

Respiratory Protection for Workers with Facial Hair - Australia

Are CleanSpace Respirators “Close Fitting” per AS/NZS 1715?

No. AS/NZS 1715 uses the term “close fitting” to describe respirators which “rely on facial fit to prevent inward leakage of contaminants” (4.4.3.1). It quite properly warns against the use of such respirators on workers with facial hair. Although a CleanSpace PAPR mask looks superficially like a close fitting PAPR mask (and will seal to the face of a clean shaven wearer) its protective mechanism is the same as a PAPR with a hood: more air is blown into the mask each second than the wearer breathes in. As a result, positive pressure inside the mask is always maintained and any leaks are pushed outwards. A CleanSpace PAPR’s protection does not rely on maintaining an airtight seal between mask and face.

AS/NZS 1715 was first released (based on an earlier standard AS CZ11 from 1960) in 1994, at which time no breath-responsive PAPRs had been released. Even the latest version (2009) pre-dates the development of the first CleanSpace PAPR. It does not contemplate the breath-responsive PAPR, which combines a low-profile mask design with constant monitoring of mask pressure and produces a peak flow rate well in excess of that required of a hooded PAPR.

CleanSpace respirators are certified to AS/NZS 1716 as type PAPR. (Certificate available from CleanSpace on request).

Are CleanSpace Respirators Suitable for Workers with Facial Hair?

Yes. Because their protective mechanism does not rely on maintaining an airtight seal between mask and face, CleanSpace respirators provide a high level of protection for those with facial hair.

CleanSpace keeps records of all protection factor testing conducted on its devices worn by workers with facial hair (Internal testing records as well as records provided by external testers). To date (April 2023) we have records for 371 industrial workers with facial hair. Their average protection factor was 8,194, with a 5th percentile result of 1,337 and a lowest-ever result of 105 (the pass mark is 100)*.

Workplace Protection Factor (WPF) studies, in which the protection factor achieved is measured while workers perform their normal work in their normal environment, show similar results. The most recent WPF study in the UK of 20 workers with facial hair showed an average protection factor of over 10,000, a 5th percentile of 1,250 and a worst minute (out of 1,015 minutes of data recorded) of 262. An earlier Australian WPF study of 9 workers with facial hair showed an average protection factor of over 6,000, a 5th percentile of 1,309 and a worst minute of 404**.

* A complete listing of all protection factor testing is also being prepared and will be available on our web site in May 2023. In the meantime data is available on request.

** CleanSpace White Paper Workplace Protection Factors (Australia 2020); and CleanSpace Workplace Protection Factor Study UK 2023. Data available on request.

Demonstrating Compliance with Employer's Legal Obligations

An employer's responsibilities in relation to protective equipment come from the local work health and safety law. In most instances, the key requirements are **a)** that the equipment provide effective protection against the hazards present, **b)** that it is a suitable size and comfortable fit, **c)** that it is maintained and **d)** that efforts are made to ensure it is worn when required.

For instance, in the Australian state of New South Wales, an employer's responsibilities are governed by the Work Health and Safety Regulation 2017.

To demonstrate compliance with these responsibilities, we recommend the following, as a minimum. Each action must be recorded, and the records maintained.

- Fitted by a suitably trained and experienced person, to ensure comfort and suitable sizing.
- Protection factor testing of each employee before issuing the respirator. This should be a power-on test, to OSHA 29 CFR 1910.134, using a particle counter (TSI PortaCount or similar). Most employers currently choose to repeat this testing annually. This testing demonstrates the level of protection that the employee receives.
- Annual servicing of the respirator by a competent service organisation.
- To maximise use of the respirators, employers should choose equipment that is simple and comfortable to wear and does not impede the wearer in their normal tasks. Most employers will institute a system of rules, mandating use of the respirator for various tasks and a system of supervision to ensure they are followed. Supervision is easier if the device can record and store its usage so that failure to wear the respirator can be detected, even if no inspection happens during the shift.
- It has been found that a key element in demonstrating that a particular worker was protected on a given day is establishing that they were actually wearing the PAPR and that it was in serviceable condition. Records of use can help considerably. Ideally the respirator should store a record of when it was used, its condition (filter state, battery voltage, etc.) and ideally an estimate of the protection factor being achieved. These records can be produced when required, to establish compliance with the employer's responsibilities.

Experience to date is that the records of these checks, together with the historical records of performance and WPF testing discussed above, are adequate to establish compliance.

