575-665

# 3M 4000 Series Gas and Vapour Respirators

## TYPICAL INDUSTRY APPLICATIONS

| MODEL | HAZARD | INDUSTRY |
|---|---|---|
| 4251/ 4255 | Organic Vapours | Anywhere conventional paints are used (subject to usage conditions).<br>Vehicle manufacture.<br>Plant equipment manufacture.<br>Shoe treatment and tanneries.<br>Domestic appliance manufacture.<br>Aircraft manufacture and refurbishment.<br>Boat building.<br>Machinery manufacture.<br>Chemical manufacture and handling.<br>Ink and dye manufacture and usage.<br>Adhesive manufacture and laboratories.<br>Paint and varnish manufacture.<br>Manufacture and use of resins. |
| 4254 | Ammonia | Manufacture and maintenance of refrigeration equipment, agrochemicals. |
| 4257 4277 | Organic Vapour<br>Inorganic Gases<br>Acid Gases | As 4251 but also:<br>Electrolytic processes.<br>Acid cleaning.<br>Metal pickling.<br>Metal etching. |

## FEATURES

The 3M 4000 Series is a range of totally unique respirators which use new technology to provide integral construction gas and vapour respirators.

Each respirator is designed to provide protection against specific gases/vapours and particulates and is marked for easy identification in accordance with the colour coding requirements of the H.S.E. Approved Standard, EN405.

They have been ergonomically designed incorporating filters which are moulded into the facepiece so they do not protrude, resulting in improved peripheral vision and greater compatibility with other safety equipment, e.g. goggles and visors. Due to the single piece construction of each respirator, they are exceptionally light in weight.

The 3M 4000 Series uses twin inhalation valves together with unique carbon filters, which do not require granule containers, to reduce breathing resistance. This is complemented with a new parabolic exhalation valve which further reduces breathing resistance whilst preventing heat build-up.

The single piece integral construction also avoids operator assembly errors and allows a respirator to be designated to a specific area, making a respirator programme easier to manage.

Wearer comfort has been further improved in the design of the harness and strap system. A four point strap adjustment system has been used to ensure that the mask can achieve the best possible fit with minimum pressure. The head-cradle is also adjustable, both on the crown and at the rear to ensure the optimum position on the face. The new strap is both easy to use and, due to its design, minimises interference with hair. The facepiece is constructed from a soft non-allergenic compound for reduced skin irritation and greater comfort.

An hermetically sealed foilbag is utilised to extend shelf-life and prevent moisture and other substances contaminating the carbon. The bag is resealable and has the facility of a name panel to allow easier allocation.

An optional overspray guard is also available to prolong the life of the main filter when using the 4251 or 4255 respirators for paint spraying.

The 3M 4000 Series is exempt from the costly and time consuming maintenance requirements of the Control of Substances Hazardous to Health Regulations 1988 (COSHH) which stipulate the inspection, cleaning and record keeping requirements of a respiratory protection programme. If the respirator is worn for longer than a single-shift it is only subject to hygiene requirements, e.g. wiping the facepiece and a visual inspection. Once the respirator life is fully used it should be disposed of immediately.

## PERFORMANCE FIELD TRIALS

Extensive field trials conducted across Europe have demonstrated excellent wearer acceptance. These trials, conducted in UK, Norway, France and Germany, were conducted amongst users of reusable half mask respirators. The methodology used for the trials was as follows:

- Initial questions on existing respirator usage.
- Training in use, fitting and limitations of the 3M 4251 respirator.
- Substituting the 3M 4251 respirator for existing respirator for one week.
- Completion of a second questionnaire.
- A short discussion.
- Independent audit of findings.

The findings can be summarised as follows:

- Overall, there was overwhelming preference for the 4251 amongst the users involved in the trial.
- On virtually every criterion, the user expressed a preference for the 4251 respirator.
- Marked preferences were expressed for 'confidence in wearing', 'avoids heat build-up', 'easy to adjust', 'clean and hygienic' and 'lightweight'.
- Average scores (marked out of 10) for the 18 most important criteria, in descending order of importance to the user were as follows:

| CRITERIA | 4251 RESPIRATOR | CURRENT RESPIRATOR |
|---|---|---|
| 1 Breathe easy | 9.1 | 7.1 |
| 2 Secure face seal | 9.2 | 6.1 |
| 3 Clean and hygienic | 9.4 | 6.5 |
| 4= Comfortable to wear | 8.8 | 6.3 |
| 4= No vision interference | 9.4 | 7.9 |
| 6= Lightweight | 8.9 | 6.1 |
| 6= Easy to adjust | 9.5 | 6.7 |
| 8= Feel confident in wearing | 9.0 | 5.4 |
| 8= Easy to test for good seal | 8.1 | 8.1 |
| 10 Easy to take off | 8.9 | 6.6 |
| 11 Easy to put on | 9.0 | 7.7 |
| 12 Allows wearing of eye protection | 8.2 | 5.7 |
| 13 Avoids heat build-up | 7.2 | 4.0 |
| 14= Pre-assembled; ready to use | 10 | 6.4 |
| 14= Can be stored easily | 8.5 | 7.3 |
| 16 Allows wearing of head protection | 8.0 | 6.2 |
| 17 Allows talk through | 6.7 | 4.8 |
| 18 Allows wearing of ear protection | 8.3 | 6.6 |

## PERFORMANCE DATA

- The 3M 4000 Series meets the performance requirements of the H.S.E. Approved Standard EN405 for valved filtering half-mask respirators, for gases or gases and particulate combinations in the categories shown below:

| 3M PRODUCT | TYPE CLASS | PERFORMANCE |
|---|---|---|
| 4251 | FFA1P1 | Provides protection against organic vapours, (boiling above 65°C) up to 10 times the Occupational Exposure Limit (OEL) or 1000 parts per million (ppm), whichever is the lower. |
| 4254 | FFK1P1 | Provides protection against ammonia and organic ammonia derivatives; up to 10 times the OEL or 1000 ppm, whichever is the lower. |
| ~~4256~~ 4277 | FFABE1P1 FFABE1P2SL | Provides protection against organic vapours (boiling above 65°C), inorganic and acid gases, up to 10 times the OEL or 1000 ppm, whichever is the lower. |
| 4255 | FFA2P2SL | Provides protection against organic vapours, (boiling above 65°C) up to 10 times the Occupational Exposure Limit (OEL) or 5000 parts per million (ppm), whichever is the lower. |

- The 3M 4251, 4254 ~~and 4256~~ and 4277 respirators are at least 78% efficient against particulates down to 0.5 micron (Pi) and offer protection up to 4 times the OEL, ie. they can be used in atmospheres containing up to 4 times the OEL of particulate hazard, as specified in H.S.E. Guidance Note EH40.

- The 3M 4255 respirator and 4277 are at least 92% efficient against particulates down to 0.5 micron (P2SL) and offers protection up to 12 times the OEL, ie. they can be used in atmospheres containing up to 12 times the OEL of particulate hazard, as specified in H.S.E. Guidance Note EH40.

- Utilises unique carbon filters with low breathing resistance. The 3M 4000 Series should remain bagged before and after use, using the resealable bag to ensure that absorbent capacity is not reduced.

- The effective life of the respirator depends upon the nature and concentration of the substance concerned. Substances should have good warning properties, eg. taste or smell, and the respirator should be disposed of immediately when breakthrough is detected.

- Respirators should always be disposed of when: breathing becomes difficult due to particulate build-up on the filter; contaminant can be smelled or tasted or respirator becomes damaged.

- The 3M 4000 Series should not be used in hazard concentrations which are immediately dangerous to life or health (IDLH). They should not be used for escape purposes and should be used in well ventilated areas (minimum 19.5% oxygen)*.

- Colour coded for ease of identification:
  4251/4255 Brown/white colour coded valve.
  4254 Green/white colour coded valve.
  ~~4256~~ 4277 Brown/grey/yellow/white colour coded valve.

## TEST AND APPROVALS

- The 3M 4000 Series meets the performance requirements of the H.S.E. Approved Standard EN405 for valved filtering half-mask respirators, for gases or gases and particulate combinations.

- Are suitable for use under COSHH, CAW, CLAW and IRR.

- Are in conformity with the relevant European Directives and are CE Type Examined, CE930086.

## GUIDANCE ON CORRECT USAGE

*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 the Fitting Instructions. (See overleaf).*

For advice on 3M product selection, ring the 3M Respiratory Protection Helpline on 0800-525385 (free-of-charge).

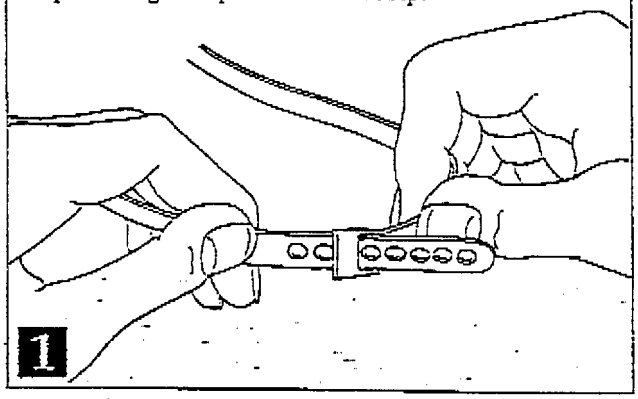
For literature and general enquiries, ring the 3M Customer Service Helpline on 0800 212490 (free-of-charge).

**3M definition of minimum oxygen requirement.*

*FITTING INSTRUCTIONS*

# 3M 4000 Series Gas and Vapour Respirators

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



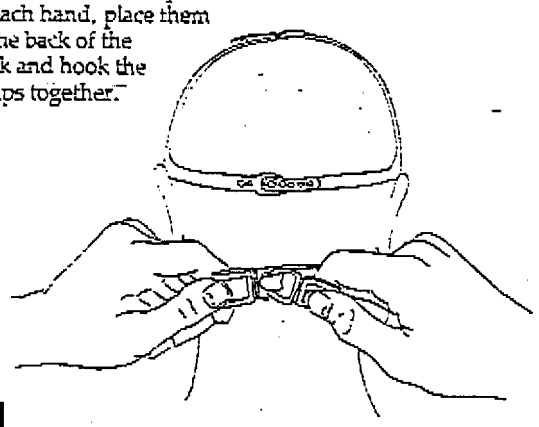
1

Place the respirator over the face, fitting it comfortably on bridge of the 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 2.

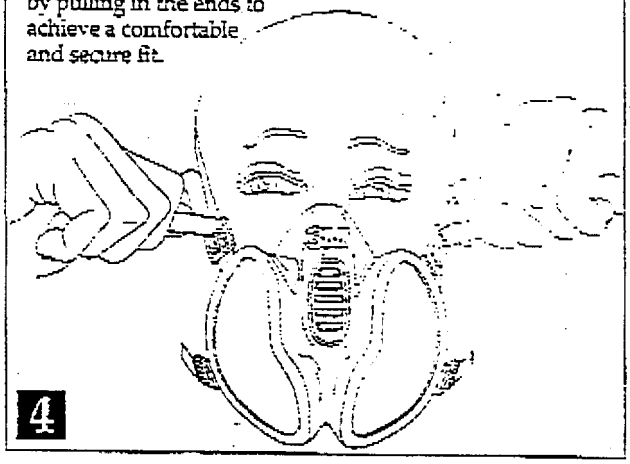
2

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



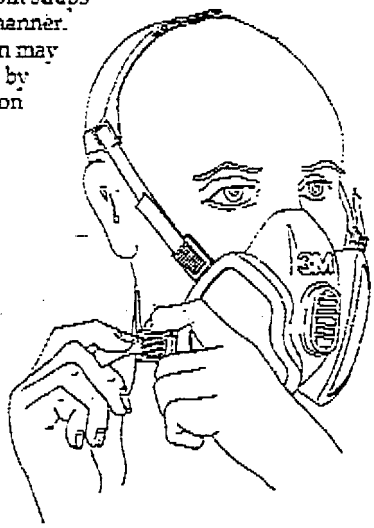
3

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



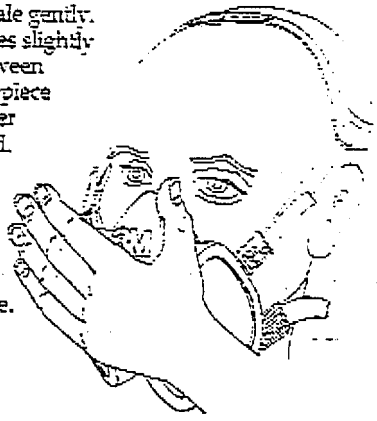
4

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 facepiece bulges slightly and no air leaks between the face and the facepiece 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.



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*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. See your supervisor or call 3M on 0800 525385 (charge-free line).*



CH81C

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