

Enhancing Respiratory Protection in Mining

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May 7, 2025

Section 3

Medical Evaluation and Fit Testing



MSHA Requires All Miners Using a Respirator to Have:

1. Training on:

- Wearer responsibilities
- Respiratory hazards
- Operation, capabilities, and limitations of respirator used
- Respirator use – donning (proper fit), doffing, user seal checks
- How to inspect, clean, maintain, and store respirator
- Filter/cartridge change schedule
- Etc.

Miner training is required prior to initial respirator use and at least annually.

2. Medical Evaluation

3. Fit Testing



Medical Evaluation

A physician or other licensed health care professional (PLHCP) must conduct a medical evaluation prior to respirator use for any miner required to wear a respirator.

- Medical questionnaire sent to a PLHCP:
 - Age, height, and weight
 - Use of tobacco products
 - Preexisting medical conditions
 - Claustrophobia with anxiety
 - Vision and hearing problems
 - Etc.
- Additional medical tests may be required at the discretion of the PLHCP (e.g., pulmonary function test).



The PLHCP Must Be Provided with:

- Information on the miner's workplace environment (e.g., temperature, humidity).
- Airborne hazards, including oxygen-deficient environments.
- Types and weight of respirators to be worn.
- Duration and frequency of respirator use and work tasks (e.g., light, moderate, heavy).
- Type of clothing or protective equipment.



PLHCP Written Recommendation/Determination

- Any limitations on respirator use related to the medical condition of the miner, or relating to the workplace conditions in which the respirator will be used, including whether the miner is medically able to use the respirator.
- The need, if any, for follow-up medical evaluations.
- Must not contain any confidential medical information.
- Provided to both operator and miner.



Medical Recordkeeping Requirements



- Written determination records received from PLHCP (e.g., 30 CFR 60.14(b)).
- Duration of employment plus six months (e.g., 30 CFR 60.16).
- Forever is best practice.

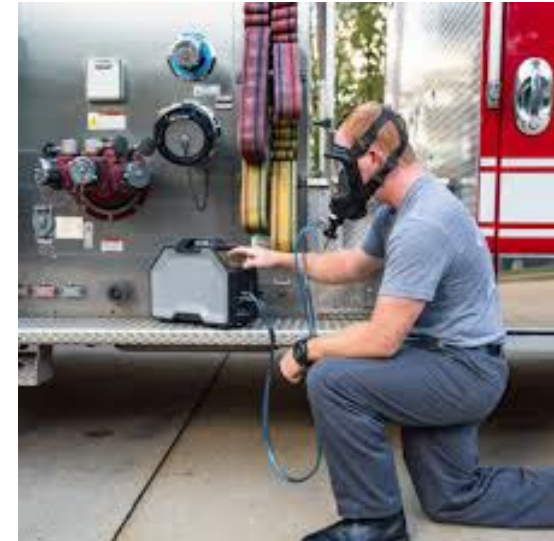
Fit Testing Is Required Prior To Tight-Fitting Respirator Use

- A respirator fit test verifies that a respirator is both comfortable and provides the miner with the expected protection.
- Depending on head shape and size, one may need to try several different respirator styles to determine which provides the best seal.
- A mine operator may offer different respirator styles, but it's crucial to only use the specific respirator model, size, and style for which the miner has passed a fit test.



Quantitative Fit Test (QNFT)

- Measures the amount of inward leakage around the face seal
- Generates a numerical fit factor (ratio of outside to inside test agent particle concentration) that must be 10X the respirator's APF
- Higher fit factor indicates a better fit
- Tight-fitting negative pressure respirator fit factors: 100 half-facepiece/500 full-facepiece
- A passing QNFT must be achieved to apply an APF of 50 or greater to a full-face air-purifying respirator
- Examples: Occupational Health Dynamics (OHD) QuantiFit2™ and TSI PortaCount™



<https://safetysourcefire.ca/product/quantifit2/>



<https://www.oemupdate.com/blog/brand-update/respirator-fit-testing-for-every-industry/>

Qualitative Fit Test (QLFT)

- Subjective pass/fail test that relies on person's response to a test agent (e.g., taste, smell).
- "Pass" result is equivalent to QNFT fit factor of 100 (i.e., leakage into respirator is 100 times less than outside test agent concentration).
- For tight-fitting negative pressure air-purifying respirators, the maximum respirator APF that can be applied is 10 when QLFT is performed (e.g., fit factor of 100 for both half- and full-facepiece).
- Examples: Bitrex (bitter), saccharin (sweet), banana oil, irritant smoke.



Respirator Fit Test Requirements



- NO BEARDS, scruff, or 5 o'clock shadows
- No other types of facial hair (e.g., mustaches, long sideburns)
- Men must be clean shaven - NO EXCEPTIONS
- Clean face free of heavy make up
- No facial piercings

Even minimal facial hair will cause respirators to LEAK.

Respirator Fit Test Schedule

1. Must be conducted before wearing **any tight-fitting respirator including a filtering facepiece.**
2. Must be conducted when changing respirator size or model/style.
3. Must be repeated annually OR any time there is a change in facial characteristics (e.g., weight, dental, and scars).

