

**Industry Code of
Practice for the Safe Use
Of
Glass Wool & Rock Wool
Insulation**

April 2003

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FARIMA

FIBREGLASS AND ROCKWOOL INSULATION
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PART A – PRELIMINARY

1. TITLE

This Code may be cited as the 'Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation'.

2. PURPOSE

This Code provides advice and guidance for the safe use of Glass Wool and Rock Wool Insulation.

The purpose of this Code is to detail overall responsibilities, procedures and work practices for handling Glass Wool and Rock Wool insulation products. Compliance with this Code is intended to eliminate risks to health in relation to the use of these products.

These general responsibilities, procedures and work practices are intended to eliminate or where that is not possible reduce to the lowest possible level the respirable fibres in the atmosphere. In circumstances where airborne fibres cannot be eliminated, the Code makes further provision for additional, suitable measures to eliminate health risks to workers.

This Code provides the basis for the specific schedules attached.

This Code is intended to assist workplaces through:

a) general provisions, in the body of the Code which are applicable to all Glass wool and Rock Wool user applications (notably provisions for assessment and control of exposure to these insulation products in workplaces)

b) detailed provisions applicable to the use of specific materials in the workplace are provided in the schedules to this Code.

2.1 EXPOSURE LEVELS

By following this Code, exposure to airborne fibre levels will generally be eliminated.

The Code requires that exposure be controlled through a hierarchy of measures. The Code provides that where 'at source' work environment and engineering controls do not completely eliminate exposure, additional individual personal protection is to be used to eliminate exposure.

The relevant Worksafe Exposure Standards of 0.5 respirable f/ml and 2.0 mg/m³ inspirable dust concentrations are relevant in relation to risk assessments and air sampling. These exposure standards do not relate to risk control measures where the intent of this Code is to eliminate worker exposure.

3. SCOPE

This Code of Practice applies to all user-applications involving mineral wool, (Glass Wool, Rock Wool and Slag Wool) and activities involving the installation, removal and any related handling work.

This Code of Practice **does not apply** to any application involving —

- Continuous glass filament (used as a reinforcing agent in industries such as boat building and swimming pools);
- Refractory ceramic fibres or superfine Glass Wool products.

4. DEFINITIONS

‘Biosoluble’ means dissolves in bodily fluids and is rapidly cleared from the body

‘Breathing Zone’ means a zone described by a hemisphere of 300mm radius, extending in front and measured from the midpoint of an imaginary line joining the ears.

‘Competent Person’ means a person whom the employer, in consultation with the site safety committee, ensures has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to currently perform a specified task.

‘Continuous Glass Filament’ (Reinforcing Filament) is an extruded filament usually having a relatively large diameter, greater than 6 micrometres, and a very narrow range of diameter distribution. Typically formed from a glass melt.

‘Exposure Standard’ means an airborne concentration of a particular substance in the worker’s breathing zone, exposure to which, over a period of 8 hours followed by a period free of exposure of 16 hours, and according to current knowledge, should not cause adverse health effects nor cause undue discomfort to nearly all workers.

Exposure standards for Glass Wool and Rock Wool

- A time-weighted average (TWA) applies for Glass Wool and Rock Wool.

‘Fibre’ means a particle with a length to width ratio of at least 3:1.

‘Glassfibre’ means Glass Wool Insulation, continuous glass filament or superfine glass fibre.

‘Glass Wool’ means a fibrous product formed by either blowing or spinning molten mass of glass. The resultant fibres are subsequently collected as an entangled matt of fibrous product.

‘Hazard’ means the potential to cause harm.

‘Hazardous Substance’ means a substance that has the potential, through being used at work, to harm health and safety in the workplace. The criteria for identifying a hazardous substance are detailed in the National Occupational Health and Safety Commission’s Approved Criteria for the Classification of Hazardous Substances (1999) as amended from time to time.

‘Inspirable Fraction’ means that fraction of dust which enters the respiratory tract as defined in Australian Standard AS2640 — 1989 Workplace Atmospheres: Method for sampling and gravimetric determination of inspirable atmospheric dust.

‘Label or Labelling’ means a label that complies with the National Occupational Health and Safety Commission Code of Practice for the Labelling of Workplace Substances (1994) as amended from time to time.

‘Material Safety Data Sheets’ (MSDS) means documents that describe the properties and uses of a substance, that is, the identification of, chemical and physical properties, health hazard information, precautions for use and safe handling information.

‘Micrometre’ (um) (Micron) represents one thousandth of a millimeter. A strand of human hair is approximately 15-30 um in diameter.

‘Mineral Wool’ means a fibrous product manufactured by the process of blowing or spinning from a molten glass of mineral raw material. The resultant fibres are subsequently collected as an entangled matt of fibrous product. Mineral wool may be either Glass Wool, Rock Wool or Slag Wool, depending on the raw material from which it is produced.

‘Nominal fibre diameter’ means the median diameter to which the fibrous product is manufactured. It may be thought of as the diameter at the mid point of a long fibre created by joining all fibres in a sample together in order to increase thickness.

‘Personal Sample’ means an air sample taken within the breathing zone of the worker.

‘Respirable Fibre’ means a fibre with a diameter less than 3 micrometres and length greater than 5 micrometres and with a length of width ratio of greater than 3:1. These fibres can reach the deepest part of the lung.

‘Risk’ means the probability of harm actually occurring.

‘Rock Wool’ is a fibrous product manufactured by a process of blowing or spinning from a molten mass of rock. In Australia, this is usually manufactured from a mix of basalt rock and slag. The resultant fibres are subsequently collected as an entangled matt of fibrous product.

‘Slag Wool’ is a fibrous product manufactured by a process of blowing or spinning from a molten mass of metallurgical furnace slag.

'SMF' means synthetic mineral fibres.

'Static Sample' means a sample taken at fixed location, commonly between 1 and 2 metres above floor levels.

'Superfine Glass Fibre' is an extremely fine fibre with a diameter less than 1 micrometre, usually made of glass for specialist applications.

'TWA' (time-weighted average) is the average airborne concentration of a particular substance over a normal eight-hour working day, for a five-day working week (Also see Exposure Standard).

5. SUMMARY OF HEALTH EFFECTS

Health effects, based on epidemiological and toxicological data available to June 2002, are summarised as follows:

Dust from these products may cause discomfort of the nose, throat and respiratory tract, especially for those suffering from upper respiratory or chest complaints such as hay fever, asthma or bronchitis.

In 1987 the International Agency for Research on Cancer (IARC) evaluated Glass Wool and Rock Wool as Group 2B — possibly carcinogenic to humans. This evaluation was based on limited evidence from animal experiments, and in the balance of findings from epidemiological studies of humans in North American and European manufacturing industries.

Studies completed since 1987 have demonstrated that the potential health risks from Glass Wool and Rock Wool are less than suggested at the time of IARC review. These reduced health risks were confirmed by the IARC in October 2001, when a meeting of a panel of experts conclude that Glass Wool and Rock Wool were not carcinogenic to humans. As a result of this conclusion, the IARC has removed Glass Wool and Rock Wool from its list of possible human carcinogens.

Since January 2000 (Glass Wool) and January 2002 (Rock Wool) all insulation wool products (Glass and Rock Wool) manufactured in Australia have been Biosoluble FBS-I Glass Wool and Rock Wool. These products are not classified as hazardous according to the criteria of National Occupational Health and Safety Commission (NOHSC).

These products are not classified as hazardous according to the criteria of National Occupational Health and Safety Commission (NOHSC).

The overall conclusion, based on available animal data and epidemiology, is that provided Glass Wool and Rock Wool work is carried out in accordance with this code of practice and compliance is maintained with the Worksafe exposure standard, then there is a negligible health risk associated with exposure to Glass Wool and Rock Wool under present day manufacturing and usage patterns.



*FBS-1
Glass Wool
symbol



**FBS-1
Rock Wool
symbol

PART B – DUTIES OF PARTIES

This Code provides practical guidance to manufacturers, importers, suppliers, employers and employees in relation to their obligations under Occupation Health and Safety legislation.

In complying with this Code all parties need to ensure also that they are aware of and meet their specific obligations under law applicable in their jurisdiction.

It should be remembered that a person may have an obligation under more than one set of duties.

6. DUTIES OF MANUFACTURERS, IMPORTERS & SUPPLIERS

The manufacturing process should be designed so that the lowest possible amount of fibres become airborne. Appropriate professional advice from, for example, an industrial ventilation engineer or occupational hygienist, may be required to achieve this.

6.1 Manufacturers, Importers and Suppliers must –

- a)** endeavour to supply Glass Wool and Rock Wool materials which emit the lowest possible amount of fibres and/or dust, especially during cutting or shaping.
- b)** ensure packages of Glass Wool and Rock Wool will be labelled in accordance with the provisions contained in the National Commission's Code of Practice on labelling.
- c)** have and supply Material Safety Data Sheets (MSDS) for Glass Wool and Rock Wool materials, including additives, in the approved National Commission format.
- d)** pack and package Glass Wool and Rock Wool materials in a form that minimises the release of fibres and/or dust.
- e)** provide information to enable the safe use of Glass Wool and Rock Wool materials.

7. DUTIES OF EMPLOYERS

1. An employer using Glass Wool and Rock Wool materials will select from among the 'suitable products' the material and product-forms that will minimize the release of fibres and/or dust.

● 'suitable products' means those Glass Wool and Rock Wool products that meet the specific technical performance requirements for the job.

2. The employer will ensure that any risk to health and safety created by Glass Wool and Rock Wool procured, handled, stored or disposed of in the workplace is examined, assessed and controlled.

3. The employer will ensure employees are instructed in safe work practices for handling Glass Wool and Rock Wool materials and correct procedures for the selection, wearing and maintenance of personal protective clothing and equipment.

4. The extent of instruction and training required must be appropriate to the duties of the individual within the organisation and be sufficiently detailed to ensure that the individual understand not only the procedural and safety requirements, but also the reasons for these requirements.

5. Employers are required to ensure that they obtain information as to the likely exposure levels that employees may experience with each given task. Where monitoring is undertaken to determine exposure levels, such monitoring shall be in accordance with the National Occupational Health and Safety Commissions' (NOHSC) membrane filter method for the estimation of airborne synthetic mineral fibres.

6. Action should be taken to apply appropriate control strategies on a continuing basis. The aim of these strategies is to reduce exposure to Glass

Wool and Rock Wool to the lowest possible levels. Personal protection should not be used to replace the other control measures such as engineering controls and systems of work and others where these other measures are adequate, unless these are shown to be inadequate or not practicable.

7. Employers should ensure appropriate site maintenance and follow proper procedures to minimize the creation and spread of fibres and/or dust and ensure that the disposal of Glass Wool and Rock Wool waste is carried out in accordance with the requirements of the local waste disposal and/or State OH&S authority.

8. DUTIES OF EMPLOYEES

1. An employee should take part in any jointly agreed instruction or training program provided by the employer or jointly agreed provider.

2. An employee who has been trained in the above control measures is required to, as far as the employee is capable, use those control measures, including personal protective equipment, in accordance with the assessment made.

3. An employee should report to the employer and OH&S representative any departure from control procedures or defects in P.P.E.

9. RISK ASSESSMENT

- 1.** All Glass Wool and Rock Wool products manufactured in Australia are biosoluble (FBS-1) in accordance with the criteria of [NOHSC: 10005 (1999)] and are not classifiable as hazardous.
- 2.** The employer must ensure that the risk assessment is carried out by a competent person.
- 3.** The assessment must be conducted in consultation with employees who are likely to be working with or otherwise exposed to Glass Wool and Rock Wool and their health and safety representatives.

9.1 WHAT THAT RISK ASSESSMENT SHOULD COVER

The Risk Assessment should cover the following:-

- a)** identification of Glass Wool and Rock Wool in the workplace — this should include the type, form, location and potential usage including production, handling, storage, transport and disposal.
- b)** the nature of the hazard to health and safety (information about Glass Wool and Rock Wool can be obtained from product labels and MSDS provided by the suppliers).
- c)** the exposure to Glass Wool and Rock Wool.
- d)** the need for atmospheric monitoring (see Appendix 2).

e) the measures required to control the exposure to Glass Wool and Rock Wool (refer Section 11).

9.2 Determining Degree of Exposure

1. There can be significant amounts of respirable fibres in all insulation wool products. Employers should ensure that they obtain information about the likely exposure levels that employees may experience with each given task. (Refer Appendix 2).

2. There are several factors that alone, or in combination, largely determine the fibre levels present during specific application of insulation wool products. These factors include:

- Type and form of product
- Degree of disturbance
- Extent of binders, cladding or sealants
- Ventilation

3. These factors should be considered in assessing the level of risk to health and safety involved in the use of insulation wool.

9.3 Air Sampling

1. Where concern exists over possible respirable fibre and dust concentrations in any application, the first step should be to confirm that the work practices, as recommended for the particular product in the schedules to the National Code of Practice, are being followed. Air monitoring is not required when it has been clearly established that the work practices outlined in the schedules are being carried out.

2. In the event that establishment of likely respirable levels is required,

then the following steps shall be taken:

a) Reference shall be made to available information relating to similar jobs to determine their typical respirable fibre concentration levels. Three (3) sources of such information are:-

- Chapter 7, 'Levels of Exposure to SMF During End User Operations' from National Commission's Technical Report on Synthetic Mineral Fibres.

- 'WorkSafe Report to the Insulation Wools Research Advisory Board (IWRAB) – 'Australian Exposure Databank on Synthetic Mineral Fibres (Glass Wool and Rock Wool) in 1991/92'.

- Insulation Wools Research Advisory Board (IWRAB) 1997- 2002 Australian Insulation Wool (Glass Wool and Rock Wool) User Industry Exposure Study.

b) Available information should be checked to determine whether the job has previously been assessed for typical air concentrations.

c) While any issues relating to establishing respirable fibre and dust concentrations are being pursued, appropriate respirators should be worn.

d) Where doubt still exists as to the levels of exposure, monitoring of fibre levels should be undertaken by adequately trained personnel in accordance with the NOHSC membrane filter method.

3. The employer shall ensure that each employee who works with insulation wools is kept informed of results of all monitoring and assessment of exposure. The employer should explain what measures are being undertaken to minimize the risk of excessive Glass Wool and/or Rock Wool exposure where these exist.

4. Records of monitoring are required to be securely stored by the

employer and kept for a period of 30 years. (refer individual State obligations).

5. Measures of exposure should be determined over a minimum sampling period of 4 hours/productive during which time one or more consecutive samples may be collected to ensure a representative sample is obtained and hence a time-weighted average (TWA).

9.4 Revision of Risk Assessment

The risk assessment should be reviewed periodically and whenever:-

- a)** there is a change in the way the insulation wool is used,
- b)** there is a change in a process or procedure or in the environment in which the product is being used which may result in a change in exposure,
- c)** new information becomes available about the possible hazardous properties, eg: introduction of FBS-I biosoluble fibres in January 2000, IARC evaluation review (2001).
- d)** inspections and/or monitoring indicates exposure controls are adequate,
- e)** new or improved control measures become available.

9.5 RECORDS OF ASSESSMENT AND MONITORING

The risk assessment of potential exposure to Glass Wool and Rock Wool should be recorded and made available to all employees, their OH&S representatives and Health and Safety Inspectors on request.

10. OVERALL STRATEGY

1. Action should be taken on a continuing basis to achieve the lowest possible level of airborne fibres and dust.

2. This level could be achieved by, for example:-

a) the provision of engineering controls

b) the greater attention to plant cleanliness and the containment of waste material

c) using work practices and materials (eg. dust suppressants) that reduce the release of dust and fibres

d) the provision of appropriate P.P.E.

3. Following this Code and the specific schedules will result in fibre levels significantly below the exposure standard of 0.5f/mL. Monitoring to date has shown that this is the case.

(Refer Appendix 2)

4. In addition, in situations where almost all the airborne insulation wool material is fibrous, a secondary, yet complimentary, standard of 2mg/m³ of inspirable dust should be applied to avoid short term irritation, for example, of the nose and throat, from largely non-respirable fibres.

5. Provided this Code is applied, and the specified work practices nominated above are implemented, any risk to health should be contained and employees should not be exposed to unsafe conditions, or face any measurable risk to health.

II. WORK PRACTICES

II.1 Pre-Delivery

Prior to working with Glass Wool and Rock Wool, employers should ensure the following:-

- a)** Glass Wool and Rock Wool material is ordered in a form and shape which requires a minimum of cutting and handling on site.
- b)** MSDS's that conform with the approved Work Safe Code of Practice are supplied and studied.
- c)** Adherence to product usage information as defined in the MSDS.
- d)** Estimated duration of the insulation wool work.
- e)** Confirmation of site arrangements, for example, training in accordance with the Code of Practice.
- f)** Consideration of protection of the health and safety of employees not working directly in the area ie: where practicable, employees not engaged in Glass Wool/Rock Wool work should not be within 3 metres of the Glass Wool and Rock Wool work areas.

II.2 General Practices

I. The employer, having determined the form and type of Glass Wool and Rock Wool to minimize the emission of fibres and dust should adopt engineering controls, including local exhaust ventilation to contain or minimize exposure to fibres and dust.

2. The employer should ensure safe work practices are developed which adopt work methods that minimize the release of or exposure to Glass Wool and Rock Wool.
3. Where exposure levels are such that P.P.E. is required, the employer should ensure that it is readily available in the workplace.

11.3 SYSTEMS AT WORK

The following engineering controls, general housekeeping, and work practices, should be adhered to when handling Glass Wool and Rock Wool materials:

- a)** Work practices are designed to minimize the release of, and exposure to, fibres and dust.
- b)** Packaging and transport of materials is carried out so as to minimize the release of fibres and dust.
- c)** Correct tools are used for the task. Where required, manual tools should be used to trim or cut Glass Wool and Rock Wool materials. If it is essential to use power tools these should be fitted with exhaust extraction at the point of dust generation, or other effective local exhaust ventilation supplied.
- d)** Designation of work areas using ropes (or similar barriers) and appropriate signs are utilised, where practicable, for all overhead work involving Glass Wool and Rock Wool. Where practicable, employees not engaged in Glass Wool and Rock Wool work should not be within 3 metres of the Glass Wool and Rock Wool work areas. An example of an appropriate sign follows:

<p>GLASS WOOL/ROCK WOOL WORK AREA FOLLOW SAFETY INSTRUCTIONS</p>

- e)** All warning labels must comply with Australian Standards AS 1319.
- f)** Glass Wool and Rock Wool materials should be stored in low traffic areas, and in intact containers or under sheet covers.
- g)** Glass Wool and Rock Wool materials to be sprayed or gunned should be used and handled in a wet, rather than dry, form where possible.
- h)** Work areas should be cleaned regularly to remove any build up of fibres and/or dust. Visible waste materials should be removed promptly to avoid being trampled and spread about.
- i)** Cleaning should be by an industrial vacuum cleaner, but wet mopping and wiping is acceptable if vacuuming is not possible.
- j)** Waste should be placed in plastic bags or other containers which prevent fibre and dust emission, and disposed of in accordance with requirements of the local environment protection and waste disposal authorities.
- k)** Amenity rooms should be kept as free as possible from fibres and dust.
- l)** Adequate washing facilities should be available on site to wash the skin, and to treat dust in the eyes.

12. INFORMATION

12.1 Material Safety Data Sheets

The employer is required to ensure that Material Safety Data Sheets are obtained and are readily available to employees and their representatives.

12.2 Labels

The employer is required to ensure that all containers or packages of Glass Wool and Rock Wool are clearly and appropriately labelled.

13. EDUCATION AND TRAINING

Supervisors and employees who work with Glass Wool and Rock Wool must be provided information, instruction and training. This must include:

- a)** any health information relating to Glass Wool and Rock Wool handling and/or exposure obtained from labels and MSDS;
- b)** the importance of controlling the level of Glass Wool and Rock Wool fibres and dust in the atmosphere to the lowest workable levels;
- c)** the probable exposure levels associated with the type of job;
- d)** how safe work practices, such as control measures, respiratory protective equipment and protective clothing;
- e)** the role and appropriateness of air monitoring;
- f)** employer responsibilities; and **g)** employee responsibilities.

SCHEDULE I

REMOVAL OF GLASS WOOL AND ROCK WOOL PRODUCTS

- a)** Procedures to be applied for removal depend on the form of the original insulation wool installed.
- b)** The two basic forms of Glass Wool and Rock Wool product are bonded and unbonded. The bonded form of Glass Wool and Rock Wool contain binding agents that have been cured in the manufacturing process prior to packaging and delivery and the products have a specific shape. The unbonded form can be loose packed.
- c)** Respiratory protection will be necessary when working in enclosed or poorly ventilated spaces or where the Glass Wool and Rock Wool insulation has undergone physical change.
- d)** Removal of bonded material is easier and less dusty than unbonded forms. Any physical abrasion, including cutting, should be kept to a minimum during removal. Such removal can be performed in a dry condition if there is minimal physical abrasion. Only in circumstances where heat or other conditions have made the bonded Glass Wool and Rock Wool attach itself to the substrate should physical abrasion take place. If this occurs, removal should be performed as for unbonded Glass Wool and Rock Wool removal.
- e)** Removal of unbonded material is more difficult and more dusty. The unbonded material should be thoroughly wetted before removal takes place. Dry removal may be necessary when there are electrical and heat considerations.
- f)** Details of the specific work practices and recommended protective equipment for removal work are detailed in Sections 9.10 and 11 of this Code of Practice.

SCHEDULE 2

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- a)** Where exposure levels are such that personal protective equipment is required it is required to be readily available in the workplace. Protective equipment is not to be regarded as a substitute for control measures to reduce exposure levels.
- b)** Respirators are required to be correctly fitted, maintained in good condition, and kept in clean storage when not in use.
- c)** Replaceable filters and cartridges should be placed regularly, in accordance with guidelines issued by the manufacturer.
- d)** The protection offered by some types of respirators may be affected by personal characteristics such as beards and the wearing of glasses or goggles. Appropriate respirators to ensure protection shall be used (see Appendix 1). All respirators shall comply with the provisions of Australian Standards AS/NZS 1715 and AS/NZS 1716.
- e)** Safety goggles or face shield should be worn to avoid eye irritation or injury, especially when performing overhead work.
- f)** Short Term skin irritation can be minimized by the use of goggles and loose fitting, long garments or disposable overalls. This clothing should be washed regularly, separated from other laundry to avoid cross contamination and subsequent skin irritation of non-workers. To avoid undue heat stress and general discomfort to the wearer, consideration should be given to the type of material chosen for this clothing.

Examples of suitable PPE referred to in the attached schedules are given in Appendix 1.

A most comprehensive discussion on the selection, maintenance and performance of all types of respirators is found in Australian Standards AS/NZS 1715 and AS/NSS 1716. These standards are reviewed periodically in line with development in the area of respiratory protection.

The choice of respiratory protection is determined by a number of factors. These include:-

- The actual or potential airborne concentration of dust or fibre;
- The duration of exposure;
- The workload demands whilst wearing the respirator;
- The availability and reliability of maintenance for non-disposable respirators;
- The facial fit for person with beards and other personal characteristics and;
- The availability of appropriate respirators.

Particulate respirators contain filters that trap dust, mists or fumes.

Disposable respirators generally are constructed of moulded, non-woven fibre and are designed to suitably fit many face sizes and shapes. They allow workers to be easily understood in normal voice tones without lifting or removing the respirator.

The WorkCover Authority of New South Wales tests and approves particulate respirators for the following classes in accordance with the requirements of Australian Standard AS/NZ 1716:

- Class P1 — intended for use against generated particulates eg; Silicate, asbestos.

- Class P2 — intended use for use against both mechanically and thermally generated particulates, eg. metal fumes.
- Class P3 — intended for use against all particulates including highly toxic materials eg. beryllium.

Disposable and non-disposable respirators have to meet the same testing requirements.

Disposable particulate respirators are currently available with a Class P1 and a Class P2 approval. Class P3 respirators must have a full face piece.

Class P1 respirators should provide the respiratory protection necessary for work with Glass Wool and Rock Wool.

In practice, the actual protection afforded by a particular respirator is influenced by two major factors:

- The degree of leakage around the respirator, and
- The proportion of time the respirator is worn during the exposure.

It takes only short periods during the workday of not wearing a respirator to erode the protection afforded even by high efficiency filters.

The filtration efficiency of Class P1 and P2 filters is similar for fibrous particulate, however, the actual protection afforded is very much determined by the quality of the facial seal and the degree of any resultant leakage.

These two factors emphasise the importance of a good facial fit and 100 percent compliance with wearing of the respirator. They also highlight the futility of burdening the individual with high efficiency devices which are not warranted by the actual exposure.

Half-face respirators may be either Class P1 or Class P2 depending upon the filter efficiency. The half face rubber respirators offer long-term economy in that only the filter cartridges need be changed. However, unlike the disposable items, the rubber half-face respirators require on-going maintenance of, for example, valves, if their efficiency is to be assured.

Many disposable respirators also have exhalation valves that make breathing easier. Because of their one-use application, they do not require maintenance.

For virtually all aspects of work involving Glass Wool and Rock Wool, Class P1 and Class P2 efficiency would be adequate to ensure that actual worker exposure is <0.1 f/ml. The choice of Class P1 and P2, and disposable or non-disposable, is often determined by practical considerations such as worker comfort or preference and the reliability of maintenance.

Airline respirators and the powered air-purifying respirators can offer a very high level of respiratory protection. When operated in the positive pressure demand mode these respirators generally reduce problems of poor facial seal due to beards and other personal characteristics. These respirators are usually only required for the most dusty operations or where there are high concentrations of toxic materials such as crystalline silica or asbestos. Airline respirators and powered air-purifying respirators demand a detailed maintenance program if they are to continue to offer the expected performance.

Australian Standards AS/NZS 1715 and AS/NZS 1716 give detailed advice of the selection and maintenance of respirators.

APPENDIX 2

LEVELS OF EXPOSURE TO GLASS WOOL AND ROCK WOOL DURING END USER OPERATION

- I.** This appendix forms part of the open "Code of Practice for the Safe Use of Glass Wool and Rock Wool".

Information of levels of exposure which may be expected during the installation or removal of Glass Wool and Rock Wool products has been summarised in the following reports prepared by Worksafe Australia and the Insulation Wools Research Advisory Board (IWRAB).

- i)** 1989: Worksafe Technical Report on Synthetic Mineral Fibres and Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres.
- ii)** 1994: Worksafe National Exposure Databank on Synthetic Mineral Fibres and Guidance Note on the Membrane Filter Method for Estimation of Airborne Synthetic Mineral Fibres.
- iii)** 1997 to 2002: IWRAB Australian Insulation Wools (Glass Wool and Rock Wool) User Industry Exposure Study.

2. This information has been summarised in the following tables.

Table 1

Glass Wool – exposures to respirable fibres and inspirable dusts during a variety of end-user applications – personal sampling only

END USE	Respirable Fibres f/ml. (range)	Inspirable Dusts mg/m³ (range)
Insulating pipes	<0.01-0.3	0.5-0.7
Lagging air-conditioning	<0.01-0.2	-
Applying blanket	<0.1-0.01	-
Installing batts in ceiling spaces	0.1-0.8	5.0-18.0
Installation of batts & blankets	<0.01-0.8	2.9-17.4
Removal of Glass Wool products	<0.01-0.2	

Table 2

Rock Wool – exposures to respirable fibres and inspirable dusts during a variety of end-user applications – personal sampling only

END USE	Respirable Fibres f/ml. (range)	Inspirable Dusts mg/m³ (range)
Insulating pipes	<0.01-0.8	-
Applying blanket	0.03-0.1	0.7->50.0
Installing batts	0.1-0.4	0.1->10.0
Removing blanket	<0.01-0.5	0.6-100.0
Spraying Rock Wool mixture	0.06-0.6	2.9->20.0
Installation of batts & blankets	<0.01-0.1 (one sample reported as 1.5)	<0.05-6.2

Table 3.**1997 - 2002 Australian Insulation Wool (Glass Wool and Rock Wool) user industry exposure study****(a) Glass Wool and Rock Wool – personal samples – respirable fibres**

Type of product	No.of sites	Respirable fibres/ml —				All
		< 0.05	0.05 - < 0.1	0.1 – 0.5	>0.5	
Batts	8	5	3	6	-	14
Batt removal	1	2	-	-	-	2
Duct liner	9	14	10	-	-	24
Blanket & rolls	10	22	3	1	-	26*
Boards	4	26	-	-	-	26**
Moulding wool	1	3	-	-	-	3
Totals	33	72	16	7	0	95

*Plus one sample overloaded with particulates

**Plus four sample overloaded with particulates

(b) Glass Wool and Rock Wool – static samples – respirable fibres

Type of product	No.of sites	Respirable fibres/ml —				All
		< 0.05	0.05 - < 0.1	0.1 – 0.5	>0.5	
Batts	4	9	-	-	-	9
Duct liner	8	14	-	-	-	14
Blanket & rolls	6	13	-	-	-	13*
Boards	2	9	-	-	-	9
Moulding wool	1	4	-	-	-	4
Totals	21	49	0	0	0	49

*Plus one sample overloaded with particulates

(c) Glass Wool and Rock Wool – inspirable fibres

Type of product	No.of sites	Inspirable dust-mg/m ³			No.of results in each category		
		< 0.1	0.1 - < 1.0	1.0 – 2.0	>2.0	All	
Batts	5	-	10	1	-	11	
Batt removal	1	-	1	-	1	2	
Duct liner	8	-	13	-	1*	14*	
Blanket	3	-	3	-	-	3	
Moulding wool	1	-	3	1	-	4	
Totals	18	0	30	2	2	34	

*One dust sample heavily contaminated with sprayed adhesive

3. These tables demonstrate the two important findings that:

(a) inspirable dust concentration will vary greatly depending on the type and circumstances of use. (All removal applications are likely to be dusty, such as installation of batts in old ceiling spaces).

(b) the inspirable dust levels will include dust other than **Glass Wool and Rock Wool.**