Data Sheet

Respiratory Protective Equipment (RPE)

Maintenance free respirators and masks Supplied to RS by 3M

Health and Safety Legislation (UK) requires employers to control exposure to hazardous substances to protect their personnel. In 'The Control of Substances Hazardous to Health Regulations: 1988', the aim is always to prevent exposure or, if this is not possible, to control the substance. The direct control may not always be possible then personal protection is required in the form of respiratory protective equipment.

Respiratory hazards.

There are primarily five types of respiratory hazard that although breathed into the lungs can affect the body in several ways.

- DUSTS are produced when solid materials are broken down into fine particles. The smaller the dust, the longer it remains in the air and the easier it is to inhale.

- MISTS are tiny liquid droplets that are formed from liquid materials by atomisation and condensation processes such as spraying. Many mists are a combination of several hazardous constituents.

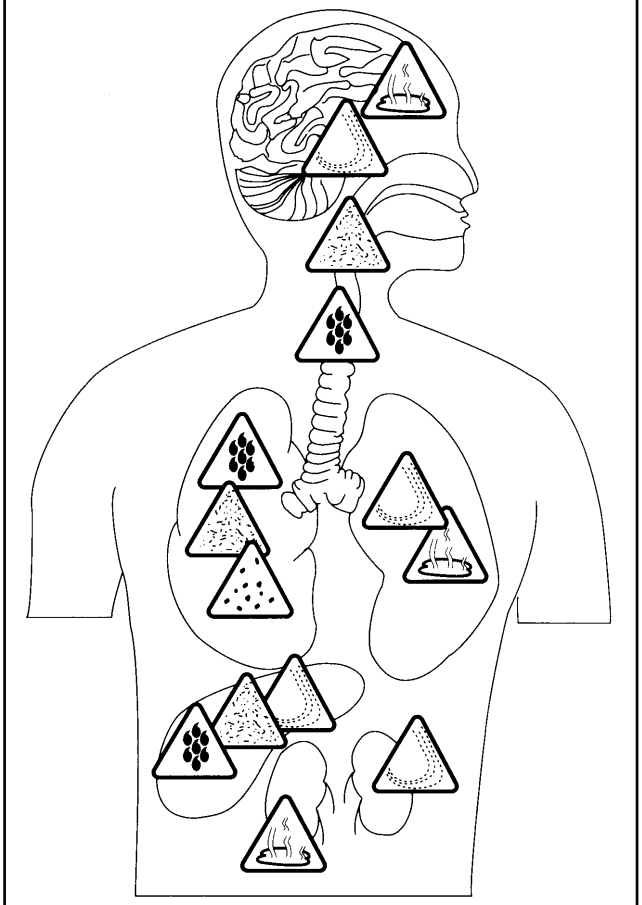
- METAL FUMES occur when metals are vaporised under high heat. The vapour is cooled quickly and condenses into a very fine particle that floats in the air.

- GASES become airborne at room temperature and, because they are able to diffuse or spread freely, can travel very far, very quickly.

- VAPOURS are the gaseous state of substances that are either liquids or solids at room temperature. They are formed when substances evaporate in the way that water vapour evaporated from water.

The areas affected by these five types of respiratory hazard can be seen in Figure 1.

Figure 1 Area affected by respiratory hazards



Respiratory tract: Irritation to the nose, throat and upper airway often leads to recurrent symptoms. Once the individual is sensitised, repeated exposure to the hazard can result in respiratory problems such as asthma.

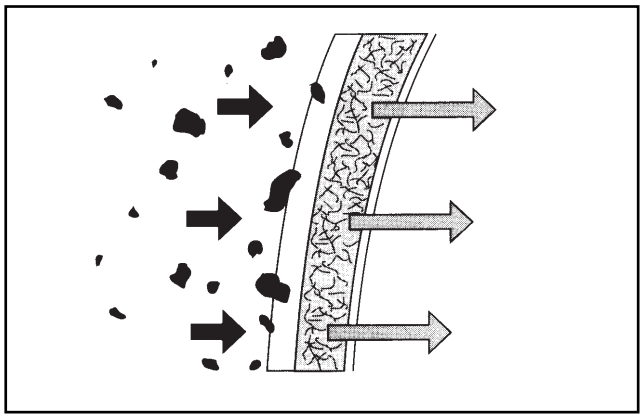
Lungs: Depending on their size and type, hazardous concentrations of substances can damage lung tissue, leading to serious health defects such as pneumoconiosis.

Heart: Once inhaled into the lungs, certain contaminants can be absorbed into the bloodstream and cause irreparable damage to the brain, kidneys, liver and other internal organs.

Method of filtration

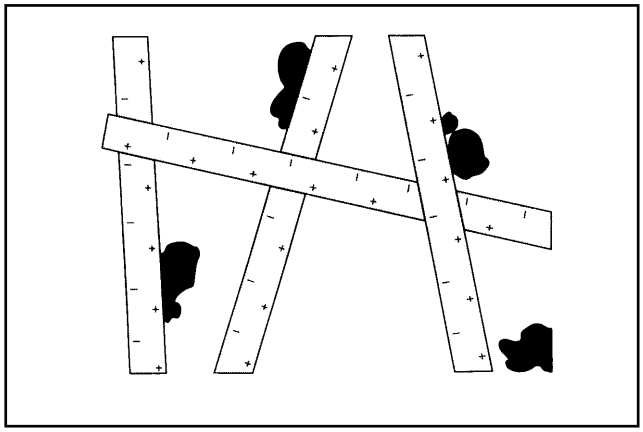
Masks and respirators can act as a barrier to the inhalation of potentially harmful particles, gases or vapours, by filtering out the contaminant. The RS range supplied by 3M uses three types of filtration method to achieve this.

The mechanical system



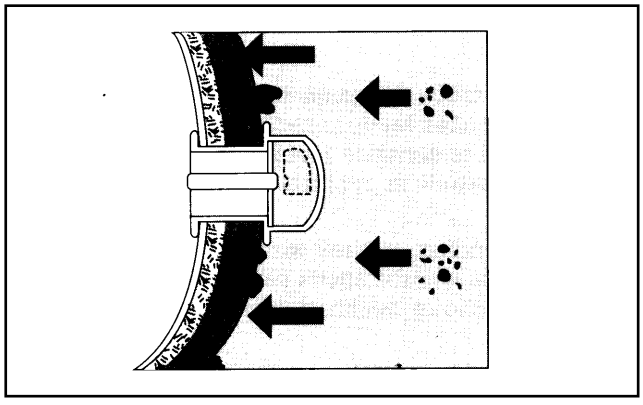
The mechanical system operates like a sieve and stops penetration of non-respirable dusts by intercepting particles over a certain size.

The electrostatic method



The electrostatic method uses charged fibres to attract respirable dusts, mists and metal fume.

Charcoal filter method



A charcoal filter method acts like a sponge to absorb specific gases and vapours until saturation is reached. At this point breakthrough occurs and a new respirator is required.

The selection of respiratory protective equipment

Important: For further advice and guidance, see Health and Safety Executive Guidance Notes EH40/EH42/HS(G)53.

Before respiratory protective equipment can be effectively selected the following important points need to be considered:

1. Name and form of contaminant. (These can be obtained from the supplier's Material Safety Data Sheets (MSDS).
2. Potential harmful effects.
3. Airborne concentration (mg/m^3 or parts per million).
4. Occupational Exposure Limit (OEL) for contaminant (mg/m^3 or parts per million). See HSE guidance note for further details EH40.
5. Nature and length of exposure.
6. Multiply measured airborne concentration by total exposure (hours) and divide by 8 hours to ascertain 8 hour time-weighted average concentration.
7. Check an specific regulation, approved codes of practice or guidance notes applicable.
8. Divide time-weighted average airborne concentration by Occupational Exposure Limit to ascertain level of protection required.
9. Then select respirator with max usage level greater than required level of protection.

An example of the method of calculation is given below with cobalt as the contaminant and dust as the form of the contaminant.

Nature of contaminant:	Cobalt
Form of contaminant:	Dust
Effects:	Fibrosis and respiratory sensitivity
Concentration:	$0.8mg/m^3$
OEL:	$0.1\ mg/m^3$
Exposure time:	7 hours

$\therefore$ 8 hour time-weighted average concentration

$$= \frac{0.8mg/m^3 \times 7}{8}$$

$$= 0.7mg/m^3$$

Divide total weighted average concentration by OEL

$$= 7 \times \text{OEL}.$$

Select respirator with max usage concentration which is greater than $7 \times$ OEL, as this is a minimum safety requirement.

A suitable respirator may be the dust/mist respirator RS stock no. 179-3618 (3M - 8810)

Example for the vapour xylene present in conventional single pack paints, adhesives and resins.

Nature of contaminant:	Toluene.
Form of contaminant:	Vapour.
Concentration:	250ppm.
OEL:	50ppm
Exposure time:	7 hours

$\therefore$ 8 hour time-weighted average concentration

$$= \frac{250ppm \times 7}{8}$$

$$= 218.8ppm$$

Divide time-weighted average concentration by OEL

$= 4.4 \times \text{OEL}$

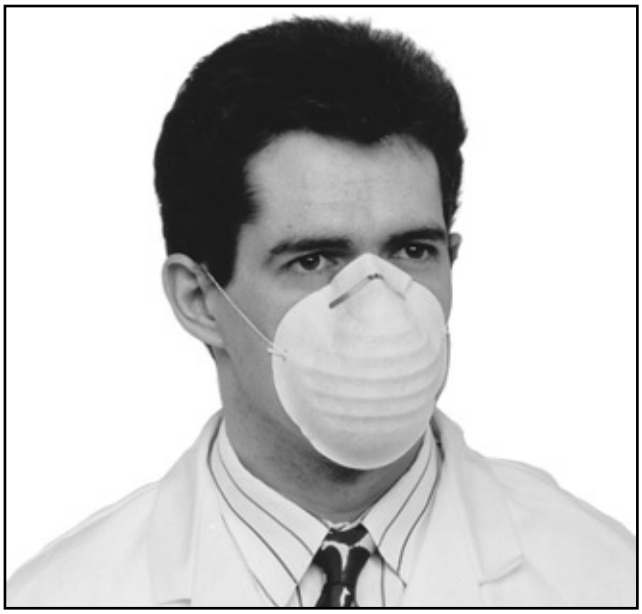
$\therefore$ Select respirator with max usage concentration which is greater than $> 4.4 \times \text{OEL}$.

A suitable respirator may be the organic vapour respirator RS stock no. 711-766 (3M - 4251).

Negative pressure respirators and masks

Negative pressure respirators work by filtering the contaminant from the atmosphere and rely on lung power to pull the air through the filtering material. Dusts, mists and metal fume are the most common respiratory hazards in the working environments. They are usually by-products of processes such as grinding, welding, sanding or drilling and are found in most industries from mining and construction to electronics and pharmaceuticals.

Nuisance dust mask (below OEL)



Protection against: Large, non-toxic dusts and pollens.

Maximum usage level: Below OEL.

Standard: No performance standards applicable.

Approval: None relevant.

Typical industry applications

- General maintenance
- Road making
- Surface finishing
- Food processing
- Construction
- Transport depots.

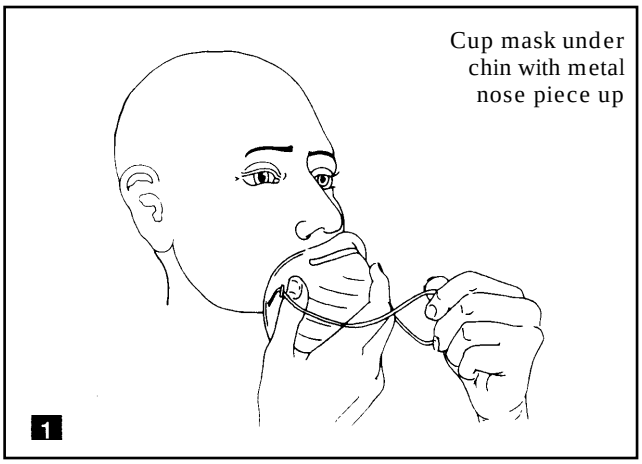
Weight: 4 grams.

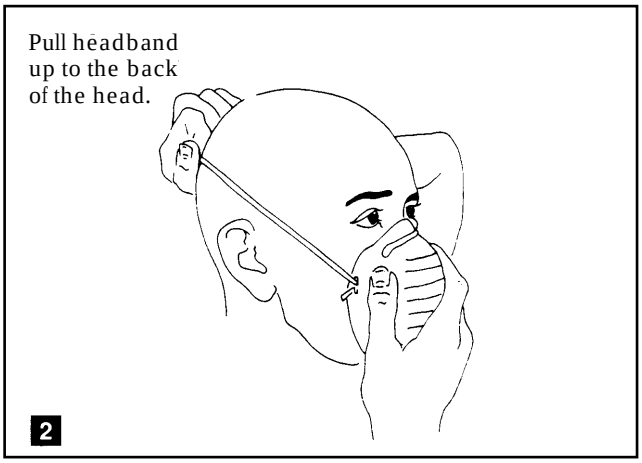
Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

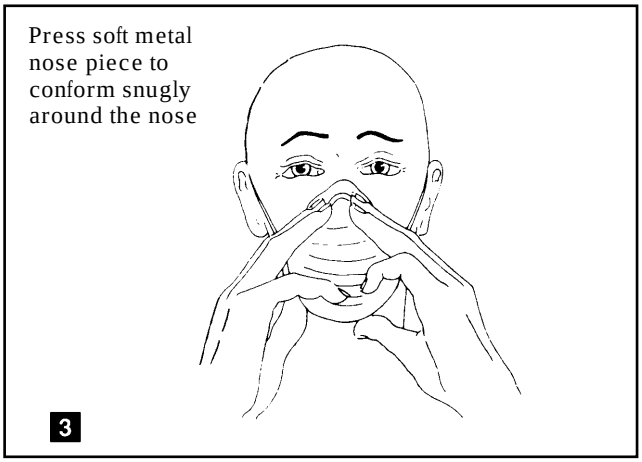
RS stock no.	3M part no.
711-671	8500

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. Please refer to fitting instructions below.

Fitting instructions for the nuisance dust mask **RS** stock no. 711-671







Do not use with beards or other facial hair that prevent direct contact between the face and the edge of the respirator.

If you cannot achieve a proper fit do not enter the contaminated area.

Dust respirator - EN149 FFPI

Protection against: At least 78% efficient against fine dusts and fibres down to 0.5 micron.

Maximum usage level: 4 × Occupational Exposure Limit (OEL).

Standard: EN149 FFP1.

Approval: Conforms to HSE Approved Standard. Suitable for use under Control of Substances Hazardous to Health (COSHH), Control of Asbestos at Work (CAW), Control of Lead at Work (CLAW) and Ionising Radiations Regulations (IRR).

Typical industry applications:

- Engineering
- Agrochemicals
- Sawmills
- Pharmaceuticals
- Laboratories
- Paint manufacture
- Rubber/Plastics
- Agriculture
- Food.

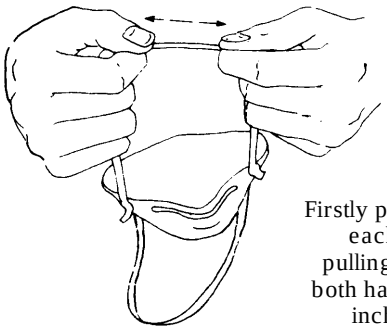
Weight: 7 grams.

Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum: 19.5% oxygen.)

RS stock no.	3M part no.
711-687	8710E

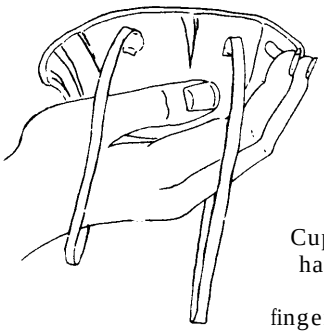
Respiratory protection is only effective if it is correctly fitted and used through out the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. Please refer to fitting instructions opposite.

Fitting instruction for the dust respirator - EN149 FFPI - **RS** stock no. 711-671



Firstly pre-stretch each strap by pulling between both hands at 1-2 inch intervals around the entire length of the strap

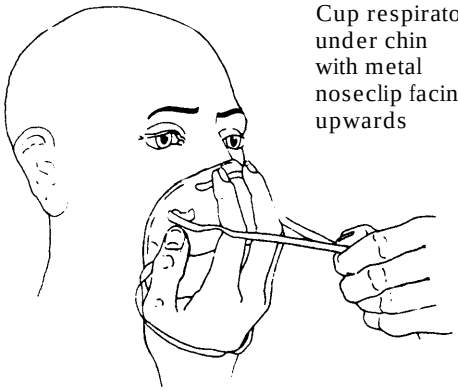
1



Cup respirator in hand, with metal noseclip at fingertips, allowing straps to hang freely below hand

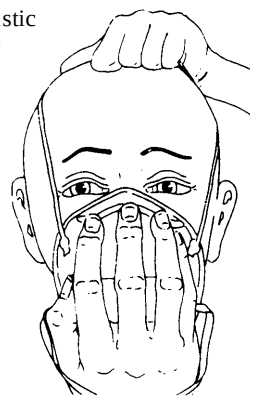
2

Cup respirator under chin with metal noseclip facing upwards



3

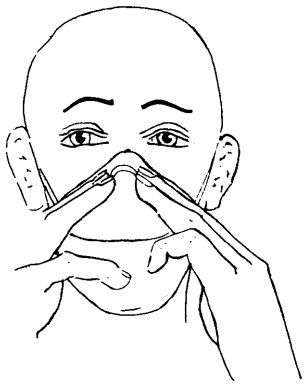
Place the top elastic strap around the head, above the ears



Place the bottom elastic strap around the head, just below the ears. Untwist the straps.

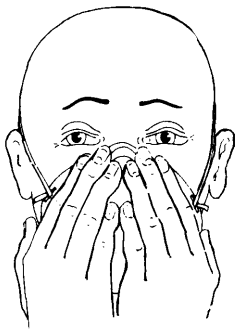
4

Using both hands, mould metal nose piece to shape of lower part of nose



5

To check fit, cup both hands over respirator and exhale vigorously. If air flows around nose, tighten nose piece. If air leaks at respirator edges, work straps back along the sides of the head.



6

Do not use with beards or other facial hair that prevent direct contact between the face and the edge of the respirator.

If you cannot achieve a proper fit, do not enter the contaminated area.

Dust/Mist respirator - EN149 FFP2S

Protection against: At least 92% efficient against fine dusts and water-based aerosols down to 0.5 micron.

Maximum usage level: 12 × OEL for fine dusts and mists. 6 × OEL for particle metal fumes.

Standard: EN149 FFP2S.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industry applications:

- Foodstuffs, eg. bagging and powdered additives
- Laboratories
- Construction
- Powdered chemicals
- Iron and steel foundries
- Electronics
- Shipbuilding/Ship repairing.

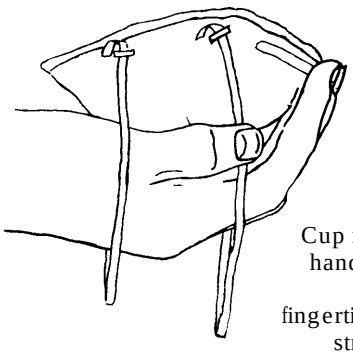
Weight: 8 grams.

Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

RS stock no.	3M part no.
179-3618	8810

Respiratory protection is only effective if it is correctly fitted and used through out the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. Please refer to fitting instructions below.

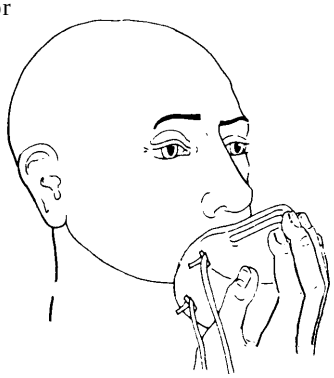
Fitting instructions for the dust/mist respirator - EN149 FFP2S - **RS** stock no. 711-693



Cup respirator in hand, with metal noseclip at fingertips, allowing straps to hang freely below hand

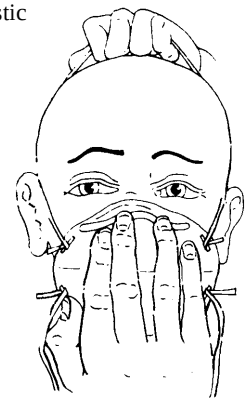
1

Cup respirator under chin with metal noseclip facing upwards



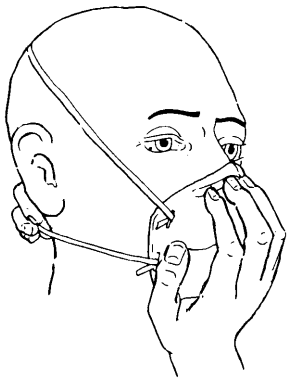
2

Place the top elastic strap around the head, above the ears



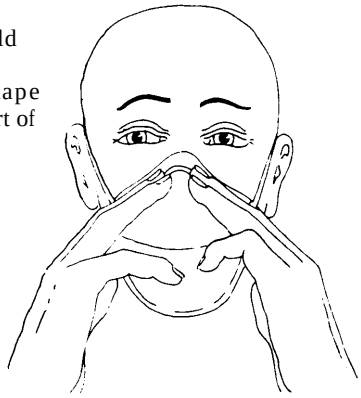
3

Place the bottom elastic strap around the head, just below the ears. Untwist the straps.



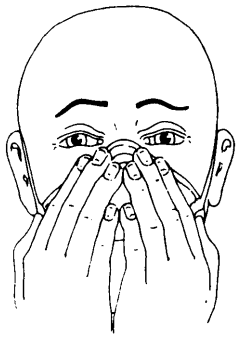
4

Using both hands, mould metal nose pieces to shape of lower part of nose



5

To check fit, cup both hands over respirator and exhale vigorously. If air flows around nose, tighten nose piece. If air leaks at respirator edges, work straps back along the sides of the head



6

Do not use with beards or other facial hair that prevent direct contact between the face and the edge of the respirator. If you cannot achieve a proper fit, do not enter the contaminated area.

Dust and welding fume respirator - EN149 FFP2S

Protection against: At least 92% efficient against fine dusts down to 0.5 micron, metal fume, and nuisance levels of welding odours. Adverse health effects, such as vomiting and chronic respiratory disease, can be caused by ozone, which is produced when ultra-violet light reacts with oxygen in the surrounding air. This is most likely to occur in carbon arc, MIG and TIG welding and specifically where aluminium, stainless or polished steel and copper are employed.

Maximum usage level: 12 × OEL for dusts, 6 × OEL for metal fume, 10 × OEL for ozone, below OEL for welding odours.

Standard: EN149 FFP2S.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Metal manufacture
- Welding processes
- Shipbuilding/Ship repair.
- Battery manufacture
- Iron foundries
- Paint manufacture
- Construction
- Powdered chemicals
- Soldering processes
- Steel foundries.

Weight: 32 grams.

Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

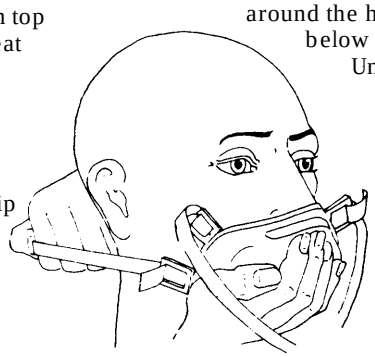
RS stock no.	3M part no.
711-700	9925

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. Please refer to fitting instructions on next page.

Fitting instructions for the dust and welding fume respirator - EN149 FFP2S
RS stock no. 711-700

Thread top elastic strap through top buckle. Repeat for bottom strap and buckle. Cup respirator in hand, with metal noseclip at fingertips

Place bottom elastic strap around the head, just below the ears. Untwist the strap

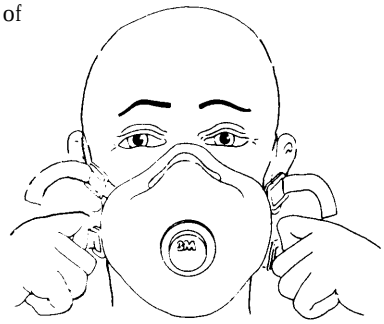


1

Place the top elastic strap around the head, above the ears. Untwist the strap

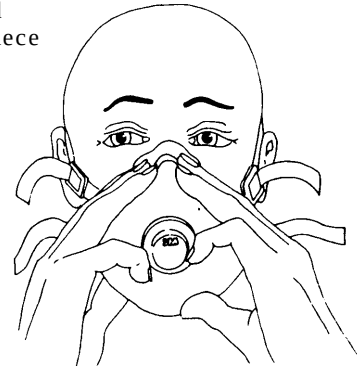
2

Adjust tension by pulling tab of each strap



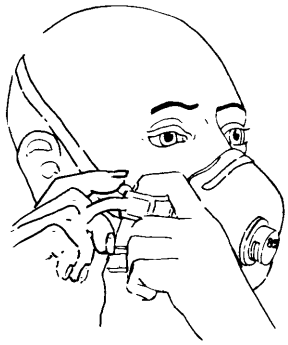
3

Using both hands, mould metal nose piece to shape of lower part of nose



4

Strap tension may be decreased without removing respirator from the head by pushing out on the back of the buckle



5

To check fit, cup both hands over respirator and inhale sharply. If air flows around nose, tighten nose piece. If air leaks at respirator edges, adjust straps.

6

Do not use with beards or other facial hair that prevent direct contact between the face and the edge of the respirator. If you cannot achieve a proper fit, do not enter the contaminated area.

Mists/Metal fume respirators EN149 FFP2SL and FFP3SL

Model 1 FFP2SL respirator

Protection against: Fine respirable dusts, fibres, mists and metal fume. At least 92% efficient.

Maximum usage level: 12 × OEL for dusts/mists, 6 × OEL for metal fume.

Standard: EN149, FFP2SL.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Engineering
- Food
- Pharmaceuticals
- Construction
- Fibreglass manufacture
- Agriculture

RS stock no.	3M part no.
711-716	8825

Model 2 FFP3SL respirator

Protection against: At least 98% efficient against fine dusts, fibres, mists and metal fume.

Maximum usage level: 50 × OEL for dusts/mists, 25 × OEL for metal fume.

Standard: EN149, FFPsSL.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Soldering
- Welding
- Construction
- Pharmaceuticals
- Chemical processing
- Battery manufacturing
- Ship building/Ship repairing
- Iron and steel foundries

RS stock no.	3M part no.
711-722	8735

The 8825 and 8835 should not be used for escape purposes and should be used in well ventilated areas with a minimum of 19.5% oxygen.

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness.

For correct fitting of both RS stock nos. 711-716 and 711-722 see the dust and welding fume respirator FFP25 RS stock no. 711-700.

Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

Weight: 64 grams.

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. See the fitting instructions for the dust and welding fume respirator EN149-FFP2S RS stock no. 711-700 mentioned previously in this data sheet.

Odour respirator - EN149 FFP1

Protection against: At least 78% efficient against fine dusts down to 0.5 micron, mists, unpleasant smells and nuisance levels of organic vapours.

Maximum usage level: 4 × OEL for particulates. Below OEL for organic vapours.

Standard: EN149, FFP1.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Electronics
- Adhesive processing
- Paint manufacture and processing
- Pathology departments (not formaldehyde)
- Hospital and laboratory sterilisation procedures
- Food processing
- Light engineering
- Resin
- Inks and dyes.

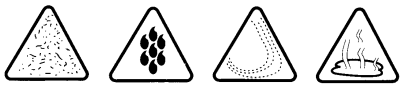
Weight: 10 grams

RS stock no.	3M part no.
711-744	9913

Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. See the fitting instruction for the dust/mist respirator EN149-FFP2S RS stock no. 711-693 mentioned previously in this data sheet.

Acid gas respirator - EN149 FFP1 (Nuisance level).



Protection against: Dusts, mists, sulphur dioxide, hydrogen fluoride and nuisance levels of organic vapours/ acid gases. At least 78% efficient against fine dusts down to 0.5 micron.

Maximum usage level: 4 × OEL of dust contaminant as specified in Guidance Note EH40 from the Health and Safety Executive.
Below OEL for organic vapours and acid gases.

Standard: EN149, FFP1.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Chemical processing
- Speciality metal reduction
- Battery manufacture
- Brewers
- Food processors
- Power stations.

RS stock no.	3M part no.
711-750	9915

Weight: 10 grams.

Warning: Should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness. See fitting instruction for the dust/mist respirator EN149-FFP2S RS stock no. 711-693 mentioned previously in this data sheet.

Gas and vapour respirators
EN405-FFA1P1 and
EN405-FFABE1P1

Organic vapour respirator - EN405-FFA1P1

Protection against: Organic vapours and particulates such as acrylic, cellulose, emulsion, enamels, lacquers, oil based paints and varnishes typically used in spraying applications.

Maximum usage level: 10 × OEL or 1000 parts per million whichever is lower for organic vapours. 4 × OEL for particulates.

Standard: EN405, FFA1P1.

Approval: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Anywhere conventional paints are used (subject to usage conditions)
- Vehicle manufacture
- Paint and varnish manufacture
- Chemical manufacture and handling
- Plant equipment manufacture
- Aircraft manufacture and refurbishment
- Heavy engineering
- Manufacture and use of resins
- Adhesive manufacture and laboratories.

RS stock no.	3M part no.
711-766	4251

Organic vapour/Inorganic gases/Acid gases/ Ammonia respirator - EN405 FFABEK1 P2SL

Protection against: Organic vapours (boiling above 65°C), inorganic acid gases and ammonia, up to 10 × OEL or 1000ppm, whichever is the lower.

Maximum usage level: 10 × OEL against organic vapours (boiling above 65°C), inorganic, and acid gases and ammonia. 12 × OEL for particulates .

Standard: EN405, FFABEK1 P2SL.

Approvals: Conforms to HSE Approved Standard. Suitable for use under COSHH, CAW, CLAW and IRR.

Typical industrial applications:

- Anywhere conventional paints are used (subject to usage conditions)
- Acid cleaning
- Metal pickling
- Paint and varnish manufacture
- Solders/Desoldering
- Electrolytic processes
- Chemical manufacture and handling.

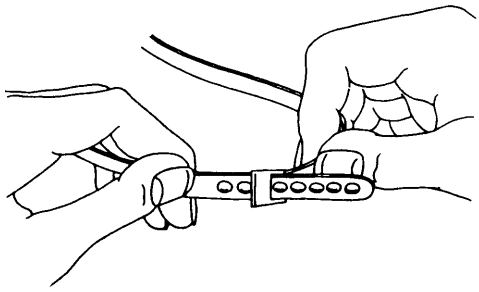
RS stock no.	3M part no.
287-2649	4279

Warning: None of the above respirators and masks should be used in hazard concentrations which are immediately dangerous to life and health (IDLH). They should not be used for escape purposes and should be used in well ventilated areas. (Minimum 19.5% oxygen.)

Respiratory protection is only effective if it is correctly fitted and used throughout the time when exposed to hazards. Incorrect fitting can reduce respirator effectiveness.

Fitting instructions for the organic vapour/inorganic gases/acid gas respirator and FFABE1P1 (also for EN405 FFA1P1)
RS stock nos. 711-766 and 711-772

Assemble/Adjust head-cradle by feeding the perforated strip through the buckle and pressing down of the stud at the required length. Repeat for second strip

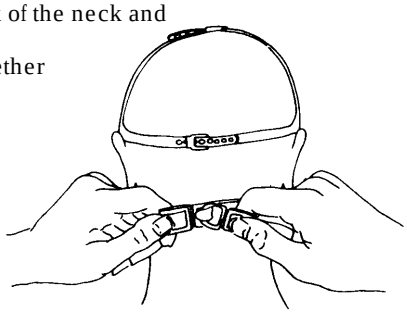


1

Place the respirator over the face, fitting it comfortably on bridge of nose, then pull the head harness over the crown of the head. If necessary, remove the respirator and re-adjust the head-cradle to a comfortable fit and repeat step 1.

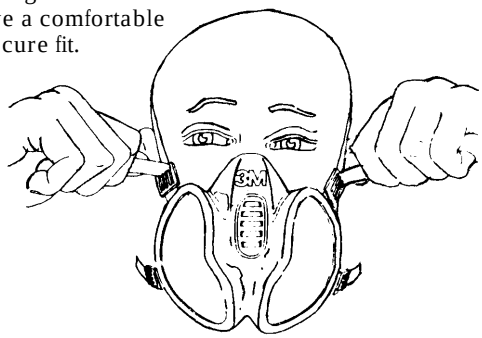
2

Take the bottom straps in each hand, place them at the back of the neck and hook the straps together



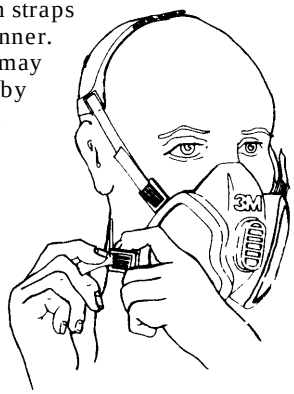
3

Tighten the top straps first by pulling in the ends to achieve a comfortable and secure fit.



4

Tighten bottom straps in a similar manner. (Strap tension may be decreased by pushing out on back side of buckles)



5

Perform a positive pressure fit check
Place palm of hand over exhalation valve cover and exhale gently. If the face piece bulges slightly and no air leaks between the face and the face piece are detected, a proper fit has been achieved. If air leakage is detected, reposition the respirator on the face and/or the head harness to eliminate the leakage. Repeat the above fit check.

6

Do not use with beards or other facial hair that prevent direct contact between the face and the edge of the respirator. If you cannot achieve a proper fit, do not enter the contaminated area.

Face seal cleaner.
RS stock no. 711-788

Respirators can be used again providing that break-through has not occurred and the respirator is still effective. To help produce an effective seal to the face a fragrance free low alcohol wipe can be used to safely remove any grease and dirt from the respirator face seal. This is particularly recommended for use with the gas and vapour respirators RS stock nos. 711-766 and 711-772.

Selection chart for the range of 3M negative pressure respirators

Contaminant	Respirator, mask type and RS stock no.									
	Dust mask 711-671	Dust respirator 711-687	Dust/Mist respirator 179-3618	Dust and welding respirator 711-700	Mist/Metal fume respirator 711-716	Mist/Metal fume respirator 711-722	Odour respirator 711-744	Nuisance level acid gas respirator 711-750	Organic vapours respirator 711-776	Organic/ Inorganic vapours respirator 711-771
Nuisance dust levels below OEL	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Respirable dust greater than 0.5µm		✔	✔	✔	✔	✔	✔	✔	✔	✔
Fibreglass		✔	✔	✔	✔	✔				
Asbestos			✔	✔	✔	✔				
Lead fume			✔	✔	✔	✔				
Welding fume				✔	✔	✔				
Ozone (concentration < 1ppm)				✔						
Chlorine								✔		✔
Nuisance levels of hydrogen fluoride								✔		✔
Nuisance levels of sulphur dioxide								✔		✔
Nuisance levels of acid gases								✔		✔
Nuisance levels of odours/organic vapours							✔	✔		✔
Hydrogen fluoride										✔
Sulphur dioxide										✔
Acid gases										✔
Odours and organic vapours									✔	✔
Acetone									✔	✔
Xylene 10 × OEL									✔	✔
Trichloroethylene									✔	✔
Toluene									✔	✔

HSE Approved Standards

European Standard	No	EN149 FFP1	EN149 FFP2S	EN149 FFP2s	EN149 FFP2S	EN149 LFFP2SL	EN149 FFP1	EN149 FFP1	EN405 FFA1P1	EN405 FFABE1P1

European PPE (Personal Protective Equipment) Directive 89/686/EEC.

The European PPE (Personal Protective Equipment) Directive 89/686/EEC was adopted by the EC Member States on 1 July 1992. The directive is concerned with the harmonisation of standards and product certification throughout Europe.

Where no harmonised standards exist, it states that compliance with National Standards was acceptable until 31 December 1992 (the PPE Product Directive transition period).

All the 3M respirators meet harmonised European Standards which have been adopted by the HSE. The respiratory protection therefore meets essential safety requirements and will conform compliance by displaying the CE mark.