

PROGRAM REQUIREMENTS FOR RESPIRATORY PROTECTION



**The Dow Chemical Company
October 1990**

DO A 043920
CONFIDENTIAL

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INTRODUCTION

Occupational health and safety is the direct responsibility of line management. A respiratory protection program is an integral part of Dow Occupational Health and Safety programs. A respiratory protection program is intended to coordinate the selection, use and maintenance of respiratory protective equipment to prevent employee exposure to respiratory hazards.

This document describes the requirements for a respiratory protection program for The Dow Chemical Company. It is intended to assist Dow sites by providing a framework for establishing and maintaining their own respiratory protection programs directed at their specific activities. Each Dow site will continue to meet or exceed all government standards and regulations established for the region or location of operation. Such standards or regulations shall supersede these Program Requirements to the extent that they are more stringent or contradict them.

More detailed guidance on the various elements of a respiratory protection program is given in the companion Occupational Health document, "Respiratory Protection Program Resource Document".

For the purposes of this document, the following definitions apply:

Air-Purifying Respirator - A respirator in which ambient air is passed through an air-purifying element (filter or sorbent bed) that removes the contaminant(s). Air is passed through the air-purifying element by the breathing action of the wearer or by a blower.

Air-Supplying Respirator - A respirator in which air is supplied to the wearer from a source independent of the ambient air where the respirator is being worn. Typically, such sources include cylinders of compressed breathing air or compressors located in breathable ambient air.

Assigned Protection Factor (APF) - The minimum expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users.

Escape Only Users - Personnel whose only use of respirators is to escape from an emergency situation.

Fit Check - A test conducted by the respirator user to verify proper sealing of the respirator facepiece to the face.

Fit Factor - A quantitative measure of the fit or sealing performance of a particular respirator to a particular individual. It is usually expressed as the ratio of challenge concentration outside the respirator to the concentration inside the respirator.

Fit Test - The use of a challenge agent to evaluate the fit of a respirator facepiece on an individual. The outcome determines whether the required fit factor was achieved under a given set of physical conditions.

Negative-Pressure Mode - A respirator configuration where the air pressure inside the facepiece is lower than the ambient air pressure during inhalation.

Qualitative Fit Test - A pass/fail fit test that relies on the subject's sensory response to detect the challenge agent.

Quantitative Fit Test - A fit test that uses an instrument to measure the challenge agent concentrations inside and outside the respirator.

Required Fit Factor - The minimum fit factor that must be attained to pass a fit test.

Respirator - A device worn by an individual which is designed to protect the wearer from inhalation of airborne contaminants or oxygen deficient atmospheres.

Respirator Users - Personnel who use any type of respirator for any purpose, regardless of frequency (includes Routine Users and Escape Only Users).

Respirator with a Tight-Fitting Facepiece - A respirator which relies on an effective seal between the facepiece of the respirator and the face of the wearer to isolate the wearer from unpurified ambient air. The most common examples are respirators with elastomeric half- and full-facepieces.

Routine Users - Personnel who use any type of respirator in the normal performance of their job, regardless of frequency (includes personnel assigned to emergency response reentry teams).

Sanitize - To remove contaminants and inhibit the action of agents that cause infection or disease.

SCOPE

A respiratory protection program shall be administered by each facility where respiratory protection is required. Line management at each location shall determine the scope of the respiratory protection programs for their respective operations. The programs shall include the following key elements.

- I. Respiratory Hazard Evaluation and Control
- II. Respirator Selection
- III. Medical Evaluation
- IV. Training
- V. Respirator Fitting
- VI. Respirator Use
- VII. Respirator Maintenance
- VIII. Program Administration, Documentation and Evaluation

I. Respiratory Hazard Evaluation and Control

- A. Exposure of unprotected employees to respiratory hazards (oxygen deficient atmospheres or toxic concentrations of air contaminants) shall be prevented.
- B. The workplace environment shall be reviewed periodically to identify and evaluate the potential respiratory hazards present.
- C. In addressing respiratory hazards, every effort shall be made to prevent exposure to such hazards by means of technically and economically feasible engineering and administrative controls. Until these controls are operational, or in those circumstances where employee exposures to respiratory hazards cannot be avoided or effectively controlled, appropriate respirators shall be used.

II. Respirator Selection

- A. Respirators shall be selected for the environment in which they are to be used. Consideration shall be given in the selection process to the nature and severity of respiratory hazards present, the characteristics of the tasks employees will be required to perform while using the respirator, the limitations of the respirators being considered, and input from the employees who will use the respirators.
- B. The selection shall be made by supervision based on the advice of industrial hygiene and/or safety personnel.
- C. Respirators which are approved or accepted by recognized authorities shall be used when they are available.

III. Medical Evaluation

- A. An employee's medical status as it pertains to respirator use shall be evaluated by a physician before the employee is assigned to tasks requiring routine or emergency response respirator use.
- B. The medical approval for respirator use and any medical restrictions on respirator use shall be communicated to the employee and the employee's supervision, who shall ensure that identified medical restrictions are observed.
- C. The medical status of an employee approved to use a respirator shall be reviewed periodically (for example, every two years) following

initial approval and a decision made by the physician whether any change in the employee's approval for respirator use is required.

- D. The results of medical evaluations for respirator use shall be documented in the employee's medical records.

IV. Training

- A. Respirator users and their immediate supervisors shall be trained in the proper use, maintenance and limitations of the respirators that they will use.
- B. Training of respirator users and supervisory personnel shall include a discussion of:
1. The location and organization of the written respiratory protection document for their facility.
 2. The nature and effects of respiratory hazards present in the workplace.
 3. The rationale behind the respirator(s) selected for use.
 4. The capabilities and limitations of the selected respirator(s).
 5. Donning and routine use procedures including actual wearing of the respirator and instruction in conducting a fit check.
 6. Conditions which affect the facepiece seal.
 7. Maintenance, inspection, cleaning, and storage procedures.
 8. How to recognize and respond to emergencies with regard to respirator limitations.
 9. Respirator users' and supervisors' responsibilities.
 10. Any legal requirements governing the use of respirators.
- C. Training of respirator users shall be conducted before actual field use of the respiratory protective equipment. Supervisors shall be trained as soon as possible after assuming responsibility for employees who are respirator users.

- D. Each respirator user's current understanding of the topics covered in respirator training shall be evaluated periodically (for example, every two years) and refresher training administered if necessary.
- E. Training shall be conducted by individuals who have a thorough understanding of the topics covered in the training and are competent to instruct others.
- F. Each employee's respiratory protection training shall be documented.

V. Respirator Fitting

- A. All routine respirator users who will use a respirator with a tight-fitting facepiece shall be fit tested before their first field use of the respirator.
 - 1. Fit testing shall not be conducted if there are any interferences with the facepiece seal or valve function. (For example – possible interferences include facial or head hair and eyeglass bows.)
 - 2. A validated fit test protocol (either qualitative or quantitative) shall be used. Several validated protocols are described in detail in IHP-407, "Respirator Fit Testing," which is available from the H&ES Industrial Hygiene Laboratory, 1803 Building, Midland.
 - 3. When quantitative fit testing is used, the required fit factor shall be established for each type of respirator and shall be at least ten times the appropriate assigned protection factor for that type of respirator.
 - 4. When qualitative fit testing is used for an air-purifying respirator, the maximum fit factor which the fit test protocol is able to distinguish shall be at least ten times the appropriate assigned protection factor for that type of respirator; otherwise, the maximum fit factor divided by ten shall be used as the assigned protection factor for the respirator. (For example, using a full-facepiece respirator with an assigned protection factor of 50 would require a qualitative fit testing protocol which can distinguish a fit factor of 500. If the maximum fit factor distinguishable by the fit test protocol used was 100, then the full-facepiece respirator could only be used as if it had an assigned protection factor of 10.)
 - 5. For an air-supplying respirator, fit testing shall be conducted using the facepiece in a negative-pressure mode (typically, an air-purifying configuration is used) and applying the appropriate required fit factor for the negative-pressure mode.

6. Fit retesting shall be conducted periodically (for example, every two years) and whenever pertinent conditions change. Pertinent conditions are those which might affect the integrity of the respirator facepiece seal, for example: large weight gain or loss, denture use, facial scars or deformities, and a change in respirator type and manufacturer.
 7. Fit testing shall be conducted by individuals who have been trained to conduct such testing.
- B. The fit testing results shall be documented and shall be communicated to the employee and the employee's supervision.

VI. Respirator Use

- A. All areas and tasks for which respiratory protection is needed under routine operating conditions shall be clearly identified in each facility and documented (for example, in the Job Safety Analysis or plant operating procedures). The type of respiratory protection required shall also be identified for each area and task identified.
- B. Respirators shall be individually assigned for routine users unless this practice is judged to be impractical for a given situation.
- C. Respirators with tight-fitting facepieces shall not be used if there is any interference with the sealing surfaces or respirator valves. Common causes of such interference may include facial hair, head hair, and eyeglass bows.
- D. Employees using full face respirator masks and requiring vision correction shall use either special respirator-compatible spectacle kits or contact lenses, unless prohibited by local regulations.
- E. For air-purifying respirators, the change frequency for the air-purifying elements (filter, cartridge, canister) shall be established for each facility or job.
- F. Using respirators in operations involving confined space entry involves special considerations. Consult the applicable confined space entry standards or guidelines when conducting such operations.
- G. Air-supplying respiratory protection systems shall meet the following minimum requirements:
 1. Supplied breathing air shall meet the specification for "Type I, Grade D" breathing air given in Commodity Specification for Air,

ANSI Z86.1, 1988 or other applicable national or international standards that are at least as stringent. Verification of meeting the specification shall be either by certification from the breathing air supplier or by analysis upon receipt.

2. Air line couplings for breathing air shall be incompatible with outlets for any other gas systems in use in the facility.
3. Breathing air compressors shall have the following design features:
 - a. Shall have the intake located to avoid entry of contaminated air into the system.
 - b. Shall have inline air purifying sorbent beds and/or filters (for example, water separator, oil filter and charcoal sorbent bed) to further assure breathing air quality.
 - c. Shall have a receiver (accumulator) of sufficient capacity to allow safe escape from a contaminated atmosphere in the event of compressor failure.
 - d. Shall have alarms to indicate compressor failure and/or overheating.
 - e. If the compressor is lubricated with a petroleum-based oil, a high-temperature alarm shall be installed immediately after the final stage or a carbon monoxide alarm installed to continuously monitor air quality. If only a high temperature alarm is used, the air shall be tested frequently (for example, before each use) for carbon monoxide.
4. Breathing air compressors shall not be used during emergencies involving airborne contaminants unless a monitoring and alarm system appropriate for the contaminants involved is installed at the compressor air inlet.
5. Breathing air sources (cylinders and compressors) and outlets shall be appropriately marked to indicate their use and contents.
6. All air-supplying respiratory protection systems shall be equipped with a low pressure alarm.
7. All alarms installed in air-supplying respiratory protection systems shall be tested periodically (for example, annually).
8. Air supplying respirators with a tight-fitting facepiece (for example, self-contained breathing apparatus (SCBA)) shall be used

in a pressure-demand mode only. Loose-fitting air supplying respirators (for example, sandblasting hoods) shall be used in a positive-pressure mode.

VII. Respirator Maintenance

- A. A respirator cleaning station shall be established centrally for each location or in each facility where reusable respiratory protective equipment is used.
- B. Respirators issued to an individual shall be cleaned and sanitized regularly. Each respirator shall be cleaned and sanitized before being worn by different individuals.
- C. Respirators shall be inspected for physical and operational defects by the user immediately prior to each use. Respirators for emergency response or escape use shall be inspected periodically (for example, monthly for emergency response respirators and annually for escape respirators).
- D. Respirators shall be stored in such a manner that they are protected from any factors which might degrade their performance (dust, sunlight, heat, extreme cold, excessive moisture, chemicals, physical distortion).

VIII. Program Administration, Documentation and Evaluation

- A. Each facility having a respiratory protection program shall develop a respiratory protection program document and ensure that a copy of the current program document is kept readily available in the pertinent facility.
- B. The program document shall, either by reference or inclusion, address the following:
 - 1. The respiratory hazards of concern and the type of respirators selected for use.
 - 2. The frequency of medical reevaluation of employees who use respirators.
 - 3. The topics covered in respirator training and the frequency of respirator user's current knowledge evaluation.

4. Fit testing methods used and the frequency of fit retesting.
5. Procedures for the routine use of respirators, including:
 - a. air purifying element change frequency
 - b. specific respirators required for various areas and tasks in the facility
 - c. fit checking, facial hair, and vision correction practices
 - d. breathing air supply operation procedures
 - e. breathing airline fitting specification
6. Procedures for the emergency use of respirators, including:
 - a. respirator types
 - b. storage locations
 - c. use situations
7. Respirator maintenance procedures, including:
 - a. location and methods of respirator cleaning
 - b. frequency of inspections and cleaning
 - c. respirator storage location(s)
 - d. procedures for obtaining respirator maintenance supplies (cartridges, straps, valves, etc.)
 - e. procedures for repairing or replacing defective respirators
 - f. inspection, testing, and maintenance schedules for breathing air supply system
8. The location and custodian of each of the following records:
 - a. fit testing records
 - b. medical evaluation records
 - c. respiratory protective equipment inspection and maintenance records
 - d. employee training records
- C. All records shall be kept in accordance with Dow records retention policies which shall be verified to meet governmental requirements.
- D. The facility respiratory protection program shall be reviewed periodically as a part of the total industrial hygiene program for the facility.
- E. Line management at each location shall ensure that contractors are informed of Dow respiratory protection practices.

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DO A 043932
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49-1290
/REQ480323