed with 2 layers of polythene sheet before the machines are disconnected from the containment.

14 Mini Containment Method

14.1 This method should be limited to small-scale asbestos abatement work which can be completed in a single shift and where the construction of a mini containment does not result in any disturbance of asbestos containing material - an example would be to remove asbestos flexible joints from an air handling unit. Construction details are similar to those of a full containment except that a mini containment needs only be big enough to accommodate 2 to 3 workers in the work area. The same site preparation work as outlined for construction of a full containment should be followed.

Care should be taken to ensure that penetrations such as pipes and conduits are properly sealed.

14.2 A 2-chamber decontamination unit comprising a shower room and a clean room of approximately $1m^2$ each, should be built as part of the mini containment. Upon leaving, the workers should HEPA-vacuum their protective clothing before entering the shower room from the dirty end. When a proper shower unit cannot be installed due to site constraints, buckets of clean water (at least 3 buckets of 5 litres each, all sitting in a tray of adequate size to collect waste water for proper disposal) should be provided for workers to wash their face and hands and wet-wipe their respirators before proceeding, in clean transit clothing and shoes, to use designated washing facilities at the work site for thorough decontamination. Detailed advice on this 'transit clothing' system can be sought from the Labour Department. It is important that respirators should only be removed when they have been washed free of dust under a shower. This decontamination unit can also be used as a debris port when the procedures listed in para. 4.3 are followed.

14.3 A HEPA vacuum cleaner should be used to continuously exhaust the enclosed work area with the hose attached securely and airtight through the containment wall. A minimum of 3 air changes per hour are required. Final cleanup and work acceptance procedures as outlined in para. 12 also apply to this method.

15 Emergency Procedures

15.1 Emergency procedures are site specific and prior assessment of the work area is important in developing suitable procedures to cater for emergencies such as fire, explosion, vandalism, typhoon, bursting of pipe, and accidents due to slips, trips and falls, working in confined space, electrical hazard, heat stress and exhaustion. All instructions should be brief and concise and should include a layout plan of the work site indicating the location of fire extinguishing equipment and means of escape. The procedures in a written form in both English and Chinese should be posted conspicuously at the entrance of the work area and read and understood by all working personnel.

15.2 If during the course of asbestos abatement work, a worker collapses or some other accidents occur, the victim should follow normal decontamination procedures with assistance from fellow workers before exiting the work area. For life-threatening situations, however, decontamination should take a lower priority and every effort should be made to ensure the victim receives immediate medical treatment. Any area contaminated during the emergency should be thoroughly cleaned by wet wiping and

HEPA vacuuming at the earliest opportunity, and verified by the registered asbestos supervisor and approved by the registered asbestos consultant before work is allowed to continue.

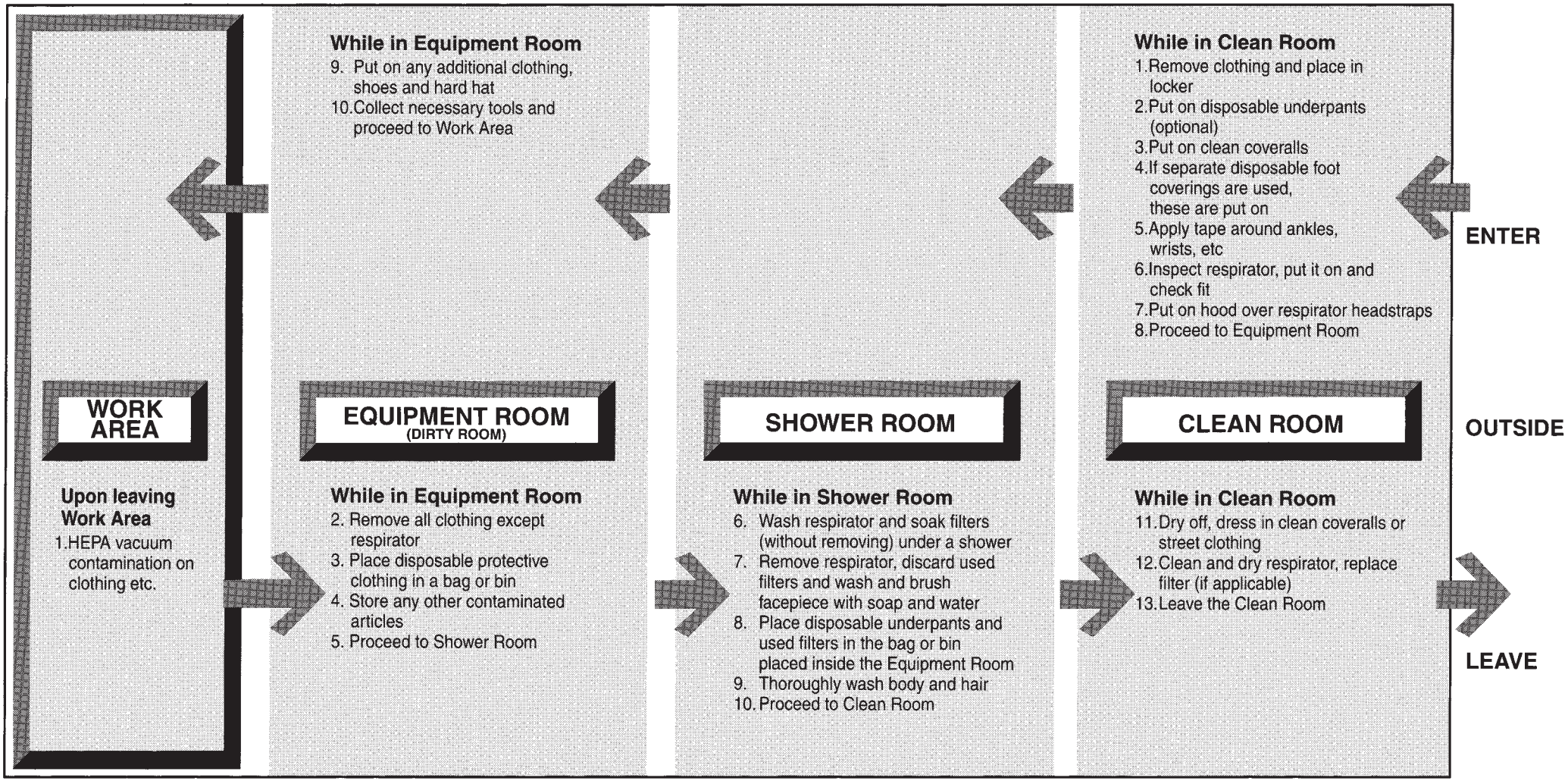
Warning Notice for Posting Outside the Work Site

Specification

The Warning Notice should comprise both warning signs and explanatory labels.

1. Material: Durable, weather-resistant and rigid on a vertical plane outside the work site.
2. Colour:
   (a) For 'DANGER' sign
   Sign: Black lines on yellow background
   Label: Black letters and characters on yellow background
   (b) For 'No unauthorized entry' sign
   Sign: Red lines on white background with the figure in black
   Label: White letters and characters on red background
3. Size: Height of sign - Not less than 120mm
   Height of capital letters - Not less than 25mm
   Height of Chinese characters - Not less than 35mm

PROCEDURES FOR ENTERING AND LEAVING DECONTAMINATION UNIT



Facilities:

EQUIPMENT ROOM
(DIRTY ROOM)

*Shelves for additional clothing/ personal protective equipment/boots/tools
*Waste bag/bin for used protective clothing, respirator filters and underpants

SHOWER ROOM

*Cold and hot shower with holder for shower head
*Tray fitted with waste water filtration system
*Liquid soap and shampoo
*Nail brush

CLEAN ROOM

*Mirror
*Storage rack for clean respirator/ protective clothing/towels/shoecovers/ gloves/duct tape
*Locker for personal belonging

Warning Notice for Posting at the Entrance of Decontamination Unit

Specification

The Warning Notice should comprise both warning signs and explanatory labels.

1. Material: Durable, weather-resistant and rigid on a vertical plane at the entrance of the decontamination unit.
2. Colour:
   (a) For 'DANGER' sign
   Sign: Black lines on yellow background
   Label: Black letters and characters on yellow background
   (b) For 'No unauthorized entry' sign
   Sign: Red lines on white background with the figure in black
   Label: White letters and characters on red background
   (c) For 'Wear approved respirator' and 'Wear protective clothing' signs
   Sign: White sign on blue background
   Label: White letters and characters on blue background
3. Size: Height of sign - Not less than 80mm
   Height of capital letters - Not less than 25mm
   Height of Chinese characters - Not less than 30mm

APPENDIX 4

Performance Test for HEPA-filtered Appliances

1 Introduction

1.1 This method is for checking the performance of HEPA-filtered appliances such as air movers and vacuum cleaners. Only results from a laboratory recognized for this method will be accepted by the Authority. Appliances satisfying all the test criteria will be certified and labelled by the laboratory in a prescribed manner before they are allowed to be used on an asbestos work site to discharge filtered air to the surroundings.

1.2 Dioctyl phthalate (DOP) is named in this method for test aerosols. However, questions are raised recently about the material's safety and potential health hazards and for that reason, laboratory personnel should take adequate preventive measures when performing the in-place leak test as described in para. 7 using the DOP reagent. Research work is also being conducted overseas to substitute the reagent with 'food grade' mineral oils such as Ondina-EL, Kaydol and corn oil. It is anticipated that any switch of the DOP reagent in future should not adversely affect the performance of instruments used in the leak test in question.

1.3 HEPA-filtered appliances, particularly the part upstream of the HEPA filter, are normally contaminated with asbestos. Any testing, maintenance or repair work on the appliances must be performed in a controlled environment. Personal protective equipment should always be used to avoid exposure.

2 Definitions

2.1 Aerosol. A suspension of small particles, solid or liquid, in air. The diameter or major dimensions of the particles may vary from 100μm down to 0.1μm or less.

2.2 Aerosol Photometer. A photometric light-scattering mass-concentration detector used for determining the concentration of particles in air.

2.3 Challenge. To expose a filter or other air cleaning device to an aerosol of known characteristics, under specified conditions, for the purpose of testing.

2.4 DOP - DOP Aerosol. Dioctyl phthalate (di-2-ethyl hexyl phthalate). A challenge aerosol for testing HEPA filters generated by blowing compressed air through liquid

DOP at room temperature, or by vaporising liquid DOP and then condensing it under controlled conditions to produce a droplet-size distribution of known characteristics. The DOP used for in-place testing of installed HEPA-filtered systems in accordance with this method is a polydisperse liquid aerosol having an approximate light-scattering mean droplet-size distribution as follows:

99+% less than 3.0μm
50+% less than 0.7μm
10+% less than 0.4μm

2.5 DOP Generator, Air Operated. A device for producing DOP aerosol for field testing, operated by compressed air at room temperature, equipped with Laskin nozzles to produce the droplet-size distribution specified in para. 2.4.

2.6 Laskin Nozzle. A nozzle used for the generation of DOP by compressed air which will produce the particle-size distribution specified in para. 2.4 when operated under an air pressure of 34.5 to 206.8kPa (5 to 30psig).

2.7 Penetrometer (Particulate Detection Unit). An instrument with a linear readout, near-forward light-scattering aerosol photometer, capable of measuring DOP aerosol concentrations.

2.8 Scanning. A method for detecting leaks in air cleaning devices or systems in which the probe nozzle of a detection device (penetrometer) is moved, at a distance of approximately 25mm from, and at a rate not exceeding 3m per minute, back and forth across the area to be tested.

3 Test Frequency

HEPA-filtered appliances should be tested in accordance with the schedule given below, as a minimum. The test should include visual inspection, housing leak test, in-place leak test, and airflow capacity test in the case of an air mover.

Air Mover	- after each HEPA filter replacement
	- after every 400 hours of service of HEPA filter
	- after serving every 10 containments or work sites
	- whichever is sooner or at least annually
Vacuum Cleaner	- after each HEPA filter replacement
	- after serving every 10 work site
	- whichever is sooner or at least annually

4 Visual Inspection

4.1 A visual inspection of the appliance including its housing, gaskets and their holding devices, and all associated components such as dampers and controls should be made in each test. It should be carried out under a combination of background light plus supplementary light on the surface to be inspected. A list of items which should be checked is given in Annex 1. Inspection of internal parts of an appliance may not be required when no deficiencies are identified in the other tests of this method.

4.2 Any defects should be duly recorded together with the remedial actions taken.

5 Housing Leak Test

5.1 This is to verify the leak integrity of the housing of an appliance, particularly the part upstream of the HEPA filter which is normally contaminated with asbestos.

5.2 Apparatus

- Compressed air cylinder or compressor to pressurize the housing to 202.6kPa (two atmospheres or 29.4psig). Compressed air should be connected to the housing with a regulating valve and a pressure gauge in the line.

- Covers to seal all discharge openings downstream of the HEPA filter.

- Bubble solution (a commercial test solution or a solution consisting of equal parts of liquid detergent, glycerine and water).

5.3 Procedure

1) Connect source of compressed air with regulating valve and pressure gauge in the line, via a suitable adaptor, to the air-intake opening of the appliance. Seal all duct openings and penetrations of the housing downstream of the HEPA filter. Hand clean the upstream part of the housing to remove any dust, scale, grease and dirt.

2) Turn on the supply of compressed air and maintain pressure gauge reading at 202.6kPa (29.4psig) for at least 5 minutes.

3) Apply bubble solution to welds, gasketed joints and other possible penetrations of the housing upstream of the HEPA filter. Check the wetted areas and mark places

when bubbles are being generated. A leak indication is any bubble 1.5mm diameter that forms in one second, or a bubble 7.0mm that forms in one minute.

4) Repair indicated leaks and retest.

6 Airflow Capacity Test (for Air Mover only)

6.1 This test is to verify that the specified volume flowrate of air can be achieved with the fan of the air mover running at nominal and maximum pressure drops across the filter.

6.2 Apparatus

- Rotating vane, heated wire or heated thermocouple anemometer having a calibrated accuracy of at least 3% of full scale reading.
- 1:10 inclined manometer.
- Filter blank-off plates sized to fit filter opening and capable of withstanding test pressures.

6.3 Procedure

1) Check for stable fan operation over a period of at least 15 minutes.

2) Divide cross-section of the air-intake opening into no less than 9 equal areas and measure the air velocity in the centre of each. To determine total airflow, calculate average velocity from the equation:

$$\overline{V} = \frac{\sum_{i}^{n} V_i}{n}$$

where $\overline{V}$ = average airflow velocity through the air mover

V_i = individual velocity readings

n = number of velocity readings

and then calculate volumetric flowrate, Q, from the equation:

$$Q = A\overline{V}$$

where A = cross-sectional area where velocity traverse was made

3) Increase system resistance artificially by blanking off portions of the filter. Calibrate the pressure gauge of the air mover against a 1:10 inclined manometer at no less than three different settings across the working range of the mover.

4) Increase resistance until a pressure drop of at least 1.25 times the design dirty-filter pressure drop for the air mover is achieved. Check for stable fan operation over a period of at least 15 minutes. Take at least 9 measurements of air velocity from the remaining area of the filter. Repeat calculations in para. 6.3 2) above for new volumetric flowrate.

5) Acceptance criteria for measurements is that the flow should be no less than 70% of the system design flow.

7 In-Place Leak Test

7.1 This is to verify that:

- the HEPA filter of the appliance has not been damaged,
- the filter has been installed properly,
- there are no leaks in the mounting frame or between the mounting frame and the housing, and
- the system contains no bypassing which would compromise the function of the HEPA filter.

Figure 1 depicts the set-up required for the testing of a HEPA appliance.

7.2 With the fan of the appliance or an auxiliary blower operating, DOP aerosol is injected upstream of the HEPA filter. Concentration measurements are made both upstream and downstream of the filter and percent penetration is calculated from the ratio of DOP concentrations in the filtered air (downstream reading) and the unfiltered air (upstream reading). If penetration is greater than 0.05%, the test is stopped and the system re-inspected for leaks or bypasses. If leaks or bypasses cannot be located visually, the auxiliary blower and DOP generator are turned on again and the downstream face of the mounting-frame-to-housing seal, the periphery of the HEPA filter, and finally the face of the HEPA filter, in that recommended order, are scanned. The appliance may have to be partly dismantled to allow equipment access. After

location and correction of leaks and bypasses or, if necessary, replacement of defective filter, the in-place leak test is repeated for record.

7.3 Apparatus

- DOP Generator. An air-operated generator certified by the manufacturer to be capable of producing the droplet-size distribution of para. 2.4. The generator output and the penetrometer adjustment should ensure penetrometer sensitivity high enough to permit detection of leaks smaller than 0.025% of upstream tracer concentrations. The DOP concentration should not exceed the linear response capability of the detector.

- Penetrometer. An instrument with a linear read-out, near-forward light-scattering aerosol photometer having the following characteristics is recommended.

  - Threshold sensitivity to permit detection of test aerosol in concentrations of at least as low as 0.001μg/litre of air with a minimum reading at this concentration of 1.0% when set on the most sensitive scale.

  - Capability of measuring concentrations of DOP in air of at least 100,000 times the threshold sensitivity of the instrument used for the test.

  - For testing air mover of design airflow capacity larger than 28.3m^3 per minute (1000cfm), a sampling rate of at least 0.03m^3 per minute (1cfm).

  - Linear response from minimum detectable aerosol concentration to maximum upstream concentration.

- Auxiliary blower capable of producing an airflow matching that of the appliance under test.

- 1:10 inclined manometer.

7.4 Procedure

1) Ensure ductwork is free from dust and debris which may damage the filter elements.

2) Switch on the appliance to establish airflow. Measure and record resistance across the HEPA filter, using the system instrument or temporary manometers.

3) Connect penetrometer sampling line to upstream sample point.

4) Check the background dust concentration upstream and downstream of the HEPA filter. The background dust concentration should not interfere with the penetrometer's capability to detect leaks smaller than 0.025%. If the background dust concentration is too high or unstable, reduce it to an acceptable level.

5) Connect DOP generator to the injection point, start injection, and adjust the generator as necessary.

6) Connect penetrometer to upstream sample point, allow to stabilize. Record upstream reading, and disconnect sampling line. Transfer sampling line to downstream sample point, allow photometer to stabilize, and record downstream reading.

7) Repeat the step 7.4 6) until readings are within ±5%. Use final readings for calculating leakage.

8) Calculate percent penetration from the equation:

$$P = \frac{C_d}{C_u} x\ 100\%$$

where

P	= percentage penetration
C_d	= downstream concentration, from photometer reading
C_u	= upstream concentration, from photometer reading

9) If penetration is greater than 0.05%, switch off the appliance under test, set up and then switch on the auxiliary blower and DOP generator and scan the downstream face of the HEPA filter as follows:

- Connect sampling line to downstream sample point, adjust penetrometer to zero when set to the most sensitive scale.

- Disconnect sampling line from downstream sample point, attach scanning probe, traverse downstream side of the HEPA filter with the probe held about 25 to 40mm from the section to be checked. It is recommended that the seal between the mounting frame and the housing be scanned first, then the periphery of the filter, and finally the core of the filter itself.

- A leak is indicated by a sustained and reproducible deflection of the meter reading (when the probe is held at the point in question).

- Mark indicated leaks; after repairs or filter replacement, and decontamination of the part downstream of the HEPA filter as necessary, retest the appliance in accordance with the steps in 7.4 1) to 7.4 8).

8 Report

8.1 A test report in an endorsed format shall be prepared by the laboratory to include the following, as a minimum:

- title or identification of test;

- test report number;

- identification of the appliance tested, including make, brand name and serial number;

- checklist used for visual inspection, with items found satisfactory checked, and disposition of nonconforming items indicated;

- leak integrity of housing: number, location, and disposition of leaks found upstream of HEPA filter;

- volumetric flowrates at nominal and maximum filter pressure drops against design values, and result of system pressure gauge calibration;

- percent penetration of DOP;
- location of excessive leakage of mounting frame and HEPA filter if discovered, and method of repairing leaks;
- conclusion and recommendations;
- signatures of testing personnel and supervisor; and
- date of test.

8.2 Test reports should be kept by the owner of appliance for at least two years and should be made available at the work site for inspection. Appliances which have passed the performance test must be properly labelled (see Annex 2) before they are allowed to be used on an asbestos work site.

9 Reference

US ANSI/ASME #510-1980 'Test of Nuclear Air-Cleaning Systems'.

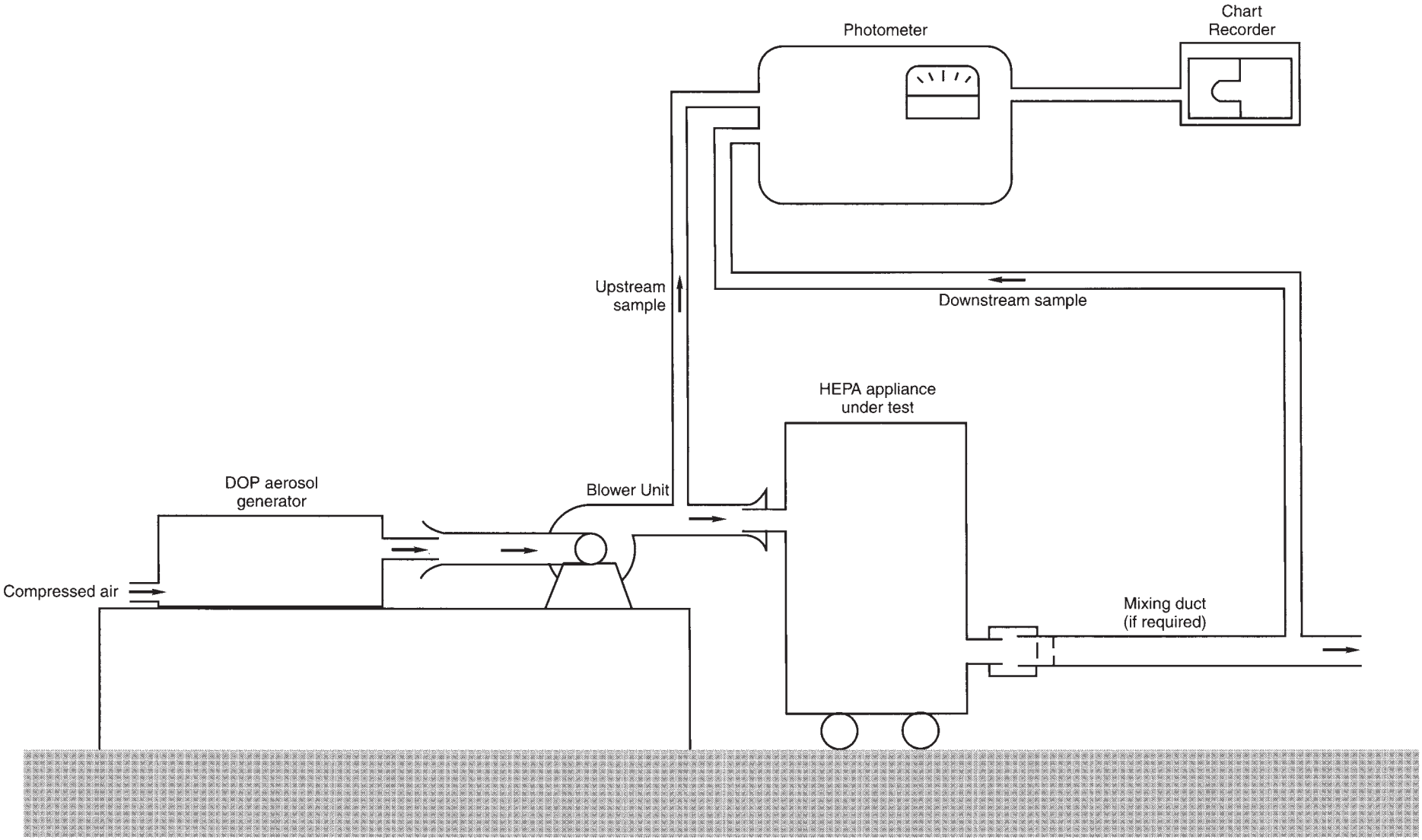


Figure 1. Dioctyl phthalate (DOP) photometric test method for HEPA appliances

Annex 1

Checklist for Visual Inspection of HEPA-filtered Appliances

1 Housing

- Housing including castors and power line free from debris and dirt.
- Damage to seal, welds and rivets between members of housing.
- Signs of corrosion, cracks, dents and peeled-off coating.
- Damage to castors and their swivel sockets.
- For air mover: damper blades missing, dented or held open by dirt.
- For vacuum cleaner: snap clamps holding filter head securely to tank; vacuum hose properly coupled up; permanent kinks, deformation or cracks in hose; and bore of hose free from debris and dirt.

2 Mounting Frame

- Continuous seal between members of frame and between frame and housing.
- Structural rigidity.
- Squareness of members, flatness and condition of component seating surfaces.
- Damage to frame.

3 Filter Clamping Device or Bolts

- Proper adjustment - 50 to 80% gasket compression all around.
- Proper condition of clamping device e.g. all nuts in place and tightened.

4 HEPA Filter

- Damage to filter media (tears, cracks), case, case corners, on both faces of filter where possible.
- Damage to or improper seating of gaskets.
- Excessive dirt loading - check gauge showing pressure drop across filters.

5 Prefilter

- Damage to media, case or gaskets.
- Excessive dirt loading.

6 Pressure Gauge

- Damage to shield or pointer.
- Pointer at zero setting.

7 Electrical Circuits

- Loose connections, damaged parts or insulation, and missing parts - using a wiring diagram of sufficient details.
- Power-off Electrical Test. Make ohmmeter check to verify that there is continuity in all circuits and that there are no grounding faults.

Annex 2

Label for Posting on HEPA-filtered Appliances

Owner of Appliance: _____

_____

Brand/Model: _____

Serial No.: _____

Appliance Tested on: _____

Cumulative use of HEPA filter
in hours on date of test: _____

Test Report No.: _____ Date: _____

Test Report Issued by: _____

_____ Tel.: _____

Authorized Signature: _____ ( )

Company Stamp: _____ Date: _____

Test Frequency

Air Mover	- after each HEPA filter replacement	Vacuum Cleaner	- after each HEPA filter replacement
	- after every 400 hours of service of HEPA filter		- after serving every 10 work sites
	- after serving every 10 containments/work sites		- whichever is sooner or at least annually
	- whichever is sooner or at least annually		

The above label, in black and white, should be at least 160mm x 140mm and made weather-resistant by plastic lamination after entry of information by the laboratory. Only suitably labelled HEPA-filtered appliances are allowed to be used on an asbestos work site to discharge filtered air to the surroundings.

APPENDIX 5

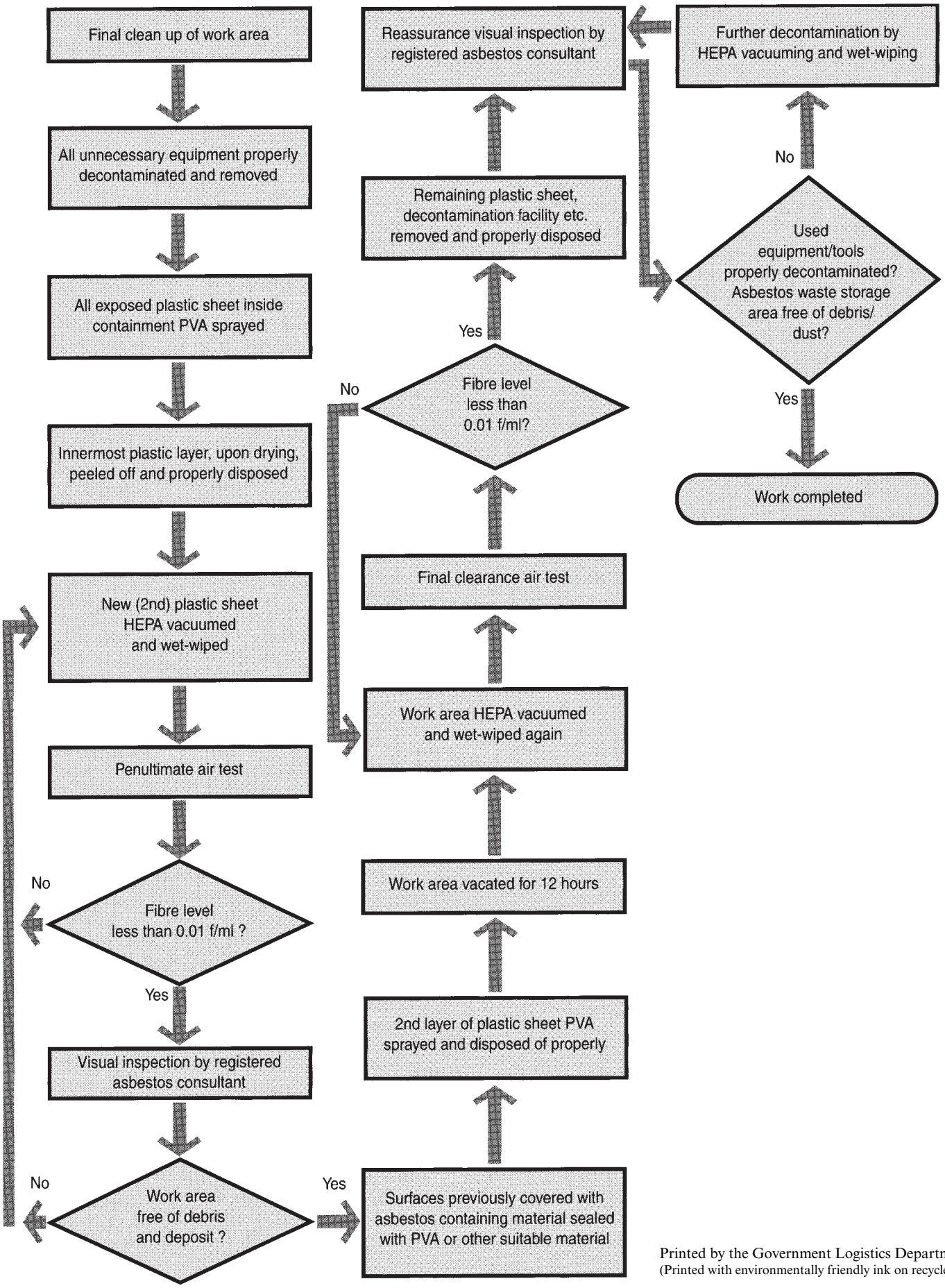
Daily Project Log for Supervision of Asbestos Abatement Work

A daily project log is to be kept by a designated registered asbestos supervisor and made available on site for inspection by the registered asbestos consultant and by the Authority. The items to be included in the daily log are:

- Name and Identity Card number of the full-time registered asbestos supervisor on site.
- Name and Identity Card number of all workers involved in the abatement work.
- Name and Identity Card number of authorised personnel visiting the work site and purpose of their visit.
- Hours of work.
- Particulars of work.
- Inspection details of containment barrier or segregation if applicable, and action required.
- Inspection details of negative pressure equipment if applicable, and action required.
- Negative pressure inside containment if applicable.
- General housekeeping inside work area with particular reference to immediate packing and removal of wastes.
- General housekeeping in transit store for asbestos wastes.
- Whether decontamination procedures in the decontamination unit are strictly followed and where appropriate, what disciplinary action taken.
- Whether correct warning labels posted outside the work area are properly maintained.
- Details of air monitoring carried out.
- Number of waste bags produced and number taken for disposal.
- Detailed account on any abnormality taking place, the corrective action adopted and the approval obtained for resumption of work.

Upon completion of work, the log should be certified as a true record by the contractor and endorsed by the consultant, and is then to be kept by the owner of premises or ship for at least 24 months for possible inspection by the Authority. Preferably, the log should be placed in a permanent asbestos file for the premises or ship in question.

Flow Chart for Work Acceptance Test for Asbestos Abatement Work Using Full Containment Method



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