Effective Use of Respiratory Protective Equipment

This fact sheet is intended to provide workers with some basic information about the effective use of respiratory protective equipment.

Background:

Every coal mine has a responsibility to ensure that exposure to respirable dust is kept to an acceptable level. Where higher level controls are being investigate or are not able to reduce exposures to acceptable levels, an emphasis is often placed on the use of respiratory protective equipment (RPE) to assist in protecting coal mine workers against harmful airborne contaminants. As seen in the hierarchy of controls (Figure 1), the use of personal protective equipment is the least effective method of control and should not be relied on as a primary or long term control solution. However, RPE does have a vital role in a coal mines overall dust management strategy. Given this, its selection, use and maintenance should be in accordance with the requirements of Australian Standard AS/NZS 1715:2009 to ensure its effective use. It is very important that coal mine workers are educated about the reasons surrounding the effective use of RPE. This should include how exposure to dust can impact workers health in the short & long term.

Figure 1

When RPE use is a requirement:

The Australian Standard AS/NZS 1715:2009 requires that if RPE is required to be worn on a coal mine, then a **respiratory protection program** shall be established. This program should include:

- Appointing a program administrator to develop an RPE policy and procedure, to coordinate the selection, purchase, training and auditing of the RPE system.
- Training of staff in the correct selection, use, maintenance and limitations of RPE. Training should involve regular fit testing to ensure the selection equipment is providing an adequate seal to the workers face.
- Mandating or assigning responsibility to ensure that RPE is worn in high contaminant areas at all times.
- Record keeping of training and usage of RPE.
- Program evaluation (annually) to determine RPE effectiveness and acceptance by workers.

Selection, Use and Maintenance:

Once a coal mine has identified and recorded all RPE required tasks on site, the **selection**, **use** and **maintenance** should be in accordance with the **requirements** of AS/NZS 1715 to ensure its effective use. Specifically, sites and workers should ensure that:

RPE selection is:	RPE is used correctly by:	RPE is maintained by:
→ An educated decision. → Undertaken by a competent & adequately trained person with the knowledge and consideration of: + AS1715 & AS/NZS 1716 + Tasks being undertaken + Characteristics of the airborne contaminant i.e. particulate (thermally or mechanically generated), vapour, gas + Equipment limitations + Other PPE required that may interfere with the suitability → Distributed by persons who understands how to appropriately assist other workers in the selection process. → Varied; different types of RPE should be made available as not every device is suitable for every worker.	→ Following the instructions provided and understanding how to 'fit' the selected RPE. + Workers should be provided with annual training that includes correct fitment techniques. + This training should be refreshed on a regular, ongoing basis. → Wearing it continuously, this includes not removing to communicate. → Being clean shaven to ensure adequate seal. → Ensuring the correct filters are installed on reusable RPE. → Performing a self-fit check prior to use, ensuring an adequate sea is achieved.	→ Implementing an effective storage and maintenance program. → Storing in a clean, sealed location, in close proximity to the work location. → Disposing of single use RPE after each use. → Regularly inspecting and thoroughly cleaning (with soapy water) reusable devices after each use. → Replacing parts as required (i.e. straps, filters); either scheduled or due to deterioration. → Ceasing use of reusable devices if they are found to be defective.

Training:

Section 65 of the coal mining safety and health regulation requires mines to have a standard operating procedure (SOP) for training workers in the use of personal protective equipment (PPE). Training should cover as a minimum:

- Identified hazardous atmospheres requiring the use of respiratory protective equipment.
- Correct selection and fitting
- Specific storage requirements
- Inspection, maintenance and cleaning regimes
- Disposal of RPE
- Stringent and auditable record keeping of all aspects of the selection, use and maintenance of RPE.

RPE Fit Testing – Qualitative vs. Quantitative:

The proper fitting of RPE requires the use of some type of fit test to determine an adequate match between the face piece of the RPE and face of the wearer. Fit testing must be performed to assure the choice of a suitable respirator before it is used. AS/NZS1715 recommends that further fit tests are performed at least annually or if the wearer's facial characteristics or features change. There are two main methods of RPE fit tests:

Qualitative Method		Quantitative Method	
Generally involve exposing a worker with RPE donned to a low toxicity substance. If the worker can smell or taste the substance this indicates an inadequate seal or leakage.		Worker fitted to equipment which measures the efficiency of RPE to a specific procedure. The atmosphere inside and outside the respirator is sampled through a probe. A series of tests and movements are undertaken during the assessment in an attempt to test the efficiency of the seal. A sequence of results are generated per test, with an overall fit factor determined.	
Pros	**Cons**	**Pros**	**Cons**
→ Cheap → Easy → Fast	→ Subjective → Not entirely reliable	→ Does not rely on subjective response → Data driven → Stored in database for easy reference	→ More expensive → More time consuming

Positive or negative pressure fit checks should also be conducted prior to entering the contaminated area.

Is facial hair a factor?

There are a number of factors that can affect an effective seal of a tight fitting RPE to a workers face including the interference of other PPE or spectacles, facial features / scars and facial hair. When the seal is impeded due to presence of facial hair (even a few days growth), it reduces the pressure within the RPE, leading to the excessive leakage of the contaminant. AS/ANZ1715 Appendix B provides extensive reasoning as to why facial hair affects the effective use of RPE. Furthermore, the OSHA test protocol (1910.134) stipulates that a fit test shall not proceed if there is any facial hair growth affecting the seal of a respirator.