



HHSEG Topic Talk

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Face-Fit Testing of Respiratory Protective Equipment (RPE)

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GHT Provide Specialist Training Courses in RPE

- Quantitative RPE Face-Fit Testing Training
- Qualitative RPE Face-Fit Testing Training
- *BOHS P603* Personal Protective Equipment
- *W505* Control of Hazardous Substances



UK law requires RPE provided to be 'adequate'

'Adequate' means – RPE provides protection against the hazardous airborne substance(s) present and reduces exposure to a safe level e.g. below the Workplace Exposure Limit (WEL)

It also means that the RPE is 'adequate' - if life threatening oxygen deficient areas are entered.





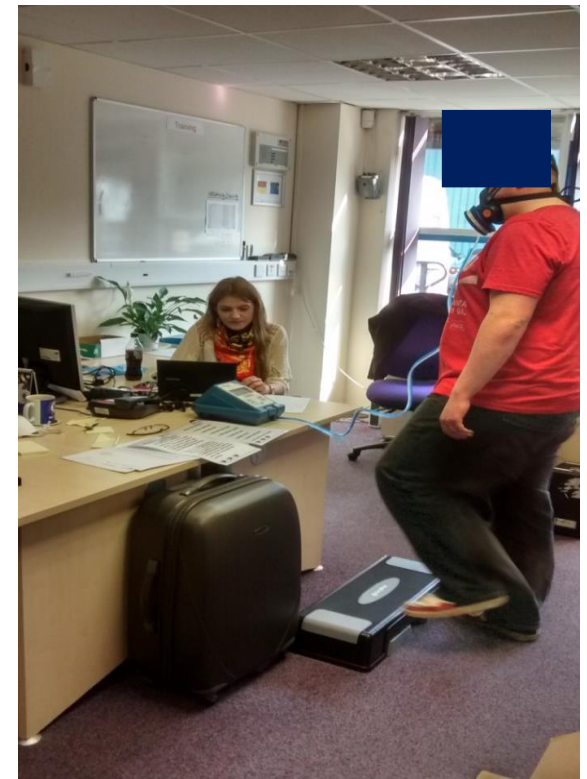
And 'Suitable'

'Suitable' means suitable for each individual **wearer** i.e. that the RPE provided is shown to fit and that tight-fitting RPE seals to the face appropriately.

This is why we face fit Test!

'Suitable' also means selecting appropriate RPE for wearer factors such as:

Wearers with beards or certain hair 'styles' and corrective eye wear





Suitable

The RPE should also be suitable for the **task** and not put the user at increased risk of other safety issues.

In addition, consideration of factors such as:

- Work-rate and wear-time (is the RPE suitable for long use?)
- Mobility (hose snagging, bulkiness of equipment)

The workplace **environment** can cause other suitability factors, such as:

- Temperature/humidity/flammable atmospheres



Approved Code of Practice (ACOPs) and Guidance

- Face-Fit testing is mentioned specifically in the ACOP and guidance of the COSHH, COA, CLAW, IR and CS Regulations.
- *Operational Circular (OC) 282/28* currently contains the HSE guidance on how to conduct RPE fit testing.
- *OC 282/28* states that RPE fit test providers should be competent.



BSIF *Fit2Fit* Accreditation Scheme

- How you can prove competence as a RPE face-fit test provider...
- When the accreditation exam was first introduced (2009) there was a 60% failure rate over the first 2 years. Exam involves a written and practical test.

• More details, such as application forms and syllabus can be found at:

<http://www.fit2fit.org/>





What is RPE Fit Testing?

- Fit testing checks that the seal between the RPE and the wearer's face is satisfactory.
- Poor sealing RPE will result in inward leakage of ambient air and potential exposure to hazardous substances which may be detrimental to health.
- Inward leakage around the face seal may occur due to the RPE being the wrong size or shape for the worker's face.



3 Basic types of design for tight-fitting masks (these all need face-fit testing)

Filtering face piece (FFP) or “Disposable”

Half-mask

Full-face mask





Loose-fitting, powered-assisted respirators

- These do not require face-fit testing.
- Work on ‘positive pressure’ - filtered air supplied down a visor, so external air can’t enter the breathing zone.
- These are still ‘filtering devices’ and therefore can’t be used in low oxygen environments.
- Note, power-assisted respirators can also be used with tight-fitting masks and these masks will need fit testing.



Which fit testing method do I need?

- **Qualitative fit testing** can be used to test filtering facepieces (FFP1, FFP2 & FFP3) disposable masks and half masks.
- The test produces a simple pass or fail based on the wearer's assessment of inward leakage by the recognition of a bitter or sweet tasting test agent in a mist sprayed into a hood positioned over the wearer's head.





Which fit testing method do I need?

- **Advantages:**
 - Test kit is much cheaper than quantitative fit testing equipment.
- **Disadvantages:**
 - Subjective and some wearers can't taste test agent.
 - Not a good test method for workers with poor English as they can't understand the instructions.
 - Can't use to test full-face masks



Which fit testing method do I need?

- **Quantitative fit testing** is more accurate and scientific, non-subjective, and can be used to all types of tight-fitting RPE and has to be used for full-face RPE. Much more costly, than qualitative kit.
- The most widely used method of quantitative fit testing is the **particle counting method** utilising the *TSI Portacount*.





Quantitative testing uses 'Fit Factors'

- In the UK, FFP's (disposable respirators) and half masks require a fit factor of >100 .
- Full-face respirators are required to have a fit factor exceeding 2000.





When should fit testing be repeated?

- When a person has gained weight
- When a person has lost weight
- When a person has major dental work
- When a person has a facial injury



When should fit testing be repeated?

The HSE now recommend 'regular' repeat RPE fit testing in OC 282/28.

- The frequency of such repeat testing is not stated.
- Many companies adopt a *set regular interval* for fit testing their employees as part of their H&S policy (e.g. every 2 or 3 years).



When should fit testing be repeated?

- Note, face-fit testing will have to be repeated if the *make*, model or size of RPE is changed or if more than one type of RPE is worn.
- For example, if a *3M Model 9332* face filtering FFP3 (disposable) respirator is replaced by a *3M Model 8835* FFP3 respirator (e.g. because the Ordering Department got £10 off per box) all workers will have to be fit tested again on the new respirator.



Pre-test checks

- Ensure persons are medically fit for testing and wearing RPE by asking them “Is there any reason you can not undertake the test?” (Note: some organisations require a health questionnaire to be completed by every person tested).
- Send out **pre-appointment information** mentioning factors which could effect the performance of a quantitative face-fit test, such as...



**GULLY
HOWARD
TECHNICAL**

Facial hair

No Beards!

People with beards or stubble can not wear tight-fitting RPE as it prevents a good seal.

Either they need to shave or wear loose fitting RPE (such as a power-assisted respirator with hood)

Unacceptable

| | |
|--|--|
| <p>E. Soul patch that will interfere with the respirator seal in the chin area on elastomeric facepieces</p> <p>Facial hair and sideburns that will interfere with the sealing surface</p> | |
| <p>F. This facial "shadow" (not clean-shaven) will interfere with the sealing surface of a half or full facepiece. It will also compromise a secondary seal inside a tight-fitting hood-style respirator.</p> <p>Degradation of fit can occur during cumulative work hours when an individual grows this amount of facial hair.</p> | |
| <p>G. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and interfere with exhalation valve.</p> <p>Sideburns and/or heavy hair under the chin will prevent a good seal.</p> | |
| <p>H. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and could get stuck in an exhalation valve.</p> <p>The hair on the rest of the face will interfere with a sealing surface.</p> | |
| <p>I. Hair is in sealing region and under the chin.</p> <p>Hair is in chin cup sealing region and on the side of the face.</p> | |
| <p>J. Moustache is too thick and too long; will contact a sealing surface and interfere with exhalation valve.</p> | |

Note: Adapted with permission from Brookhaven Lab.



Long Hair

- Long hair may need to be tied back away from the face to keep it away from the seal area.
- Certain long hair 'styles' can also effect the performance of the mask straps or head harness in keeping the mask tight to the face (e.g. buns).
- Normally a pony tail starting at the top of the neck with the hair pulled tight to the scalp is the best option with long hair.



Smoking

No smoking just
before the test!

Smokers exhale small particulates after smoking which can be detected by the *TSI Portacount* and assumed to be face seal leakage. Smoking can cause an issue with taste perception with regard to the qualitative test.



Eating, chewing & drinking

Particularly an issue with Qualitative face-fit testing as it is a taste test and strong flavoured food, gum and drinks can mask the test agent.





Test should be realistic as possible

Headgear!

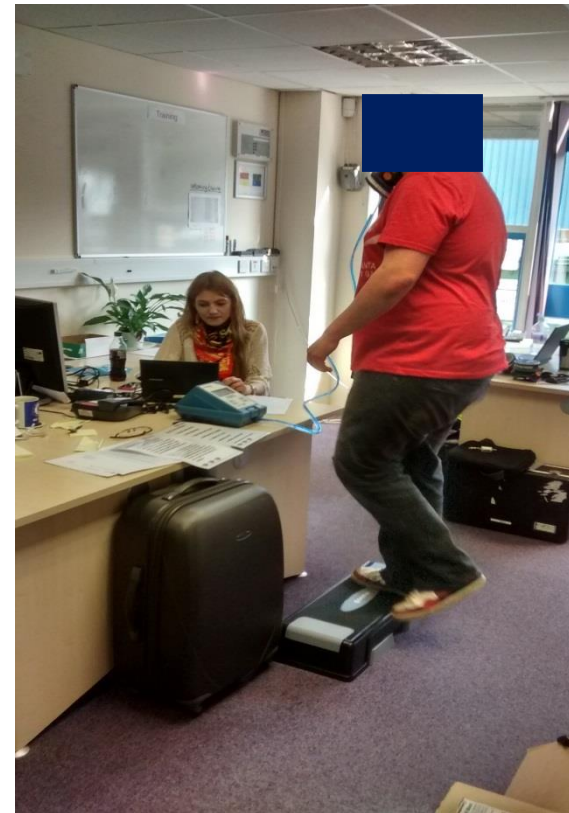
Staff should be tested with the headgear they normally wear as this may effect the RPE seal. e.g. a fire fighter should be tested wearing their helmet.





Performing a Quantitative Face-fit test

- **Practical
Demonstration!**





Performing a Qualitative Face-fit test

- **Practical
Demonstration!**





Face-fit testing would be easy if..

- **All 'fails' were the result of the mask not fitting the wearer...**
- Fails can also be caused by:
 - Problems with the respirator or mask (e.g. exhalation valve/distortion etc)
 - Wearer (smoking/user generated aerosols..)
 - Fit test equipment (and mask probing kit)
- Kit issues can also produce **false passes**



General face-fit testing good practice...

- Taking time over the minority of individuals who 'fail'. These people are why fit testing is carried out.
- Identifying alternative RPE for these individuals who 'fail' that offers them the equivalent protection to their work colleagues.
- Avoid the term 'fail' (e.g. the wearer is not a failure) or highlight any physical attributes the wearer may have which may have caused the 'fail'.



Any Questions?

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