

# Safety, Technical and Engineering

## Guidance on selection and fit testing of Respiratory Protective Equipment

### **Endorsement and Authorisation**

**Created by:**

**Kris Jeffrey**

**Occupational Health Specialist**

**Accepted by:**

**Lisbeth Fromling**

**[Chief Health and Safety Officer]**

## Contents

1. Purpose.....	3
2. Scope .....	3
3. Summary of requirements.....	3
4. Risk Assessment.....	3
5. Clean shaven .....	4
6. RPE Selection.....	4
6.1 Adequacy.....	4
6.2 Suitability.....	5
7. Types of RPE .....	5
8. Assigned Protection Factor.....	6
9. Filter Types.....	7
10. Face Fit Testing .....	7
11. Types of fit test.....	7
12. Fit test or fit check .....	8
12.1 Requesting a fit Test.....	8
12.2 Requesting a train the trainer fit test certification.....	9
12.3 Before attending a test .....	9
12.4 What happens at the test?.....	9
12.5 Requirements for repeat testing.....	10
12.6 What happens if the RPE fails the test?.....	11
13. Records.....	11
14. Maintenance.....	11

## 1. Purpose

This guidance is designed to aid Network Rail in meeting its duty to provide adequate and suitable respiratory protective equipment (RPE). RPE is provided to employees to aid reduction and or mitigate against the exposure to identified occupational respiratory hazards under the below listed regulations

- The Control of Substances Hazardous to Health (COSHH) Regulations 2002;
- The Control of Lead at Work (CLAW) Regulations 2002 and;
- The Control of Asbestos (CAR) Regulations 2012.
- The Confined Spaces Regulations 1997.

## 2. Scope

This document can be used by all Network Rail employees provided with a tight fitting RPE and responsible line managers of such employees.

**Note:** A tight-fitting face-piece is a full face mask, a half mask, or a filtering face-piece (commonly referred to as a disposable mask) which relies on a sealed fit against the wearer's skin.

## 3. Summary of requirements

Network Rail has a duty of care to prevent an employee's exposure to substances hazardous to health within the work environment. Where prevention is not possible, the exposure should be reduced to as low as is reasonably practicable. RPE can be utilised as an additional mechanism to achieve this.

A face fit test should be undertaken if;

- a) the individual is a Network Rail employee, and;
- b) the risk assessment, as detailed in section 4, for tasks to be undertaken identifies the need for tight fitting RPE to mitigate exposure to a hazardous substance whether for every day work or emergencies only.

In line with The Personal Protective Equipment Regulations 1992, section 10, paragraph 2, every employee will use personal protective equipment provided by virtue of these Regulations in accordance with training and instruction received in line with regulation 9. Failure to attend face fit testing where this has been deemed a requirement will result in the employee being removed from the work that creates the respiratory hazard. Continued use of untested tight fitting RPE could result in adverse long term ill health such as cancer, dependant on the hazardous substance being used and action being taken against the company due to a breach of the regulation.

**Note:** Face fit testing is only required where a tight fitting RPE is being used. Face fit testing is not required for loose fitting RPE.

## 4. Risk Assessment

**4.1** The identification of the requirement for face fit testing can be achieved by: Network Rail will meet its obligations for face fit testing by:

- undertaking suitable and sufficient risk assessments in line with Network Rails Work Activity Risk Assessment Standard NR/SP/OHS/00102 and The Control of Substances Hazardous to Health (COSHH) Standard NR/L2/OHS/00103 to identify hazards, determine levels of risk and mitigations required.

Following WARA and COSHH assessments, if the use of tight fitting respiratory protective equipment (RPE) is required to further control exposure to a hazardous substance by way of reduction, each individual wearing the RPE should, by law, undergo a face fit test.

In line with Network Rail's Work Activity Risk Assessment Standard NR/SP/OHS/00102 and The Control of Substances Hazardous to Health (COSHH) Standard NR/L2/OHS/00103, activities should be risk assessed prior to the task being undertaken. This risk assessment will determine work activities for which RPE is required. Personal Protective Equipment is the last line of defence in health and safety's hierarchy of control and as such RPE is often used as an additional mitigation. Additionally, RPE may not be required for day to day work activities but may be required in an emergency, such as a spill clean-up. RPE selected for this reason should still be fit tested.

Employees identified at risk and or wishing to become fit tester will undertake Network Rails respiratory e-learning which can be found on oracle, module code face fit. Further information can be found within this document.

## 5. Clean shaven

To provide the wearer with adequate protection, when wearing a tight fitting RPE or being tested as part of a fit test, it is highly recommended that the wearer be clean shaven at all times. In accordance with research undertaken by the Health and Safety Laboratory<sup>1</sup> (HSL) on behalf of the Health and Safety Executive (HSE), clean shaven is defined as 'hair which has been shaved within the previous 8 hour period prior to a working shift'. Hair being present in the area of the face seal significantly reduces the effectiveness of the mask, reduces the protection offered to the wearer subsequently increasing the chances of inhalation of respiratory hazards leading to adverse long term health.

**Note:** Where an employee has facial hair due to religious reasons and/or medical reasons, as confirmed by the General Practitioner (GP), this should be discussed with the line manager. The line manager should attempt providing an alternative type of RPE considering the level of risk posed.

## 6. RPE Selection

Where the risk assessment processes have identified the usage of RPE as mitigation, the subsequent selection of RPE should consider both adequacy and suitability as defined in 6.1 and 6.2.

Selection based on adequacy and suitable is important as there are many different RPE types designed to:

- protect the wearer from a variety of hazards and hazardous substances;
- suit a variety of task requirements and environments;
- match the specific requirements of the wearer.

### 6.1 Adequacy

For RPE to be adequate, it should provide protection to the wearer and reduce exposure to the hazard to a level required to protect the wearer's health.

When undertaking the risk assessment, the adequacy selection should take into account:

- Toxicity of the hazard;
- Form of the hazard e.g. gas, vapour, fume, dust, aerosol, biological agent;
- Particle size (if relevant);
- The Workplace Exposure Limit (WEL) of the hazard (if it has one);
- Known or suspected concentration of the hazard in the working atmosphere.

---

<sup>1</sup> The effect of wearer stubble on the protection given by Filtering Face pieces Class 3 (FFP3) and Half Masks Research report RR1052

## 6.2 Suitability

To be suitable RPE selection should consider the wearer, the task and the environment so that the wearer can work freely without importing additional risk due to the RPE, this can be but is not limited to impacts on communication systems.

When undertaking the risk assessments, suitability selection should take into account:

- Movement involved in the task;
- Duration of task, should it be anticipated that the task will last longer than one hour before taking a break or finishing the task, , and how much physical effort is required to do the job (heavy, medium or low effort)
- Working Conditions such as temperature.
- Working environment (is it or could it become: a confined space, oxygen deficient, susceptible to sudden release of materials without warning, a flammable atmosphere?)
- Other personal protective equipment (PPE) that should be worn at the same time such as ear protectors, eye protection, communication. Where multiple PPE should be worn simultaneously, they should be compatible with each-other.
- Characteristics of the individual such as face shape, religious requirements such as facial hair, wearing of turban, and any pre-existing medical conditions (e.g. asthma, heart problems) that may prevent the wearing of a particular type of RPE.

## 7. Types of RPE

RPE is divided into two main types:

**A) Respirator (filtering device):** uses filters to remove contaminants in the workplace air , there are two main types:

- Non-powered respirators – rely on the wearer’s breathing to draw air through the filter
- Powered respirators – use a motor to pass air through the filter to give a supply of clean air to the wearer

**B) Breathing apparatus (BA):** needs a supply of breathing-quality air from an independent source (e.g. air cylinder or air compressor)

Both respirators and BA are available in a range of different styles, which can be divided into two main groups:

- **Tight-fitting face-pieces** (often referred to as masks) -shown in figure 1, rely on having a good seal to the wearer’s face. These are available as both non-powered and powered respirators and BA as shown in figure 2. A face fit test should be undertaken to check that the RPE can protect the wearer. Examples are face pieces, half and full-face masks.
- **Loose-fitting face-pieces** - shown in figure 3, rely on enough clean air being provided to the wearer to prevent contaminant leaking in (only available as powered respirators or BA). Examples are hoods, helmets, visors, blouses and suits.

There are two types of tight fitting face-pieces as shown below:



**Figure 1: (a)** disposable filtering face pieces

**(b)** half face tight fitting masks



**Figure 2:** Breathing apparatus

**Figure 3:** Full-face powered system

## 8. Assigned Protection Factor

Different types of RPE will protect against different types of hazard by varying degrees of protection. The level of protection is described by the Assigned Protection Factor (APF) which is the realistic level of protection achieved by correctly trained and fitted employees. Each RPE APF should be checked for compliance with a British Standard (BS EN 529:2005) (table1). All RPE used in Network Rail will be CE marked and manufactured to the relevant BS EN Standard.

**Note: Network Rail, in line with guidance from the Office of Rail Regulations (ORR), has taken the decision to use a protection factor of 20 as a minimum. This means all RPE used is expected to be a minimum of an FFP3 / P3. The hazards identified may at times require a higher protection factor which can be determined through the risk assessment process.**

Type of Respirator	Class	APF UK
Filtering Half Mask	FFP1	4
	FFP2	10
	FFP3	20
Half Mask EN 140	P1	4
	P2	10
	P3	20
	GasX	10
Full Face Mask EN 136	P1	4
	P2	10
	P3	40
	GasX	20

**Table 1: UK APF**

## 9. Filter Types

When selecting a filter for the associated work activity, the filter should be appropriate to mitigate against the airborne contaminant identified. A particulate filter will have no effect when used with gases, and a gas filter will have no effect when used with particulate hazards. Combined gas and particle filters are available. Filter types are summarised in Table 2.

Filter Types				
Colour Code	Type	For use against	Class	Other Information
White	P	Particles	1 2 3	European standard: EN 143
Brown	A	Organic gases and vapours, boiling point above 65oC	1 2 3	European standard: EN 14387
Grey	B	Inorganic gases and vapours	1 2 3	European standard: EN 14387 Do not use agaisnt carbon monoxide
Yellow	E	SO2 and other acid gases	1 2 3	European standard: EN 14387
Green	K	Ammonia and its organic derivatives	1 2 3	European standard: EN 14387
Red & White	Hg P3	Mercury		European standard: EN 14387 Includes P3 particile filter Maximum use time 50 hours No class number
Blue & White	NO P3	Oxides of nitrogen		European standard: EN 14387 Includes P3 particile filter single use only No class number
Brown	AX	Organice gases and vapours, boiling point at or below 65oC		European standard: EN 14387 Single use only No class number
Violet	SX	Substance as specified by the manufacturer		European standard: EN 14387

**Table 2 – Filter types**

*Note: Extracted from the HSE Guidance, HSG53, Respiratory protective equipment at work*

## 10. Face Fit Testing

When using RPE that relies on a seal being achieved such as a tight fitting face piece, it is vital that there is good contact between the wearer and the mask to prevent leaks. This is confirmed by way of a face fit test. Face fit testing is a method of checking that a tight-fitting face piece matches the wearer's facial features and seals adequately to their face. It will also help to identify unsuitable face pieces that should not be used. This test allows assessment that the RPE is not only suitable for the conditions in which it is being used, but that, by fitting the wearer correctly, it provides effective protection. Should a mask be worn with an inadequate fit, contaminated air will take the path of least resistance and travel through leaks in the face seal. Consequently, a poor seal to the face will reduce the level of protection provided to the wearer. If the RPE does not fit, it will **not** protect the wearer.

Remember that tight-fitting RPE will only provide effective protection if the wearer is clean shaven, so they should also be clean shaven when fit tested.

**Note:** Once a fit test has been passed for a particular RPE, the exact make, model, style, and size respirator will subsequently be used by the wearer.

### 11. Types of fit test

There are two types of fit test which can be used to assess the fit of an RPE; table 3 explains which test is appropriate dependant on the RPE. The two testing mechanisms are:

- Qualitative – this is a pass/fail method which uses taste, smell or reaction to an irritant in order to detect leaks.
- Quantitative – this test uses a machine to measure the amount of leakage into the face piece and does not rely on the user’s sense of smell or taste. This test requires specialised equipment and is not necessary for disposable masks.

<i>Fit Testing Methods</i>					
<i>RPE (Type and class)</i>	<i>Quantitative</i>			<i>Qualitative</i>	
	<i>Ambient Particle Counting</i>	<i>Test Chamber</i>	<i>Controlled Negative Pressure</i>	<i>Taste</i>	<i>Smell</i>
Filtering face piece					
FP1	Yes	No	No	Yes	No
FP2	Yes	No	No	Yes	No
FP3	Yes	Yes	No	Yes	No
Half mask respirator	Yes	Yes	Yes	Yes	Yes
Full face mask respirator	Yes	Yes	Yes	No	No
Power assisted respirator with full face mask or half mask	Yes	Yes	Yes	No	No
Air fed breathing apparatus with full face mask or half mask	Yes	Yes	Yes	No	No
Self-contained breathing apparatus with full face mask	Yes	Yes	Yes	No	No

**Table 3: Fit testing methods**

## 12. Fit test or fit check

A fit test should not be confused with a fit check. A fit test is the test that is conducted every time a new model of tight-fitting RPE is selected. It should be conducted by a competent employee.

A fit check is a check that should be carried out by the employee of the RPE each time it is worn, even if this occurs several times per day. Although not a formal requirement like fit testing, a fit check is good practice that gives an indication that the RPE has been correctly fitted. The responsibility of a fit check remains with the employee and can be achieved by:

- Covering the front of the RPE with both hands, being careful not to disturb the fit on the face
- For an unvalved RPE – exhale sharply; for a valved RPE, inhale sharply
- If air flows around the nose, readjust the nosepiece; if air flows around the edges of the respiratory, readjust the headbands.
- A successful fit check is when there is no air leaking from the edges or around the nosepiece of the RPE.
- If a successful fit check cannot be achieved, remove and re-fit the RPE.

### 12.1 Requesting a fit Test

Only competent employees are permitted to undertake face fit testing.

Network Rail has an RPE Face Fit Testing e-learning module, Face Fit Briefing FF/OHS/1, FF/OHS/2 and FF/OHS/3 which is available on Oracle. Prior to undertaking fit testing or training, identified employees will first complete this course which will subsequently guide through next steps to be taken to achieve a fit test and fit trainer competency. The detail of the course is as follows:

- **Module 1** – Awareness of Respiratory Hazard; for all employees identified as working with an exposure to a respiratory hazard;
- **Module 2** – Face fit requirements and fit check; for all employees who have a requirement to wear tight-fitting respiratory protective equipment (RPE) as identified within the work activity risk assessment (WARA);
- **Modules 1 - 3** – Face fit testing; for employees wishing to become an RPE fit tester.

Where there are no Network Rail employees who are deemed competent to undertake testing, our personal protective equipment provider can facilitate this. Please contact David Boyle at David Boyle at [David.Boyle@greenham.co.uk](mailto:David.Boyle@greenham.co.uk).

**Note:** Prior to service provider attending site to provide face fit testing, a testing kit should be purchased. This can be done via the iProc system using the following references:

- 3M Fit Test Kit Bitter FT30: 290129
- 3M Fit Test Kit Sweet FT10: 290128

## 12.2 Requesting a train the trainer fit test certification

Employees wishing to become trained face fit testers should firstly complete Network Rails respiratory e-learning module as referenced in 12.1. A practical session should then be arranged by contacting David Boyle at David Boyle at [David.Boyle@greenham.co.uk](mailto:David.Boyle@greenham.co.uk).

**Note:** Practical sessions to become a fit tester require a minimum of 9 attendees and are delivered within half a day. Testing kits should be purchased and be available on the day arranged.

## 12.3 Before attending a test

- Before attending tests, it is strongly recommended the employee is clean shaven in the area of contact with the face seal of the RPE. This will prevent an adequate seal from being achieved and the test will not be successful. If for religious purposes and/or medical purposes as verified by a general practitioner (GP), the employee cannot remove facial hair then a loose fitting type of RPE (hood/visor) should be provided which does not require a fit test and can be worn with facial hair.
- The employee should not smoke (including electronic cigarettes) for 90 minutes before the test.
- The employee should not eat, drink (except water) or chew gum for 30 minutes before the test.

## 12.4 What happens at the test?

Tight fitting RPE users are required be trained in the correct use of the equipment and its limitations. The face fit testing training will incorporate the following topics:

- Why fit testing is required,
- How the selected RPE works,
- How to wear and check RPE correctly,
- Fit checking before use,
- Maintenance required,
- Storage and cleaning of RPE,
- Employer and employee responsibilities

The test provided is a qualitative face fit test. The employee (known as testee) wears the RPE and a fit test hood. A test aerosol (bitter or sweet tasting) is sprayed inside the hood while the employee being tested (known as testee) carries out a series of exercises, see table 4. If the testee can taste the

aerosol then the RPE fails the test. The procedure takes about 15-20 minutes. Please remember due to the sensitivity of this test it is only suitable for filtering face pieces and half face masks only as per table 3.

Exercise	Description
<b>(i) Normal breathing</b>	In a normal standing position, without talking, the testee breathes normally for one minute. After the normal breathing exercise, the testee should face forward and hold their breath for approximately 10 seconds during the test measurement.
<b>(ii) Deep breathing</b>	In a normal standing position, the testee breathes deeply for one minute. After the deep breathing exercise, the testee will hold their head straight ahead and hold their breath for approximately 10 seconds during test measurement.
<b>(iii) Turning head side to side</b>	Standing in place, the subject will slowly turn their head from side to side between the extreme positions on each side for one minute. After the turning head side to side exercise, the testee will face to the left and hold their breath for approximately 10 seconds during test measurement. Next, the testee needs to hold head full right and hold their breath for 10 seconds during test measurement.
<b>(iv) Moving head up and down</b>	Standing in place, the testee will slowly move their head up and down (approximately 15-20 times) for one minute. After the moving head up and down exercise, the testee will hold their head full up and hold their breath for approximately 10 seconds during test measurement. Next, the testee will hold their head full down and hold their breath for approximately 10 seconds during test measurement.
<b>(vi) Bending over</b>	The testee should stand and bend at the waist as if to touch their toes and then return to an upright position. Repeat approximately 10-15 times per minute. After the bending exercise, the testee will hold their head straight ahead and hold their breath for approximately 10 seconds during the test measurement.
<b>(v) Talking</b>	The testee should talk out loud slowly and loud enough so as to be heard clearly by the fit tester. The testee should read from a prepared text such as the Rainbow Passage or count down from 100. After the talking exercise, the testee will hold their head straight ahead and hold their breath for approximately 10 seconds during the test measurement.
<b>(vii) Normal breathing</b>	In a normal standing position, without talking, the testee will breathe normally for one minute. After the normal breathing exercise, the testee should face forward and hold their breath for approximately 10 seconds during the test measurement.

**Table 4: Fit test exercises**

## 12.5 Requirements for repeat testing

Once you have successfully passed your test, you will need to attend a repeat test, as a minimum at 3 yearly intervals or immediately if:

- a) Your risk assessment suggests that an interval less than 3 years is required;
- b) you lose or gain weight;
- c) you undergo substantial dental work;
- d) you develop any facial changes around the face and mask seal area;
- e) you change to a different type of RPE than already tested.

## 12.6 What happens if the RPE fails the test?

If the fit test fails the following will be attempted:

- The fit of the mask will be re-checked and adjustments made such as the positioning and tightness of the straps or, if the mask has a nose clip, making sure it is shaped firmly to the nose. The test will then be repeated. Often a better fit can be achieved by taking more care when putting the mask on.
- If the RPE still fails then the test should be repeated with a different size or a different model until one that is suitable is found.

## 13. Records

Where testing is undertaken by a competent Network Rail employee, a record of the testing should be kept and maintained as evidence employees have attended a fit test. Appendix 1 can be used as example templates for local recording of fit testing. Where testing is provided by an external company, said external company will provide confirmation of training / testing.

A template certificate for issuing upon successful completion of fit test is included in appendix 2.

To support logging of face fit testing on an employee's sentinel record, competent Network Rail face fit testers should record all tests undertaken by completing the record in appendix 3. Once completed, the record should be sent to the local competence development specialist. If this is not completed, the employee record will not be updated.

## 14. Maintenance

Maintenance, including cleaning, is required for all RPE except disposable (single use) RPE. This is to remove contamination, moisture build-up and microbes and allow the RPE to function and provide the protection required. Where maintenance is undertaken, it should be done by a competent employee and in line with manufacturer's instructions. Thorough maintenance, examination and tests should be carried out at least once a month and should not exceed a three month interval. If the RPE is used only occasionally, an examination and test should be carried out before use and not exceed three month intervals. Emergency escape-type RPE should be examined and tested in accordance with the manufacturer's instructions.

### Five key points to consider when undertaking RPE maintenance:

- Maintenance to be undertaken in line with the manufacturer's instructions,
- Maintenance should be undertaken by a competent person,
- Records of maintenance should be kept, an example is included in **appendix 4**,
- The intervals for maintenance should be appropriate; and
- The maintenance programme should reflect the complexity of maintaining the RPE.

Appendix 1 – Template recording form

**Respirator Fit Test Report**

Test conducted using 3M FT-10 or 3M FT-30 Fit Test Kit

<b>Name:</b>		<b>Date:</b>	
<b>Employee Number:</b>		<b>Sentinel Number:</b>	
<b>Function / department:</b>			
<b>Make, model and size of respirator</b>	<b>Operators Own</b> <input type="checkbox"/>	<b>Pool</b> <input type="checkbox"/>	<b>Test Purposes</b> <input type="checkbox"/>
<b>Own face piece, pool or test model used? Please circle</b>	<b>Own</b>	<b>Pool</b>	<b>Test</b>
<b>Kit used Please circle</b>	<b>FT-10 (Sweet)</b>	<b>FT-30 (Bitter)</b>	
<b>Amount of puffs for taste test:</b>	<b>10</b> <input type="checkbox"/>	<b>20</b> <input type="checkbox"/>	<b>30</b> <input type="checkbox"/>
<b>Test conducted by (name and Company)</b>			
<b>Retest required? Please circle</b>	<b>Yes</b> <input type="checkbox"/>	<b>No</b> <input type="checkbox"/>	
<b>If yes, record number and reasons</b>			
<b>Pass achieved on</b>			
<b>Valid from</b>			
<b>Valid until</b>			
<b>Signed by tester:</b>			
<b>Signed by testee:</b>			
<b>Valid certificate issued?</b>	<b>Yes</b> <input type="checkbox"/>	<b>No</b> <input type="checkbox"/>	

Report should be kept for at least five years

**Appendix 2 – Fit test certification – to be issued upon completion and passing of fit test**

**Name:**

**Sentinel Number:**

**Has been FFP3 face fit tested with DISPOSABLE MASK FFP3 EN149: 2001, by the following approved face mask tester**

**Print name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**THIS CERTIFICATE IS VALID FOR THREE YEARS FROM TEST DATE**

**Mask Type:** \_\_\_\_\_

## **Appendix 3 – Recording of face fit testing**

**See attached spreadsheet**

Appendix 4 – Example RPE maintenance record

Respiratory Protective Equipment Maintenance Record														
Depot / Location:														
Make:								Model:						
Serial Number:								Issued to:						
Type								Half face mask						
<b>DATE:</b>	<b>FULL FACE MASK</b>	Cleanliness?	Filter Check / filter changed	Face peice / seal	Visor	Head straps / buckles fully operational	Valves	<b>HALF FACE MASK</b>	Cleanliness	Filter Check? Filter changed?	Face peice / seal	Head straps / buckles	Valves / seals	Other

