

CODE OF PRACTICE

Safety and Health at Work with Asbestos



**Occupational Safety and Health Branch
Labour Department**

**Addendum relating to the
Occupational Safety and Occupational Health Legislation (Miscellaneous Amendments)
Ordinance 2023
(Effective from 28 April 2023)**

The Legislative Council passed the Occupational Safety and Occupational Health Legislation (Miscellaneous Amendments) Bill 2022 (“Bill”) on 19 April 2023 to amend the Factories and Industrial Undertakings Ordinance (Cap. 59) and the Occupational Safety and Health Ordinance (Cap. 509), as well as their subsidiary legislation. The Bill seeks to overall increase the maximum penalties for occupational safety and health (“OSH”) offences in order to enhance their deterrent effect. The Occupational Safety and Occupational Health Legislation (Miscellaneous Amendments) Ordinance 2023 (“Amendment Ordinance”) was published by the Government in the Gazette on 28 April 2023 and came into operation on the same day.

2. Key amendments introduced by the Amendment Ordinance include:
 - (i) with regard to extremely serious OSH contraventions, to take out prosecutions by invoking the general duty (“GD”) provisions for employers, proprietors and occupiers of premises (“employer GD provisions”) as indictable offence and to pitch their maximum fines and imprisonment terms at \$10 million and two years respectively;
 - (ii) to increase the maximum fines of offences prosecuted summarily under “the employer GD provisions” and “the employee GD provisions” to \$3 million and \$150,000 respectively;
 - (iii) to adjust the maximum fines for other summary offences, and to set the maximum fines for employer-related offences and employee-related offences respectively according to their seriousness; and
 - (iv) to extend the time limit for prosecution for an offence that is triable summarily from six months to nine months.
3. The Amendment Ordinance can be downloaded [HERE](#).
4. Public forms related to the Amendment Ordinance have been updated and can be downloaded from the GovHK’s website at <https://www.gov.hk/en/residents/forms/>.
5. This Department will continue to update the content of OSH publications related to the Amendment Ordinance. The Amendment Ordinance prevails over the content of the OSH legislation in the existing publications.

CODE OF PRACTICE

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Occupational Safety and Health Branch
Labour Department

This Code of Practice is prepared by the
Occupational Safety and Health Branch
Labour Department

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This Code of Practice has a special legal status. Although failure to observe any provision of this Code is not itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining whether or not a person has breached the relevant safety and health legislation under the Factories and Industrial Undertakings Ordinance.

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Introduction

This Code of Practice on 'Safety and Health at Work with Asbestos' (hereinafter referred to as the COP) is an approved code of practice issued by the Commissioner for Labour under Section 7A(1) of the Factories and Industrial Undertakings Ordinance (Cap 59) for the purpose of providing practical guidance for the compliance with the provisions of the Factories and Industrial Undertakings (Asbestos) Regulation (hereinafter referred to as the Regulation).

Asbestos in dust form can cause adverse health effects. Removal of asbestos or materials containing asbestos in the workplace requires strict control to prevent serious occupational diseases—asbestosis, lung cancer and mesothelioma. The primary aim of the Regulation and the COP is to ensure the safe removal and disposal of asbestos and materials containing asbestos in order to protect the health of persons at work in industrial undertakings under the interpretation of the Factories and Industrial Undertakings Ordinance (Cap 59). It is important to note that compliance with the COP does not itself confer immunity from legal obligations in Hong Kong. Besides, statutory provisions referred to or cited in the COP are those in force as at 4 April 2014.

This COP has a special legal status. Although failure to observe any guideline given in the COP is not in itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining whether or not a person has breached any of the provisions of the Regulation to which the guideline relates.

This COP provides guidelines on the necessary measures to protect workmen from exposure to asbestos dust at work in industrial undertakings. As far as protection of the environment from pollution by asbestos is concerned, the duty holder should refer to the Air Pollution Control Ordinance (Cap 311) (hereinafter referred to as APCO) and the corresponding codes of practice published by the Environmental Protection Department, which provide guidance on how to prepare an area for asbestos abatement, construction of work area enclosure, clearance of the area after completion of abatement work, etc. The duty holder should also refer to the Waste Disposal Ordinance

(Cap. 354) and the Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354 sub. leg. C) on the legislative requirements on handling, transportation and disposal of asbestos waste.

The layout of this COP is based on that of the Regulation which is reproduced according to Sections, followed by the corresponding practical guidance of the COP arranged in paragraphs.

PART I

PRELIMINARY

Section 1 ***Omitted as spent – E.R. 2 of 2014***

THE
REGULATION

Omitted as spent.

1. Omitted as spent.

Section 2 Interpretation

(1) In this Regulation, unless the context otherwise requires:-

“**action level**” (措施水平) means one of the following cumulative exposures to asbestos over a continuous 12-week period, namely -

- (a) where the exposure is solely to chrysotile, 96 fibre-hours per millilitre of air; or
- (b) where the exposure is to any other form of asbestos either alone or in mixtures including mixtures of chrysotile with any other form of asbestos, 48 fibre-hours per millilitre of air; or
- (c) where both types of exposure occur separately during the 12-week period, a proportionate number of fibre-hours per millilitre of air;

“**amphibole asbestos**” (閃石類石棉) means any of the minerals crocidolite (青石棉), amosite (鐵石棉), fibrous actinolite (纖維狀陽起石), fibrous anthophyllite (纖維狀直閃石), fibrous tremolite (纖維狀透閃石的礦物) and any mixture containing any of those minerals;

“**approved respiratory protective equipment**” (認可呼吸防護設備) means any respiratory protective equipment approved by the Commissioner under Section 4;

“**asbestos**” (石棉) means chrysotile (溫石棉) and amphibole asbestos and any mixture containing any of those minerals;

“**asbestos cement**” (石棉水泥) means a material which is predominantly a mixture of cement and asbestos and which when in a dry state has a density greater than 1 tonne per cubic metre;

“**asbestos coating**” (石棉塗層) means a surface coating which contains asbestos;

“**asbestos insulating board**” (石棉絕緣板) means any sheet, tile or building board consisting of a mixture of asbestos and other material which mixture when in a dry state has a density greater than 500 kilograms per cubic metre;

“**asbestos insulation**” (石棉絕緣物) means any material containing asbestos and used for thermal, acoustic or other insulation purpose (including fire protection) except -

- (a) asbestos cement or asbestos insulating board, or
- (b) any article of bitumen, plastic, resin or rubber which contains asbestos and the thermal and acoustic properties of which are incidental to its main purposes;

“**asbestos spraying**” (石棉噴塗) means the application by spraying of any material containing asbestos to form a continuous surface coating;

“**control limit**” (控制限度) means one of the following concentrations of asbestos in the atmosphere of the industrial undertaking, namely-

- (a) for chrysotile -
 - (i) 0.5 fibres per millilitre of air averaged over any continuous period of 4 hours;
 - (ii) 1.5 fibres per millilitre of air averaged over any continuous period of 10 minutes;
- (b) for any other form of asbestos either alone or in mixtures including mixtures of chrysotile with any other form of asbestos -

- (i) 0.2 fibres per millilitre of air averaged over any continuous period of 4 hours;
- (ii) 0.6 fibres per millilitre of air averaged over any continuous period of 10 minutes;

“proprietor” (東主) means a proprietor of any industrial undertaking;

“protective clothing” (防護衣物) means clothing which is impervious to asbestos dust and which when worn can protect the body and personal clothing of the wearer from contamination by asbestos;

“work with asbestos coating or asbestos insulation” (石棉塗層或石棉絕緣物工作) includes any work in which asbestos coating or asbestos insulation is removed, repaired or disturbed.

(2) For the purpose of this Regulation -

- (a) any reference to a workman being exposed to asbestos in an industrial undertaking shall be construed as a reference to the exposure of that workman to asbestos dust arising out of or in connection with any work with asbestos which is carried out in the industrial undertaking;
- (b) in determining whether a workman is exposed to asbestos or whether the extent of exposure exceeds the action level or any control limit, no account shall be taken of any respiratory protective equipment that is being worn by the workman; and
- (c) the method for measuring exposure of workman to asbestos in the atmosphere of the industrial undertaking shall be a method approved by the Commissioner.

2. For the purpose of the COP -

“amended water” (潤濕水劑) means the aqueous solution prepared by

diluting a wetting agent which is a mixture of 50% polyoxyethylene ester (聚氧化乙烯酯) and 50% polyoxyethylene ether (聚氧化乙烯醚) or equivalent, with water to a specific concentration in accordance with the manufacturer's instruction.

“**competent person**” (合資格人士), in relation to any duty to be performed in the COP, means a person who is

- (a) appointed by the proprietor to perform the duty; and
- (b) by reason of substantial training and practical experience, competent to perform the duty.

“**heavy duty plastic sheeting**” (耐用塑料布) means transparent plastic sheeting of not less than 0.15 mm in thickness made of low-density polyethylene.

“**HEPA filter**” (HEPA過濾器) means high efficiency particulate air filter (高效粒子空氣過濾器) capable of trapping and retaining 99.97 percent of the particulates with mass median aerodynamic equivalent diameter 0.3 μm or larger from the air flowing through the filter.

“**young person**” (青年) has the meaning assigned to it in the Employment Ordinance (Cap. 57).

Section 3 Application

This Regulation applies to all industrial undertakings in which any work with asbestos is carried out.

THE
REGULATION

3. The Regulation is applicable to all activities involving work with asbestos or materials containing asbestos carried out in industrial undertakings, including removal or disposal of asbestos or materials containing asbestos.

Section 4 *Approval of respiratory protective equipment, etc.*

THE REGULATION

- (1) For the purposes of this Regulation, the Commissioner may approve any respiratory protective equipment and shall publish in the Gazette the name or description of the respiratory protective equipment.
- (2) The Commissioner may, by notice in the Gazette, revoke any approval given by him under subsection (1) in respect of any respiratory protective equipment.
- (3) The Commissioner may also by notice in the Gazette set out the approved form for notification under section 6(4) and the approved method for measuring exposure to asbestos under section 15(1)(a), as well as the approved form of health register under section 17(3).

4. The Commissioner for Labour will from time to time approve respiratory protective equipment (hereinafter referred to as RPE) that can be used in asbestos process. Name or description of the approved RPE will be published in the Gazette. Only RPE with valid approval should be used in asbestos process. A proprietor who plans to carry out asbestos process should take into consideration the possible exposure of workmen to asbestos dust in the process and choose from the approved list the appropriate RPE for use in the process.

5. The Commissioner for Labour may revoke the approval given to any RPE when he considers that the equipment is no longer suitable for use in asbestos process. Name or description of the RPE for which approval is revoked will be published in the Gazette and a proprietor should stop using such RPE in asbestos process.

6. RPE is approved with all its components as integral parts. Substitution of parts of a RPE with parts from a different brand or type of respirator, or unauthorized modification would decrease or cause a total loss of protection to workman. Such substitution of parts and modification will invalidate the approval of the RPE.

PART II

IDENTIFICATION, ASSESSMENT AND NOTIFICATION

Section 5 *Assessment of work*

THE REGULATION

- (1) A proprietor shall before carrying out any work which exposes or is liable to expose any workman to asbestos ensure that an adequate assessment of exposure or the likely exposure has been made by a person who by reason of his training and experience is competent to make that assessment.
- (2) The assessment shall -
 - (a) (i) identify the type of asbestos to which any workman is or is liable to be exposed by analysis or otherwise;
or
 - (ii) without performing the identification, assume that the asbestos involved is not chrysotile alone;
 - (b) determine the nature and degree of exposure or the likely exposure; and
 - (c) set out the steps that may be taken to prevent the exposure or to reduce it to the lowest level reasonably practicable.
- (3) The proprietor shall keep a written record of the assessment and shall, on being requested by an occupational safety officer, produce the record for inspection.
- (4) A proprietor shall ensure that a further assessment is made under subsection (1) when -
 - (a) there is reason to suspect that the existing assessment is no longer valid; or
 - (b) there is significant change in the work to which the existing assessment relates.

7. Before carrying out any work which exposes or is liable to expose any workman to asbestos, the proprietor is required to conduct an assessment on the exposure or the likely exposure. The assessment should cover workmen who are engaged in the work with asbestos and other workmen in the industrial undertaking who are not directly involved in the work but could be affected by the asbestos work due to, for example, proximity to the work. The proprietor shall ensure that the assessment is conducted by a competent person who has adequate knowledge of the type of work involved and of the available control measures. The person should have sufficient knowledge, skills and appropriate experience to evaluate the health and safety risks to workmen arising from the exposure to asbestos at work. That person may be a works manager, an occupational hygienist, a safety officer or an asbestos consultant registered under the APCO. Relevant professional bodies such as laboratories accredited for the relevant asbestos tests under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) may also assist with elements of an assessment when special expertise is required.

8. The purpose of the assessment is to provide basic information on the nature and degree of the exposure of workmen to asbestos dust, and for establishing appropriate control measures, safe work practices and procedures for preventing or minimizing the exposure. The assessment should appropriately cover :

- (a) the type of work and the materials containing asbestos involved;
- (b) the type of asbestos involved and results of analysis, or assume that it is a type of asbestos other than chrysotile or is a mixture of asbestos containing chrysotile;
- (c) details of the expected exposure :
 - (i) frequency and duration of exposure to asbestos;
 - (ii) whether the exposure is liable to exceed the control limit and the number of workmen affected;

- (iii) whether the exposure is liable to exceed the action level and the number of workmen affected;
 - (d) control measures (other than RPE) to be applied to prevent or reduce exposure to the lowest level reasonably practicable, e.g. suppression of dust at source, enclosure and mechanization, partial enclosure with dust extraction, wetting, etc.;
 - (e) the choice, provision and use of RPE and any other personal protective equipment;
 - (f) practices to be adopted including arrangements for prevention of spread of asbestos from the work area and arrangements for decontamination of workmen prior to entering asbestos-free areas;
 - (g) determination of any ongoing monitoring requirements;
 - (h) the procedures for removal of waste from the work area; and
 - (i) the procedures for dealing with emergencies.
9. The following sources of information can be used in performing the assessment :
- (a) any relevant information available from the builder, owner or occupier of the premises or plant, or the manufacturer or supplier of the asbestos material;
 - (b) information from any previous monitoring exercise made on the same type of work or in relation to the same type of work;
 - (c) information about the performance of RPE and any other personal protective equipment from the manufacturer or supplier;

- (d) guidelines on likely dust levels for various jobs outlined in the selection guide to approved RPE (Appendix VI) and guidance materials from other government departments such as Environmental Protection Department; and
- (e) Asbestos Investigation Report and Asbestos Abatement Plan prepared in pursuance of APCO.

It is necessary to emphasize that the guidelines or guidance materials mentioned in (d) above are for reference only. Proprietors should exercise their due diligence to verify the actual situation whenever required.

10. Whether it is necessary to make an assessment for each individual job involving asbestos depends on the nature of the jobs as well as the location where the jobs are carried out. When the nature of the jobs is simple and involves the same process repeatedly carried out at the same location, a single assessment can be used to cover the jobs that are performed on different occasions. For any job involving asbestos being carried out at a different location, as in demolition, a separate assessment is required.

11. For asbestos abatement work, the Asbestos Investigation Report and Asbestos Abatement Plan required under APCO will be accepted as assessment under the Regulation if appropriate elements mentioned in paragraph 8 are included in the report or plan.

12. Section 5(4) also requires that an assessment shall be reviewed whenever there is evidence to suspect that the original assessment is no longer valid or where there has been a significant change in the work. Situations where re-assessment are required include :-

- (a) change in the work method;
- (b) change in the method of dust suppression or dust control;
- (c) change related to the volume or rate of work;

- (d) when the results of monitoring indicate inadequate control of exposure;
- (e) when improved control measures become reasonably practicable.

13. A proprietor is required to maintain a written record of the assessment and a copy of the record should be kept at the location where the work with asbestos covered by it is conducted. The assessment record should be readily available to the enforcing officers for inspection.

Section 6 Notification

- (1) Subject to subsection (2), before a proprietor begins to carry out work with asbestos coating or asbestos insulation or other asbestos work, he shall give the Commissioner not less than 28 days' notice, or such shorter notice as the Commissioner may agree to accept, of the work.
- (2) Notification is not required in respect of work with asbestos other than work with asbestos coating and asbestos insulation if the extent of exposure of that asbestos work neither exceeds nor is liable to exceed the action level.
- (3) Where there is a material change in the asbestos work which might affect the particulars notified under subsection (1), the proprietor shall, within 7 days after he becomes aware of the change, notify the Commissioner of that change.
- (4) Notification under subsections (1) and (3) shall be in the approved form.

14. A proprietor is required to notify the Commissioner for Labour not less than 28 days, or such shorter notice as the Commissioner may agree to accept, before he commences to undertake

- (a) work with asbestos coating or asbestos insulation; or
- (b) other type of asbestos work in which the extent of exposure, as revealed by the assessment under Section 5, exceeds or is liable to exceed the appropriate action level.

15. Action level is the exposure to asbestos accumulated over a continuous 12-week period, and is expressed as fibre-hours per millilitre of air (fibre-hours/ml). If the assessment (Section 5) reveals that the exposure of any workman is liable to exceed the appropriate action level, the requirement on notification applies.

16. If the asbestos work is repeatedly carried out at different time periods at the same location, the proprietor is only required to notify the Commissioner for Labour not less than 28 days before the asbestos work at that location is first commenced, and notification each time before the work is carried out is not required. However, when there is significant change in the particulars of the asbestos work described in the notification, the proprietor is required to notify the Commissioner for Labour of that change within 7 days after he is aware of the change. In this case, significant change includes change in the date of commencement of the asbestos work and date of its completion, change in nature of the asbestos work and type of materials containing asbestos involved in the work.

17. Notification of asbestos work and notification of change in notified asbestos work shall be submitted in the form approved by the Commissioner for Labour (Appendix I). Regarding the 'Date of completion of asbestos work' column, if the asbestos work is in the form of a single project which is anticipated not being repeated at the same location in the near future, the proprietor should fill in the date of completion of the project into the column. However for any on-going process involving asbestos carried out at the same location, the proprietor can fill in wordings such as 'on-going process' to the column.

18. To decide whether or not the action level is liable to be exceeded it is first necessary to know what type of airborne fibre exposures are likely encountered. Types of exposure that should be taken into consideration are:

- (a) exposure to chrysotile alone; or
- (b) exposure to asbestos fibres other than chrysotile, either alone or in mixtures, including mixtures containing chrysotile.

Exposures can be estimated using available data or past experience of the process in question, but in case of doubt it will be necessary to verify the estimated exposures by measurement, using a method approved by the Commissioner for Labour (refer to Section 15).

Action level calculation

19. In case of single type of exposure throughout the working period, either (a) or (b) of paragraph 18, individual exposure is calculated by multiplying the airborne exposure in fibres/ml (f/ml) by the time in hours for which it lasts to give exposure in fibre-hours/ml. Cumulative exposure is calculated by adding together all the individual exposures over the 12-week period in question. If within any 12-week period this total exposure exceeds 96 fibre-hours/ml for chrysotile, or 48 fibre-hours/ml for all other form of asbestos, either alone or in mixtures, including mixtures containing chrysotile, then the action level has been exceeded. The followings are some examples of action level calculation applicable to single type of exposure:

- (a) A workman is exposed to a uniform concentration of 0.1 f/ml for 6 hours in every working day. Over the 12-week period the cumulative exposure is:

$$0.1 \times 6(\text{hours}) \times 6(\text{days}) \times 12(\text{weeks}) = 44 \text{ fibre-hours/ml}$$

and is below the action level for chrysotile and also for all other forms of asbestos, including mixtures.

- (b) A workman is exposed to mixture of asbestos including chrysotile at a concentration of 0.3 f/ml for 7 hours a day for a continuous period of 4 weeks. In the following 8 weeks, he is not exposed to any form of asbestos. Over the 12-week period the cumulative exposure is:

$$0.3 \times 7(\text{hours}) \times 6(\text{days}) \times 4(\text{weeks}) = 51 \text{ fibre-hours/ml}$$

and is above the action level for mixture including chrysotile.

20. In case of combined exposures where within the working period some of the exposures are due to chrysotile alone, and the rest to asbestos other than chrysotile or to mixtures including chrysotile, and one type of exposure can be clearly distinguished from the other, two methods of calculation can be used to decide whether or not the action level is exceeded:

- (a) The action level is considered to be exceeded if

$$\frac{E_{\text{chry}}}{AL_{\text{chry}}} + \frac{E_{\text{amp}}}{AL_{\text{amp}}} > 1$$

where E_{chry} = the cumulative exposure to chrysotile alone;
 E_{amp} = the cumulative exposure to other form of asbestos either alone or in mixtures;
 AL_{chry} = action level for chrysotile alone (96 fibre-hours/ml); and
 AL_{amp} = action level for other form of asbestos either alone or in mixtures (48 fibre-hours/ml).

For example, a 20-hour exposure at 3 f/ml for chrysotile and a 6-hour exposure at 2 f/ml to any other form of asbestos other than chrysotile, either alone or in mixtures, including mixtures containing chrysotile, then the calculation becomes:

$$\frac{20 \times 3}{96} + \frac{6 \times 2}{48} = 0.875 < 1$$

As the result is less than one, the action level has not been exceeded.

- (b) Alternatively, the exposure in fibre-hours/ml for asbestos other than chrysotile is multiplied by 2 (the ratio of the two action levels) and added to the exposure in fibre-hours/ml for chrysotile. If the resulting total is greater than 96 fibre-hours/ml, the action level is exceeded. Taking the same example as above, it would give a combined exposure of:

$$(20 \times 3) + 2(6 \times 2) = 60 + 24 = 84 \text{ fibre-hours/ml}$$

which is less than 96 fibre-hours/ml and therefore the action level has not been exceeded.

PART III

HYGIENE AND SAFETY

REQUIREMENTS

Section 7 *Prevention or reduction of exposure*

THE REGULATION

- (1) A proprietor shall -
 - (a) prevent the exposure of any workman to asbestos; or
 - (b) where it is not reasonably practicable to prevent exposure, reduce the exposure of any workman to asbestos to the lowest level reasonably practicable by measures other than the use of respiratory protective equipment.
- (2) A proprietor shall in all circumstances -
 - (a) provide every workman who is or is liable to be exposed to asbestos with approved respiratory protective equipment that is suitable for the circumstances; and
 - (b) ensure the full and proper use by each workman of the respiratory protective equipment.
- (3) Without prejudice to the generality of the requirement in subsection (2), where after taking the measures required in subsection (1) exposure of any workman to asbestos still exceeds or is liable to exceed the control limit, a proprietor shall ensure that the respiratory protective equipment provided under subsection (2) is capable of effectively reducing the concentration of asbestos in the air inhaled by the workman to below the control limit.
- (4) A proprietor shall not provide respiratory protective equipment which has been used by another person for use by any workman unless the equipment has first been thoroughly cleaned and disinfected.

21. Diseases caused by asbestos are often serious and irreversible. Section 7 sets out the provision for a proprietor to take measures to ensure that health of workman will not be endangered by asbestos. The proprietor should in the first place avoid the need to remove materials containing asbestos if such material is in good condition. On the other hand, as work with asbestos or materials containing asbestos in industrial undertakings is prohibited under Sections 21C and 21D, asbestos-free substitutes should be used if the materials containing asbestos have to be removed. Moreover, under Sections 21A and 21B, spraying of asbestos and use of asbestos insulation for thermal, acoustic or other insulation (including fire protection) in industrial undertakings are prohibited.

22. Where removal of asbestos or materials containing asbestos cannot reasonably be avoided, proprietor must take measures to prevent workmen from exposure to asbestos dust. Work process should be designed such that asbestos dust will not be released into the atmosphere as far as reasonably practicable. When exposure to asbestos is inevitable, the exposure shall be reduced to the lowest level reasonably practicable by means of control measures and systems of work, while use of RPE shall only be a supplement to, and not in lieu of, control measures and systems of work.

Control Measures

23. Control measures include:-

- (a) Suppression of dust at source — achievable as appropriate by wetting, by using dust suppressing materials or compounds, or by the application of vacuum/extraction techniques at the work-face.
- (b) Total enclosure — dust-producing part of the process is localized and totally enclosed. The enclosure should be incorporated with dust extraction which is capable of removing the dust generated in the course of the process. The dust extraction system should incorporate HEPA filter. The filtration should be effective and reliable. The design of dust extraction system is a highly technical skill, and it is

recommended that such work be entrusted to specialists with sufficient professional knowledge.

- (c) Partial enclosure — used together with dust extraction when total enclosure is not practicable. As with totally enclosed system, dust extraction used in association with hoods or partial enclosures must be capable of removing the dust that is generated in the course of the process and the filtration of air (by HEPA filter) must be effective and reliable so that no harmful asbestos dust will be emitted to the general environment or returned to the workplace.

Systems of work

24. In repairing industry, suitable systems of work include:-
- (a) only using asbestos-free substitutes for repair work;
 - (b) isolating the process involving asbestos;
 - (c) limiting to a lowest possible number of exposed workmen;
 - (d) collecting and removing asbestos waste and debris as soon as they are produced from the work area in suitable container labelled in accordance with Section 19;
 - (e) ensuring immediate repair of damaged containers of asbestos waste or place it inside another suitable container; and
 - (f) ensuring cleanliness of premises and plant.

25. In demolition, activities may involve the removal of materials containing asbestos that were installed in the past. In these activities, exposure should be reduced as far as reasonably practicable by:

- (a) removing materials containing asbestos before any other work begins;
- (b) adopting work methods that minimize breakage, abrasion, sanding, grinding or cutting of materials containing asbestos;
- (c) suppressing dust by wetting where appropriate;
- (d) avoiding carrying out asbestos work together with other work in the same place at the same time;
- (e) segregating the asbestos work area from other areas; and
- (f) keeping the work area clean by promptly removing off-cuts, waste and debris.

26. The safe practices for removing the following commonly encountered materials containing asbestos are described in the appendices:

- (a) asbestos-containing friction materials (Appendix II);
- (b) asbestos cement products (Appendix III);
- (c) asbestos coating and asbestos insulation (Appendix IV);

and safe practices for using the glove bag method in small scale short duration asbestos abatement work is described in Appendix V.

Respiratory Protective Equipment (RPE)

27. In addition to the control measures and systems of work described above, a proprietor is required to provide RPE to every workman who is or is liable to be exposed to asbestos. The following points should be observed in providing RPE:

- (a) The RPE must be able to provide sufficient quantity of clean air to the wearer for breathing and the equipment must fit the wearer;
- (b) The RPE must be of a type approved under Section 4; and
- (c) The RPE is properly used by the workman (refer to Section 11).

28. In cases where the concentration of asbestos in the air exceeds the control limit despite of taking of all practicable control measures and safe system of work, the proprietor is required to ensure that RPE provided is capable of effectively reducing the concentration of asbestos in the air inhaled by the workman to a level below the control limit. It is important that under no circumstances should the concentration of asbestos in the air inhaled by a workman be above the relevant control limit.

29. In view of the difference in protection capability and restrictions in application of various types of RPE in the approved list under Section 4, a proprietor should select the appropriate RPE from the approved list for use in a particular asbestos work, making reference to the selection guide detailed in Appendix VI. Selection of RPE should be based on the maximum likely dust level of the particular job and not on the average dust concentration of the working day. To account for some unforeseeable worse conditions, RPE which can offer better protection should be selected to prevent excessive exposure to asbestos dust.

30. A proprietor should bear in mind that no RPE completely removes asbestos fibres from the inhaled air. For each type of RPE, the degree to which asbestos fibres are removed from inhaled air is known under test conditions (nominal protection). In situation where concentration of asbestos in the air exceeds any of the control limits, it is important that the RPE selected is capable of protecting the wearer from exposure above the control limit. The following factors should be taken into consideration in making selection:-

- (a) the likely peak exposure to asbestos dust in air;
- (b) the maximum use concentration (MUC) of a particular RPE (MUC is the concentration below which the RPE can offer adequate protection); RPE should be selected for exposures that are well within its limit of protection;
- (c) the bulk asbestos content, the nature and condition of the material, and the work method;
- (d) particular features of the wearer e.g. facial hair, glasses, facial contours, etc.

31. Disposable type respirator will distort after prolonged wearing. This type of respirator should be used for short duration work and should not be used in the main asbestos work. Activities in which disposable respirator may be used include pre-abatement inspection, preparation of abatement area where there is no risk of disturbance to asbestos materials, and removal of last layer of heavy duty plastic sheeting of the work area enclosure, handling of bagged asbestos waste outside work area, etc., where measurable concentration of asbestos is not detectable.

32. Non-disposable RPE is preferably issued on a personal basis and should be separately stored in suitable receptacle with name of the user clearly indicated on the receptacle. In case it is not practicable to issue RPE on a personal basis, the proprietor is required to ensure that the RPE after use by one workman is effectively cleaned and disinfected before it is used by another workman.

33. In view of the physical strain caused by the use of RPE, adequate rest breaks should be arranged to allow the workman to rest during use of RPE. A normal work/rest regime should be established depending on those factors such as the nature of the work and the type of equipment used.

Section 8 ***Prevention of spread of asbestos***

THE REGULATION

A proprietor shall take such measures as may be necessary to prevent or, where this is not reasonably practicable, reduce to the lowest level reasonably practicable, the spread of asbestos from any place where work with asbestos is carried out, including providing in cases where there is risk of spread of asbestos dust in the use of changing and washing facilities, separate facilities for washing and changing of personal protective clothing, of personal clothing and of respiratory protective equipment.

34. A proprietor is required to take appropriate measures to prevent or reduce to the lowest level reasonably practicable the spread of asbestos from the asbestos work area to other areas of the workplace. This can primarily be achieved by restricting emission of asbestos dust from the asbestos work area, and preventing the carriage of asbestos from the asbestos work area by such means as air, water, equipment, tools, shoes and body of workman. Prevention of spread of asbestos can be achieved appropriately by:

- (a) adopting appropriate system of work which aims to minimize workman's contact with asbestos, to minimize the possibility of spillage or accumulation of debris and to discourage careless, unduly hurried or untidy work;
- (b) taking appropriate control measures such as carrying out work with asbestos under HEPA filter-equipped local exhaust ventilation;
- (c) restricting access to the asbestos work area by the designation of a protective equipment zone, and ensuring that contaminated protective clothing and RPE are not worn outside the protective equipment zone;

- (d) ensuring asbestos wastes, contaminated protective clothing and filters of RPE are suitably packed and labelled, and outside surfaces of the packages are adequately cleaned before being removed from asbestos work area for disposal;
- (e) isolating air conditioning and ventilation systems serving the asbestos work area from all other such systems;
- (f) constructing the appropriate work area enclosure to confine the asbestos work in an enclosed region, and maintaining the enclosure under negative pressure so that any leakage will result in clean air being drawn into the work area from outside;
- (g) ensuring any piece of tools and equipment contaminated by asbestos is adequately cleaned or sealed inside polythene bags before being removed from asbestos work area for maintenance or servicing or other treatments; and
- (h) providing appropriate washing and changing facilities for decontamination of the workmen.

Work Area Enclosure

35. Removal of the more hazardous types of asbestos materials, such as asbestos coating and asbestos insulation, which is liable to give rise to high dust levels should be conducted inside a work area enclosure. The work area enclosure is a physical barrier to enclose the asbestos work area. The enclosure should be constructed appropriately by:

- (a) sealing floors and all openings to the work area including windows, doors, air vents, grilles, floor drains, pipe-ducts and conduits, etc., with heavy duty plastic sheeting; or
- (b) erecting a floor to ceiling barrier of heavy duty plastic sheeting by installing the sheeting on the floors, walls, ceiling or on a temporary structure of timber frame which is erected for attachment of the plastic sheeting. All joints and edges

of the plastic sheeting should be overlapped and double tapped to ensure that the area is completely sealed off.

Access to or egress from the work area enclosure should be achieved through air-locks provided by the hygiene facilities or the transit facilities as appropriate (refer to Section 14). Regarding the construction and testing of the work area enclosure, the proprietor should also observe the requirements set out in the *Code of Practice on Asbestos Control - Asbestos Work Using Full Containment or Mini Containment Method* published by the Environmental Protection Department.

36. Appropriate HEPA filter-equipped air extraction equipment should be installed to provide a minimum of six air-changes per hour to the enclosure and to maintain a negative pressure inside the enclosure (1.5 to 4mm water gauge lower than that of the surrounding atmosphere). Where practicable, the point of discharge of the exhaust air to the outside of the containment should be distant from other working areas, air-conditioning inlets or air compressors for breathing purposes. Flexible ducting may have to be used to connect the discharge point of the equipment to the open air.

Decontamination of Workmen

37. Every workman involved in work with asbestos should observe a high standard of personal hygiene so as to reduce the risk of spreading asbestos contamination. After finishing work with asbestos, all workmen should decontaminate themselves. Decontamination may involve removal of any asbestos that may have deposited on the body with use of HEPA filter-equipped vacuum cleaner and/or by wet wiping followed by thorough decontamination in washing and changing facilities (refer to Section 14) which may involve washing of hands and face or a full body shower depending on the extent of contamination.

Section 9 Cleanliness of premises and plant

- (1) A proprietor who carries out work with asbestos shall ensure that the premises or those part of the premises where the work is carried out and the plant used in connection with the work are kept in a clean state and as far as possible free from asbestos and, in particular, where work with asbestos has been completed the premises or those parts of the premises and the plant used in connection with the work are thoroughly cleaned.
- (2) The cleaning required by subsection (1) shall be carried out -
 - (a) by means of vacuum cleaning equipment; or
 - (b) by such other method,

so designed, constructed and used that asbestos dust neither escapes nor is discharged into the air.

38. Before the commencement of removal of asbestos on a premises, all movable furniture, plant and fittings inside the area should be moved out of the area as far as reasonably practicable. The floors and walls of the work area and immovable items inside should be covered or sealed, as appropriate with heavy duty plastic sheeting to protect them from contamination by asbestos dust. In particular, rough or uneven surface on which dust accumulates rendering cleaning difficult should be covered with heavy duty plastic sheeting to prevent accumulation of asbestos dust. The plastic sheeting will collect off-cuts and coarse dust and will facilitate clean-up when the work is completed.

39. During removal of asbestos, particular attention should be paid to regular cleaning of the premises and plant so that deposits of asbestos-containing dust and debris do not accumulate in any part of the workplace. Cleaning of areas which may be contaminated with asbestos should be done as frequently as necessary to ensure cleanliness. In particular the

following should be cleaned at the minimum frequency given below:

- (a) floor once per working day;
- (b) external surface of plant once per working day; and
- (c) washing and changing facilities once per working day.

Asbestos debris and spillage should not be allowed to remain on the floor or working surface but should be cleaned up as soon as possible and disposed of as asbestos waste according to the Waste Disposal Ordinance (Cap. 354) and the Waste Disposal (Chemical Waste)(General) Regulation (Cap. 354 sub. leg. C).

40. Method used for cleaning should not create risk to the cleaner or other persons or spread contamination. In order to prevent spread of asbestos fibres, HEPA filter-equipped vacuum cleaner should be used whenever practicable. Small amount of asbestos dust can be removed with a damp cloth, which should be placed in a suitable container and sealed before it dries out.

41. Dry manual brushing or sweeping should not be used to remove asbestos dust and debris. Likewise, compressed air should not be used for cleaning clothes or equipment as the dust will be blown into the air causing further contamination of the work environment.

42. After all materials containing asbestos have been removed and properly bagged, the entire work area should be thoroughly cleaned by using HEPA filter-equipped vacuum cleaner and/or by wet wiping. The cleaning should include all surfaces from which asbestos has been removed as well as exposed surfaces of the heavy duty plastic sheeting and all equipment which has been used inside the work area, followed by thorough visual inspection paying particular attention to ledges, rough surfaces and regions where access is restricted to ensure that all materials containing asbestos have been removed and no traces of asbestos debris or dust are present. When the visual inspection shows that the work area is sufficiently clean, exposed surfaces of the high duty plastic sheeting should be sprayed with a solution of polyvinyl acetate or similar water

based paint to encapsulate any residual asbestos dust on these surfaces to prevent them from release when the plastic sheeting is dismantled for disposal.

43. After clean-up, air monitoring should be conducted inside the work area to provide supporting evidence that the area has been sufficiently cleaned in accordance with the requirements set in the codes of practice on asbestos control published by the Environmental Protection Department. It should be stressed that air monitoring should not be used as a substitution to careful visual inspection. Careful visual inspection and air monitoring are two complementary techniques and both techniques should give clear results before the work area can be declared as sufficiently clean.

Section 10 ***Provision and cleaning of protective clothing***

THE REGULATION

- (1) A proprietor shall provide adequate and suitable protective clothing for use by any workman who is exposed to asbestos unless no asbestos is liable to be deposited on the body or personal clothing of the workman.
- (2) A proprietor shall ensure that the protective clothing is either disposed of as asbestos waste within the meaning of the Waste Disposal Ordinance (Cap. 354) and the Waste Disposal (Chemical Waste)(General) Regulation (Cap. 354 sub. leg. C), or adequately cleaned at suitable intervals.
- (3) The cleaning of protective clothing shall be carried out in a suitably equipped facility located on the premises where work with asbestos is being done or in a suitably equipped laundry elsewhere, and if protective clothing is to be removed from the person for cleaning or disposal, it shall be packed in a suitable container labelled in accordance with section 19(1).
- (4) Where, as a result of failure or improper use of the protective clothing, asbestos is deposited on the personal clothing of a workman, then that personal clothing shall be treated in the manner prescribed in subsection (2) as if it were protective clothing and shall forthwith be handed over by the workmen concerned to the proprietor who shall be responsible for such treatment.

44. Protective clothing includes clothing and footwear worn to reduce contamination of the wearer's body or personal clothing by asbestos. The clothing should consist of one piece overall with an integral head covering. Footwear can be rubber boots, or disposable shoe covering worn over ordinary shoes. Rubber boots should be used when use of disposable shoe covering creates danger of slipping. Trousers of the overalls should be able to be worn outside of boots or shoe covering.

45. The protective clothing inclusive of the shoe covering should be made of material that is resistant to penetration by asbestos dust. Design of the clothing should be such that it will not allow asbestos dust to pass through like close fitting at neck, wrists and ankles. The clothing should preferably has a zipper at the front and should not have any external pockets, fasteners or other attachments that could trap asbestos dust.

46. Protective clothing should be suitable in size to fit and should be comfortably worn by the wearer. Appropriate administrative control or work practice should be arranged to reduce the physical stress imposed on the wearer caused by the protective clothing.

47. A proprietor is required to provide protective clothing to any workman whose body or clothes are liable to deposition of asbestos dust based on the assessment under Section 5, from which judgement about whether or not protective clothing is required for the work with asbestos is made. Assessment should start from the assumption that protective clothing will be necessary. Factors to be considered include:

- (a) the nature of the process and method of work: whether it is carried out in the presence of engineering controls and, if so, the effectiveness of these controls in reducing the amount of asbestos dust in the workplace; whether the process includes removal of asbestos situated overhead; whether the work is performed outside in the open air, or inside a confined area; etc.;
- (b) the material involved, e.g. whether the asbestos is in friable form or bonded in a matrix which makes fibre release unlikely;
- (c) the known or expected airborne fibre concentration generated by the process, and whether the airborne fibres are short-lived and derived from a small, easily controlled source; and

- (d) whether asbestos is liable to be deposited on clothing through contact, e.g. by rubbing against friable, wet or dusty materials.

48. Any visible deposit of asbestos fibre on clothing or body of a workman indicates that use of protective clothing is required. However asbestos can be deposited on clothing or body of workmen without being visible. In dismantling and removal of materials containing asbestos processes, it is likely that asbestos will be deposited on workman's clothing and body, and protective clothing is in general required.

49. Protective clothing can be of disposable or washable type. Protective clothing of the disposable type should always be used unless specific facilities equipped for the laundering of asbestos contaminated clothing are available.

50. Washable protective clothing should be washed clean and it is generally preferred that all laundering of contaminated clothing be done on-site in suitably equipped facilities. If this is not possible the laundering should be done elsewhere in suitably equipped facilities provided and operated by the proprietor.

51. Any type of protective clothing that has been worn inside asbestos work area should be regarded as being contaminated with asbestos. Contaminated protective clothing should be vacuum cleaned using a HEPA filter-equipped vacuum cleaner fitted with suitable attachment and/or wet-wiped before the workman takes it off. It should be removed before the workman takes off RPE and leaves the working area. Where purposely built hygiene facilities are provided for the purpose of decontamination, the procedures in Appendix X should be followed in putting on and taking off protective clothing.

52. Contaminated protective clothing once removed should be sealed in dust-tight containers waiting for disposal or for cleaning. Protective clothing of the disposable type should be disposed of as asbestos waste (refer to paragraph 39). Washable protective clothing for despatch to laundry for cleaning should be thoroughly wetted when discarded by the workman and not allowed to dry out before it is washed. The clothing should

be despatched in a thoroughly wet state in impermeable container that is labelled in accordance with Section 19, and precautions should be taken to ensure that personnel at the laundry are not at risk from asbestos. Under no circumstances should the workman be allowed to take home asbestos contaminated clothing for laundering.

53. Personal clothes of workmen accidentally contaminated with asbestos should be treated in the manner as if these personal clothes were protective clothing. The workman shall handover his clothes, wetted and suitably packed, to the proprietor who shall be responsible for such treatment. The proprietor and the workman should agree among themselves as to how the contaminated personal clothes should be treated.

54. Notwithstanding the use of protective clothing, clothing worn underneath the protective clothing may still be contaminated through deficiencies or careless wearing of the protective clothing. In cases where the protective clothing cannot prevent contamination of underclothing, the proprietor should, if required, issue underclothing to the workmen. The underclothing should then be cleaned or disposed of in the same way as protective clothing.

55. In removing asbestos coating, asbestos insulation or other friable asbestos materials inside an enclosure, it is likely that underclothing will be contaminated. Workmen engaged in these processes should not wear any personal clothing underneath the protective clothing and if required, the proprietor should provide workmen with underclothing which should be cleaned or disposed of in the same way as protective clothing.

Section 11 *Use and maintenance of control measures*

THE REGULATION

A proprietor who provides any control measure, personal protective equipment or other thing or facility pursuant to this Regulation shall -

- (a) ensure so far as is reasonably practicable that it is properly used or applied, as the case may be; and
- (b) ensure that it is maintained in an efficient state, in efficient working order and in good repair.

56. A proprietor is required to make adequate arrangements to ensure that control measures, personal protective equipment, washing and changing facilities etc., are fully and properly used. The arrangements should include employment of competent persons as supervisors at the asbestos work site, and installation of viewing panels to enable effective supervision of the work in progress from outside the asbestos work area. Viewing panels should be positioned at strategic locations on the boundary of the asbestos work area and each should be at least 300mm x 450mm in size made from 3mm thick clear acrylic sheet.

57. A proprietor should draw up maintenance procedures, as appropriate, for all control measures and personal protective equipment. The procedures should include a list of control measures requiring maintenance; method and date of maintenance; and the person responsible for maintenance and remedying defects. Items requiring maintenance procedures include:

- (a) local exhaust ventilation including exhaust hoods, duct work and dust-collectors;
- (b) HEPA filter-equipped appliances — air extraction equipment and vacuum cleaner;

- (c) washing and changing facilities;
- (d) control measures to prevent the spread of contamination (including work area enclosure); and
- (e) respiratory protective equipment (RPE).

Details about the use and maintenance of these items are respectively described in the following.

Local Exhaust Ventilation

58. Local exhaust ventilation should draw the airborne material away from the workman's breathing zone and entrain asbestos dust. It should be kept in use during the performance of asbestos work and for such time after the cessation of the work as is necessary to keep the air clear of asbestos fibres. Local exhaust ventilation system should be inspected weekly and thoroughly examined and tested at intervals of not more than six months.

Weekly inspection should ensure that:

- (a) exhaust hoods are properly positioned in relation to the source of dust;
- (b) exhaust hoods, duct-work, dust collectors and other parts are in working condition;
- (c) there are no system leaks;
- (d) all filter elements are leak-proof to dust; and
- (e) dust collection unit is not overfilled and safe routine for emptying the collection unit has been carried out.

Examination and testing carried out every six months should be conducted by a ventilation engineer or other competent persons, and should ensure that:

- (a) all system parts are in position and in working order;
- (b) there are no air leak in any part of the system;
- (c) all filter elements are effective; and
- (d) the air flow is to the design specifications.

59. Record of inspection, examination and remedial measures carried out on exhaust ventilation system should be kept by the proprietor for a minimum of two years and should be readily available for inspection by the enforcing officers.

HEPA Filter-equipped Appliance-air extraction equipment and vacuum cleaner

60. In using air extraction equipment, the following measures should be taken:

- (a) The exhaust from the equipment should not normally be discharged into the building in which they are located. Discharge ducting should where reasonably practicable be used to vent the extracted air to the outside atmosphere, distant from other work areas, air-conditioning inlets or air compressor for breathing purpose.
- (b) The equipment should be turned on before the work starts, and should be left running continuously whilst the work area enclosure is in place, including times when personnel are not on site, until the cleanliness of the work area is proven to be satisfactory.
- (c) The pre-filter of the equipment should be changed at least at the beginning and at the end of each working day. The fan of the equipment should be turned off when changing the pre-filter.

61. Every piece of HEPA filter-equipped appliances in use should be inspected at least weekly to ensure that there is no leakage and that the performance meets the manufacturer's specifications. HEPA filter-equipped appliances should also be examined and tested for performance in accordance with the following schedule as a minimum :

- | | |
|--------------------------|---|
| Air extraction equipment | - after each HEPA filter replacement; or
- after every 400 hours of service of HEPA filter; or
- after serving every 10 enclosures or work sites; or
- whichever is sooner or at least annually. |
| Vacuum cleaner | - after each HEPA filter replacement; or
- after serving every 10 work sites; or
- whichever is sooner or at least annually. |

Appliances should be clearly labelled to show their examination and testing status. A proprietor should ensure that examination and testing of HEPA filter-equipped appliances as well as labelling of examined and tested appliances are in accordance with the provisions set out in the *Code of Practice on Asbestos Control-Asbestos Work Using Full Containment or Mini Containment Method* published by the Environmental Protection Department.

62. Record of inspection, examination and performance testing, and maintenance including defects repaired should be kept by the proprietor for a minimum of two years and be readily available for inspection by the enforcing officers.

63. All repairs and servicing to HEPA filter-equipped appliances should be carried out inside an enclosure which is maintained under negative pressure and constructed with washing and changing facilities. Personal protective equipment, including disposable overall and full-face positive pressure powered respirator as a minimum, should always be used to protect maintenance personnel from exposure to asbestos dust. When removing HEPA filter-equipped appliances out of the workplace for off-site repairs and servicing, the provisions in Section 8 should be observed.

64. Warning labels in Chinese and English should be affixed to the outside of the air extraction equipment and vacuum cleaner according to Appendix VII.

Washing and Changing Facilities

65. Adequate lighting should be provided inside the washing and changing facilities. Light fittings should be easily cleaned and decontaminated.

66. Arrangements should be made for the facilities to be cleaned at least at the end of each working day. The daily cleaning should include the removal of all dust by vacuum cleaning and then thorough wash down or wet mopping of all exposed surfaces. Debris should not be allowed to accumulate but should be cleared and bagged for disposal as asbestos waste in accordance with the requirements of the Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354 sub. leg. C).

Work Area Enclosure

67. Before removal of asbestos commences, the integrity of the work area enclosure should be tested with the use of a non-toxic smoke generator. Thorough visual inspection of the work area enclosure and the air extraction equipment installed should be carried out at the beginning of each working shift.

68. Interior of the work area enclosure should be maintained under negative pressure throughout the work, including time intervals when personnel are not on site. Effectiveness of the enclosure and of the air extraction equipment in achieving the negative pressure should be checked, where necessary, by local smoke testing or other techniques for detecting leakage airflow. The pressure difference between the inside and outside of the work area enclosure should be continuously monitored at location suspected of having the lowest pressure differential with the use of a micromanometer.

69. Defects revealed during test and inspection of the work area enclosure should be remedied immediately. Records of test and inspection should be kept by the proprietor for a minimum of two years and be readily available for inspection by the enforcing officers.

Respiratory Protective Equipment (RPE)

70. No single RPE fits everyone. A proprietor should ensure proper fit of the RPE and face-seal (a close seal between the face and facepiece of the RPE) for individual workman who is required to wear RPE, such as by providing several brands of the appropriate type of RPE in various sizes and performing test to ensure fitness of the RPE to individual workman. Methods for the test are outlined in Appendix VI.

71. Routinely prior to each entry into the asbestos work area, the wearer of RPE equipped with a tight fitting facepiece must check the seal of the facepiece to ensure face-fit. This may be done by using the procedures recommended by the manufacturer, or using the negative or positive pressure face-fit test detailed in Appendix VIII.

72. Non-disposable RPE should be checked and cleaned before and after each time it is used. Defects should be repaired before the RPE can be used. Cleaning and maintenance of RPE should be carried out in an area free from asbestos contamination. Every workman should be instructed how to check that a piece of RPE has been maintained and is effective. Preferably a person is assigned to perform the daily cleaning and inspection of RPE.

73. RPE must be inspected for wear and tear and deterioration of components before and after each use. Special attention should be given to rubber or plastic parts that can deteriorate. The facepiece, especially the faceseal surface, headband, valves, connecting tube, fittings, and filters must be in good condition. Inspection of RPE must include checking of the tightness of the connections. For positive pressure supplied air respirator, a check on the air supply with use of air flow indicator should also be made before each use.

74. Repairs to RPE must be performed only by competent persons using parts specifically designed for the RPE. The manufacturer's instructions should be consulted for any repair, and no attempt should be made to repair or replace components or make adjustments or repairs beyond the manufacturer's recommendations.

75. Record of maintenance and repairs performed on RPE should be kept by the proprietor for a minimum of two years and be readily available for inspection by the enforcing officers.

Section 12 **Protective equipment zone**

- (1) (a) Subject to subsection (2), a proprietor shall designate any area where work with asbestos is being carried out as protective equipment zone.
- (b) In respect of the protective equipment zone, a proprietor shall -
 - (i) ensure that the area is clearly demarcated and identified by notices indicating that it is a protective equipment zone, that entry into it is limited to persons authorized by the proprietor and that any person who enters the area must wear suitable approved respiratory protective equipment and suitable protective clothing;
 - (ii) provide suitable approved respiratory protective equipment and suitable protective clothing for the use of every workman in the protective equipment zone; and
 - (iii) ensure that no person enters or remains in a protective equipment zone unless he is wearing suitable approved respiratory protective equipment and suitable protective clothing.
- (2) Subsection (1) shall not apply where -
 - (a) (Repealed 1 of 2014 s. 9)
 - (b) the concentration of asbestos in the air from work with asbestos in the area does not exceed or is not liable to exceed any control limit.

- (3) No person shall enter or remain in a protective equipment zone unless he is wearing suitable approved respiratory protective equipment and suitable protective clothing.

76. A proprietor is required to designate an area where removal of asbestos is being carried out as protective equipment zone unless the condition stated in Section 12(2) is satisfied. Protective equipment zone shall be demarcated with its boundary clearly defined.

77. Sufficient number of warning notices (per Appendix IX) should be displayed prominently at the approaches to, and along the boundary of the protective equipment zone. Adequate arrangements including the installation of sufficient number of viewing panels (refer to paragraph 56) along the boundary should be established by the proprietor to ensure that no person enters a protective equipment zone unless that person is authorized to do so and is wearing appropriate RPE and protective clothing.

78. Isolation of the protective equipment zone from the rest of the workplace in the form of a work area enclosure (refer to Section 8) is generally required when the work involves asbestos coating or asbestos insulation, or when the concentration of asbestos dust in the air exceeds or is liable to exceed the control limit.

Section 13 *Prohibition of eating, drinking and smoking*

- (1) A proprietor shall take all reasonable steps to ensure that no workman eats, drinks or smokes in an area where work with asbestos is being carried out.
- (2) A proprietor shall put up sufficient number of notices in prominent positions prohibiting eating, drinking and smoking in the area where work with asbestos is being carried out.
- (3) No person shall eat, drink or smoke in the area where work with asbestos is being carried out.

THE REGULATION

79. A proprietor should instruct all workmen not to eat, drink or smoke in asbestos work area or the washing and changing facilities; or not to take food, drink or cigarettes into such areas. Sufficient notices should be put up in prominent places in and around asbestos work area to warn workmen of the prohibition of eating, drinking and smoking.

80. Where eating and drinking is required during working hours, a proprietor should designate a specific area for such purpose. The area should be situated away from the asbestos work area and entry to the eating and drinking area while wearing contaminated personal protective equipment or carrying equipment contaminated with asbestos is prohibited.

Section 14 **Washing and changing facilities**

THE REGULATION

- (1) Where any workman in an industrial undertaking is exposed to asbestos, the proprietor shall provide for the use of the workman -
 - (a) adequate and suitable washing and changing facilities;
 - (b) where he is required to provide protective clothing, adequate and suitable facilities for the storage of -
 - (i) the protective clothing; and
 - (ii) personal clothing not worn during working hours; and
 - (c) where he is required to provide approved respiratory protective equipment, adequate and suitable facilities for storage of the equipment.
- (2) The facilities provided for the storage of personal protective clothing, of personal clothing and of respiratory protective equipment shall be separated from each other and indicated in both English and Chinese.
- (3) The proprietor shall ensure that the facilities provided for washing, changing and storage are fully and properly used.

81. A proprietor is required to provide washing and changing facilities for use by workmen who have been exposed to asbestos for the purpose of decontamination. The facilities should enable each workman to meet a high standard of personal hygiene so as to:

- (a) minimize secondary exposure to asbestos from contaminated clothing, hands or face; and
- (b) avoid the spread of asbestos contamination to clean areas.

82. The type and extent of washing and changing facilities should be related to the nature and degree of exposure as indicated by the assessment carried out under Section 5. In the following cases where

- (a) the exposure exceeds or is liable to exceed the control limit; or
- (b) the exposure is due to asbestos coating or asbestos insulation; or
- (c) the work involves large scale removal of materials containing asbestos (the area involved is 15 square metres or more);

separate washing and changing facilities (hereinafter referred to as the hygiene facilities) solely used for the purpose of decontamination of workmen exposed to asbestos are required.

83. Where the exposure is not due to asbestos coating or asbestos insulation, and the exposure is low and infrequent, existing washing facilities on the premises may be shared by the asbestos workmen with other workmen who are not liable to such exposure. In this case, exposed workmen should clean any asbestos dust that may be found on their clothes and bodies as far as possible with the use of HEPA filter- equipped vacuum cleaner or by wet wiping before they leave the asbestos work area to go to the shared washing facilities.

84. The hygiene facilities can be a prefabricated unit or can be constructed on site using heavy duty plastic sheeting. The hygiene facilities should consist of three compartments:

- (a) a clean changing room;
- (b) a shower room; and
- (c) a dirty changing room.

Each compartment should be separated by a curtained doorway consisting of a heavy duty plastic sheeting with a slit opening covered by a plastic flap which hangs and lifts in the direction of access.

85. The clean changing room is the area where workmen remove their street clothes and put on clean RPE and protective clothing. Mirrors should be provided in the room to assist workmen in putting on properly the headgear of the protective clothing and RPE.

86. The shower room should be contiguous with both the clean and dirty changing rooms so that workmen must pass through it when going from one changing room to the other. All workmen leaving the work area should thoroughly wash themselves in the shower room. Showers should be provided in the ratio of one for every six workmen as a minimum and size of the shower room should be at least 1m square and 2m headroom for every shower provided. The shower room should be equipped with the following:

- (a) constant supply of hot and cold running water for the shower(s);
- (b) tray of adequate size to collect the waste water from washing, which should be drained through a high efficiency filter before being discharged to drainage;
- (c) soap, shampoo and other cleansing agents; nail brushes;
- (d) individual towels for each workman; and
- (e) hooks for hanging RPE and supports for the showers.

87. The dirty changing room is the area where workmen remove their protective clothing on leaving the work area, and where contaminated footwear and tools used in the work area are stored. Plastic bag properly supported should be provided in this room for the collection of contaminated clothing and filters of RPE. The naming of this room should not be taken to imply that this room can be maintained in a low standard of cleanliness.

88. The hygiene facilities should be constructed contiguous to the work area such that the workmen can enter the hygiene facilities directly after leaving the work area. Where this is not possible, appropriate facilities known as the transit facilities for the workmen to carry out preliminary decontamination before proceeding to the hygiene facilities installed elsewhere on site for thorough decontamination should be provided at the exit of the work area. The transit facilities (refer to Appendix XI) should also comprise three compartments as with hygiene facilities. No shower but water for cleaning and washing is provided in the middle compartment of the transit facilities. When transit facilities are used, the workmen should wear transit overalls, which is another set of protective clothing, for travelling between the transit facilities and the hygiene facilities. The transit overalls should be easily distinguishable from the working overalls (protective clothing worn in the work area), e.g. by use of different colours or by markings. The route which workmen take in travelling from transit facilities to the hygiene facilities should be selected to avoid them having to pass through other occupied areas as far as reasonably practicable.

89. Procedures for entering and leaving the work area through the hygiene facilities and through the transit facilities are detailed in Appendix X and Appendix XI respectively.

90. A proprietor should provide lockers with separate compartments for storage of personal belongings of the workmen, and for storage of clean protective clothing. These lockers should be labelled clearly in both Chinese and English. The lockers can be installed inside the clean changing room or in a convenient location next to the hygiene facilities.

91. Plastic bags which can be sealed, or containers with tight-fitting lids should be provided as receptacles for storage of RPE. RPE should be thoroughly dried before being sealed inside the receptacle which is marked with name of the workman to whom the RPE is issued. Receptacles holding RPE should be stored in a convenient, clean and sanitary place to protect the RPE from sunlight, excessive heat or cold, harmful chemicals and mechanical damage.

92. A separate 2-compartment debris port (consisting of a washing room and a clean room) should be constructed adjoining the work area for the removal of asbestos wastes as far as reasonably practicable. However, if this is not practicable, asbestos wastes may be moved out of the work area through the hygiene facilities or the transit facilities provided that the surfaces of the containers of the asbestos waste have been thoroughly cleaned as far as reasonably practicable to prevent secondary contamination of these facilities by asbestos dust.

Section 15 ***Air monitoring***

- (1) A proprietor shall ensure that -
- (a) the exposure of any workman in an industrial undertaking to asbestos in the air is monitored by means of an approved method where such monitoring is appropriate for the protection of the health of the workman and whenever there is a substantial change in the working conditions rendering the findings of the previous air monitoring no longer valid; and
 - (b) the air monitoring required in paragraph (a) is carried out by a laboratory that is accredited for the relevant asbestos test by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) managed by the Commissioner for Innovation and Technology on behalf of the Government or by a scheme with which HOKLAS has a mutual recognition agreement.
- (2) A record of any monitoring carried out in pursuance of subsection (1) shall be kept by the proprietor who shall, on being requested by an occupational safety officer, produce the record for inspection.

93. Air monitoring for asbestos removal process serves the following purposes:

- (a) to determine the level of exposure of workmen to airborne asbestos dust in the course of work;
- (b) to assure that the RPE chosen provides the appropriate degree of protection to the workmen; and
- (c) to check the effectiveness of control measures adopted for reducing exposure of workmen to asbestos.

94. In general, there are two ways for carrying out air monitoring, namely static air sampling and personal air sampling. Static air sampling will be useful for checking effectiveness of the control measures or the cleanliness of work areas when work with asbestos has been completed. However, the result from static air sampling should not be regarded as indication of actual workman exposure.

95. Personal air sampling at the breathing zone of the workman in accordance with the method approved by the Commissioner for Labour published in the Gazette# shall be used for monitoring the exposure of the workmen to asbestos, and for determining whether the relevant control limit or action level is exceeded.

96. Personal air sampling should be conducted regularly during the course of the work, and whenever there is change in work condition or doubt as to the effectiveness of the control measures in protecting workmen from exposure to asbestos dust. The following guidelines are recommended frequency of personal air sampling for reference purposes:

- (a) For asbestos removal work conducted in any industrial undertakings other than construction work, if the assessment under Section 5 indicates that the estimated level of the asbestos dust exceeds or is equal to half of the relevant control limit, personal air sampling should be conducted at the commencement of the asbestos work; while for cases where the estimated level is less than half of the relevant control limit, personal air sampling may be conducted within one year after commencement of the work. If the air monitoring reveals that the level of the asbestos dust:
 - (i) exceeds or is equal to half of the relevant control limit, subsequent personal air sampling should be conducted at least annually; or
 - (ii) is less than half of the relevant control limit, subsequent personal air sampling should be conducted at least once every three years.

- (b) For construction work other than removal of asbestos coating or asbestos insulation, if the assessment under Section 5 reveals that the estimated level of the asbestos dust exceeds or is equal to half of the relevant control limit representative personal air sampling should be conducted at a frequency of no less than one sampling for every 4 workmen at the commencement of the work and subsequently every working day.
- (c) For removal of asbestos coating or asbestos insulation, representative personal air sampling should be conducted at a frequency of no less than one sampling for every 4 workmen at the commencement of the work and subsequently every working day.

97. Where groups of workmen are doing the same type of work under similar conditions, personal air sampling may be carried out on a group basis. Individuals chosen for sampling should be selected randomly on those suspected to have the highest exposure to the asbestos dust. The number of individuals chosen for sampling should be of statistical significance.

98. If the assessment under Section 5 reveals that air monitoring is inappropriate, such as in cases where:

- (a) exposure is known to be low and not likely to approach the relevant control limit;
- (b) the work is intermittent and of short duration and adequate information is available to enable the provision of appropriate protective equipment; and
- (c) the protective equipment provided is of such a standard that no foreseeable measurement result could indicate a need for equipment of a higher standard;

the assessment should be substantiated by information on the likely level of airborne asbestos. Sources for such information could be previous experience of the work or guidance issued by Labour Department (Appendix VI), Environmental Protection Department or other relevant organizations.

99. Since measurement of airborne asbestos fibres is a highly skilled process, air monitoring should only be carried out by competent persons from laboratories which are accredited for the relevant asbestos test by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) managed by the Commissioner for Innovation and Technology on behalf of the Government or by a scheme with which HOKLAS has a mutual recognition agreement.

100. Record of the air monitoring results should be kept by the proprietor for at least five years and shall be readily available for inspection by the enforcing officers.

101. Environmental air sampling during the removal of asbestos materials, and air sampling to check cleanliness of the areas after completion of the removal work are required by the Environmental Protection Department. The Environmental Protection Department should be consulted for the requirements in collecting these samples.

Note : A copy of the Gazette for approved method for measuring exposure to asbestos in air can be found in the website of the Labour Department at http://www.labour.gov.hk/eng/public/pdf/os/B/approved_method_asbestos.pdf

Section 16 *Safety information, instruction and training*

A proprietor shall -

- (a) give every workman who is or is liable to be exposed to asbestos adequate information about risks of asbestos and the precautions that should be observed;
- (b) ensure that every workman who works with asbestos is trained and instructed in-
 - (i) safety precautions for working with asbestos; and
 - (ii) the purpose, proper use and limitations of any control measure, personal protective equipment or other thing or facility provided in pursuance of this Regulation.

THE REGULATION

102. The purpose of information, instruction and training provided by a proprietor is to ensure that every workman who is liable to be exposed to asbestos is aware of the hazards of asbestos and of the measures to be observed in safe-guarding himself and others; and to ensure that every asbestos workman is equipped with the skills and knowledge required when using the control measures, personal protective equipment, safe practices and emergency procedures. Training and instruction should be provided prior to commencement of the removal of asbestos, and before a workman is engaged in removal of asbestos. Persons who need to be trained should include but not limited to:

- (a) all workmen who are involved in removal of asbestos;
- (b) all workmen who are required to work in or around the area of a workplace where asbestos removal work is being carried out; and
- (c) supervisors of the workmen described above.

103. It is the responsibility of a proprietor to ensure that all workmen under his employment are properly instructed and trained. The proprietor may conduct the training himself if he is competent to do so or he may arrange for someone who possesses sufficient skill, knowledge and experience to provide the training.

104. A proprietor may send his workmen to attend training courses on asbestos organised by the Occupational Safety and Health Council, or the Construction Industry Council or equivalent organizations. However, attending these courses can only be regarded as part of the general training required under the Regulation. In supplement to these training courses, the proprietor should provide instruction and training specific to the particular situation.

105. The extent of training required depends on the level of risk of exposure to asbestos in a particular situation and the complexity of the control measures, work practices and procedures required to minimize the risk of exposure. It is necessary to tailor the training programme for particular work activity in commensurate with the risks of the activity. In general, information, instruction and training given to workmen should cover in appropriate details on:

- (a) health hazard of asbestos, its effect and how it enters the body, and the increased risk of lung cancer for asbestos workmen who also smoke;
- (b) importance of minimizing the creation of dust in the course of work and choosing the correct work method;
- (c) control measures, personal protective equipment and work methods: how can they reduce hazard from asbestos and their limitations;
- (d) proper use and maintenance of control measures;
- (e) correct selection, proper use, cleaning, storage and maintenance of RPE and protective clothing with specific attention to the proper fit and face-fit test of RPE;

- (f) work practices and procedures to be followed in the removal or disposal of asbestos;
- (g) nature and reasons for air monitoring and the availability of the monitoring results;
- (h) hygiene procedures and the importance of maintaining a high standard of personal hygiene;
- (i) purposes of medical surveillance;
- (j) procedures for reporting and correcting defects; and
- (k) emergency procedures, e.g. in case of failure of control measures.

106. Refresher training should be given at least annually and whenever necessary to existing workmen to remind them of the precautions needed. Additional training should be provided when new work methods, plant or control measures are introduced.

107. In planning training programmes the language and literacy factors should be taken into consideration in determining the most suitable method. If the literacy level is low, verbal or highly graphic visual presentations should be used. The training provided should be practical and include hands-on training whenever appropriate. Training should also be evaluated to ensure that trainees have an adequate understanding of the matters covered.

108. Records of the training maintained by the proprietor should include:

- (a) names of workmen receiving the training and the date of attendance;
- (b) an outline of the course content; and
- (c) names and positions of the persons providing the training.

The training record of each workman should be kept for at least two years, and should be readily available for inspection by the enforcing officers.

Section 17 *Medical surveillance*

- (1) A proprietor shall not employ any person in working with asbestos unless that person has within the 4 months immediately preceding the commencement of such employment undergone a radiographic examination of his chest and is certified by a registered medical practitioner to be fit to do such work.
- (2) A proprietor shall ensure that at intervals of not more than 12 months every person employed in working with asbestos -
 - (a) undergoes a radiographic examination of his chest; and
 - (b) is certified by a registered medical practitioner to be fit to continue to do such work.
- (3) A proprietor who employs a person shall -
 - (a) maintain a health register in the approved form for every person employed in working with asbestos;
 - (b) keep the register for at least 5 years from the date of last entry by the proprietor and it shall be made available for inspection by the Commissioner when requested by him; and
 - (c) give a copy of the health register to the person covered by it upon termination of his employment.
- (4) Every person employed or to be employed in working with asbestos shall within a reasonable time after being requested by the proprietor present himself to a registered medical practitioner for medical examination.
- (5) The cost of any radiographic and medical examination undergone by any person under this Regulation shall be borne by the proprietor.

109. A satisfactory health and physical condition is important in considering whether someone is fit to work with asbestos in which use of RPE is required. Section 17(1) requires a proprietor to ensure that any person employed by him to work with asbestos has been medically examined by a registered medical practitioner and is certified by the medical practitioner with a certificate that the employee is fit to do such work within 4 months immediately preceding the commencement of the employment. The medical examination shall include chest X-ray.

110. A proprietor shall ensure that every workman under his employment in work with asbestos undergoes chest X-ray and medical examination at intervals not more than 12 months, and is certified by a registered medical practitioner to be fit to continue to do such work. In between medical examinations when a workman has any doubt as to his fitness in work with asbestos, he should inform the proprietor who should arrange for him to be medically examined as appropriate.

111. Section 17(3) requires a proprietor to maintain a health register in the approved form (Appendix XII) for every person employed by him to work with asbestos. Copy of the certificate issued by the medical practitioner should also be attached to the health register. A copy of the health register should be kept at the work location of the asbestos workman covered by it, and be readily available for inspection by the enforcing officers. Health register shall be retained by the proprietor for at least five years from the date of last entry in it. Upon termination of the employment of an asbestos workman, the proprietor shall provide the workman with copy of his own health register.

112. A proprietor should obtain a copy of the health register of a workman who claims to have been previously medically examined, and request the workman to undertake medical examination as appropriate in accordance with the Regulation before employing him as asbestos workman. If being requested, the workman shall present himself for the medical examination.

PART IV STORAGE, DISTRIBUTION AND LABELLING

Section 18 *Storage, distribution of loose asbestos and waste*

THE REGULATION

A proprietor who undertakes work with asbestos shall ensure that no loose asbestos or waste which contains asbestos is -

- (a) stored;
- (b) received into or despatched from any place of work; or
- (c) distributed, except in a totally enclosed distribution system, within any place of work,

unless it is in a suitable and sealed container clearly marked in accordance with section 19.

113. Receptacles for loose asbestos or asbestos waste should be so designed, constructed and maintained as to prevent dust and any of the content escaping out of the receptacles under stress and strain of normal handling.

114. Loose fibrous or dusty waste, or other asbestos waste in small fragments can be double-bagged in impermeable heavy duty plastic bags. The inner plastic bag should not be filled more than half-full and each bag should be capable of being securely sealed in goose-neck with adhesive tape. Air should be excluded from the bag as far as possible by means of vacuum before sealing.

115. Large pieces of rigid materials such as asbestos cement sheeting should not be broken or cut for disposal in plastic bags. They should be wrapped intact in two layers of heavy duty plastic sheeting. To avoid the plastic packaging from being damaged by sharp objects, the sharp ends should first be wrapped with heavy duty plastic sheeting and completely sealed with adhesive tape.

116. Alternatively, metal drums can be used for packing asbestos wastes such as roof tiles, as the heavy weight of these wastes and presence of sharp objects render plastic packaging not suitable. The metal drums should be fitted with full aperture type lids which should be secured with latch, lever or nut and bolt closures.

117. Waste material should be removed and packed promptly in order to avoid being trampled. Damage to asbestos material should be avoided as far as possible and in no circumstances should asbestos material be broken up so as to facilitate packing for disposal.

118. Practices for treating asbestos waste (including the requirements for the heavy duty plastic bags mentioned in paragraph 114 and the metal drums mentioned in paragraph 116) covered in the *Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste* published by the Environmental Protection Department should be observed by a proprietor as appropriate in treating asbestos wastes produced in industrial undertakings.

Section 19 *Labelling of container and articles containing asbestos*

THE REGULATION

- (1) Where any asbestos is required to be put in a container that container shall have affixed to it a clear and visible label on which is written -

**“DANGER – CONTAINS ASBESTOS
DO NOT INHALE DUST
危險 — 載有石棉
切勿吸入塵埃
(Follow Safety Instructions)
(遵從安全指示)”** .

- (2) Any article which contains asbestos, being an article for use at work, shall be labelled as required in subsection (1). The labelling shall be effected by means of -
- (a) an adhesive label firmly affixed to the article or its packaging;
 - (b) a tie-on label firmly attached to the article or its packaging;
or
 - (c) direct printing onto the article or its packaging, as the case may be.

119. Section 19(1) requires plastic packaging and metal drums used for packing asbestos or asbestos wastes to be clearly and distinctly labelled. This Section also sets out the required wording of the label. All letters and characters of the label should be in bold type and should be at least 30 mm high. Colour of the letters and characters should be in distinct contrast to the background, e.g. black letters and characters against red background.

120. Under Section 19(2), warning labels should be affixed to articles for use at work if the articles contain asbestos. The label should be in the form as shown in Appendix XIII and it should be clear and distinctly visible, and should be effected in a conspicuous position of the article.



PART V

MISCELLANEOUS

Section 20 *Employment of young persons*

THE REGULATION

No proprietor shall employ any young person -

- (a) in working with asbestos;
- (b) in carrying out any cleaning in connection with work with asbestos.

121. Section 20 prohibits a proprietor in employing any young person in any work with asbestos, and in carrying out any related cleaning activities including:

- (a) preliminary cleaning of and preparation for the work area where removal of asbestos is to be carried out;
- (b) cleaning of washing and changing facilities in connection with removal of asbestos;
- (c) cleaning up work area where removal of asbestos has been conducted;
- (d) clearance of the work area after removal of asbestos has been completed.

Section 21 *(Repealed 1 of 2014 s. 10)*

Section 21A *Ban on asbestos spraying*

The proprietor of an industrial undertaking must not undertake asbestos spraying in the industrial undertaking.

Section 21B *Ban on using asbestos insulation*

The proprietor of an industrial undertaking must not use in the industrial undertaking asbestos insulation for thermal, acoustic or other insulation (including fire protection).

Section 21C *Ban on working with amphibole asbestos*

(1) The proprietor of an industrial undertaking must not carry out work with amphibole asbestos in the industrial undertaking.

(2) Subsection (1) does not prohibit the proprietor from removing or disposing of amphibole asbestos that was in use before 1 September 1997.

Section 21D *Ban on working with chrysotile*

(1) The proprietor of an industrial undertaking must not carry out work with chrysotile in the industrial undertaking.

(2) Subsection (1) does not prohibit the proprietor from removing or disposing of chrysotile that was in use before Part 3 of the Air Pollution Control (Amendment) Ordinance 2014 (1 of 2014) comes into operation*.

Note : * Operation Date : 4 April 2014

122. Section 21A prohibits spraying of asbestos or spraying of any material containing asbestos, while Section 21B prohibits use of asbestos insulation for thermal, acoustic and other insulation purposes and for fire protection not applied as a coating. Asbestos insulation includes pre-formed sections of pipe insulation, asbestos lagging and asbestos in-fill used for fire protection. However, asbestos insulation does not include asbestos cement products and asbestos insulation board. Also articles made of rubber, plastic, resin or bitumen, which also contain asbestos, such as vinyl floor tiles, electric cables, and roofing felts are not regarded as asbestos insulation as the insulating properties of such articles are incidental to their main purpose. Other asbestos products which may be used at high temperatures but have no insulation purpose such as gasket, washers and seals are also not taken as asbestos insulation.

123. Work with asbestos (chrysotile, crocidolite, amosite, fibrous actinolite, fibrous anthophyllite and fibrous tremolite) and products containing these asbestos is also prohibited under Sections 21C and 21D. However, a proprietor can undertake process for the removal and disposal of amphibole asbestos or materials containing this asbestos that were in use before 1 September 1997 provided that other provisions under the Regulation are observed. A proprietor can also undertake process for the removal and disposal of chrysotile or materials containing chrysotile that were in use before 4 April 2014 when Part 3 of the Air Pollution Control (Amendment) Ordinance 2014 (1 of 2014) came into operation provided that other provisions under the Regulation are observed.

PART VI

DUTIES OF WORKMEN

AND OTHER PERSONS

Section 22 ***Responsibilities of any person***

THE REGULATION

- (1) Any workman in an industrial undertaking where work with asbestos is carried out shall-
 - (a) observe the safety precautions and the procedures set by the proprietor in respect of the asbestos work which have been made known to him in the industrial undertaking;
 - (b) make full and proper use of any control measure, personal protective equipment or other thing or facility provided in pursuance of this Regulation which have been made known to him in the industrial undertaking; and
 - (c) report forthwith to the proprietor any fault or defect in any such control measure, personal protective equipment or other thing or facility as provided in pursuance of this Regulation.
- (2) The obligations set out in subsection (1)(a) and (b) shall apply also to any other person in the industrial undertaking.

PART VII

OFFENCES AND

PENALTIES

Section 23 *Offences by proprietors*

THE
REGULATION

- (1) Any proprietor who fails to comply with section 5(1), (3) or (4), 6(1), (3) or (4), 7, 8, 9, 10, 11, 12(1), 13(1) or (2), 14, 15, 16, 17(1), (2), (3) or (5), 18, 19 or 20 commits an offence and is liable to a fine at level 5.
- (2) A proprietor who, without reasonable excuse, fails to comply with section 21A, 21B, 21C or 21D commits an offence and is liable to a fine of \$200,000 and to imprisonment for 6 months.

Section 24 *Offences by workman*

THE
REGULATION

Any workman who fails to comply with section 10(4) or 22(1) commits an offence and is liable to a fine at level 3.

Section 25 *Offences by any person*

THE
REGULATION

Any person who fails to comply with section 12(3), 13(3) or 22(2) commits an offence and is liable to a fine at level 3.

Section 26 *Transitional*

THE
REGULATION

For assessment of work under section 5(1) where work with asbestos has been commenced before the coming into operation of this Regulation or within 28 days after that date, it shall be sufficient compliance with that section if the proprietor makes the assessment within 28 days after the date of coming into operation of this Regulation.

APPENDICES

Appendix I

工廠及工業經營(石棉)規例 Factories and Industrial Undertakings (Asbestos) Regulation

通知 (i) 石棉工作 [規例第6(4)條]
(ii) 改變已通知的石棉工作 [Section 6(4)]
Notification of (i) Asbestos Work
(ii) Change in Notified Asbestos Work

本表格乃由勞工處處長就工廠及工業經營(石棉)規例第6(4)條的需要而認可
Form approved by the Commissioner for Labour for the purposes of section 6(4) of the Factories and Industrial Undertakings (Asbestos) Regulation

* 通知石棉工作：須填寫第一部及第二部。
Notification of asbestos work: complete Part I and Part II

* 通知改變已通知的石棉工作：須填寫第一部及第三部。
Notification of change in notified asbestos work: complete Part I and Part III

第一部 Part I

(1) 工業經營名稱 Name of industrial undertaking	
(2) 註冊辦事處地址 Address of registered office	
(3) 東主/經理姓名 Name of proprietor/ Manager	(4) 電話Tel. No.
(5) 工作場地地址(如與(2)相同可省略) Address of workplace (omit if same as (2))	(6) 電話Tel. No.

第二部 Part II

(7) 工作場地負責人姓名 Name of responsible person at workplace	(8) 職位Position	(9) 電話Tel. No.
(10) 石棉工人數 Number of asbestos workers	男Male	女Female
(11) 開始進行石棉工作日期 Date of commencement of asbestos work	(12) 石棉工作完工日期 Date of completion of asbestos work	
(13) 石棉工作性質 Nature of asbestos work		
(14) 石棉工作涉及的石棉物料(註明物料含溫石棉或閃石類石棉) Type of asbestos-containing material involved in asbestos work (indicate whether chrysotile or amphibole asbestos is present in the material)		

第三部 Part III (祇須填寫有改變的詳情 Fill in the particulars that have been changed)

(15) 開始進行石棉工作日期 Date of commencement of asbestos work	(16) 石棉工作完工日期 Date of completion of asbestos work
(17) 石棉工作性質 Nature of asbestos work	
(18) 石棉工作涉及的石棉物料(註明物料含溫石棉或閃石類石棉) Type of asbestos-containing material involved in asbestos work (indicate whether chrysotile or amphibole asbestos is present in the material)	

* 請在適當空格內加上 '✓'。

Please '✓' in the appropriate box.

注意 (i) 任何工業經營的東主在開始進行石棉工作之前，須給予勞工處處長不少於28天的書面通知。

(ii) 任何工業經營的東主在得知已通知石棉工作有所改變後，須在7天內將該改變通知勞工處處長。

(iii) 任何東主不遵守工廠及工業經營(石棉)規例第6(1)或第6(3)條通知石棉工作或通知改變已通知的石棉工作，即屬犯罪，可處第5級罰款。

Note (i) Notification of asbestos work shall be submitted to the Commissioner for Labour not less than 28 days before commencement of the asbestos work.

(ii) Notification of change in notified asbestos work shall be submitted to the Commissioner for Labour within 7 days after a proprietor becomes aware of the change.

(iii) A proprietor who fails to give notification of asbestos work or fails to give notification of change in notified asbestos work in accordance with sections 6(1) or 6(3) of the Factories and Industrial Undertakings (Asbestos) Regulation commits an offence and is liable to a fine at level 5.

簽名 Signature	姓名(正楷) Name in Block Letter	職位 Position	日期 Date
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ASB-F-NOT

Appendix II

Safe practices for removal of asbestos-containing friction materials

1. Asbestos has been used as a constituent in the manufacture of friction materials which are commonly used in the automotive industry — brake linings, disc brake pads and clutch facings. The asbestos content in these materials may vary from 10% to 60% by weight and usually chrysotile asbestos was used. In these materials, asbestos fibres are "locked" in resins and binders thereby preventing the release of asbestos fibres during normal handling. However, heat and abrasion during operation will generate fine dust which may contain asbestos.

2. A proprietor should be aware of the potential hazard of exposing workmen involved in the removal of friction materials containing asbestos, and take adequate precautions to protect these workmen. A proprietor should use asbestos-free substitutes available in the market for replacing asbestos-containing friction materials.

Safe practices

3. Any dust accumulated on the machine assembly where asbestos-containing friction material is installed should be removed by HEPA filter-equipped vacuum cleaner. In a workshop (other than vehicle repairing/ servicing workshop) where servicing of machine assembly with friction materials is incidental to the main business and is carried out only occasionally, abraded dust on the assembly may be removed by wiping with damp cloth in the absence of HEPA filter-equipped vacuum cleaner, and the contaminated cloth should be disposed of immediately afterwards as asbestos waste. In no circumstances should compressed air or dry brushing be used for cleaning purposes.

4. In a vehicle repairing/servicing workshop, cleaning asbestos-containing brake assemblies prior to removal should be carried out inside specially designed local dust extraction system consisting of a HEPA filter-equipped vacuum cleaner and a brake assembly isolation cylinder

which is a wheel-shaped cylinder to enclose the wheel assembly. The cylinder should be fitted with:

- (a) a vision or sight glass to provide visibility;
- (b) rubber access gloves for the workman to handle the brake assembly parts; and
- (c) a suction hose for connection to a HEPA filter-equipped vacuum cleaner;

The HEPA filter-equipped vacuum cleaner should be capable of capturing all the airborne dust generated within the cylinder.

5. The specially designed local dust extraction system should be used in accordance with manufacturer's instruction. Before removing the brake assembly isolation cylinder from the cleaned brake assembly, the inside of the cylinder should be thoroughly cleaned.

6. In addition to engineering control measures, workmen engaged in removal of asbestos-containing friction materials should be provided with appropriate approved RPE (half-face with replaceable filtering cartridge as the minimum requirement). Protective clothing of the disposable type should also be provided where there is risk of body contamination.

7. When removal of asbestos-containing friction materials is completed, all plant and equipment, machinery and work surfaces should be kept free of asbestos dust and waste by vacuum cleaning, wet wiping or other method of cleaning that will not create dust. Workmen should decontaminate themselves with HEPA filter-equipped vacuum cleaner or wet wiping. RPE should be wiped with dampened cloth and the filtering cartridge sprayed wet. Workmen should remove their protective clothing followed by removing the RPE and disposing of the filtering cartridge before leaving the work area. In addition, a proprietor should make arrangements on the premises for workmen to wash exposed parts of their bodies.

8. All asbestos wastes, contaminated protective clothing and filters of respirators should be disposed of as asbestos waste in accordance with Section 18.

Appendix III

Safe practices for removal of asbestos cement products

1. Asbestos cement is a grey, hard and brittle material generally containing 10% to 15% asbestos fibre which is bound in a cement mixture. Most asbestos cement products contained only chrysotile (white asbestos) but older products that were manufactured prior to 1970, may contain the more hazardous crocidolite (blue asbestos) or amosite (brown asbestos). Blue and/or brown asbestos are present particularly in asbestos cement pressure pipes. Asbestos-free fibre-cement products should be used to substitute asbestos-cement products.

2. A large number of building products used in the building and construction industry have been compounded from asbestos cement. These products include, but not limited to:

- (a) corrugated and flat sheets*;
- (b) roofing tiles and slates;
- (c) grille panels; and
- (d) pipes for water, drainage or flues.

*Note: Most asbestos cement sheets will not support a person's weight. Falling through asbestos cement roofing is a hazard and adequate safety measure should be taken to prevent such accident.

The hardness and structure of asbestos cement and relatively low asbestos content mean that these materials are less likely to generate asbestos dust. Asbestos-cement products pose low risk to health of workmen if they are in good condition and are removed carefully. However, risk of exposure to asbestos dust will occur during demolition and other operations causing breakage of the asbestos cement products. Exposure to asbestos dust will also occur when work is carried out on worn, crumbly or damaged products.

Safe practices

3. Only workmen who are authorized by the proprietor and who are properly protected should be permitted to perform removal work of asbestos cement. Warning notices should be posted around the perimeter of the work area.
4. Work method should be established so as to minimize the need to operate directly on asbestos cement products and to break the products into pieces. Asbestos cement material should be removed with minimal breakage. As far as practicable the removal should be accomplished by only operating on fixings holding the cement material in place, and the removed cement material should not be dropped from height so as not to cause damage.
5. Removal of asbestos cement products should be carried out in well-ventilated area, and where possible in open air. Before the operation, asbestos cement products should be kept wet by generous application of amended water in a fine mist to minimize dust generation whenever reasonably practicable (wetting of asbestos cement products should be carefully applied to ensure that workmen are not exposed to the danger of slip and fall).
6. Non-powered hand tools such as hand-saws, cutters, hammer, chisel should be used for the operation as these tools will generate a greater quantity of predominantly coarser dust or waste chips, hereby reducing the risk of generating a large amount of airborne fibres. Off-cuts and coarse dust should be collected by heavy duty plastic sheeting.
7. The work area should be kept clean and tidy to prevent the accumulation of asbestos dust and debris. At the end of each work shift, the work area should be cleaned of asbestos dust and debris. Appropriate dustless method such as using HEPA filter-equipped vacuum cleaner or wet wiping should be used in cleaning the work area. Removed asbestos cement products should be properly packed up as asbestos waste as soon as possible and not allowed to lie about in the site where they may be broken up or crushed by other site activities.

8. Asbestos cement products, waste and debris, contaminated protective clothing and filters of respirators etc. should be packed in suitable containers and disposed of as asbestos waste (refer to Section 18). The containers should be labelled in accordance with Section 19.

Personal protective equipment

9. In addition to adopting the above safe practices, workmen engaged in removal of asbestos cement should be provided with:

- (a) disposable protective coveralls;
- (b) rubber boots with non-slip sole where there is danger of slip and fall; and
- (c) appropriate approved RPE (refer to Appendix VI).

Decontamination

10. Washing and changing facilities should be provided for workmen to decontaminate themselves after removal of asbestos cement. The type and extent of washing and changing facilities to be provided should be related to the nature and degree of exposure as indicated by the assessment carried out under Section 5. When the area of asbestos cement to be removed is more than 15 m², hygiene facilities and if required transit facilities constructed and equipped in accordance with Section 14 should be provided. Procedures for entering and leaving the work area through these facilities stipulated in Appendix X or Appendix XI should be followed as appropriate by all workmen.

11. In small scale removal of asbestos cement where exposure is low and brief, existing washing and changing facilities on the premises may be shared with other workmen who are not liable to such exposure. Exposed workmen should preliminary clean themselves, remove their protective clothing and RPE before leaving the work area to use these facilities.

12. Preliminary cleaning should include cleaning any asbestos dust that may be on protective clothing of workmen with use of HEPA filter-equipped vacuum cleaner and by wet wiping, cleaning RPE with sponge and water and spraying wet the filter, washing clean rubber footwear in boot-bath and washing exposed parts of bodies. Sufficient quantity of water should be provided at the work area to enable the workmen to carry out preliminary cleaning.

13. Surfaces of containers/plastic wrappings holding asbestos cement products, wastes and debris should be thoroughly cleaned before being removed from the asbestos removal work area. Washing and changing facilities provided for workmen should not be used to decontaminate the containers. Wherever reasonably practicable, a 2-chamber debris port (consisting of a washing room and a clean room) should be provided for controlling transfer of these asbestos wastes out of the asbestos removal work area.

Appendix IV

Safe practices for removal of asbestos coating and asbestos insulation

1. Asbestos coating and asbestos insulation are particularly hazardous types of asbestos materials. Removal of these materials without adequate control measures will likely give rise to high dust levels. In order to contain the airborne asbestos dust, removal of asbestos coating and asbestos insulation should be conducted inside a work area enclosure (hereinafter referred to as the enclosure), which is maintained at a pressure slightly lower than that of the surrounding atmosphere. The following only contains a brief description of the safe practices, readers should refer to the main text of the COP for details.

2. A proprietor should also refer to the *Code of Practice on Asbestos Control-Asbestos Work Using Full Containment or Mini Containment Method* published by the Environmental Protection Department for guidelines on preparation of the work area, construction of the containment, and clearance of the work area after removal work is completed.

The enclosure

3. The asbestos work area should be totally enclosed inside the enclosure which is constructed, tested and maintained according to Sections 8 and 11. The enclosure should be designed and constructed in such a way that the asbestos materials are not disturbed during the erection of the containment. In case where asbestos materials are present in the ceiling void above false ceilings, the ceiling tiles should only be disturbed after the enclosure is completed and in operation. All movable items inside the work area should be removed, after pre-cleaning to avoid contamination. Any item that cannot be removed should be pre-cleaned and sealed inside heavy duty plastic sheeting.

4. The enclosure should be equipped with the following items:

- (a) viewing panels (refer to paragraph 56 under Section 11) of sufficient number and at appropriate positions such that all

activities inside the enclosure can be viewed through these viewing panels;

- (b) appropriate type of fire extinguishers;
- (c) emergency lighting, such as an appropriate number of suitable torches; and
- (d) means of communication with the workmen inside the enclosure from outside in case of emergency, such as audible alarm.

5. The enclosure should be as small as possible but should be large enough to contain the work and to allow reasonable working space. Maximum volume of the enclosure should not exceed 2,800 cubic metres. For larger work area, dividing the space into a number of smaller enclosures rather than treating it as one single unit is required.

6. The enclosure should as far as practicable be constructed with separate means for access of personnel and for transport of asbestos wastes from the work area. Workmen should enter and leave the work area through the hygiene facilities while asbestos wastes should be removed through a separate 2-chamber debris port.

7. For a large enclosure, appropriate means of escape should be provided. Hygiene facilities and debris port should be located at different positions of the enclosure to serve as alternative means of escape. Alternatively, points of escape from the enclosure should be designated and a knife accessible from inside the enclosure for slitting open the polythene sheet partition in case of emergency should be provided at these points. The routes of escape should be clearly indicated inside the enclosure.

Safe practices

8. Work procedures for removing asbestos coating and asbestos insulation should be established to minimize release of asbestos dust into the atmosphere. The wet method, involving handling materials containing asbestos wet, is one of the most reliable methods in ensuring that asbestos

fibres do not become airborne, and this practice should therefore be used whenever feasible.

9. Wet method involves soaking the asbestos material with amended water which facilitates rapid wetting. The amended water should be applied by means of an airless sprayer to minimize disturbance to the materials containing asbestos, and should be applied continually throughout the work period to ensure that any dry material containing asbestos exposed in the course of work is wet and remains wet until final disposal. The rate of application of the amended water should be such as to minimize any excess water in the work area.

10. In case of thick asbestos insulation where penetration by wet spraying will not be effective, the amended water should be injected into the asbestos material (with the use of lances etc.) in order to obtain adequate penetration and diffusion. Holes or cuts should be made in the outer covering of the insulation enabling injection of amended water in such a manner and quantity as to ensure that the material is wetted but is not washed out.

11. The time required to soak the asbestos material depends on thickness of the material and location of the holes. Removal should not be attempted until visual examination reveals that the insulation is of a dough-like consistency and water may readily be squeezed from it. However, over-saturation should be avoided since this will lead to the formation of pools of water and may turn the material into a slurry.

12. Asbestos material saturated with amended water should be removed in sections by scraping or cutting. The wetted material should be removed while still wet and should not be allowed to drop from height, and should be placed directly into properly labelled plastic bags or containers, re-wetted with amended water as necessary.

13. Removal of asbestos insulation should not be carried out on hot plant unless that is unavoidable. Routine or scheduled work should be planned to be performed during plant shutdowns or annual holidays, or else temporary equipment as substitution for the out-of-service plant or temporary piping to by-pass the affected section should be installed. Only

after all possibilities to avoid hot removal of asbestos materials have been explored and, after careful consideration, rejected should “hot removal” be considered.

14. In carrying out “hot removal”, temperature of the plant should be reduced as low as possible in order to allow wetting to be carried out safely. Adequate precautions should also be taken to protect workmen from being scalded by hot substances and possible risks of heat stress.

15. In using wet removal method, additional safety precautions shall be taken to prevent electrical hazards. Any plugs, sockets, switches and other sources of electric current should be covered with waterproof protection so that water cannot penetrate.

Personal protective equipment

16. The proprietor should provide at least disposable respirators to workmen engaged in erection of enclosure. Where erection of the enclosure may disturb materials containing asbestos, which should be kept to a minimum, respirators of higher performance will be required (refer to Appendix VI) and workmen may also have to wear protective clothing. Appropriate hygiene facilities may have to be installed prior to erection of the enclosure in order that the workmen can decontaminate themselves after work.

17. All workmen inside the enclosure where removal work is carried out should wear, as a minimum, full-face powered air-purifying or supplied-air respirators. Respirators of lower performance may only be worn by workmen during cleaning in connection with clearance of the work area and dismantling of the plastic layers of the enclosure when air monitoring shows that the respirator can provide adequate protection.

18. Workmen engaged in the removal work inside the enclosure should also wear protective clothing of the disposable type as well as disposable underclothing.

Decontamination

19. The proprietor shall provide adequate hygiene facilities for workmen to change and to decontaminate themselves after working inside the enclosure. Hygiene facilities should be located adjoining the enclosure in accordance with Section 14. All workmen should follow the procedures in Appendix X in entering and leaving the enclosure through the hygiene facilities.

20. In case where it is not possible to provide hygiene facilities adjoining the enclosure, transit facilities (refer to Section 14) should be provided contiguous to the enclosure to enable workmen to carry out preliminary decontamination before proceeding to the hygiene facilities provided elsewhere on the premises for thorough decontamination. The procedures in Appendix XI should be followed by all workmen when using the transit facilities.

Appendix V

Safe practices in using the glove bag method

1. Glove bag method is suitable for use in small scale short duration asbestos abatement work. It is suitable for removing small section of asbestos pipe insulation, for removing asbestos lagging from individual valves or joints in pipelines. A proprietor should also refer to the *Code of Practice on Asbestos Control - Asbestos Work Using Glove Bag Method* published by the Environmental Protection Department for precautions in the use of glove bag.
2. Glove bag is fabricated from transparent polyethylene (0.15 to 0.30 mm thickness) with built-in sleeves and access ports. It is a disposable bag and should be disposed of after use. It should never be shifted, moved, re-installed or re-used once contaminated with asbestos.
3. Workmen using glove bag should have the appropriate training and experience in the operating procedures and precautions. Preferably they should work in pairs — one workman performs the removal work while the other wets the asbestos material simultaneously at regular intervals. They should wear disposable protective clothing and half-face cartridge respirators as a minimum.
4. The work surface where glove bag will be applied should be cleaned of any loose debris or asbestos fibres with the use of HEPA filter-equipped vacuum cleaner before installing the bag. The pipe lagging on both sides of the bag should be sufficiently sound to support the weight of the bag and its wet content, and the bag should be additionally supported at the bottom.
5. In using glove bag, work is performed from outside the bag by inserting hands and arms through the built-in sleeves. The access ports will be used for introducing the nozzle of airless sprayer for applying wetting agent, and for introducing the hose of the HEPA filter-equipped vacuum cleaner.
6. The asbestos insulation should be thoroughly wetted by spraying with amended water before being removed. The amended water should be

continually applied as new insulation is being exposed in order to prevent release of fibre.

7. Choice of tools used to remove the asbestos insulation depends on the nature of the material. Powered tools should not be used inside glove bag and the tools used should be so designed that the likelihood of puncturing or cutting the bag is minimized (examples of tools that can be used are knife with retractable blade, snips, brush with non-metal bristles).

8. After removal of asbestos insulation, the pipe or surface from which asbestos has been removed must be brushed and wet-wiped to remove all visible materials containing asbestos. In addition, the upper section of the bag should be washed down to remove any adhering asbestos material.

9. Any asbestos-containing insulation edges that have been exposed as a result of the removal activity must be sealed with suitable material to ensure that these edges do not release asbestos dust to the atmosphere after the glove bag has been removed.

10. Once the removal and encapsulation of asbestos have been completed, a vacuum hose from a HEPA filter-equipped vacuum cleaner should be inserted through the access port to remove any air in the bag that may contain asbestos dust. Once the bag has been evacuated, the bag should be squeezed tightly (as close to the top as possible), twisted and sealed with tape to keep the asbestos materials safely in the bottom of the bag. The vacuum hose can then be removed from the glove bag.

11. While the glove bag is still attached to the pipe, a heavy duty plastic bag is slipped around the bag which can then be detached from the pipe and received in the plastic bag for disposal as asbestos waste.

12. Arrangements should be made for workmen to wash themselves after finishing work. Washing facilities existing on the premises can be made use of or temporary hygiene facilities should be erected at the work area where there is significant risk of body contamination. Before leaving the work area to use washing facilities on the premises, workmen should remove their protective clothing, wet wipe the RPE and spray wet the filtering cartridge, and carry out preliminary washing of face and hands.

Appendix VI

Selection guide to approved respiratory protective equipment (RPE) for protection against asbestos dust

1. This selection guide serves as a reference for selecting the appropriate RPE for use in various jobs or in workplaces with known likely maximum concentration of asbestos dust. It is the responsibility of the proprietor to verify the likely maximum dust level in actual situations prior to selection from the approved list (refer to Section 4). Before using this selection guide, it is important to ensure that the guidance regarding control measures, safe practices, selection and proper use and maintenance of RPE set out in Sections 7 and 11 of the COP has been followed. To account for any unforeseeable circumstances, it is a good practice to select RPE which can offer better protection in order to prevent excessive exposure to asbestos dust.

2. Efficiency is a key factor to be considered in selecting the appropriate RPE for use. The efficiency of various types of RPE, in terms of the assigned protection factor, is illustrated in the following table. The maximum use concentration (MUC) represents the maximum fibre concentration in the air outside the respirator such that the air inside the respirator can be maintain to a level below 0.1 fibre/ml under optimal experimental conditions.

Types of Respiratory Protective Equipment	Assigned Protection Factor	MUC (fibres/ml)
Disposable, half-face particulate respirator	5	0.5
Half-face particulate filter (cartridge) respirator	10	1
Powered air-purifying, loose-fitting helmet or hood respirator	25	2.5
Supplied-air, continuous-flow, loose-fitting helmet or hood respirator	25	2.5
Full-face particulate filter (cartridge) respirator	50	5
Powered air-purifying, full-face particulate respirator	100	10
Supplied-air, positive pressure demand, full-face respirator	>1000	>100
Supplied-air, continuous flow, full suit	>1000	>100

- Note:
1. All supplied-air respirator should be equipped with escape respirator with HEPA filter.
 2. Any respirator considered to have efficiency superior to that listed in the table needs to be supported by field evaluation data.

3. Proper fit of the RPE and face-seal for individual workman is another factor to be considered. Spectacles, beards, moustaches, sideburns or even a visible growth of stubble will affect the face-seal, and workmen with these facial features will not be provided with adequate protection from asbestos when the RPE worn relies on a good face-seal. A solution to the problem of facial features is the use of equipment that does not rely on good face-seal for adequate protection, e.g. positive pressure powered RPE with blouse. There are two methods for testing the fitness of the RPE to individual workman:

- (a) Qualitative fit-test involves the introduction of a harmless odorous or irritating substance into the breathing zone around the RPE being worn. If no odour or irritation is detected by the wearer, a proper fit is indicated.
- (b) Quantitative fit-test offers more accurate, detailed information on fitness of RPE. It involves the introduction of a harmless

aerosol to the wearer who is in a test chamber. While the wearer performs exercise that could induce facepiece leakage, the air inside and outside the facepiece is then measured for the presence of the harmless aerosol to determine any leakage into the RPE.

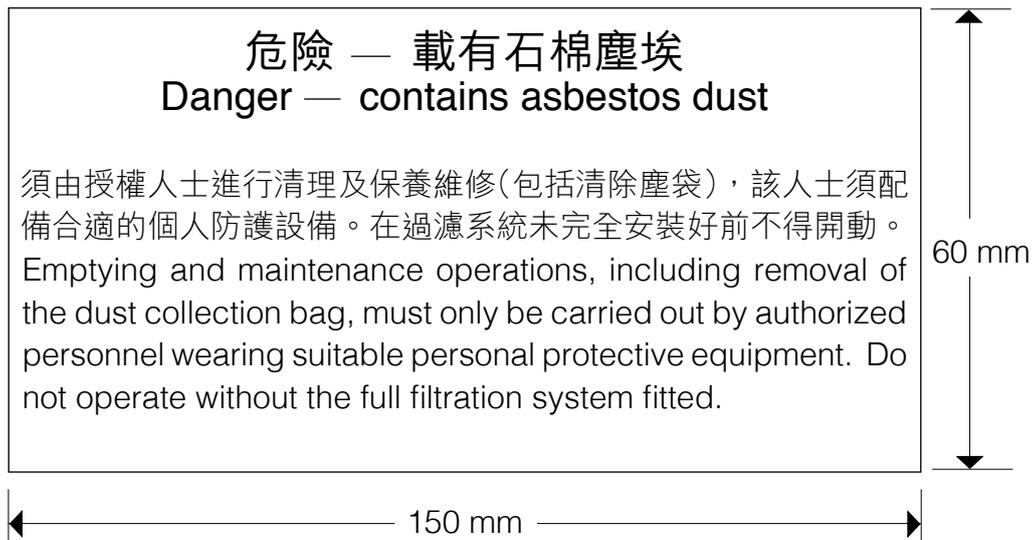
4. The following tables are selection guide to approved RPE indicating the likely dust level in the workplace of certain typical jobs involving asbestos and the corresponding types of RPE required. The likely dust level represents concentration of airborne asbestos when the process is carefully carried out with implementation of good control measures and safe practices. Bad handling practices may result in higher value. These values are for reference only. It is the duty of a proprietor to verify the dust level in the actual situation by appropriate means such as air monitoring. The minimum types of RPE represent the types of respirator of minimum efficiency that are sufficient to provide protection of workman to asbestos dust. It requires that the respirators are properly used and maintained according to Section 11. Respirators assigned for high dust levels can be used for lower dust levels.

Selection guide to RPE for jobs involving asbestos materials

Job	Likely Dust Level (fibres/ml)	Minimum Types of RPE
simple short duration sampling; enclosure erection; clearance sampling	0 to 2	any approved respirator, including disposable or half-face cartridge respirators
some sampling operations; enclosure erection under adverse conditions	0 to 4	any approved respirator other than disposable respirator and half-face cartridge respirator
extensive sampling operations on friable lagging; enclosure erection under adverse conditions and on friable lagging	0 to 20	any approved full-face respirator equipped with high efficiency filters
<i>Removal work in progress</i>		
removal work of asbestos-cement sheeting;	0 to 1	any approved respirator other than disposable respirator
certain forms of wet stripping in which wetting is prolonged and effective; certain small scale dry stripping operations	0 to 180	any approved full-face powered air-purifying or supplied-air respirator
ineffectively wet stripping (light wetting with inadequate time for saturation); dry stripping	>180	approved full-face, positive pressure demand respirator; or supplied-air, continuous flow, full suit

Appendix VII

Warning label for HEPA filter-equipped appliances



Specifications

Colour : letters and characters should be in white and/or black on red background; or other colour combination such that the label is clearly distinguishable from the background of the appliance.

Size : dimensions shown above are the minimum requirement.

Appendix VIII

Procedures for the face-fit check of respiratory protective equipment

The seal of a respirator should be checked prior to entering a contaminated atmosphere by procedures recommended by the manufacturer of the RPE or by the following tests:

Negative pressure test

- (a) Block the end of the breathing tube or close off the inlet opening of the respirator's cartridge(s) or filter(s) by covering with the palm of the hand(s) or replacing the seals so that it will not allow the passage of air.
- (b) The wearer inhales gently so that the facepiece collapses slightly and holds the breath for at least 10 seconds. If the facepiece collapses slightly and no inward leakage of air into the facepiece is detected, it can be reasonably assumed that the respirator has been properly put on and the exhalation valve and facepiece are not leaking.

Positive pressure test

- (a) Close off the exhalation valve of the respirator so that it will not allow the passage of air.
- (b) The wearer exhale gently for at least 10 seconds. If a slight positive pressure can be built up inside the facepiece without the detection of any outward leakage of air, it can be reasonably assumed that the respirator has been properly put on.

- Note : 1. The tests can only be used on respirators which depend on good face-seal.
2. For some respirators, the positive pressure test requires that the wearer first remove the exhalation valve cover from the respirator and replace it after completion of the test. This task is difficult to carry out without disturbing the fit of the respirator.

Appendix IX

Warning notice for protective equipment zone



Specifications

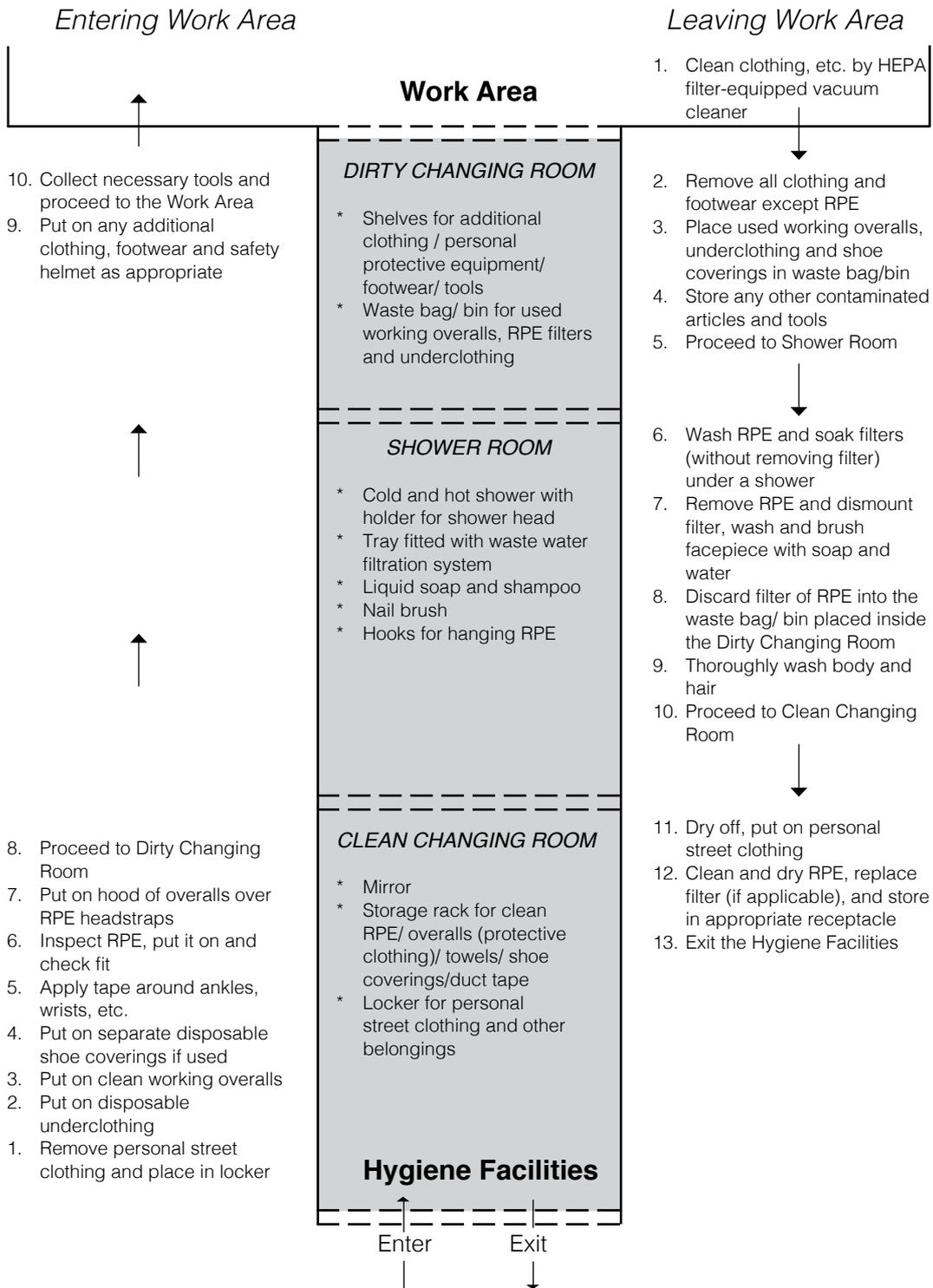
The warning notice should comprise both warning signs and explanatory labels.

- 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' sign
 - sign : white sign on blue background
 - label : white letters and characters on blue background

Size : height of the overall warning notice not less than 400mm
height of individual sign not less than 80mm

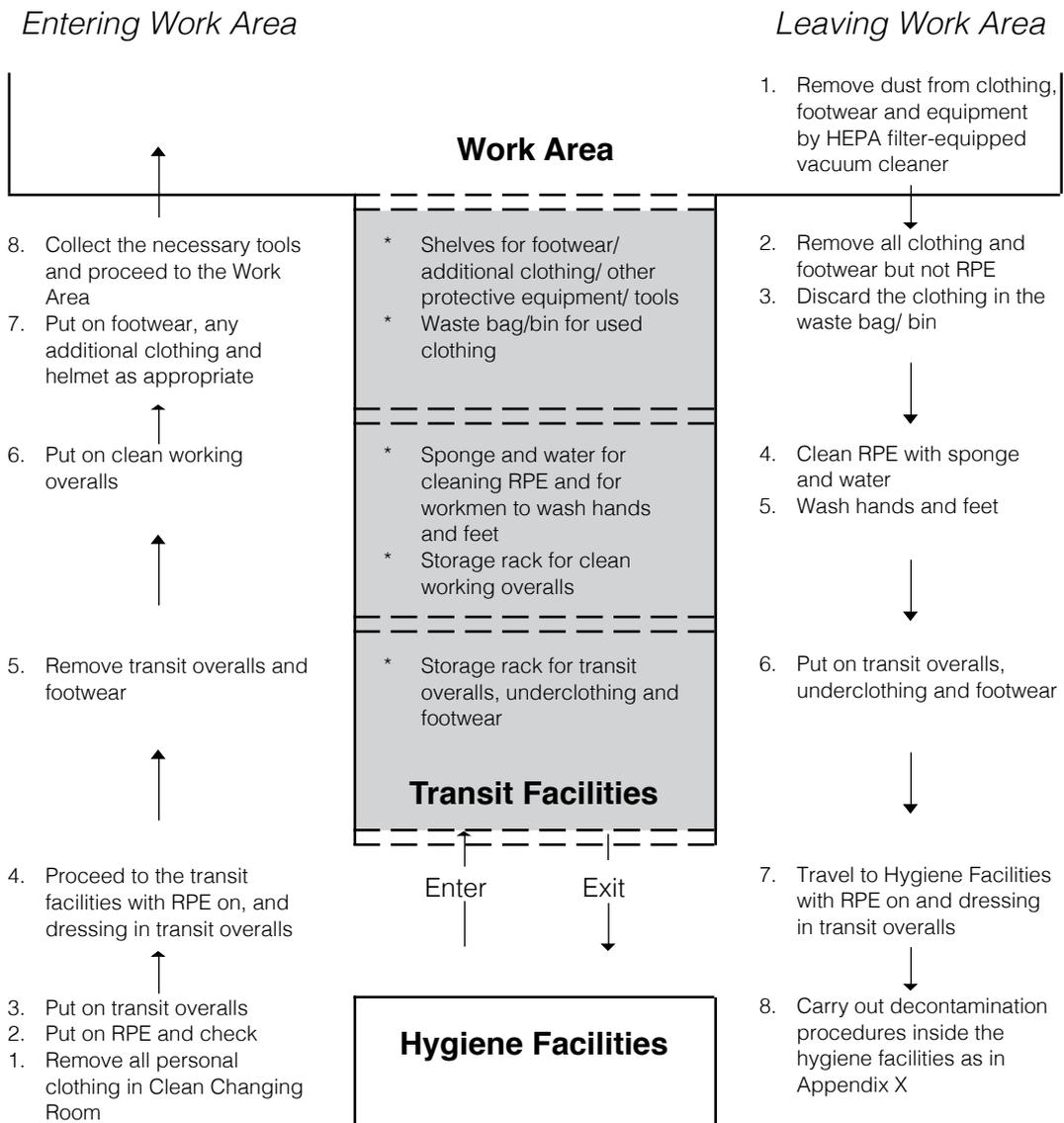
Appendix X

Procedures for entering and leaving work area through hygiene facilities



Appendix XI

Procedures for entering and leaving work area through transit facilities



- Note :
1. Transit overalls are protective clothing for transit purposes only, while working overalls are protective clothing used in the work area. Transit overalls should be clearly distinguishable from the working overalls, for example by use of different colours or markings.
 2. The workman may not put on RPE in travelling between the transit facilities and the hygiene facilities if wearing the RPE is considered hazardous. In this case, the RPE should be packed in a plastic bag and carried by the workman.

Appendix XII

工廠及工業經營(石棉)規例 Factories and Industrial Undertakings (Asbestos) Regulation

受僱於石棉工作的人的健康登記冊 Health Register for Person Employed in Asbestos Work

[規例第17(3)條]

[Section 17(3)]

本表格乃由勞工處處長就工廠及工業經營(石棉)規例第17(3)條的需要而認可
Form approved by the Commissioner for Labour for the purposes of section 17(3) of the Factories and Industrial Undertakings (Asbestos) Regulation

工業經營的名稱

Name of Industrial Undertaking _____

身份證號碼

Identity card no. _____

該人在工業經營首次受僱於
石棉工作的日期

受僱人姓名

Name of
employed person _____

出生日期

Date of birth _____

Date on which the person first
employed in asbestos work in
the industrial undertaking _____

健康檢查日期 Date of medical examination	進行健康檢查的 註冊醫生姓名 Name of registered medical practitioner conducting the examination	健康檢查結果 (註明該人是否被證明適合 從事石棉工作) Result of medical examination. (State whether the person is certified fit for working with asbestos)	填寫此記項的人的 姓名、簽名及職位 Name, signature and position of person making this entry	填寫此項日期 Date of making this entry

- 注意 (i) 須為每名受僱於石棉工作的人分別備存健康登記冊。
(ii) 此健康登記冊須附有由進行健康檢查的醫生所簽發的證明書。
(iii) 健康登記冊須保存為期最少5年，自登記冊內最後一項記項的日期起計。
(iv) 在健康登記冊所涉的人在僱用終止時，東主須給予該人一份健康登記冊的副本。
(v) 任何東主不遵守工廠及工業經營(石棉)規例第17(3)條為受僱於石棉工作的人備存健康登記冊，即屬犯罪，可處第5級罰款。
- Note (i) A separate health register shall be maintained for each person employed in asbestos work.
(ii) The certificate issued by the medical practitioner conducting the examination shall be attached to this health register.
(iii) Health register shall be kept for at least 5 years from the date of last entry in the register.
(iv) A copy of the health register shall be given to the person covered by it upon termination of his employment.
(v) A proprietor who fails to maintain health register for person employed in asbestos work in accordance with section 17(3) of the Factories and Industrial Undertakings (Asbestos) Regulation commits an offence and is liable to a fine at level 5

ASF-F-HR

Appendix XIII

Warning label for articles containing asbestos



Specifications

Colour : (a) letter 'a' in white on black background; and
(b) for the warning wording, letters and characters in white and/or black on red background;

OR

if the label is printed directly on the article, label in single colour clearly distinguishable from that of the background.

Size : dimensions shown above are the minimum requirements

This Code of Practice is issued free of charge and can be obtained from offices of the Occupational Safety and Health Branch of the Labour Department. It can also be downloaded from website of the Labour Department at <http://www.labour.gov.hk>. For enquires about addresses and telephone numbers of the offices, please visit the above website or call 2559 2297.

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**Occupational Safety and Health Branch
Labour Department**