Section 6
Respirator Program

Action Items

Respirator (Dust) Program

1. Eliminate worker exposure to dust. Your money is better spent on controlling dust exposure than on both controls and the respiratory protection program required after you receive an MSHA citation for overexposure.

2. If you are cited, follow the instructions in this section to complete the written Respiratory Protection Program and adhere to your written program.
1. Every mine must have a written respiratory protection program. True/False
2. Respiratory protection standards enforced in metal/nonmetal mines were published in 1973. True/False
3. MSHA requires miners who work near respirable dust to wear respirators. True/False – MSHA does not regulate dust emissions. MSHA regulates worker exposure to dust emissions and requires that engineering controls be put in place when workers are overexposed. Respirators are required as part of a complete Respiratory Protection Program when a mine has been cited for overexposure. Respirators are considered by MSHA to be a temporary corrective measure only while feasible engineering controls are being developed.
4. A good-quality air-purifying respirator will protect you from dust, harmful gasses, and harmful vapors. True/False – You need respirators that are specially designed for the airborne contaminant your workers are exposed to.
5. An air purifying respirator will protect you from oxygen deprivation. True/False – An air purifying respirator only filters out the contaminant for which it is designed. It does not add oxygen to the air. For oxygen deprivation you need an air-supplying respirator.
6. A self-contained breathing apparatus (SCBA) is an air purifying respirator. True/False – A SCBA is an air-supplying respirator in a small package designed for emergencies, and some underground mines require that one be available for each miner. It provides clean air for a short period of time (usually about an hour) while the miner escapes from a hazardous atmosphere.
7. The amount of harm from mineral dusts depends on the particle size and composition. True/False – Particles that are most harmful are the invisible ones that are less than 10 microns. The amount of harm depends on what they contain. For example, the 8 hour time-weighted average worker exposure to some particles is limited to 5 mg/m3, while for crystalline quartz, for example, the limit is 0.1 mg/m3.
8. An air-line respirator is an atmosphere-supplying respirator. True/False – air is supplied to the person through a specially designed regulator/hose/face mask system.
9. Beach sand is largely crystalline quartz. True/False – Beach sand is composed of crystalline quartz, but the particle size is too large to be of concern. If this sand were to be abraded into fine particles less than 10 microns, it would become the very toxic crystalline quartz that causes silicosis.
10. Almost all mine products contain crystalline silica at concentrations greater than 1 %. True/False – Crystalline silica, which is usually in the form of quartz, is found in almost all rock formations at concentrations in excess of 1%. However, it is the concentration of the very finely abraded (less than 10 micron) crystalline silica, which becomes airborne, that is of concern to workers. The standard is based on the concentration in the air the miners breathe and not the concentration in the ore that is mined.
11. Mine products containing quartz at concentrations in excess of 1 % crystalline silica are considered to be hazardous chemicals. True/False – When mine products contain more than 1 % crystalline silica, they are considered to be hazardous chemicals; the mine must have an MSDS for the product and train workers about its hazards and protective measures.
12. Mine air averaging more than 0.1 mg/m3 of crystalline silica is a violation of MSHA standards. True/False – MSHA doesn’t regulate the concentration in the mine air. MSHA regulates the amount a miner is exposed to and measures this by mounting a sampler on the miner for the entire workshift.
13. Mine products containing quartz at concentrations in excess of 1 mg/m3 require the use of a respirator. True/False – MSHA doesn’t regulate the amount in the mine product, but the amount in the air a miner is exposed to. However, the HazCom rule requires that when the mine product contains more than 1 % crystalline silica, the mine must have an MSDS available, on request, to miners and customers and train the miners in the hazards and protective measures.
14. A miner who is exposed to mine air containing crystalline quartz at concentrations in excess of 0.1 mg/m³ for 8 hours is in violation of MSHA standards. True/False.

15. One major source of exposure to respirable dust is improper housekeeping and a poor choice of cleanup procedures. True/False – As odd as this sounds, this is probably the major source of overexposure in many mines. The miner collects the fine toxic silica dust in his clothing and brings it into the lunchroom, office, vehicle cabs, control booths, his car, his home, etc. This dust collects in seat cushions, on the floors, walls etc. If fresh air is not continually ventilating this enclosed space, every movement the miner or others make, stirs up the fine crystalline silica dust, which is so fine that it remains airborne for hours. 1 teaspoon of this fine crystalline silica in the air inside a large great lakes ore carrier would cause the concentration in the air to exceed the level a miner can legally be exposed to over an 8-hour workshift.

16. Hosing down the ore pile is a good way to reduce dust. True/False – This would wash the fine silica dust from the rocks before they are transported to the next step in the process.

17. Properly functioning water sprays at critical locations in conveying, crushing, screening and sizing operations can significantly reduce respirable dust emissions. True/False – The placement of sprays is critical because each time a particle is crushed or abraded, new faces are exposed, which release the fine crystalline silica dust. The spray should preferably be directed at the particles while they are being crushed or abraded in other process steps.

18. Dry dust control systems are ineffective. True/False – Enclosed systems which draw the dusty air away are effective means of dust control.

19. Operator isolation is an effective dust exposure control method, if applied correctly. True/False – Operator isolation is effective if precautions are taken to ensure that dusty clothes are not worn into the control room or other operator station. Good housekeeping and effective ventilation with fresh clean air will help ensure that a buildup of fine crystalline silica in the operator’s workspace does not occur.

20. Operator isolation may contribute to overexposure. True/False. If the abovementioned precautions are not taken, operator isolation may very well become a major contributor to operator overexposure to crystalline silica.

21. Surface drills located out in the open air are a serious dust concern. True/False – Inadequate dust controls on surface drills is a major source of operator overexposure to crystalline silica. MSHA is very concerned and issues numerous citations.

22. Road dust is: a) a safety concern, b) a health concern, c) both a & b. While it is not the visible dust that causes silicosis, visible dust is unsafe because it limits operator visibility. Also, visible dust is an indication that the toxic respirable silica dust is also present in excessive concentrations.

23. MSHA will usually not require you to do a dust survey unless you have been cited for an overexposure condition. True/False

24. An MSHA citation usually brings with it the requirement that the mine operator begin to monitor dust and establish a respiratory protection program. True/False

25. Monitoring dust can be done by anyone with a little training. True/False Dust monitoring requires training and experience. Equipment is expensive and maintenance is time consuming. Meaningful results require extreme care in following carefully-designed procedures. MSHA uses only MSHA’s sampling results to determine whether or not an overexposure condition exists. Once a mine is cited for overexposure, mine operators may be required to sample to ensure that controls are working.

26. Crystalline silica is the same thing as crystalline quartz. True/False – Crystalline quartz is only one form of crystalline silica. The three types of crystalline silica of main concern are quartz, tridymite and cristobalite. While the standard limits the average respirable crystalline silica concentration to which a worker may be exposed over an 8-hour shift to less than 0.1 mg/m³, concentration limits for cristobalite and tridymite are ½ this level or about 0.05 mg/m³.
27. Silicosis is a condition where crystalline silica causes the lung tissue to react by developing fibrotic nodules and scarring around the trapped silica particles. **True**/False – *Chronic silicosis limits the ability of the lungs to transfer oxygen into the bloodstream through which it is delivered to other parts of the body. Acute silicosis, resulting from extremely high exposures for short periods of time, causes death by severe lung inflammation.*

28. Silicosis is a disease, the effects of which can be reversed, given time. **True**/False -- *Silicosis is irreversible.*

29. The correct use of dust respirators requires training. **True**/False

30. A person experiencing any difficulty wearing a dust respirator should receive a medical evaluation to determine if the person is capable of wearing one. **True**/False – *A medical evaluation will determine whether or not the person is capable of wearing a respirator. Some people cannot wear a respirator and breathe sufficient air to do work.*

31. A dust respirator is not effective if the worker wearing it has beard stubble. **True**/False – *Beard stubble breaks the seal between the respirator and the worker’s face, and the dusty air simply bypasses the respirator, offering no protection to the worker.*

32. Qualitative fit testing requires a specialist to perform. **True**/False -- *A kit with instructions is available for less than 100 dollars.*
RESPIRATORS

Is your respirator really protecting you from the hazards in the working environment? The best way to reasonably assure proper filtration is to make sure the respirator is properly selected, fitted, used and maintained in accordance with ANSI Z-88.2 (Note -- you should not need to purchase the expensive ANSI standards if you use the information provided in this Section), "Practices for Respiratory Protection", which is incorporated by reference in Section 72.710 of 30 CFR.

As an individual, you need to be aware of the potential of being exposed to airborne hazards and their properties. A proper size respirator and appropriate filters then need to be chosen. Respirators are not one-size fits all and one-type of filter protects against all airborne contaminants. In order to assure the respirator fits you properly either a qualitative or quantitative test needs to be conducted with the proper filters for the hazards in your occupation. The qualitative testing method is the most common at most mines, with an acceptable respiratory protection program. The miner is subjected to a test atmosphere that can detect an improper fitting respirator. Also, miners that wear respirators must maintain a face piece to face seal which means keeping the face free of facial hair at all points the respirator contacts the face.

Once the miner is fitted and the filters selected, the miner needs to know and follow the proper maintenance and care necessary to maintain the respirator. The respirator needs to be properly inspected for any defects prior to and after each use. The respirator needs to be properly cleaned and disinfected at regular intervals and stored in the proper environment. Once all of this has been accomplished the miner needs to know when to wear the respirator to reduce any potential exposure to airborne contaminants. Of course, in order for the respirator to be effective, it must be worn properly.
OPERATORS – TAKE NOTE OF THE FOLLOWING! YOU SHOULD CONCLUDE THAT YOUR LEAST COSTLY APPROACH TO DUST WILL BE TO CONTROL IT FROM DAY 1.

56/57.5005 Respiratory Protection – From MSHA’s Program Policy Manual (Volume IV)

Standard 56/57.5001(a) requires that a miner's exposure shall not exceed the permissible limit of any substance on the 1973 ACGIH TLV list. When the TLV is exceeded, standard 56/57.5005 mandates that operators install all feasible engineering controls to reduce a miner's exposure to the TLV. Respiratory protection is required when controls are not feasible, as well as when establishing controls, and during occasional entry into hazardous atmospheres to perform short-term maintenance or investigations. Whenever respirators are required, operators must establish a respirator program containing all elements of the standard, which incorporates ANSI Z88.2-1969. The inspector must evaluate the effectiveness of the respiratory protection in order to determine whether miners are protected from overexposure. If the operator's respiratory protection program fails to include proper selection and fit testing, the .5001(a)/.5005 violation is significant and substantial ("S and S").

Respirator selection directly affects the efficiency of the respirator. Respirators are designed to protect wearers from inhalation of hazardous atmospheres. There are many different types of respirators but each is limited in protection and application. A respirator can only protect against atmospheres for which it is designed. Without proper selection a serious health hazard may occur. A serious hazard may also occur if the respirator, even though properly selected, is not fitted as required by the standard. Fit testing is essential in order to assign the correct model and size respirator to a miner. Otherwise, it is likely that the respirator will leak and the miner will be overexposed to the toxic substance.

There are other factors that should be considered by the inspector on a case-by-case basis when determining whether the violation should be "S and S" with regard to an operator's respiratory protection program. These factors include training, cleaning and sanitizing, and maintenance of respirators.

With regard to listed nuisance particulates and silver metal overexposures between 0.01 mg/m3 and 0.1 mg/m3, operators must use engineering controls to reduce exposure to the permissible limit and comply with the respiratory protection requirements of standard 56/57.5005. However, the .5001(a)/.5005 citation for overexposure to nuisance particulates and to silver metal in the above concentration range is not "S and S." Overexposures to soluble compounds of silver, such as silver nitrate, above 0.01 mg/m3 should be considered "S and S" if adequate protection was not worn.
PROCEDURE INSTRUCTION LETTER NO. I00-IV-4

FROM: EARNEST C. TEASTER, JR.
Administrator
Metal and Nonmetal Mine Safety and Health

SUBJECT: Use of Respirators, Respirator Programs, and Engineering Controls

Scope
This letter applies to Metal and Nonmetal Mine Safety and Health (MNMS&H) enforcement personnel.

Purpose
This procedure instruction letter provides guidance on the issuance of citations for overexposure to airborne contaminants and abatement of the violations involving respiratory protection.

Procedure
When a citation is issued for a violation of 30 CFR 56/57.5001/5005 because the miner's exposure exceeds a permissible level, the initial abatement time should reflect the time needed for the mine operator or independent contractor to furnish the miner with a respirator, institute a comprehensive respiratory protection program in accordance with 56/57.5005(b), and train affected employees in respirator use, wear, and maintenance. The abatement time allowed for implementing the respiratory protection program would generally be of a shorter duration than the abatement time for the engineering controls. If the mine operator already has a comprehensive respiratory protection program in place, the initial abatement time should be based on the time needed to implement the necessary engineering controls. If these actions have not been taken by the initial abatement time, the inspector will determine if an extension of the abatement time is warranted.

The abatement time may be extended for a reasonable time period to allow work to resume with employees utilizing respiratory protection until engineering controls have been installed and tested to ensure they reduce the exposure level of the miner to values at or below the permissible limit. No health citation is to be extended beyond 12 months from the date of issue without approval from the Chief, Division of Health.

If the inspector determines that an extension of the abatement time is not warranted, the inspector must issue a Section 104(b) noncompliance order requiring that the affected miner(s) be removed from the area. Once the mine operator or independent contractor satisfies the conditions for respiratory protection, the order should be modified to allow the miner(s) to resume work in the
area until engineering controls that reduce exposures to permissible levels are established. If respiratory protection violations are repeated during the abatement period, the order that was issued should be re-modified back to the original and the miner(s) withdrawn again from the work area. Any such violations should be completely documented.

Respiratory protection citations should be terminated when:

- a written respiratory protection program in accordance with ANSI Z88.2-1969 is established as required by 56/57.5005(b);
- the proper respirator is selected and the miner is fit-tested with the selected respirator, (fit-testing is required for both disposable respirators and those using replaceable cartridges or filters);
- the proper cartridge, canister, or filter is used;
- the miner has been trained on how to wear, store, and maintain the respirator; and
- storage and cleaning facilities for the respirator have been provided.

In determining the gravity of a violation, the inspector should evaluate the actions the mine operator has taken to control employee exposure, including operator or contractor sampling, and the nature and level of the employee's exposure to the contaminants. The lack of exposure control measures and the presence of one or more health-threatening contaminants at levels near or above the permissible limits indicate a serious risk for miners. In determining the number of persons affected, the inspector should consider the probable exposure of miners on other shifts who may be performing the same tasks.

Summaries of the key elements of a respiratory protection program and inspection of half-mask respirators are attached to assist inspectors when determining whether the respiratory protection or the respiratory protection program is in compliance with 56/57.5005 and ANSI Z88.2-1969, and evaluating the gravity of the violation (Attachments 1 and 2).

**Background**
Both respiratory protection and engineering controls are usually cited on the same citation under standards 30 CFR 56/57.5001/.5005. This is a reissue of the procedures established to help reduce confusion regarding the issuance, abatement, and modification of these citations and orders.

**Authority**
Section 103(a) of the Federal Mine Safety and Health Act of 1977; 30 CFR 56/57.5001/5005.

**Filing Instructions**
This Procedure Instruction Letter should be filed in the binder for MSHA Program Handbooks and Procedure Instruction Letters.

**Issuing Office and Contact Person**
ATTACHMENT 1 for PIL00-IV-4
Use of Respirators, Respirator Programs, and Engineering Controls

Evaluation of Half-Mask Respirators

**Applies to:** non-powered, tight-fitting, negative pressure air-purifying respirators provided by mine operators to miners and respirators supplied by MNMS&H to inspectors.

**Does not apply to:** full-face, supplied air, or powered air-purifying respirators; self-contained breathing apparatus (SCBA); filter-type self-rescuers, or self-contained self-rescuers.

**Face Piece**
1. No chemical contamination or excessive dirt
2. No cracks, tears, holes, or distortion
3. No broken or cracked holders for cartridges or canisters
4. No missing seals or gaskets; seals fit properly
5. Rubber or silicone face pieces are soft, flexible, pliable

**Head Straps**
1. No breaks, tears, or straps missing
2. No loss of strap elasticity
3. No broken or malfunctioning strap buckles
4. Straps are securely attached to face piece

**Valves**
1. No dust, dirt or debris in or under seals
2. No cracked, torn, perforated, distorted, or missing valves, valve membranes, or valve covers
3. Valves are inserted and sealed properly in face piece

**Air Purifying Elements (cartridges, canisters)**
1. Cartridge, canister, or filter appropriate for the hazard
2. Connections are tight, seal well, and no cross threading
3. Cartridge or canister not cracked, damaged, or missing
4. Cartridge or canister does not cause excessive resistance to breathing; replaced according to manufacturer's instructions
5. Cartridge or canister shelf life not exceeded
6. Matching manufacturer cartridge or canister for model respirator

Respirator Use
1. All persons wear respirators in areas designated for respirator usage.
2. Persons in occupations required to wear respirators are wearing respirators while in their workplace.
3. Respirators are inspected and fit-checked before use, and worn properly:
   a. Good face seal: subject is clean-shaven everywhere respirator touches face
   b. Straps: proper number of straps, worn on head and not over the hard hat, not too tight or too loose
   c. Safety glasses do not interfere with respirator fit or face seal

ATTACHMENT 2 for PIL00-IV-4
Use of Respirators, Respirator Programs, and Engineering Controls

Respiratory Protection Program

Respiratory protection programs should be administered by an individual having sufficient knowledge of the subject to properly supervise the program. This individual should be identified in the program. Standard operating procedures must be written and cover:
   a. respirator selection that is appropriate for hazards; and
   b. respirator use.

Employee training: Training must cover all affected employees and supervisors. Training must include (at a minimum):
   a. nature of the hazard and why respiratory protection is needed;
   b. engineering controls; and
   c. respirator selection, use, capabilities, and limitations.

Fit-testing: Must be performed for each employee using a respirator. Should include a written record of the following:
   a. name of employee tested;
   b. date of testing;
   c. respirator manufacturer, model, style, and size worn;
   d. fit-test protocol and the name of the person administering the test; and e. fit-test results.

Respirator cleaning and disinfecting: Program must include provision for:
   a. cleaning and disinfecting respirators on a regular basis, or after each use if they are
used by more than one person; and
b. for disposable respirators, a provision for employees to obtain a new respirator when theirs becomes unusable, unsanitary, or exhibits excessive breathing resistance.

**Respirator storage:** Program must include provision for convenient, clean, and sanitary storage.

**Respirator inspection:** Program must make provision for respirator inspection before and after each use and during cleaning:
a. Visual inspection OK; no written record required;
b. Deficiencies identified must be corrected.

**Surveillance:** Work area must be periodically checked to ensure respirator use and to monitor conditions, employee exposure, and employee stress due to breathing resistance or heat.

**Program evaluation:** The respiratory protection program must be evaluated regularly to ensure continued effectiveness.
Generic Written Respiratory Protection Program

Mine Name: ___________________________________________________________________ Mine I.D.# _____________

1. Written Procedures

   a. Hazard Identification & Respirator Selection – Air purifying respirators are
designed to protect persons from breathing specific airborne contaminants and
often provide little or no protection against other contaminants. Table RPP1 lists
for each hazard, the respirators this company will use, their limitations, and job
duties/areas of use.

   b. Program Administrator -- Respiratory protection programs will be
administered by ____________________________________, who has sufficient
knowledge of the subject to properly supervise the program.

2. Employee training

   Training time, min ____ to ____
   Teaching Method________________________________________________________
   Training Materials _______________________________________________________
   Evaluation Method _________________________________________________________
   Training will be done by _________________________________________________
   Training will cover all affected employees and supervisors. Training will be conducted before
the worker begins work in the area where the respirator is needed. Training will include:

   1. Engineering and administrative controls, order of priority of controls, proper use and
      maintenance of these controls
   2. Reason respirators are required -- explanation of the hazard and its effects (i.e. acute or
      chronic)
   3. Selection of a respirator -- fit, comfort, one you can breath through.
   4. Health conditions that interfere with respirator use
   5. How long can you wear a respiratory device, how to detect breakthrough, excessive
      resistance to flow etc.
   6. Types of respirators and limitations of each including N,R, and P and 95, 99 and 100.
   7. Respirators used at particular site and proper procedures for mounting, care and maintenance
      of each
   8. Proper fit
      a. No facial hair
      b. Medical conditions affecting skin texture
      c. Self-fit test
      d. Professional fit tests
   9. Inspection, cleaning/disinfecting and storage -- including reusables and throw-aways.
<table>
<thead>
<tr>
<th>Hazard</th>
<th>Respirator Manufacturer</th>
<th>Model No.</th>
<th>Respirator Limitations</th>
<th>Job Duties/Location Where Protection Will Be Used</th>
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3. **Fit-testing**

1. All persons required to use a respirator will be fit tested first

2. Annual fit testing to be conducted on (date)___________________ by (person/organization conducting test)______________________________________

3. The test will be conducted by subjecting each person, while wearing the appropriate respirator, to the following fit test procedure:

___Qualitative Fit Test by one of the following methods:

   a. Stannic Chloride Smoke____
   b. Bitrex ____
   c. Saccharin____

___Quantitative Fit Test - the fit is acceptable if the person, while wearing a fitted respirator which has been outfitted with a sample port, is subjected to a test atmosphere (usually mineral oil mist) and the concentration of test atmosphere inside the respirator is negligible.

4. The person will perform exercises while wearing the respirator in the test atmosphere to determine if the respirator fits. Exercises will simulate at least the work of lifting, bending over, talking, movement of the head in all directions and exhibiting various facial expressions.

5. A written record form of the following will be maintained for these employees. (See copy of record form at end of this RPP):

   a. Name of employee tested;
   b. Date of testing;
   c. Respirator manufacturer, model, style, and size worn;
   d. Fit-test protocol and the name of the person administering the test;
   e. Fit-test results.

6. If during respiratory fit testing, the employee experiences difficulty breathing through the respirator(s), the employee will be evaluated by a physician to determine his/her medical suitability for wearing a respirator.
4. **Respirator cleaning and disinfecting**

Users will be trained:

1. To inspect respirators prior to each use to determine that they are functioning properly

2. To clean and disinfect or replace the respirator on a regular basis according to manufacturer's recommendations, or after each use if they are used by more than one person. Adequate cleaning and disinfecting facilities will be provided at the following convenient location ____________________________________________

3. To store respirators in the following convenient, clean and sanitary location ____________________________________________

4. For reusable respirators (person) __________________________ will be trained to be knowledgeable in the respirator manufacturer recommendations for the use, care and maintenance of each model of respirator provided by the Company

5. Employees will be instructed as to where and how to obtain new disposable respirators or respirator cartridges when theirs become unusable, unsanitary, or exhibit excessive breathing resistance or breakthrough. These respirators will be available at the following locations:
   ____________________________________________
   ____________________________________________

5. **Records of actions taken**

(See fit testing/training record form at end of this RPP)

1. Records of fit-test which identify:
   
   a. The exact model and size respirator
   
   b. Date of testing
   
   c. The fit-test method and
   
   d. Whether the person passed or failed the test.

2. Records of training provided which include at least:
   
   a. Identification of persons
   
   b. Date of training and
   
   c. Topics covered.
6. **A statement of use**

1. Assigned respirators will be worn by persons at all times while in the normal work areas where persons may be overexposed; These areas will be posted “Respirator Required” and

2. Work area(s) affected will be periodically checked to ensure that employees are using respirators and to check dust controls, employee exposure, and employee stress due to breathing resistance or heat. The area supervisor will include this check on his/her daily walk-around inspection.
Procedures to be used for Qualitative Dust Respirator Fit Testing

Training

1. Controls and their order of priority -- examples of engineering and administrative controls

2. Reasons respirators are required for the persons being trained
   a. Protect health from what?
   b. Remove what from breathing zone?
   c. Acute or chronic effect?
   d. PPE is considered by MSHA to be for temporary use until feasible controls are installed.

3. Selection
   a. Use only the correct respirator for the contaminant of concern.
   b. Make sure the respirator you select is comfortable -- If not, let your supervisor know – you may need to select a different type
   c. Make sure you don’t need to strain to breathe with the respirator on
      (1) If you do, ask your supervisor to schedule a medical examination
      (2) If medical examination shows you can’t wear a respirator, you may need to transfer to a different job

4. Health conditions that interfere with respirator use.
   a. Heart condition
   b. Asthma or other breathing condition
   c. Claustrophobia
   d. Contact lenses
   e. Eye glass temples
   f. Missing teeth
   g. Skullcaps
   h. Other

5. How long can you wear a respirator
   a. Contaminant break through
   b. High breathing resistance

6. Types of respirators
   a. Filtering (air purifying) and air supply
   b. Types of filtering respirators
   c. Types of particulate respirators and classes
      (1) N, R, and P and 95, 99, and 100.
      (2) Other toxins
(3) Problems caused when the wrong type is used

7. Types used at this site and proper procedures for putting them on -- Read instructions for and demonstrate each type used

8. Proper fit
   a. How to get a good fit?
      (1) Remove all facial hair; cooperate fully during fit testing.
      (2) How to self fit-test the respirator each time it is put on
         (a) Breathe out with exhaust valve sealed by hand – should feel respirator lift from face
         (b) Breathe in with inhalation valve sealed – respirator should cling with no leaks

9. How to inspect respirator and how to clean reusable type, how to store respirator.

**SACCHARIN/BITREX FIT TESTS** -- Follow the manufacturer’s instructions
   (Protocol below contains detailed procedure used by MTU in past testing)

**Items Needed for Test**

1. Selection of respirators to be available at site (the selection should include enough of each type so that each person tested can try one of each and obtain one).
2. Filter cartridges to use when fitting non-dust respirators.
3. Saccharin (or Bitrex) fit test kit including:
   a. Dilute test solution (to test the person’s sensitivity) and concentrated test solution (for fit testing)
   b. Test Hood and collar
   c. Dispensers (nebulizers) for dilute and concentrated solutions and spare parts
   d. Forms to be used as records that people have been fit tested (copy form at end of this section)
      (1) Date
      (2) Fit person’s name
      (3) Type of respirator person is qualified to use (model and serial no)
      (4) Type of test used
      (5) Statement “**By my signature, I verify that I did not detect the sweet taste of saccharin** [the bitter taste of Bitrex] **during any of the actions required in fit testing me. However, I did taste the test substance during the sensitivity test**”
      (6) Fit person’s signature
      (7) Tester’s name
      (8) Tester’s signature
SACCHARIN/BITREX FIT TESTS (continued)

Room Set up for Qualitative Fit Testing

1. Set up Work Table for materials in fit test area, and a work table in another room or at least 20 feet away for the sensitivity test
2. Set up hood assemblies
3. Pour about one teaspoonful of weak solution (#1) into nebulizer labeled #1
4. Pour about one teaspoonful of strong solution (#2) into nebulizer labeled #2
5. Set up all the different types of respirators that Company wants to fit test and supply each with a dust filter for fit testing using saccharin or Bitrex
6. Mirror(s) for fitting respirator.

Conducting Test

1. Bring in subjects ahead of time, show them how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit
2. Tell them how to select a respirator – hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit
3. Review the following comfort and fit criteria with each person:
   a. Position of mask on the nose
   b. Room for eye protection
   c. Room to talk.
   d. Position of mask on face and cheeks
   e. Chin properly placed
   f. Adequate strap tension, but not too much.
   g. Fit across nose bridge
   h. Respirator of proper size for distance from nose to chin
   i. Tendency of respirator to slip
   j. Self-observation in mirror
4. Instruct subject on how to conduct self-fit test and have him/her conduct one; also that if it works proceed with the fit test, otherwise the subject may need to select another respirator
5. Allow subjects to select respirators from a sufficient number of models and sizes and to self-fit test those selected
6. Read the material on the following page.
SACCHARIN/BITREX FIT TESTS (continued)

Preliminary remarks for test

Saccharin only -- If you’ve used sweetener in the past hour, postpone taking this test until later. This includes chewing gum, candy, drinking pop, drinking coffee with sweetener etc.

Bitrex & Saccharin -- Please tell me if you suspect you’re unable to taste a weak solution. If you’re unable, the test we’re using won’t work and we’ll need to use another test.

Correct respirator fit is serious business. Wearing an improperly-fitting respirator is false security, which makes you think you can go into dusty or other areas without serious consequences.

Dust respirators are for dust only. A dust respirator will not filter out toxic gases. Make sure you’re using the correct respirator.

Persons with facial hair can’t be fit with a respirator, and can’t legally work in areas where a respirator is required. A caring supervisor is obliged to send you home if you’re not clean shaven and need to work in an area requiring a respirator. Repeat court cases have upheld management’s rights to require persons working in respirator-use areas to be clean-shaven or sent home.

How we plan to fit test you

1. You’ll first select a comfortably-fitting respirator by holding it up against your face as it would be when in actual use. This is the respirator you’re legally authorized to use from now on if the remaining steps in the selection procedure are successful.
SACCHARIN/BITREX FIT TESTS (continued)

2. You’ll put the respirator on and properly adjust the straps. Note that if you must wear safety glasses or other head-mounted safety equipment in your work area, you must wear this equipment during these tests.

3. You’ll wear the respirator for at least 5 minutes to determine if it’s comfortable. You’ll need to talk, walk, turn your head from side to side and up and down and make other movements that are similar to movements you make during your work in the respirator area of your workplace.

4. You’re then ready to be fit tested.

5. You’ll put the hood over your head and I’ll blow the test mist into one of the openings in the front of the hood. I’ll blow in more test mist every 30 seconds while you’re performing the following movements for 60 seconds each. During the entire test, you’ll breath through your mouth so you are able to taste any test solution that gets past the respirator.

   a. Normal breathing
   b. Deep breathing (if you feel faint, ease up).
   c. Turning head from side to side and inhaling in each position.
   d. Nodding head up and down and inhaling in the up position.
   e. Counting or reading the rainbow passage.
   f. Grimacing while breathing.

6. If during any of the above exercises you taste the test mist, the respirator doesn’t fit and will not provide complete protection. You’ll need to select another respirator and start over.
SACCHARIN/BITREX FIT TESTS (continued)

7. Finally, after you’ve removed the hood, you’ll go to the other end of the room and while you’re breathing through your mouth, I’ll blow a very weak solution of test mist toward your mouth using 10 squeezes of dispenser bulb. If you taste the test mist now, but did not taste it with the respirator on, you’re properly fit.

For your health’s sake, please be honest – if you taste the test mist at any time while wearing the respirator, stop me immediately and select a different respirator to start the test over with.

STANNIC CHLORIDE SMOKE FIT TESTS -- Follow the manufacturer’s instructions (Protocol below contains detailed procedure used by MTU in past testing)

Items Needed for Test

1. Selection of respirators to be available at site
2. Filter cartridges to use when fitting non-dust respirators
3. Fit test kit including:
   a. Stannic Chloride Smoke Tubes, Squeeze Bulb and Tubing
   b. Forms to be used as records that people have been fit tested (copy form at the end of this writeup)
      (1) Date
      (2) Fit person’s name
      (3) Type of respirator person is qualified to use (model and serial no)
      (4) Type of test used
      (5) Tester’s name
      (6) Tester’s signature

Room Set up for Qualitative Fit Testing

1. Set up Work Table for materials in fit test area, and a work table in another room or at least 20 feet away for the sensitivity test
2. Adequate ventilation to remove smoke
3. A suitable number of respirators of each type so that each person to be tested can try out each type and select one that is suitable. For disposable respirators, provide a suitable number dust filtering cartridges for the test. These must be either HEPA or P100 filters when using stannic chloride for the test
4. Mirror(s) for fitting respirator.
STANNIC CHLORIDE SMOKE FIT TEST (continued)

Conducting Test

Note – The technician must always cover the free end of the smoke tube with tubing to minimize the likelihood of injury.

1. Bring in subjects ahead of time, show them how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit.
2. Tell them how to select a respirator – hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
3. Review the following comfort and fit criteria with each person:
   a. Position of mask on the nose
   b. Room for eye protection
   c. Room to talk
   d. Position of mask on face and cheeks
   e. Chin properly placed
   f. Adequate strap tension, but not too much
   g. Fit across nose bridge
   h. Respirator of proper size for distance from nose to chin
   i. Tendency for respirator to slip
   j. Self-observation in mirror
4. Instruct subject on how to conduct self-fit test and have him/her conduct one; also that if it works proceed with the fit test, otherwise the subject may need to select another respirator
5. Allow subjects to select respirators from a sufficient number of models and sizes and to self-fit test those selected
6. Conduct sensitivity test as follows (see instructions next page):
   a. Advise test subjects that the smoke irritates the eyes, lungs, and nasal passages and keep the eyes shut
   b. Carefully direct a small amount of the smoke in the test subject’s direction to determine that he/she can detect it
   c. After detecting the irritant smoke, the subject puts the respirator on and performs the required self-fit check(s)
7. Conduct these tests as on the following pages. The person must still be sensitive after the fit test or the test results are invalid. Complete the test record for each person that is successfully fitted
8. Read the material on the following page
STANNIC CHLORIDE SMOKE FIT TEST (continued)

Preliminary Remarks

Correct respirator fit is serious business. Wearing an improperly fitting respirator is false security, which makes you think you can go into dusty or other areas without serious consequences.

Dust respirators are for dust only. Each respirator has a specific purpose. A dust respirator will not filter out toxic gases. Make sure you’re using the correct respirator.

Persons with facial hair can’t be fit with a respirator, and can’t legally work in areas where a respirator is required. A caring supervisor will feel obliged to send you home if you’re not clean shaven and need to use a respirator. Repeat court cases have upheld management’s rights to require persons working in respirator-use areas to be clean-shaven or sent home.

HOW WE PLAN TO FIT TEST YOU

1. Before you select and put on a respirator, we will need to expose you to a small amount of the irritant smoke to see if you are sensitive to it.

2. You will then select the respirator that seems to fit you best following the procedures below.

3. We will then subject you to irritant smoke with the respirator on and while you are performing certain exercises.

4. Finally we will repeat the exposure to a small amount of irritant smoke with the respirator off.
STANNIC CHLORIDE SMOKE FIT TEST (continued)

Close your eyes now and I’ll blow some in your direction. Let me know what effect it has on you.

1. Now that we’ve determined that you are sensitive to the irritant smoke, you will select a comfortably-fitting respirator by holding it up against your face as it would be when in actual use. This is the respirator you’ll be legally authorized to use from now on if the remaining steps in the selection procedure are successful.

2. You’ll put the respirator on and properly adjust the straps. Note that if you must wear safety glasses or other head-mounted safety equipment in your work area, you must wear this equipment during these tests.

3. You’ll wear the respirator for at least 5 minutes to determine if it’s comfortable. You’ll need to talk, walk, turn your head from side to side and up and down and make other movements that are similar to movements you make during your work in the respirator area of your workplace.

4. You’ll do a self-fit test before the stannic chloride fit test. This involves (manufacturer’s recommendations for self-fit testing) ____________________________

5. If the respirator seems to be OK and to fit your face with no leaks, you are ready to be fit tested with the stannic chloride smoke. Remember -- Breathing stannic chloride smoke is very uncomfortable and will cause you to cough! Also keep your eyes closed during the test – it burns your eyes!
STANNIC CHLORIDE SMOKE FIT TEST (continued)

6. I’ll blow stannic chloride smoke around the edges of your respirator from about 12 inches distance. If you don’t cough, I’ll blow more smoke around your respirator from 9 and then from 6 inches while you’re performing the following movements for 60 seconds each.

   a. Normal breathing
   b. Deep breathing (if you feel faint, ease up).
   c. Turning your head from side to side and inhaling in each position.
   d. Nodding your head up and down and inhaling in the up position.
   e. Counting or reading the rainbow passage.
   f. Grimacing while breathing.

7. If during any of the above exercises the stannic chloride makes you cough, the respirator doesn’t fit and will not protect you. You’ll need to select another respirator and start over.

Since you didn’t cough when subjected to irritant smoke with the respirator on we’ll need to check your sensitivity to irritant smoke once more. Close your eyes now and I’ll blow some in your direction again. Let me know what effect it has on you.

The test indicates that you are still sensitive to the irritant smoke, but were unaffected with the respirator on. These results indicate that the respirator fits. Remember, this is the only respirator you are legally approved to wear. Before you can legally use a different respirator, another fit test will need to be conducted.
Respirator Fit Testing Record

This is to certify that ____________________________, social security number ___________________ has been trained and fitted in the use, limitations, and maintenance of the following respirator:

Manufacturer__________
Model number__________
Protection against ____________________________

using the following protocol.

Bitrex Solution Aerosol   ____
Saccharin Solution Aerosol  ____
Stannic Chloride Smoke   ____

The following test exercises were performed while being tested for at least 60 seconds each.

1. Normal breathing
2. Breathing deeply
3. Turning head from side to side, inhaling in each position
4. Nodding head up and down, inhaling in the up position
5. Counting or reading the rainbow passage

“I acknowledge that I have received respirator training and have been fit test according to the above instructions. By my signature, I verify:

_____ Saccharin or Bitrex Protocol -- That I did not detect the test solution during any of the actions required in fit testing me with the respirator on which this test qualifies me for. I did, however, taste the test solution during the sensitivity test”.

_____ Stannic Chloride Protocol – That I did not smell the stannic chloride smoke with the respirator on and (or) did not need to cough because of it”. I did smell the smoke when tested for sensitivity with the respirator off.

__________________________  ____________________________
Signature of Person Fit Tested   Date

__________________________
Signature of Test