

Respiratory protective equipment – What’s the problem with fit?

OH 2017

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I'm going to talk about..

- The need and benefits of fit testing
- Competency of fit testers
- Fit2Fit/HSE competency scheme
- Lessons learnt
- Successes
- Going forward

Hierarchy of control

Likelihood of something going wrong



**Eliminate /
Substitute**

Control at Source
- Provision
- Training
- Use
- Maintenance

RPE
- Selection
- Face fitting
- Provision
- Training
- Use
- Storage
- Maintenance

Controls

RPE as control

Like no other form of control



Human intervention – *the wearer!*

Hard to measure effectiveness



Still getting it wrong!



Work-related ill health

13,000

Deaths each year estimated to be linked to past exposures at work, primarily to chemicals or dusts

2515

Mesothelioma deaths in 2014, with a similar number of lung cancer deaths linked to past exposures to asbestos

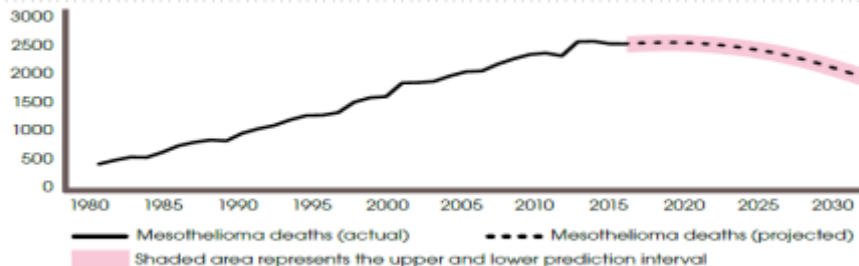
14,000

Estimated new cases of breathing or lung problems annually, according to self-reports from the Labour Force Survey

Estimated current annual deaths due to work-related diseases



Mesothelioma in Great Britain: annual actual and predicted deaths



There are projected to be around 2,500 mesothelioma deaths per year for the rest of this decade before numbers begin to decline.

An estimated 150 new cases of occupational asthma were seen by chest physicians each year on average over the last three years. This is lower than the early 2000's, but there has been little change over the last decade.

Find out the story behind the key figures. Visit www.hse.gov.uk/statistics/causdis/

The need to fit test

‘Where adequate control of exposure cannot be achieved by other means, the provision of *suitable* personal protective equipment

- Fit testing introduced 1999 in CAW, then COSHH, etc. 2002



How do RPE 'leak'?



a) penetration through the filter

b >> a

b) leakage through the face seal
'face seal leakage'



How well do FFPs fit?

HSE Studies	Passed a Fit Test %
<p>25 wearers, 4 FFPs, 3 repeats Wearers put on the FFPs following the manufacturer's instructions (No supervision) <small>Source: HSE study 2016 – to be published</small></p>	<p>32 - 44</p>
<p>25 wearers, 9 FFPs, no repeats FFPs selected at random Wearers put on the FFPs following the manufacturer's instructions (Supervised)</p>	<p><50</p>
<p><small>Source: Frost et al 2014: Fit of Filtering Facepiece Class 3 (FFP3) Respirators Part 3: Suitability of FFP3 for Real Faces JSIRP Vol. 31, No. 2, 2014</small></p>	

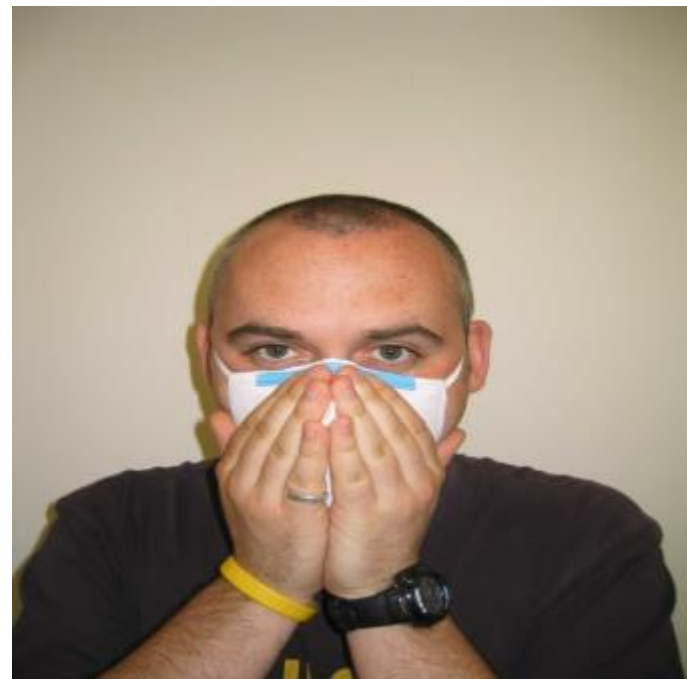


How effective are fit-checks?

HSE Studies		Passed a Fit Test %
2016/17	Trained and supervised wearers who recorded a Pass during a fit-check <small>Source: HSE study 2016 – to be published</small>	57
2014	Trained and supervised wearers who recorded a Pass during a fit-check	36

Source:
Frost et al 2014:

- Fit of Filtering Facepiece Class 3 (FFP3) Respirators Part 2: The Value of Fit-Checking and Simple Subjective Assessments of Fit as an Alternative to a Fit Test JISRP Vol. 31, No. 2, 2014



The need to fit test

- Evidence obtained during research conducted by NIOSH and HSE (Zhuang et al., 2016; ; Frost et al JISRP Vol. 31, No. 2, 2014; Coffey et al., 1999; Coffey et al., 2004; Lawrence et al., 2006; Duling et al., 2007) **and from the experience of accredited fit testers in the UK, have highlighted the fact that some designs of facepieces only fit a very small population**

The value of fit testing

- Passing a fit test reduces the likelihood of poor fit on subsequent fit tests

Source: HSE study, due for publication 2017

- Fit testing programmes improved selection and use of RPE

Reference: Bell et al (2012) Annals of Occupational Hygiene 56 3, 350-361

[An assessment of workplace programmes designed to control inhalation risks using respiratory protective equipment](#)

Fit test methods

Qualitative

Taste test



Used only for FFPs & half masks

Quantitative

Portacount



Used for FFPs, half masks & full face masks

Controlled Negative Pressure



Test chamber



HSE fit testing guidance – HSE 282/28



Health and Safety Executive		Operational Circular	
OC 282/28			
Review Date	23/06/2020	Open Government Status	Fully Open
Version No & Date	3: 23/06/2010	Author Unit/Section	FOD Central Specialist Division

To
All HSE Inspectors

FIT TESTING OF RESPIRATORY PROTECTIVE EQUIPMENT FACEPIECES

This updated Operational Circular (pages 1-6) gives practical advice on the inspection of the suitability of RPE fit testing methods and the meaning of the results generated. The accompanying information document (page 7 onwards) gives further more detailed information on fit testing.

INTRODUCTION

- 1 Where respiratory protective equipment (RPE) is used as a control measure under Health and Safety Legislation (see paragraph 6), it is vital that the selected RPE is adequate and suitable. RPE must reduce exposure to as low as reasonably practicable, and in any case to an acceptable level (e.g. below any applicable Workplace Exposure Limits or Control Limits). To ensure that the selected RPE has the potential to provide adequate protection for individual wearers, the ACoPs supporting COSHH, CAR and CLAW stipulate that tight-fitting RPE must be fit tested as part of the selection process. This will help to ensure that inadequately fitting facepieces are not selected for use. Ill-fitting facepieces can create inward leakages of airborne contaminants.

Note: A tight-fitting facepiece is a full face mask, a half mask, or a filtering facepiece (commonly referred to as a disposable mask). The performance of these types of facepieces, irrespective of whether they are used in negative pressure respirators, power assisted respirators or compressed air supplied breathing apparatus, relies heavily on the quality of fit of the facepiece to the wearer's face. An inadequate fit will significantly reduce the protection provided to the wearer. The presence of facial hair in the region of the facepiece will significantly reduce the protection provided.

- First detailed UK fit testing guidance
- First published 2000
- Contains the *what* and the *how*
- Established areas of **competency**
- Appendix on Troubleshooting
- Fit testers, employers & employees

http://www.hse.gov.uk/foi/internalops/fod/oc/200-299/282_28.pdf

Competency concerns

- Incorrect application of the test method
- Poor mask probing
- Modifications to be the method
- Lack of care / short cuts taken
- Lack of understanding / knowledge of RPE

Result = poor fitting RPE worn

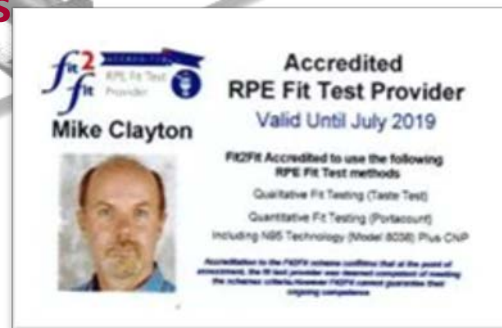
Action required



HSE engagement – the Fit2Fit Scheme

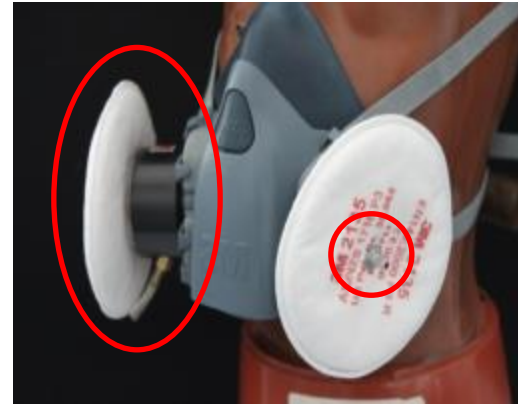


- Launched in 2009 – *increase the competence of fit testers*
- Assesses the competence of fit testers – HSE282/28
- Accreditations for Qualitative and Quantitative methods
- Developed and run by BSIF with support from HSE
- Multiple-choice exam and practical assessment
- 3-yearly re-assessment



Common reasons for failing Fit2Fit

- Lack of practical experience
 - in fit testing
 - with different mask types
 - probing of masks - ***false passes***
- Lack of RPE knowledge
- Inadequate, poor training or no training



Lessons learnt

1. Communications through industry sectors and other stakeholders is essential – BSIF, ISRP, BOHS, IOSH, etc
 - country-wide ‘roadshows’ to promote fit testing
 - vital when introducing fit testing into the healthcare sector
2. Guidance on fit testing is essential - particularly on probing of masks
3. Clear guidance from regulators, RPE & fit test equipment manufacturers – *all saying the same thing*
4. Training is essential for fit testers
 - manufacturer’s instructions, DVD, etc. are not sufficient
5. A form of quality assurance for fit testers is essential
6. It takes time!

Successes

- Approx. 300 accredited fit testers
- Pass rate increased from approx. 30% to 70%
- A number of training courses now approved
- Similar scheme established in Netherlands
- Scheme reach – Europe to Middle East

Going forward

- Estimated only reaching ~10% of fit testers
- Continue to improve the competency of fit testers
- Further expand the Fit2Fit fit test training scheme
- Continue to improve compliance with the legal requirements relating to fit testing
- Review fit testing methods:
 - To reduce the ‘perceived’ burden
 - Shorter fit test protocols
- Encourage innovation in fit test methods



Increasing compliance – road map

- Encourage innovation in fit test methods
 - faster, shorter, multiple fit test options, etc.
- Define the validation criteria
- Consulting with HSE/BSIF stakeholder group
- Drafting validation criteria and developing the framework

Updated guidance

Operational circular 282/28
Fit testing of respiratory protective equipment
facepieces

New operational guidance
(NOG RPE)

INDG
fit testing
- the *What*

BSIF Fit2Fit
Fit test methodology
guidance
- the *How*

Questions

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HSE fit test training courses visit www.hsl.gov.uk

www.fit2fit.org

