

# **Asbestos Removal**

## **Manual and Procedures for**

**PA Group**

**The Granary Pinden Farm**

**Dartford Kent**

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**Section Name:**

Introduction To Procedures Manual

**Section No: 1.00**

- 1.0 This asbestos removal procedure manual contains a standard operating procedures Section which will assist our company to provide services to clients for the safe removal of Asbestos Containing Materials (ACMs) from buildings.
- 2.0 It also details a standard sequence of works Section 8 which should be read in conjunction with the standard operating procedures and the site specific plan of work.
- 3.0 The procedure manual has been prepared to assist in compliance with current statutory legislation, Approved Codes of Practice (ACOPs) and guidance notes as detailed in Section 4. It will be the responsibility of this company to ensure this procedure manual is inspected and maintained at regular intervals to ascertain the procedures detailed herein are current and up to date.
- 4.0 A copy of this procedure manual must be registered and kept with the Local Health and Safety Executive office, namely the Asbestos Licensing Principal Inspectorate (ALPI) and any notified works carried out should make reference to Section 7 & 8 of this procedure manual.
- 5.0 The implementation of this procedure manual is to be used on site, by employees to follow safe working procedures and ensure exposure and spread of asbestos are reduced so far as is reasonably practicable.
- 6.0 It is also of interest to the Enforcing Authority when appraising any proposed works and ensuring compliance with the legislation detailed in Section 7. A duplicate of this manual must remain on site at all times during asbestos removal work for inspection by the Enforcing Authority and/or any authorised persons auditing the works in progress.
- 7.0 This Company will ensure that the work has been properly assessed and that the contents of this manual are relevant to the application selected. Assessment must be correctly applied by appropriately qualified, trained and experienced personnel for whose guidance this manual has been prepared.

**Section Name:**

Statement of Intent

**Section No: 2.00**

- 1.0 The Director named on the cover sheet of this 'Procedures Manual' in compliance with the Health and Safety at Work Act 1974 (Section 2 & 3) accepts responsibility for the health and safety of employees and other persons affected by their undertakings with asbestos.
- 2.0 The Director named on the cover sheet of this 'Procedures Manual' and on the asbestos removal licence will be responsible for the implementation, enforcement and adherence of this policy manual.
- 3.0 The Director will ensure the prevention of exposure of his employees to asbestos as far as is reasonably practicable in accordance with CAR 2006, Regulation 11.
- 4.0 The Director will ensure regular air monitoring as defined in CAR 2006, Regulation 19, and Section 7.12 of this manual.
- 5.0 The Director will ensure that recording of exposure and monitoring is carried out in accordance with CAR 2006, Regulation 22. Each employee who works with asbestos will receive personal air monitoring at least once on each different work activity carried out to ensure compliance with CAR Regulation 11.
- 6.0 The Director will ensure the Enforcing Authority is notified of work with asbestos, as defined in the CAR 2006, Regulation 3 & 8 and Section 5 of this manual.
- 7.0 The Director will also ensure that Risk Assessments & Plans of Work are prepared for the removal works with any asbestos containing materials as defined by CAR 2006, Regulation 6 & 7, to ensure compliance with the prevention of spread of asbestos CAR 2006, Regulation 16.
- 8.0 It is important that all asbestos removal personnel are aware of their responsibilities and duties in complying with the Health and Safety at Work Act 1974 (Section 7) which is;
  - 8.1 Working in a safe and responsible manner and as trained and instructed by the employer;
  - 8.2 Taking all reasonable care for the Health and Safety of themselves and other persons whilst carrying out their work;
  - 8.3 Taking all reasonable care for the environment.
- 9.0 For and on behalf of this Company
- 9.1

Director's signature

Print

Date

**Section Name:**

Statement of Responsibilities

**Section No: 3.00**

- 1.0 Each key personnel member detailed below must ensure his/her specific responsibilities are carried out.
- 2.0 Responsibilities of: Project & Contracts Manager.
  - 2.1 Maintain company's Asbestos Removal Procedure Manual.
  - 2.2 Ensure all employees are suitably trained for the company's undertakings.
  - 2.3 Ensure all employees who work with asbestos have medical checks.
  - 2.4 Carry out assessments of exposure in accordance with CAR 2006 Regulation 6.
  - 2.5 Prepare plans of work in accordance with the HSE aide memoir and CAR 2006, Regulation 7.
  - 2.6 Notify works to Enforcing Authority, at least 14 days before required start date.
  - 2.7 Liaise with Enforcing Authority when a waiver of statutory notification is required.
  - 2.8 Ensure all plant and equipment provided for working with asbestos is suitable and sufficient.
  - 2.9 Carry out spot checks on the working site to ensure compliance.
  - 2.10 Ensure personal air monitoring is carried out on all operatives for each variation of work.
  - 2.11 Monitor the exposure of personnel and maintain results for 40 years.
  - 2.12 Review personnel exposure records and implement additional controls where required.
  - 2.13 Ensure documentary records are maintained for at least five years for plant and equipment.
  - 2.14 Check RPE monthly and maintain records for 5 years.
- 3.0 Responsibilities of: Site Supervisor.
  - 3.1 Assist in the construction of enclosures and work areas as defined by the plan of work.
  - 3.2 Carry out toolbox talks with all operatives and any other persons as required prior to commencement of work.
  - 3.3 Implement and ensure the plan of work is being adhered to and that controls are being applied when work is being carried out.
  - 3.4 Carry out daily inspections of DCU using (Section L of Site pack) detailing any faults which required rectification.
  - 3.5 Carry out daily inspections of NPUs using (Section J of Site pack) detailing any faults which required rectification.
  - 3.6 Carry out daily inspections of Vacuums using (Section J of Site pack) detailing any faults which require rectification.
  - 3.7 Carry out daily inspections of enclosure and airlocks using (Section K of Site pack) detailing any faults which require rectification.
  - 3.8 Carry out smoke test and ensure it is witnessed and recorded (on Section F of Site pack) ensure any faults have been rectified.
  - 3.9 Carry out daily maintenance on plant and equipment as required and record details on (Section J of Site pack).
  - 3.10 Ensure all certification and documents required to be on site are available for inspection.
  - 3.11 Assist any Inspectors or Auditors to carry out their checks.
  - 3.12 Assist the Analyst when carrying out any air monitoring.
  - 3.13 Amend where necessary the plan of work and record (on Section G of Site pack) prior to commencing work. Where serious amendment has occurred the Supervisor is to contact the Project Manager for possible re-notification.
  - 3.14 Any other responsibilities as directed by the Project Manager.

**Section Name:**

Statement of Responsibilities

**Section No: 3.00**

- 4.0 Responsibilities of: Asbestos Operative.
- 4.1 On site assistance to the Site Supervisor.
- 4.2 Construct the enclosure and airlocks under the supervision of the Supervisor.
- 4.3 Ensure the site layout is in accordance with the plan of work and all controls are correctly positioned.
- 4.4 Ensure when working with asbestos that all relevant control measures are in place and being utilised as described in the plan of work.
- 4.5 To assist in ensuring that fibre release is kept to an absolute minimum and notifying the Supervisor of any changes to the work.
- 4.6 Ensure the safe and careful removal of the asbestos waste from the working area.
- 4.7 Ensure the respiratory protective equipment is worn correctly and checked prior to its use.
- 4.8 Ensure the daily respirator check list is completed.
- 4.9 Assist the supervisor in the daily plant and equipment checks, as instructed.
- 4.10 Assist the analyst when personal monitoring is being carried out.
- 4.11 Comply with any on site emergency procedures as directed by the Site Supervisor.
- 4.12 Read and understand this company procedure manual to ensure full compliance when working on site.
- 4.13 Any other responsibilities as directed by the Site Supervisor or Project Manager.

**Section Name:**

Legislation and References.

**Section No: 4.00**

- 1.0 All work will be carried out in accordance with the references listed below.
- 2.0 Health and Safety at Work Act 1974.
- 3.0 The Control of Asbestos Regulations 2006 (CAR 2006).
- 3.0 ACOP L143:- Work with Materials Containing Asbestos.
- 4.0 The Hazardous Waste Regulations 2005.
- 5.0 HSE Guidance - Licensed Asbestos Contractors Guide HSG 247.
- 6.0 Company's Health & Safety and Environmental Policy.

**Section Name:**

Definitions

**Section No: 5.00**

- 1.0 Asbestos;
- 1.1 The following minerals, Crocidolite, Amosite, Chrysotile, fibrous Actinolite, fibrous Anthophyllite or fibrous Tremolite or any mixture containing any of those minerals;
- 2.0 Competent Person;
- 2.1 Employees who by reason of training or experience or both and are competent to perform the task or function or assume responsibility and are authorised to perform such task or function.
- 3.0 Control Measure;
- 3.1 Measure taken to prevent or reduce exposure to asbestos including the provision of systems of work and supervision, the cleaning of workplaces, premises, plant and equipment, the provision and use of engineering controls and personal protective equipment.
- 4.0 Decontamination Unit (DCU);
- 4.1 Mobile, fixed or temporary facility which is provided for asbestos work operatives involved in removing asbestos insulation, to change from their normal outdoor clothing into protective clothing and respiratory equipment, before entering the asbestos contaminated work area, and to effectively decontaminate themselves when leaving, or transiting from, the work area.
- 5.0 Enclosure;
- 5.1 Proprietary constructed area from polythene to prevent contamination, during the course of asbestos removal operations, of adjacent property, plant, equipment and persons. The area will be completely sealed normally under negative pressure.
- 6.0 Enforcing Authority;
- 6.1 Government department where licensable work is notified. The authority that requires the notification depends on the type of premises where the work is proposed, as defined on HSE Form ASB Notification Form.
- 7.0 Asbestos Licence;
- 7.1 Asbestos removal and associated work shall be undertaken under the authority of the Asbestos Licence and the respective conditions issued to the company by the HSE Licensing Unit.
- 8.0 Notification;
- 8.1 Means work as defined by the asbestos license will be notified to the relevant enforcing authority on form ASB/5 with accompanying site specific plan of work and a copy of the asbestos license, normally 14 days prior to work commencing. This will also be determined by the risk assessment as required by CAR 2006, Reg 6 (1) (a) and Reg 3(2).
- 9.0 Plant;
- 9.1 Means all plant; vacuum, extract negative pressure units, hygiene decontamination units, will be of the type suitable to asbestos work operations and shall be maintained and tested where required in accordance with the recommendations laid down in the current regulation, Approved codes of practice, and HSE Guidance Notes. All plant to comply with the Publicly Available Specification 60 (PAS 60 1/2/3)
- 10.0 Personal Protective Equipment (PPE);
- 10.1 PPE specified as per the risk assessment carried out prior to works commencing i.e. Respirator, Coveralls (type 5/6), Footwear, Gloves, Ear protection, Eye protection, Harness, etc.
- 11.0 Risk Assessment;
- 11.1 Means the assessment of risk required by regulation 6 (1)(a), Control of Asbestos Regulations 2006.
- 12.0 Respiratory Protective Equipment (RPE);

**Section Name:**

Definitions

**Section No: 5.00**

12.1 Means H.S.E. approved respiratory protective devices for use against atmospheric contaminants.

13.0 Sporadic & Low Intensity

13.1 Means where the concentration of asbestos in the air does not exceed or is liable not to exceed 0.6 fibres per cubic centimetre (f/cm<sup>3</sup>) in the air measured over a ten-minute period.

14.0 Waiver;

14.1 Dispensation of the statutory 14 days notification to the Enforcing Authority.

Where a waiver is sought owing to commercial, practical or other reasons, a request will normally be made by the client by letter or telephone to the enforcing authority, giving justification for the request of a waiver. This will be supported by notification of the works as detailed above by the company, either before the waiver is granted or retrospective to the works commencing, if and only instructed by the Enforcing Authority.

**Section Name:**

Overview of Training Requirements

**Section No: 6.00**

- 1.0 Regulation 10 of the Control of Asbestos Regulations 2006 requires employers to ensure that adequate information; instruction and training are given to their employees who are liable to be exposed to asbestos or who supervise such employees. The aim of this regulation is to ensure that employees are equipped with the relevant skills and knowledge to enable them to either remove or supervise those removing asbestos safely, by minimising their exposure to asbestos.
- 2.0 All managers, supervisors and operatives will have received the appropriate training, for work associated with Asbestos Removal.
- 3.0 The Responsible Manager will ensure that the authorisation for work procedure is carried out for all employees.
- 4.0 All asbestos removal operatives and supervisors will have been fully trained in accordance with the current Code of Practice and HSE Guidance. Training will be undertaken by an approved external organisation. On successful completion of training, an 'Asbestos Removal Certificate' is awarded by the training organisation and a copy retained on the company's database and site files.
- 5.0 Refresher training will be undertaken by employees to bring the operatives and supervisors up to the required standard. This training will be given to all asbestos personnel every 12 months.
- 6.0 Identification of training needs.
- 6.1 Training on its own does not make people working with asbestos 'competent'. Training must be consolidated so that the person becomes confident, skilful and knowledgeable in practice on the job, for example, attending a supervisor's training course does not in itself make an employee a supervisor.
- 6.2 This training should complement experience gained as an operative. An employee new to asbestos work would be ill equipped to supervise work with asbestos, however, if that employee had gained experience as an operative, with increased responsibility over time, a supervisor's training course would then consolidate this experience.
- 6.3 In these instances, the training need would be 'to understand and apply the decontamination procedure in the right order' and a training programme should be chosen or drawn up that meets this need.
- 6.4 Everyone employed to work with (or work ancillary to) Asbestos Insulation; Asbestos Coating or Asbestos Insulating Board must have their training needs assessed before they start work.
- 7.0 Medical Surveillance.
- 7.1 Operatives employed full time or temporarily on asbestos removal work must have a valid medical certificate. If they have not been examined in the past two years, the responsible manager will arrange for the operative to be medically examined by an E.M.A.S. appointed doctor.
- 7.2 The hospital or doctor carrying out the medical must be made aware the company requires two copies of the Certificate of Examination to be issued.
- 7.3 One copy is to be held within the company offices,
- 7.4 One copy to be issued to the operative. The operative shall be advised to keep the certificate safe as it may be required as proof at a later date.
- 7.5 The personal file copy shall be held for a period of 40 years from the date of examination, this will also apply to any temporary workers. Examination shall be carried out at intervals not exceeding two years.
- 7.6 Important Note.
- 7.6.1 No operative shall be employed on any asbestos removal work until this examination has taken place, and will not be allowed to undertake any work until a current medical certificate is produced.

**Section Name:**

Overview of Training Requirements

**Section No: 6.00**

7.6.2 For new employees previously examined, the operative shall provide certificates. The responsible Manager must verify the certificate before the operative is allowed to commence asbestos removal work and a copy should be placed on the company's training record system.

**Section Name:**

Health Record

**Section No: 7.00**

- 1.0 The responsible manager shall maintain a Health Record for every operative employed on asbestos work. A copy of the Record will be maintained within the company database safety file.
- 2.0 Each record shall contain the following information;
  - 2.1 The number of hours worked per day on asbestos;
  - 2.2 Details of work (Quote\job number);
  - 2.3 The measured or assumed exposures for the work undertaken;
  - 2.4 The type of RPE worn;
  - 2.5 The type of Asbestos worked on including the type of ACMs;
  - 2.6 The employee's National Insurance Number;
- 3.0 Personal exposure summary record
- 3.1 The responsible Manager shall, for every operative employed on asbestos work maintain a summary record of personal air monitoring results.

**Section Name:**

Use of spray adhesives

**Section No: 7.01**

- 1.0 Spray adhesives used for fixing and sealing of enclosures, all operatives must be fully aware of the hazards and the safety measures that need to be taken. COSHH data sheets should be held at the company offices and on site, and should be read before use. COSHH assessments will be carried out on all toxic substances used.
- 2.0 Hazards;
- 2.1 Fire Hazard - Non-flammable but propellant is butane, therefore it is a fire hazard.
- 2.2 Toxic Hazard - gives off highly toxic vapours, pressurised container - store away from direct heat.
- 3.0 Safety Measures;
- 3.1 Protective equipment: Rubber orinasal respirator fitted with combined organic vapour dust filter.
- 3.2 The above respiratory equipment must be worn at all times when using spray adhesives.
- 3.3 In confined and poorly ventilated areas, a negative pressure unit shall be installed as early as possible when erecting the enclosure and ventilated to outside atmosphere where practicable.
- 3.4 Filters shall be changed as soon as the smell of vapour is detected through the filter being used.
- 3.5 There is no need to leave the working area when changing filter.
- 3.6 Where adequate ventilation cannot be obtained, spray must not be used. Concentrations of vapour can become so great, so as to create oxygen deficiency within the working enclosure.
- 3.7 Note: Copies of relevant COSHH Material Safety Data Sheet and Assessments should be at site in the job file. COSHH Training in the safe use of these products should be given to all operatives required to use them.

**Section Name:**

Personal Protective Clothing

**Section No: 7.02**

- 1.0 It is the policy of this company that all overalls/coveralls used for asbestos removal works are disposable and not reusable. Personal Protective clothing for Asbestos Removal operatives will consist of the following;
  - 1.1 General Work coveralls;
  - 1.2 jhdfhdfh
  - 1.3 Disposable transit coverall, Note: All overalls are complete with hood, elasticated cuffs and ankles, and have no pockets;
  - 1.4 Coveralls to be colour coded as detailed in the site pack plan of work;
  - 1.5 Underwear including socks. (Disposable only, when applicable)
  - 1.6 Industrial Safety Footwear (Rubber boots or overshoes).
  - 2.0 When applicable or requested, 'Spare' PPE may be available for use by;
  - 2.1 Specialist services, first aid etc, in the event of an emergency within the working enclosure;
  - 2.2 Client inspecting personnel;
  - 2.3 Approved site visitors;
  - 2.4 Protective Clothing of the correct colour must be worn at all times when working within the asbestos zone. Contaminated clothing or PPE must NOT be taken into any 'Clean Area'. All contaminated clothing and PPE must be placed in appropriate asbestos bags within dirty area of hygiene unit and securely taped to prevent escape of dust.
- 3.0 Note:
- 3.1 Any clothing accidentally contaminated shall be sent to an approved laundry equipped to handle asbestos or disposed of as asbestos waste. Asbestos removal operatives will be instructed that, under no circumstances whatsoever are any items of asbestos work clothing to be removed from a work site. Any employee found to be breaching this directive will be subject to Company Disciplinary procedures for gross misconduct.

**Section Name:**

Respiratory Protective Equipment

**Section No: 7.03**

- 1.0 Assessment of RPE
- 1.1 The type of RPE chosen for the work will be suitable for the assessed risk presented by the airborne asbestos fibre concentration. The choice of which type of RPE will be made from previous air sampling on similar work carried out, or assumed exposure referenced from published HSE documentation.
- 2.0 Full face power assisted respirators
- 2.1 These will be manufactured to the current EN standard 129420; they will be fitted with a P3 filter. The assigned protection factor afforded to this type of respirator is 40, and in order to maintain the fibre concentration within the face piece to below the control limit of 0.1 f/cm<sup>3</sup> the maximum fibre concentration within the work area will be maintained below 4.0 f/cm<sup>3</sup> by using the appropriate removal techniques. This respirator will be worn within the enclosure unless the assessment indicates otherwise.
- 3.0 Half mask respirators
- 3.1 These will be manufactured to the current EN standard 143; they will be fitted with a P3 filter. The assigned protection factor afforded to this type of respirator is 20, therefore this respirator should only be used where the control limits are unlikely to be exceeded, for instance when handling wrapped asbestos waste, pre-cleaning or constructing enclosures in dusty areas and handling asbestos cement sheeting in well ventilated areas. These types of masks can also be used when low exposures are expected or recorded i.e. single tile or board removal under full fibre reduction measures, this will have to be confirmed by previous air sampling on similar work and reference to past records.
- 3.2 This will have to be confirmed by previous air sampling on similar work and reference to past records.
- 4.0 Instructions for use of RPE
- 4.1.4 Maintenance of the respirator;
- 4.1 All operatives employed on asbestos work should be instructed in the following:
  - 4.1.1 Fitting of the respirator;
  - 4.1.2 Use of the respirator;
  - 4.1.3 Cleaning and Inspection of the respirator;
- 5.0 Quantitative face fitting of RPE
- 5.1 All operatives, including new starters to the company, will undergo 'Quantitative Face Fit Testing', to ensure correct sizing and fit of respirator, before any asbestos related work can be undertaken. This testing will be carried out by a recognised test organisation or approved consultant. The testing is unique to the individual operator and therefore it is extremely important that respirator equipment is personal issue to each operator. The type and style of powered respirator issued to operatives, including any replacements, must be consistent with that used in the initial face fit test.
- 5.2 Maintenance and inspection of RPE;
- 5.2.1 All re-usable items of RPE will be inspected and maintained as per the manufacturer's schedule, and in compliance with CAR 2006. Full records of repairs and maintenance will be kept at the company offices for 5 years, monthly examination records will be kept and stored on the company database.

**Section Name:**

Hygiene Facility (DCU) and Decontamination Procedure

**Section No: 7.04**

- 1.0 Specification and requirements of the DCU;
- 1.1 A ratio of one shower per four people must be available to personnel using the facility; the facilities are purpose built to current laid down standards including lockers and power points for charging RPE batteries.
- 1.2 All exterior and interior doors must be self-closing. Non-return air vents must be fitted on the exterior wall of the clean end and interior partition walls to allow an air-flow, by means of the fitted extractor, from the clean end to the dirty end, to ensure contamination cannot pass through the unit from the dirty end.
- 1.3 The extraction unit must be in operation immediately at the start of the shift period and when applicable during pre-clean procedures it must run continuously throughout the entire shift. The extraction unit will be left running for a period of at least 15 minutes after the last man has passed through the shower unit.
- 1.4 No materials or equipment are to be stored in the unit other than immediate requirement i.e. RPE, clean working clothing and new filters. All wastewater will pass through a removable filter. The filter will be disposed of as asbestos waste.
- 2.0 Clean end:
  - 2.1 Only to be entered from exterior door (marked 'CLEAN'), in outdoor personal clothing or via shower compartment after showering. The unit must have the following equipment fitted;
    - 2.1 Self-closing door;
    - 2.2 Sufficient personal security lockers with power points for charging RPE and storage hangers, hooks or suitable accommodation for personal clothing;
    - 2.3 Fixed seating;
    - 2.4 Mirror;
    - 2.5 Non-return ventilator grilles;
    - 2.6 Space heater, if gas must have a balanced flue.
  - 3.0 Shower compartment:
    - 3.1 Centrally located between clean and dirty ends;
    - 3.2 Separated from clean and dirty ends by self-closing doors;
    - 3.3 A supply of fresh, clean towels, nail-brushes, soap and shampoo to be retained in this area.
    - 3.4 Hooks for towels to be fitted.
- 4.0 Dirty end:
  - 4.1 Only to be entered from exterior door (marked 'DIRTY') when returning from asbestos working area in transit overalls and respirator, or via shower compartment (wearing respirator) in order to don transit clothing. The unit must have fitted the following:
    - 4.1 Fixed seating;
    - 4.2 Laundry bag holder;
    - 4.3 Space heater, if gas must have a balanced flue;
    - 4.4 Air extractor unit;
  - 5.0 Maintenance and Inspection:
    - 5.1 Maintenance of facility is essential to provide a satisfactory standard of decontamination.
    - 5.2 The Site Supervisor shall inspect the facility before the start of each working shift period.

**Section Name:**

Hygiene Facility (DCU) and Decontamination Procedure

**Section No: 7.04**

- 5.3 The Site Supervisor shall ensure the facility is cleaned at the end of each working day. Operatives or nominated site personnel, carrying out cleaning of hygiene facility shall wear protective clothing and R.P.E. and shall take a shower after cleaning the facility.
- 5.4 The daily cleaning shall include the vacuuming of all dust and then a thorough washing down of all exposed surfaces. Checks shall be made to ensure that the DCU's facilities are all functioning correctly; these checks will be recorded on (Section L of Site pack).
- 5.5 An adequate supply of asbestos disposal bags and filters shall be provided. Debris shall not be allowed to accumulate and it shall be cleared and placed in asbestos bags for disposal as asbestos waste. Before the facility is removed from site, it shall be thoroughly decontaminated both inside and out. Air monitoring and certification must be carried out by an analyst.
- 5.6 Checks shall be made to ensure that no damage has occurred whilst it has been in use, If damage has occurred, it shall be rectified before facility is placed on another working site.
- 5.7 The air extraction unit shall be closed off during travel by secure dust-tight caps inside and out. Water system shall be drained and traps in shower and wash basins emptied and residue disposed of as asbestos waste.
- 5.8 The maintenance instructions shall be strictly adhered to.
- 6.0 Fitted extraction unit (NPU):
- 6.1 The extraction unit fitted to unit is subject to daily inspection and logged in (Section L of Site pack), a copy of the current DOP test certificate and inspection sheet shall be kept on site at all times.
- 7.0 Unauthorised Use:
- 7.0 Dismantling ducting
- 7.1 Under NO circumstances shall operatives who are not engaged in asbestos removal operations use the decontamination unit. Any unauthorised use of the decontamination unit will be deemed to be gross misconduct and the offender will be subject to Company disciplinary procedures.

**Section Name:**

NPU Exhaust Ventilation

**Section No: 7.05**

- 1.0 Negative pressure units, Exhaust ventilation (NPU) will be applied to the enclosure to create an internal pressure ('negative pressure') lower than atmospheric outside the enclosure (5pa or 0.5mm water gauge), the current of air produced will assist in the capture and reduction of airborne fibres. All exhaust extraction will be fitted with a High Efficiency Particle Arrestor (HEPA) filter and machines tested to a Standard of 99.98 efficiency (DoP test).
- 2.0 Calculating the size of NPU
- 2.1 In order to gain a suitable level the NPU should be rated to carry out a minimum of 8 complete air changes per hour (equiv: 10% of the volume of the enclosure per minute), the site pack 'Section C' will stipulate the minimum size of NPU. The NPU will be operating from the commencement of the work until the clearance air test at the completion of the works.
- 2.2 Calculation of NPU size is as follows; Volume in cubic feet of the area, times by the number of air changes required per hour (Minimum of 8) divided by 60.
- 2.3 Example Area volume is 1320 cubic feet X 8 = 10560 divide by 60 = 176 therefore a unit pulling more than 176 cubic feet per minute is required.
- 3.0 Positioning of NPUs
- 3.1 Where practicable extractor units shall be positioned directly onto the side of the enclosure wall with pre-filter box situated within the enclosure and if possible sited directly opposite the airlock to facilitate a good even flow of air throughout the enclosure. Where this is not possible, a roving head or baffle wall will be introduced
- 4.0 Pre-filters
- 4.1 Pre-filter box must always be fitted to prolong the life of the HEPA filter. Pre-filters must be checked and if necessary, changed at least once a day. When a build-up of dust and debris occurs the performance of the extractor unit will deteriorate. This will be indicated by an increase on the pressure gauge.
- 4.2 The extraction unit must be switched off temporarily whilst pre-filter is replaced. It is recommended that this operation occurs when shift breaks are taken.
- 4.3 Note: Pre-filter box must always be fitted to prolong the life of the HEPA filter. It is recommended that extractor units shall be run continuously throughout the period of the contract. Where this is not possible, the unit must be run for at least 1 hour after stripping operations have ceased. This will ensure that dust levels within the enclosure are reduced to the lowest level that is practicable.
- 5.0 Maintenance and Inspection
- 5.1 The NPU will be in possession of a current 6 month DOP test certificate and will be suitably marked with the details of the test and the expiry date. All plant and equipment will be visually examined daily and site records will kept of the inspected items, (Section J of Site pack). All NPU's will be sealed during transport to and from sites and also during storage.
- 5.2 Note: The gauge only indicates the pulling power of the machine, NOT the negative pressure being attained within the tent. As filters become clogged, pressure build up is shown by an increase on the dial/gauge.
- 6.0 Hose-Ducting
- 6.1 Where it is not possible to site the extraction unit directly into the enclosure wall, hose ducting will be used. It must be noted that the use of ducting will result in a decrease of the pulling power of the extraction unit (e.g. 1500 C.F.M unit: for every metre, run, a 10 C.F.M loss will occur.)

**Section Name:**

NPU Exhaust Ventilation

**Section No: 7.05**

- 7.1 Great care must be exercised to avoid asbestos dust contamination when removing ducting from between working area and extraction unit. The extraction unit must be running and ducting disconnected at enclosure side first. Asbestos waste bag is to be placed over duct end and sealed, hose then collapsed down to extraction unit and removed.
- 7.2 A further bag to be placed over duct end and sealed, complete hose to be sealed in final asbestos bag. Use of the asbestos waste bag will denote that hose is only to be used on inlet side of exhaust unit.
- 8.0 Air testing of exhaust
- 8.1 It is recommended that periodically, air samples be taken at the exhaust end of the extraction unit to ensure integrity of HEPA filter. Where any reading is in excess of 0.010 f/cm<sup>3</sup>. The Extraction unit must be immediately taken out of commission and the matter reported to the contract manager/supervisor.
- 9.0 Distribution of records
- 9.1 Copy of DOC certificates to be distributed as follows:
  - 9.1.1 Copy to accompany equipment;
  - 9.1.2 Copies to be retained in site pack with plant inspection records;
  - 9.1.3 At the end of each job the site pack containing daily checks must be returned to the office for retention on file for a period of 5 years;
- 9.2 Note: Under no circumstances are extraction units to be used when validity of 6 months DOP test certificate has elapsed.

**Section Name:**

Type 'H' vacuum cleaners

**Section No: 7.06**

- 1.0 Operation, cleaning and maintenance of type 'H' vacuum cleaners will conform to the requirements of BS 5415 specification for Type H Vacuum Cleaners. Competent persons will check equipment when in use daily, result of inspection and comments recorded on daily site diary record (Section J of Site pack) form.
- 2.0 Replacement of bags
- 2.1 Vacuum cleaners must always be used with a cloth bag and a disposable paper bag. Operatives must never use a vacuum machine for wet pick up, dampness will cause the filter to deteriorate.
- 2.2 Disposable paper bags are to be changed under controlled conditions. It will assist in containment of fibres if the machine is left switched on whilst carrying out this operation.
- 3.0 Cleaning and transport
- 3.1 The exterior of plant is to be kept in a clean condition, on completion of work, all contaminated hoses shall be sealed in appropriate polythene bags. All vacuums must be cleaned and sealed with waste bags or strong polythene bags then secured before and during transport.
- 4.0 Distribution of records
- 4.1.1 One copy to accompany the equipment.
- 4.1.2 One copy to be retained with site plant equipment file.
- 4.1 A Nominated Person shall arrange for plant to be examined and tested by an independent competent company, the 6 month DOP test. Daily inspections will be carried out and recorded on the (Section J of Site pack) form. Copies of certificates to be distributed as follows;
- 4.1.3 Current documentation for each machine DoP test certificate to accompany machine when being transferred between sites. At the end of the 6-month certification period, test record shall be returned to company office for retention on file for a period of 5 years.
- 5.0 Note: Under no circumstances are vacuum units to be used without a current DOP test certificate.

**Section Name:**

Transit Procedures and Changing

**Section No: 7.07**

- 1.0 The following procedures are as laid down by the Health and Safety Executive. Deviation is not permitted. Should any client or consultant request any operative to modify any part of the laid down procedure he/she shall politely refuse and refer the matter immediately to his immediate supervisor.
- 1.1 These procedures are designed to protect the operatives from exposure to asbestos respirable fibres.
- 2.0 Procedure where Hygiene Unit is connected to the Enclosure.
  - 2.1 On starting work; Enter hygiene unit through door marked 'clean area';
  - 2.2 Inspect RPE to ensure it is serviceable, fit new primary filter and pre-filter.
  - 2.3 Remove all clothing including underwear and socks.
  - 2.4 If disposable underwear is provided put it on in the clean area.
  - 2.5 Put on respirator mask and use mirror to ensure a good face fit, carry out fit test.
  - 2.6 Pass through shower section (without showering) connect power-pack if left from previous shift; enter into 'dirty area'.
  - 2.7 Put on clean protective clothing in the 'dirty area'.
  - 2.8 Pass through external door of the 'dirty area' through intervening space and through airlock into stripping enclosure.
- 3.0 When leaving 'working area'; Vacuum off RPE and PPE
  - 3.1 Enter first compartment and remove PPE including footwear, do not switch off RPE.
  - 3.2 A bucket, water and sponge will be provided to wipe off any visible signs of contamination.
  - 3.3 Pass through 2nd stage or tunnel, enter dirty end of DCU, and remove or dispose of under-clothes with respirator on and motor running pass into 'shower area'.
  - 3.4 Proceed to shower and remove respirator face-piece as soon as hair and body are thoroughly soaked.
  - 3.5 Whilst in the shower, clean face-piece of RPE.
  - 3.6 Sponge down pack and remove filter, place filters in asbestos bag for disposal. Start drying down in the shower section. Any towels used are not taken into 'clean area' Pass through door into 'clean area' complete drying.
  - 3.7 Leave respirator in 'clean area', place pack on charge.
- 4.0 Procedure where Hygiene Unit is 'not' connected to the Enclosure.
  - 4.1 On starting work; Enter hygiene unit through door marked 'clean area'.
  - 4.2 Inspect RPE to ensure it is serviceable, fit new primary filter and pre-filter.
  - 4.3 Remove all clothing including underwear and socks.
  - 4.4 If disposable underwear is provided put on in clean area.
  - 4.5 Put on RPE and use mirror to ensure a good face fit.
  - 4.6 Carry out fit test.
  - 4.7 Pass through shower section (without showering); connect power pack.
  - 4.8 Put on clean protective clothing, i.e. transit overall and footwear.
  - 4.9 Pass through external door of 'dirty area'; transit to 3-stage air lock at entrance of working enclosure.
  - 4.10 Enter first compartment of air lock and remove transit overall.
  - 4.11 Pass through second compartment of air lock.
  - 4.12 Enter second compartment put on new working overall or previously used if left from previous shift.

**Section Name:**

Transit Procedures and Changing

**Section No: 7.07**

- 4.13 Pass through third compartment into working area.
- 5.0 When Leaving Working Area; Vacuum dust from clothing and equipment inside enclosure.
- 5.1 Pass into first compartment of air-lock; remove dust from clothing and equipment using second vacuum.
- 5.2 Footwear to be cleaned and washed if necessary.
- 5.3 Enter second compartment of air lock and remove working overall and footwear.
- 5.4 Sponge off RPE.
- 5.5 Place connected power pack in plastic bag.
- 5.6 Enter third compartment of air-lock, put on transit overall.
- 5.7 Transit to hygiene unit Enter Hygiene unit at door of 'dirty area'.
- 5.8 Remove all clothing and footwear with respirator on and motor running pass into 'shower area'.
- 5.9 Proceed to shower and remove respirator face-piece as soon as hair and body are thoroughly soaked.
- 5.10 Whilst in the shower, clean face-piece of RPE.
- 5.11 Sponge down pack and remove filter, place filters in asbestos bag for disposal. Start drying down in the shower section. Any towels used are not taken into 'clean area' Pass through door into 'clean area' complete drying.
- 5.12 Leave respirator in 'clean area', place pack on charge.

**Section Name:**

Safe handling and disposal of waste

**Section No: 7.08**

- 1.0 Waste shall be bagged or wrapped on a continual basis and not allowed to accumulate loose on floor areas. Waste shall be sealed into appropriate Polythene bags or wrapped in equivalent polythene sheets marked 'ASBESTOS WASTE' Care shall be exercised at all times where waste contains materials liable to puncture polythene bags.
- 2.0 Cleaning of waste bags and packages;
- 3.0 Double bagging of waste;
- 3.1 The waste will then be passed to an operative in full protective clothing and suitable RPE in the centre of the 3 stage airlock system who will then double bag the waste into a clear outer waste sack and then sealed in the same manner as above. The operative will then pass the sack to an outside man who will directly load the waste sack or waste package to sealed van or container for disposal.
- 4.0 Storage of waste on site;
- 4.1 All waste will be stored and removed from the site in compliance with the Hazardous Waste Regulations 2005, the Classification, Packaging and Labelling Regulations, and all relevant guidelines. If a container/skip is used to store or hold the waste, the site supervisor will ensure that it is inspected on delivery and secured at all times when it is unattended.
- 4.2 For large asbestos clearance works, sealed lockable skips must be located on site. The skip shall have 'Asbestos Waste' signs and must be loaded whilst on the ground.
- 5.1 Transporting of waste;
- 5.2 For smaller type works a designated van boarded out and sealed from the cab area may be used. The waste carried within must comply with UN packaging and where practicable, must not weigh more than 10 kg per package. The full load of the vehicle shall not exceed 333 kg for fibrous amphiboles (blue or brown) or 1000kg for serpentine (white) and the vehicle must display orange hazard signs and carry the relevant consignment notes.
- 5.3 The site supervisor will ensure that the appropriate signs are displayed on any vehicle, information concerning the load is supplied, emergency equipment is available and appropriate sections of the consignment note will have been completed before leaving the site.
- 5.4 Note: Before the company can carry or transfer waste it must ensure that it holds a valid waste carrier's licence

**Section Name:**

Emergencies within the enclosure

**Section No: 7.09**

- 1.0 Accidents;
- 2.1 Only operatives at the scene of the accident can determine the action taken. The following points are instructions and guidelines for any operative involved in an emergency situation.
- 2.2 There should be on site at least one employee nominated as 'Appointed Person' who will take charge of the situation if a serious injury or major illness occurs.
- 2.3 Before any work commences within the asbestos enclosure, the 'Appointed Person', if not working in the enclosure will inform operatives of his expected location for that particular work period.
- 2.4 Should an accident occur to an operative in the working enclosure an assessment shall be made to see if the injured person, with the assistance of workmates can be led out of the enclosure and complete a full decontamination. The 'Appointed Person' shall be contacted for further action to be taken.
- 2.5 Should a serious injury occur where it may be considered necessary for others to help to move the injured person; the 'Appointed Person' is to be contacted immediately. He will then decide what further immediate action is necessary. Local first aid site services shall also be contacted informing them of the occurrence.
- 2.6 The urgency of the need to provide medical attention shall be considered with regard to decontamination procedures. If time is an important factor, the minimum standard acceptable, providing it is practicable, is the wearing of a transit overall on top of working overalls.
- 2.7 Should an operative lose consciousness; under no circumstances shall his respirator be removed until well clear of working area. The respirator must be thoroughly wetted or wiped down first prior to removal. Action to contact 'Appointed Person' as above.
- 2.8 If at all possible the injured person shall always be taken from the enclosure via the '3 stage air-lock'. If the occasion shall arise where it is considered impractical and the enclosure has to be breached, all necessary action must be taken to ensure unprotected persons are kept away from the area whilst evacuation of the patient is taking place.
- 2.9 The breach must be repaired immediately after the injured person is clear of the enclosure.
- 2.10 Note: If an 'Appointed Person' is not in the working enclosure, a set of protective equipment i.e. respirator, overalls, can be held in the clean end of the DCU or air-lock for their use if required in an emergency.
- 3.0 Fire emergencies;
- 3.1 As with accidents, action can only be determined by the seriousness of the situation.
- 3.2 A suitable extinguisher can be located within the 3-stage air lock. Should a fire occur within the asbestos working enclosure which is of a minor nature an attempt can be made to extinguish it.
- 3.3 If it can be seen that the fire is beyond your capabilities, the working area must be evacuated immediately.
- 3.4 Depending on the location of the fire, evacuation will be through the 3-stage air lock.
- 3.5 Decontamination procedures within the air lock will probably not be possible because of the time factor, but each operative shall collect transit overalls on passing through air lock. These shall be put on when clear of the enclosure on top of working overall.
- 3.6 An operative shall be dispatched to raise the alarm.
- 3.7 Supervisors must check that all operatives are accounted for.

**Section Name:**

Emergencies within the enclosure

**Section No: 7.09**

- 3.8 Further action will be as per contract specification, i.e. operatives to remain in general area until fire is extinguished to carry out decontamination and restore sheeting work, or proceed to hygiene facility for decontamination.
- 3.9 Should the fire alarm go off whilst working within the enclosure, action shall be taken as above, i.e. area evacuated immediately. Supervisor to check every operative is accounted for. Operatives to proceed to hygiene unit for decontamination.
- 3.10 If fire occurs during non-asbestos work, all operatives to report to designated assembly point.
- 4.0 Failure of enclosure (damage);
- 4.1 Should the enclosure be damaged all removal work must cease immediately and the following action taken:
- 4.2 Attempt to repair breach from inside the enclosure if not possible, dispatch one operative, two if possible, through 3 stage air lock, carrying out full decontamination procedure, with instructions to warn anyone in the area of the damage to the enclosure, to keep clear and then if possible to assist in repair of enclosure, wearing the minimum P3 disposable filter and transit overalls.
- 4.3 Depending on degree of damage, decontamination clean up may be required outside enclosure.
- 5.0 Failure of Negative Pressure;
- 5.1 There are two possible reasons for the failure of negative pressure.
- 5.2 Enclosure has been damaged.
- 5.3 Breakdown of extractor unit.
- 5.4 All stripping work to cease immediately. Dispatch an operative to investigate the breakdown of the unit. If fault can be rectified immediately, working operatives may remain in the enclosure ready to resume work as soon as negative pressure is obtained.
- 5.5 Should it result in the unit being inoperative for some time, all working operatives will be instructed to leave the working area for full decontamination. Work will not resume until the fault has been rectified. Enclosure must be thoroughly examined before the unit is switched on again to resume further work
- 6.0 Elevated fibre levels outside the enclosure:
- 6.1 Whilst working on site if any company employees are informed of any elevated fibre levels outside the enclosures then all works must stop immediately.
- 6.2 The analyst employed on the site will be consulted in an attempt to ascertain what the source of the elevated fibre levels may be. In some circumstances these elevated fibre levels may have been caused by 'interfering fibres' from other materials non asbestos on site, if this is identified to be so by the analyst then work may recommence.
- 6.3 In the event of subsequent elevated fibre levels being identified by the analyst as likely to be coming from either the enclosure, incorrect transiting procedures or insufficient cleaning of bags etc., then this should be addressed by the relevant site supervisor and no work shall commence until both the supervisor and analyst are satisfied that procedures are adequate and background levels are re-established at <0.01 f/ml of air.
- 6.4 Where circumstances, such as the above are identified and rectified then consultation between Company, the appointed analyst and the client will define whether or not continued background monitoring will occur.
- 7.0 Breach of a waste bag

**Section Name:**

Emergencies within the enclosure

**Section No: 7.09**

- 7.1 All wastes within asbestos identified waste bags will be sufficiently wetted at all times before removal. A suitable wetting agent or PVA solution will be applied to all materials upon removal, therefore, if any waste bags are breached outside an enclosure or working area the risk to other workers or members of the public will be minimal, due to the materials within the bag being saturated or coated in the relevant solution.
- 7.2 Where such a breach as that identified above occurs on site, then the company employees will be instructed to restrict access to the immediate areas, and initiate a suitable clean up method i.e. put on the relevant RPE and PPE, wet any debris within the affected area, once sufficiently wet the materials will be placed inside another waste bag and the general bagging and disposal arrangements described within this manual will be carried out.

**Section Name:**

Airborne asbestos fibre measurement

**Section No: 7.10**

- 1.0 Measures shall be taken to ensure that dust levels are reduced to the minimum that is reasonably practicable. All air monitoring will be carried out by a UKAS accredited analytical company conforming to ISO 17025. Air monitoring can be carried out as follows:
  - 2.0 Before Erection of Enclosure (Backgrounds)
    - 2.1 Prior to erection of enclosure where it is considered that surrounding area may be contaminated, air sampling shall take place. Should readings prove to be positive the matter shall be brought to the attention of client for further action if necessary, and to ascertain areas of responsibility?
    - 2.2 If after erection of enclosure doubts still exist about the possible contamination of the surrounding area, air samples may be taken outside the enclosure area before stripping operations commence. Should the results prove positive the client must be informed and agreed action taken.
  - 3.0 Enclosure Check Sampling (Static)
    - 3.1 Whilst work is in progress, sampling may help in checking for leaks. However it is not a precise means of pinpointing enclosure faults, and shall be considered as no more than a back up to careful and regular inspections.
    - 3.2 Verification that the enclosure is under negative pressure shall be sufficient to ensure any leakage flows are inwards. Sampling should take place shortly after removal commences. It is not considered necessary for sampling to be continuous throughout the duration of the work. The frequency of sampling can be defined and agreed with the client at pre-tender meetings.
  - 4.0 Personal sampling inside the working enclosure (Personal)
    - 4.1 A check of personal exposure by representative personal sampling during stripping operations shall be carried out frequently enough to confirm that exposure levels do not exceed those against which the R.P.E. can provide adequate protection.
    - 4.2 Concentrations shall be within the range of 4.0 f/cm<sup>3</sup> of air or less. (when full face power assisted respirators are worn). These should be carried out at a ratio of at least 1 in 5 (or 20% of work carried out)
  - 5.0 Final clearance procedures and the (Certificate of reoccupation)
    - 5.1 The following procedure will be adopted on site for compliance with current guidance and will be undertaken by a UKAS accredited analytical company. Site clearance sampling can only be carried out after the Site Supervisor has performed a thorough visual inspection of the area to establish that it is clean, dry and free from visible debris and inner surface of polythene enclosure has been vacuumed and wiped down. On successful completion of this inspection the enclosure will be given over to the analyst to carry out the clearance procedure.
      - 5.2 Stage 1: Preliminary check of site condition and completeness to ensure that the scope of clearance is agreed. The work area, enclosure, hygiene facilities, and controls should be intact. All ACMs included in the scope of the work and contaminated equipment should be removed. A hygiene facility operable until a certificate of reoccupation has been issued. All areas are free of asbestos. Findings are recorded.
      - 5.3 Stage 2: Thorough visual inspection to ensure: the completeness of the removal of the ACM from the underlying surfaces, the removal of any visible asbestos debris left inside the enclosure and airlocks or work area where there is no enclosure. The removal of fine settled dust.
      - 5.4 Stage 3: Clearance air monitoring including; Visual inspection prior to the dismantling of the enclosure or handing back of the area, ensuring that enclosures are intact and dry, that the NPU is turned off, capped and sealed, dust disturbance is carried out using a brush. Records are made detailing the method and duration of cleaning. Employees (analysts etc) decontaminate after the test.

**Section Name:**

Airborne asbestos fibre measurement

**Section No: 7.10**

- 5.5 Stage 4: Final assessment post enclosure/work area resulting in, Visual/air monitoring subsequently being passed, the enclosure being dismantled, type H vacuum cleaners and PPE should be available on site to remove asbestos released from the fabric of the enclosure (if applicable). The areas identified in stage 1, being visually inspected by a competent person.
- 6.0 Distribution of Air Monitoring Results
- 6.1 Whilst work is in progress, copies of certificates of all monitoring, which has taken place, shall be held on site and recorded in (Section F of Site pack form). Details recorded here must include the report number of the test report. On completion of work and satisfactory final clearance all certificates shall be forwarded to the company offices for filing in contract file. Any personal monitoring results should be made available to all employees measured.

**Section Name:**

Completion of Works and Handover

**Section No: 7.11**

- 1.0 At the end of the asbestos removal works the analyst will carry out a visual examination of the designated areas, stated in the agreed scope of clearance.
- 2.0 The Supervisor should ensure that surfaces within the enclosure are dry and free of all visible dust and debris, at this stage.
- 3.0 The site supervisor should carry out a thorough inspection of the enclosure; it is his responsibility on behalf of the company to ensure that all traces of asbestos and other debris have been removed as far as is reasonably practicable, so that stage 2 can commence. Read in conjunction with section: 2.10.6
- 4.0 An independent visual examination of the enclosure will be made by the UKAS accredited analytical company who must be accompanied and assisted by the site supervisor. Should further cleaning be required, the work will commence at once
- 5.0 Once the visual is satisfactorily completed by the analyst, the analyst should ensure that the enclosure is thoroughly dry, if satisfactory the analyst will commence the air test during which dust disturbance will be carried out using a clean soft brush. On completion an air test should show: <0.010 f/ml
- 6.0 The analyst will examine the external areas of the enclosure and other areas stated in the agreed scope of clearance; consideration will be given to the possibility of asbestos debris being trapped behind the enclosure construction. If satisfactory, the analyst will issue instructions to dismantle the enclosure and the precautions to be adopted to remove any debris and for the protection of the operatives. All enclosure materials, which have been exposed to asbestos fibres, will be treated as contaminated waste and then disposed of.
- 7.0 The site supervisor will then hand the area back to the client.

**Section Name:**

Site documentation held on site

**Section No: 7.12**

- 1.0 A site pack file will be kept on site by the site supervisor and any other members of the site management team, this will contain as a minimum:
  - 1.1 Copy of Licence;
  - 1.2 Copy of the plan of work;
  - 1.3 Site check lists for plant and equipment etc
  - 1.4 Clearance test certificates for DCU
  - 1.5 Any other air monitoring;
  - 1.6 Employers Liability insurance certificate.
  - 1.7 RPE check records, i.e. daily
  - 1.8 Test certificates for LEV, NPU's i.e. DOP certificates
  - 1.9 Training records;
  - 1.10 Medical records;
  - 1.11 Face fit certificates;
- 2.0 Other documentation such as Risk Assessments, COSHH Assessments, and documentation relating to CDM or other safety related matters should also be included in the site safety/documentation file.
- 3.0 It is essential that any document files kept on site whilst the works are carried out is accessible for any inspections carried out by enforcement officers or client etc.

**Asbestos Removal Manual and Procedures for:  
PA Group**

Issue No: 2  
Issue date: 01/01/2008

**Section Name:**

Appendices to be used with this manual

**Section No: 7.13**

- 1.0 ASB HSE Notification Form;
- 2.0 Method Statement/Plan of Works
- 3.0 Daily site diary record form;
- 4.0 Authorisation for works procedure;
- 5.0 Respiratory Protective Equipment, monthly examination
- 6.0 Inspection Record;
- 7.0 Employee exposure record (weekly);
- 8.0 Employee health record (12 week summary);

**Section Name:**

Generic Operational Sequence: Removal of ACMs

**Section No: 8.00**

- 1.0 The following generic sequence of operations has been prepared to enable clients & any enforcement officers to follow a typical asbestos removal programme;
- 2.0 Site Assessment
- 2.1 Any pre-tender specification documents complete with survey information will be examined by the Manager or Competent Person & used for setting out the basis of the Assessment and Plan of Works. The Manager or Competent person shall ensure that all relevant documentation is available to be sent to and held on site.
- 3.0 Employee competence
- 3.1 The Manager or Competent person will ensure that all employees selected to carry out the works conform to the company requirements for employment before works commence.
- 4.0 Decontamination checks
- 4.1 If a Decontamination Unit is to be used on site then the Manager or Competent person should ensure that the relevant unit is checked over or hired from the hire company (if applicable), & that all certification is included with the unit.
- 5.0 Decontamination operational
- 5.1 If a Decontamination Unit is to be used on site then the Manager or Competent person should ensure that the unit is operational before the commencement of any site set up or asbestos removal works.
- 6.0 RPE and PPE.
- 6.1 The Manager or Competent Person shall ensure that the correct RPE and PPE is selected as per the Assessment, the Supervisor shall ensure that all operatives use such RPE and PPE as instructed whilst on site.
- 7.0 Pre-Cleaning
- 7.1 The Manager or Competent Person shall instruct through the Plan of Works any pre-cleaning of work areas (if applicable) and the Supervisor shall ensure this work is carried out.
- 8.0 Enclosure
- 8.1 The Supervisor shall ensure that any enclosure needed for the removal works are constructed, and that all relevant checks are carried out on the enclosure.
- 9.0 Exhaust ventilation (NPU)
- 9.1 The Supervisor shall ensure that the NPU is checked, maintained and positioned in the correct location to ensure maximum airflow throughout the enclosure.
- 10.0 Vacuum equipment
- 10.1 The Supervisor shall ensure that any vacuum equipment used on site is positioned in the correct areas, the plant shall be checked and maintained accordingly.
- 11.0 Air Monitoring
- 11.1 Any air monitoring before the works commence will be carried out by an independent analyst; i.e. ambient air test. The analyst will be instructed in the scope of the certificate of re-occupation. This will be identified by the Manager or Competent Person, monitored & results entered into the site file by the Supervisor.
- 12.0 First Shift Entry
- 12.1 The Supervisor shall instruct the operatives to proceed through the first shift entry procedure to gain access to the working enclosure. The other subsequent entry and exit procedures will be used throughout the removal works and during any intermediate working times throughout the duration of the contract.

**Section Name:**

Generic Operational Sequence: Removal of ACMs

**Section No: 8.00**

13.0 Control measures

13.1 The Manager or Competent person shall ensure that information on controlled wetting and dust suppression of the ACMs is identified within the Plan of Works, the Supervisor shall ensure that all control measures used for reducing fibre levels are used correctly whilst on site.

14.0 Asbestos Waste

14.1 As work proceeds, the Supervisor shall ensure that the site is completely free of ACMs as identified in the Plan of Works. All asbestos waste will be placed into the relevant waste containers, bags or packages. The waste will be correctly stored onsite or removed from site.

15.0 Unexpected hot work

15.1 In the unlikely event of 'hot-works' being carried out during the removal of ACMs from site, the Manager or Competent Person shall ensure adequate arrangements are in place to deal with this safely. The Supervisor shall ensure that all precautions are enforced during the works. It is company policy to avoid when possible all aspects of 'hot-works' during any removal of ACMs.

16.0 Responsibilities

16.1 All operatives and Supervisors will be conversant with the company procedures to deal with any subsequent emergencies which may occur during the works. The Manager or Competent person shall ensure that the client will be aware of any special requirements or needs to deal with emergencies on site.

17.0 Amendments

17.1 In the event of any minor amendments to this generic sequence of operations or any minor amendments to the Plan of Works, the Manager or Competent Person will be informed by the Supervisor of such amendments & the details will be recorded and included in the relevant section of the Plan of Works.

**Section Name:**

Generic Method: Pre-Cleaning of Contaminated Areas

**Section No: 8.01**

- 1.0 If as a result of ambient air testing or survey report, pre-cleaning is required, then the following procedure will apply prior to the construction of any work enclosure;
- 1.1 Operatives will be informed of the level of contamination within the designated work area. Site operatives will wear appropriate protective clothing and respirators as determined by the pre risk assessment carried out by the site Supervisor.
- 1.2 Where practical an exclusion zone shall be established around the enclosure site, marked with warning signs and statutory signs to exclude unauthorised persons.
- 1.3 Prior to construction of the enclosure, any uncontaminated items of equipment loose fixtures or fittings will be removed to an area outside the space of where the asbestos enclosure will be constructed.
- 1.4 Where items of equipment, loose fixtures and fittings are deemed to be or are suspected to be contaminated, they will be vacuumed off lightly, using an H type vacuum, left in situ and the enclosure built around them and then bagged as contaminated waste during removal/treatment works. Determination of contaminated items will be made by guidance give by our Project Manager, Client and analytical reports.
- 1.5 Any fixed equipment, fittings or other fixtures will be left in situ and suitably cleaned, after a satisfactory pre inspection by the supervisor these items will be covered with suitable gauge polythene to ensure contamination does not occur during removal/treatment works.
- 1.6 All remaining accessible surfaces will be cleaned to remove visible dust and debris using an H type vacuum or tack rags. All surfaces to which the enclosure is fixed will be cleaned to ensure maximum adhesion of the adhesive tape.
- 1.7 After cleaning is complete, the analyst will be requested to carry out relevant visual and air tests to ensure area is ready for the enclosure construction to commence.

**Section Name:**

Generic Method: Using Wrap & Cut Methods/Asbe glove bags

**Section No: 8.02**

- 1.0 Before any work begins, all necessary materials and supplies should be brought into the work area. The work area should be taped off and warning signs posted within the area. (Barrier tape with a pre-printed asbestos warning sign works well for this purpose).
- 2.0 Before starting any removal work, inspect the insulation material along the entire length of the pipe to be wrapped. If it is damaged clean the pipe work and surrounding surfaces using a type H vacuum cleaner and seal the damaged areas with tape or cover them with a 'cut and wrap' skin. (Remember when doing Asbe glove bag work that loose pipe lagging several feet away maybe jarred loose by the work and the environment immediately outside the working areas should be reviewed carefully and if necessary, protected with tape or cut and wrap skins).
- 3.0 Remember; do not use Asbe glove bags on pipes over 50 centigrade. If possible, always isolate the heating and ventilation equipment in the work area.
- 4.0 Fill the water sprayer with water/pva and obtain pressure.
- 5.0 Don respiratory protective equipment in accordance with the employer's assessment of exposure and check face fit.
- 6.0 The Asbe glove bag has a zipper top and shoulders at each end. Place the Asbe glove bag over the pipe work and close the zipper. Then place one strip of duct tape along the edge of the top zipper slit of the Asbe glove bag for reinforcement.
- 7.0 Pass the tools required. (These will usually include a hammer, abrafile utility knife, wire wool, rags and wire cutters), through the shoulder inlet and insert into the Asbe glove bag tool pouch, then seal the shoulders using non slip tie straps.
- 8.0 Lay a sheet of 1000 gauge polythene on the floor underneath the Asbe glove bag and locate a bucket of water and sponge close by for final clean up operations.
- 9.0 Insert the nozzle from the water sprayer through the water hose inlet and fasten into position. Then direct the water spray at the insulation material and shoulders of the Asbe glove bag to reduce the emission of fibres.
- 10.0 Use the abrafile (a serrated wire with handles at each end) to cut the insulation at each end of the section to be removed inside the Asbe glove bag. Throughout this process, water should be sprayed onto the cutting edge to keep dust release to a minimum.
- 11.0 Once the ends are cut, removal work can commence. Some sectional insulation may be slit from end to end using the utility knife, along the bottom of the pipe. Some insulation may have wires to be clipped. Other sections may need to be chipped away using a hammer and this again should be done from the bottom of the pipe. Then the insulation can be lifted off the pipe and placed into the bottom of the bag
- 12.0 Spray the lagging with water at frequent intervals on the pipe work and at the bottom of the Asbe glove bag and wash down the walls of the Asbe glove bag to maintain visibility.
- 13.0 When the insulation material has been stripped from the pipe spray, clean the tools and place them back into the tool pouch. Then using the wire wool, rags water, scrub and wipe down the exposed pipe inside the Asbe glove bag.
- 14.0 Once the section of pipe is clean and asbestos free, thoroughly spray the sidewalls and contents of the Asbe glove bag with water and dampen the exposed ends of the insulation remaining on the pipe work, which can then be painted with encapsulation membrane.
- 15.0 Close the internal zip to seal the lower portion of the Asbe glove bag and its asbestos waste materials.

**Section Name:**

Generic Method: Using Wrap & Cut Methods/Asbe glove bags

**Section No: 8.02**

- 16.0 If more than one adjacent section of pipe work lagging is to be removed, loosen the Asbe glove bag tie straps at each end and slide the Asbe glove bag along the pipe to the next section. Then open the internal zip and repeat the stripping operations.
- 17.0 Once the stripping operation has been finally completed and the bag and tools thoroughly washed down remove the water spray nozzle from the water hose inlet and seal with duct tape.
- 18.0 Put all tools in one hand (glove), Pull hand and glove out inverting the glove which will now contain the tools inside. Twist the glove to create a separate pouch and double tape or wire tie the glove to seal. Cut between the two pieces of tape or wire ties and place the new glove pouch into the next Asbe glove bag or into the nearby bucket of water. Open glove tool pouch under water and clean tools and then allow to dry out.
- 19.0 Slip a 500 gauge asbestos waste disposal sack onto the Asbe glove bag (still attached to the pipe). Then remove the tie straps from the shoulders and the duct tape covering the zipper and unfasten the zip enabling the Asbe glove bag to fall gently into the asbestos waste disposal sack.
- 20.0 Remove the disposable suits and place these into the asbestos waste disposable sack, then twist the top of the sack and seal with wire ties.
- 21.0 Tidy up the work area, then using a clean, damp rag, wipe the exterior of the respirator and leave the work area. Remove the respirator.
- 22.0 Asbestos containing material must be disposed of at an approved landfill site in accordance with the waste regulations.
- 23.0 Once the area has met the criteria for re-entry by unprotected personnel, the barriers may be removed.

**Section Name:**

Generic Method: Tented Enclosures and Work Areas

**Section No: 8.03**

- 1.0 Enclosures
- 1.1 To prevent contamination, during the course of asbestos removal operations, of adjacent property, plant, equipment and persons, the areas of asbestos removal will be completely sealed normally under negative pressure.
- 2.0 Method of Containment
- 2.1 In containing asbestos removal operations, two methods are used;
- 2.2 Use of building, structure or room as the actual containment structure.
- 2.3 This would require the sealing of all windows, doors, roof openings and other incidental openings such as ducting, pipe-work electrical services etc using suitable sheeting. The condition of any existing building etc., which may cause considerable final cleaning e.g. ledges, voids, ducts, plant, equipment and rough surfaces, must be taken into account before any asbestos removal work commences.
- 2.4 In such circumstances it may be the case than an enclosure is built within the building site.
- 3.0 Specially constructed enclosures to contain affected areas
- 3.1 The erection of framed 'tents' using polythene sheeting.
- 3.2 The framing may be specially constructed timber frames (50mm x 50mm softwood timber as a minimum and where required additional bracing or increased timber profile where additional stability should be required) or specifically constructed scaffold structures. For enclosures constructed from scaffolding equipment, the polythene sheeting must be affixed inside the scaffold structure.
- 3.3 Any scaffold structure shall incorporate 'Ranch Fencing' or 'Vertical Decking', at suitable intervals, in order that the polythene sheeting can be stapled securely to provide a stable containment.
- 3.4 Open-ended scaffold tubes within the area of the enclosure must be sealed, preferably using scaffold end caps. All scaffold fittings within the area of the enclosure must be wrapped and taped.
- 3.5 All scaffold boards must be fully sheeted and sealed to prevent contamination.
- 3.6 All gaps in boarding or flooring must be closed or covered to prevent areas which could be punctured or cause trip hazards to asbestos removal workers.
- 3.7 Polythene sheeting is sealed using 75mm or equivalent, poly-cloth tape and a spray contact adhesive.
- 4.0 Warning Signs
- 4.1 Signs shall be displayed around the exterior of the enclosure, typically these will be worded;
  - 4.1.1 Caution - Asbestos Removal Work in Progress.
  - 4.1.2 Strictly No Admittance to Unauthorised Persons.
- 4.4 Respiratory Protective Equipment to be worn
- 5.0 Airlock and Bag lock specification;
- 5.1 The airlock and any bag lock system will consist of three chambers constructed of 1000 gauge polythene sheet sealed onto the timber framework or other existing framework by 75mm adhesive tape. The size of each chamber should be of a minimum size of 1000mm x 1000mm on a plan elevation, and approx 2.0 metres in height. The airlock and bag lock (dirty end) shall have a viewing panel of 600 x 300 mm minimum size
- 5.2 Airlock details

**Section Name:**

Generic Method: Tented Enclosures and Work Areas

**Section No: 8.03**

- 5.3 The airlock chambers will be interconnected via an oval shaped hole in the polythene sheet, behind the sheet will be hung a 'flap' which should extend to the sides and below the opening, these will be weighted at the bottom with a suitable material attached. The 'flaps' will be positioned on the inside face of the opening (enclosure Side). Wherever possible the airlock system will be positioned directly onto the DCU (De-contamination Unit) or purpose built showering facility.
- 5.4 Wherever possible the airlock system will be positioned directly onto the DCU (De-contamination Unit) or purpose built showering facility.
- 6.0 Smoke testing
- 6.1 Filling with smoke, produced by a smoke-generating machine whilst the NPU is switched off, will test the enclosure. If smoke is observed to leak from the enclosure, it will be repaired and subjected to a further test. As well as smoke testing of enclosures, and before work commences the enclosure will be thoroughly visually inspected, this will be repeated with the NPU in operation to test the integrity of the enclosure and will also detect any 'leaks or breaches'. Only then will the asbestos removal commence.
- 6.2 Witness of smoke test
- 6.2.1 Once the enclosure has been smoke tested, it will be signed off, the signature of the person carrying out the smoke test will be required in (Section F of Site pack), in some circumstances an independent witness may also sign to confirm the integrity of the enclosure.
- 7.0 Continual inspection of the enclosures
- 7.1 To ensure the integrity of the enclosure, the tented area shall be thoroughly examined by the company nominated Competent Person at the commencement of each work period throughout the day and also at the end of the shift before leaving site. Any faults found in the enclosure must be rectified immediately. The person carrying out the checks must sign the daily site diary record form (Section F of Site pack).
- 8.0 Viewing panels
- 8.1 Where practicable enclosures are to be fitted with inspection windows. Clear Perspex or other suitable material is to be fixed and sealed to the side of the asbestos removal enclosure in suitable locations as shown on the site plan, the minimum size of the viewing panel shall be 600 x 300mm.
- 8.2 Where the use of viewing panels is impracticable, CCTV will be considered, as required by the client.

**Section Name:**

Generic method: Spray wetting (Typically for removal of AIB)

**Section No: 8.04**

- 1.0 This technique can be used for a number of applications, where injection is inappropriate due to the nature of the material (e.g. AIB). This method will wet the outer surface, but will only penetrate very thin porous materials. With materials such as AIB and asbestos cement it will only seal the outer surface. Spraying can also be used to prepare surfaces prior to injection or removal. Examples include:
  - 1.1 Where the ACM is unsealed and porous, e.g. thin sprayed coatings;
  - 1.2 Preparation of ACM's for removal, e.g. before the injection of damaged pipe lagging;
  - 1.3 Removal of AIB;
  - 1.4 In conjunction with Asbe glove bags;
  - 1.5 Removal of asbestos debris;
  - 1.6 Work on asbestos cement.
- 2.0 The nature of the work being carried out and the volume of asbestos involved will determine the method of application. For relatively small applications, such as the preparation for injection or inside glove bags, operators can use hand-pressurised and operated spraying equipment, similar to that used in gardening.
- 3.0 For more extensive applications such as an unsealed sprayed coating, a low-pressure spraying machine (less than 3.4 bar (50 psi)) can apply the wetting agent. iv. The objective is to achieve thorough wetting of the ACM without disturbing it or producing an excessive quantity of run-off.
- 4.0 The method of application will vary depending on the type of material. Examples include:
  - 5.0 Application on unsealed sprayed coatings: spraying should be carried out with care over a defined area using a wide-angled and fine spray. The spray should be moved continuously back and forth across the surface, avoiding disturbance. The number of spraying passes required will depend on the material.
- 6.0 Application on unpainted AIB boards and tiles: if the boards or tiles are unpainted on both surfaces, or an unpainted surface is readily accessible, they should be first vacuumed clean to remove all deposits of dust and debris and then sprayed as described in the previous sub-paragraph. Once they are thoroughly wet, they can be carefully removed by unscrewing and shadow vacuuming.
- 7.0 A magnet can be used to locate the screws if hidden by paint. Where the unpainted surface is not accessible, as is often the case with ceiling tiles, a single tile should be unscrewed using shadow vacuuming, then the unpainted top surface vacuumed and sprayed. Once access is available to the upper surfaces of the surrounding boards or tiles, they can be vacuumed clean and sprayed before removal as outlined previously.

**Section Name:**

Generic Method: Shadow vacuuming

**Section No: 8.05**

- 1.0 The use of extraction equipment i.e. vacuum cleaners etc, in the immediate vicinity of the work area in order to remove at source some or all of the fibres which have become airborne. This method may take the form of:
  - 1.1 Shadow vacuum technique by holding the nozzle of a type H (BS5415) vacuum cleaner to the point of disturbance of the ACMs;
  - 1.2 The use of locally sited dust extraction equipment (NPU's) at the point of removal to provide extraction from the immediate work area. The pre-filter holder must be sited within 1 metre or less of the area being removed and a flexible hose from this connected to an NPU outside the enclosure. The hose and pre-filter holder must be treated as contaminated and decontaminated or disposed of as appropriate at the conclusion of the work.
- 2.0 Safe handling techniques;
  - 2.1 All packages of waste will be vacuumed with the approved vacuum within the enclosure to remove any surface dust or contamination; if necessary the packages can then be sprayed with PVA to entrap any loose fibres or contamination.
    - 2.1.3 Any sheet materials should be handled carefully sprayed with PVA solution and removed from the enclosure whole;
  - 2.1 The more roughly the ACMs are treated and the more they are handled the more asbestos fibres can be released. The following general principles will be applied to minimise the release of fibres:
    - 2.1.2 If direct bagging is not possible, polythene sheeting will be so arranged that any pre-wetted asbestos debris falls onto it and will then be wrapped and removed;
    - 2.1.1 Asbestos will be removed in one operation in as few pieces as possible directly from its location into the waste sack;
- 3.0 Use of hand tools;
  - 3.1 During the course of the asbestos removal operations, operatives will be instructed to use hand tools of a general nature i.e. brushes, scrapers, screwdrivers, wire brushes (only to be used with wetting agents) knives etc. All hand tools will be chosen according to the assessment of the ACMs to be removed. Low dust methods will be adopted at all times, and all hand tools will be suitably cleaned at the end of each shift.
  - 3.2 Abrasive cleaning should only be carried out on wet products. Clients will be advised that residual asbestos left in place will only be removed where reasonably practicable and that abrasive measures will remove the residue. Any remaining asbestos may require encapsulation, the use of controlled abrasive grit blasting may be considered but only under full supervision and after training in the use of the equipment.

**Section Name:**

Generic Method: Insulation using wet injection techniques

**Section No: 8.06**

- 1.0 The most useful technique for achieving good control of asbestos fibres at the point of removal is multi-point injection using needles which penetrate the outer skin of ACM's such as sprayed coatings or lagging allowing delivery of the wetting agent to the asbestos fibres. Effective wetting of asbestos fibres relies on controlled low pressure injection to all areas of the ACM.
- 2.0 Injection needles come in many sizes and designs. You need to ensure that the needles are appropriate for the asbestos being removed.
- 3.0 Thin coatings (1 cm or less) require needles with holes at the tip, or long angled needles. This allows the needle to be pushed into and flat with the thin coating. These angled needles help the lateral movement of the wetting agent. However, injection techniques may not be appropriate for unsealed sprayed coatings where the needles can dislodge asbestos during application. In this situation, the coating can be sealed using an airless spray and injected once the surface coating is dry. Alternatively, airless spraying of a wetting agent can be used on its own to thoroughly saturate unsealed sprayed coatings.
- 4.0 Thick coatings require long needles with holes along their length, sufficient to penetrate the full depth of the insulation.
- 5.0 Injection systems come in two basic forms: multi-point and single point. Multi-point systems have a number of needles connected together and served from a common injection pump. 'Hedgehogs' (a number of needles grouped together on a flat board) are appropriate for flat surfaces such as sealed sprayed coatings, lagging on plant with large flat surfaces, etc. Alternatively, a 'string' of needles 10 to 15 cm apart, connected by tubing from the injection pump can be placed along the pipe work. Single-point injection systems are only useful for inaccessible areas where it would be difficult to set up a multi-point system. Multi-point systems should generally be used as they provide comprehensive wetting.
- 6.0 Once you have selected your needle type, you then need to give careful consideration to siting of the needles.
- 7.0 Injection should be carried out in a methodical manner. If the needles are placed too far apart, dry patches can occur.
- 8.0 Where reasonably practicable, the wetting agent should be applied from the top to allow gravity to aid its movement through the asbestos.
- 9.0 Horizontal pipes should have needles running along the top of the pipe, spaced 10 to 15cm apart allowing wetting solution to diffuse down from the top of the lagging.
- 10.0 Large diameter pipes may need additional runs of needles, again towards the top of the horizontal pipe.
- 11.0 Vertical pipes should have needles placed horizontally around the top of the pipe, allowing wetting solution to diffuse as a wet band down the lagging.
- 12.0 Tall vertical pipes may need additional horizontal rings of needles every 1 to 2 metres
- 13.0 Where lagging is covered by a cement-like layer (typically 6 mm thick), it may prove impossible to carry out injection without some preparatory work. In order to permit injection, holes can be carefully drilled in the cement layer to permit access of the needles. Drilling can be a dusty procedure so hand drills or a low speed drill should be used. The use of integral LEV can achieve additional control, for example cowls, by shadow vacuuming or by drilling through a viscous medium such as wallpaper paste.
- 14.0 Pipe and vessel lagging can be covered in metal cladding which will need to be carefully removed to expose the lagging material before injection. This can normally be carried out with minimal disturbance to the underlying lagging. However, if the underlying lagging is likely to be damaged, you can use airless sprays and shadow vacuuming as an effective way of controlling fibre release while the cladding is carefully removed.



**Section Name:**

Generic Method: Insulation using wet injection techniques

**Section No: 8.06**

- 15.0 Where the asbestos is damaged, injection may result in the material being disturbed or breaking off. If the damage is relatively slight, this can be avoided by the liberal use of sprayed wetting agent. If there is the potential for the asbestos to fall off the pipe work or vessel, it can be wrapped in an impervious material such as polythene sheeting and then carefully injected.
- 16.0 With your needles now selected and placed in the optimum positions as described above, you are ready to start delivery of the wetting solution. Low pressure injection (less than 3.4 bar (50 psi) should be used as it wets by capillary action. The use of high pressure can damage the asbestos and cause the wetting agent to be forced along the path of least resistance rather than flowing by capillary action. Needles with integral flow control will aid controlled low pressure injection.
- 17.0 When using wetting agents, you should: Avoid over-wetting to prevent the wetting agent seeping out of cracks in the asbestos and presenting a slip hazard. It can also cause a slurry which can be difficult to deal with. Wrapping any damaged pipe lagging can collect any wetting agent (and asbestos debris), which may seep out. Alternatively drip trays can be placed under the pipe work.
- 18.0 Allow sufficient time for the wetting agent to thoroughly penetrate the ACM. The time taken will depend on the type of ACM being injected. More porous and less dense materials, such as sprayed asbestos coatings, become saturated much more quickly than denser and less porous materials such as pipe lagging. It is therefore important that the workers carrying out the injection work and their supervisors have sufficient training and experience to judge when it is safe to begin removal. Some materials may be removed after only 3 to 4 hours soaking while others may require up to 24 hours.
- 19.0 The degree of penetration and wetting should be checked by visual examination before attempting removal. With some ACM's, there is a visible colour change when adequate wetting has been achieved. Lagging should be of a dough-like consistency when adequately wetted. The use of dyes in the wetting agent or a moisture meter can also assist examination.
- 20.0 Small samples taken to determine the degree of penetration and wetting should be from areas remote from the pump or towards the last group of needles. During such testing, 'shadow' vacuuming should be used and if any exposed dry patches are found, they should be sprayed immediately and then re-injected.

