Overview of the Fit Testing Process

Tight-fitting respirators must seal to the wearer's face in order to provide expected protection. This includes disposable respirators (also called "filtering facepieces"). Therefore, fit testing is required in the US by the Occupational Safety and Health Administration (OSHA) before a user wears a mandatory respirator on the job, and must be assessed at least annually. In addition, fit tests should be performed:

- Whenever a different size, style, model or make of respirator is used.
- When any facial changes occur that could affect fit, such as significant weight fluctuation or dental work.

OSHA doesn't require fit test administrators to be certified, just to know how to conduct a test, recognize invalid tests, and properly clean and maintain equipment. Read more about OSHA fit testing protocols.

There are two kinds of tests: **qualitative** and **quantitative**.

Qualitative Fit Test (QLFT)

A qualitative fit test (QLFT) may only be used to fit-test:

- Negative-pressure, air-purifying respirators, as long as they'll only be used in atmospheres where the hazard is at less than 10 times the permissible exposure limit (PEL).
- Tight fitting facepieces used with powered and atmosphere-supplying respirators.

QLFT is pass/fail and relies on the user's senses using one of four OSHA-accepted test agents:

- Isoamyl acetate (banana smell); only for testing respirators with organic vapor cartridges.
- Saccharin (sweet taste); can test respirators with a particulate filter of any class.
- Bitrex® (bitter taste); can also test respirators with particulate filters of any class.
- Irritant smoke (involuntary cough reflex); only for testing respirators with level 100 particulate filters.

Each QLFT method uses seven exercises performed for 1 minute each:

- Normal breathing.
- Deep breathing.
- Moving head side to side.
- Moving head up and down.
- Bending over (or jogging in place if fit test unit doesn't permit bending at the waist).
- Talking.
- Normal breathing again.

Read more about OSHA fit testing protocols.

Quantitative Fit Test (QNFT)

A quantitative fit test (QNFT) can be used to fit-test any tight-fitting respirator. It involves using an instrument to measure leakage around the face seal and produces a numerical result called a “fit factor.” There are three OSHA-accepted QNFT test protocols:

- **Generated aerosol** uses a non-hazardous aerosol such as corn oil generated in a test chamber.
- **Condensation nuclei counter (CNC)** uses ambient aerosol and doesn’t require a test chamber.
- **Controlled negative pressure (CNP)** uses a test that creates a vacuum by temporarily cutting off air. (There is also a fourth method, which is an abbreviated version of this one.)

QNFTs use the same seven exercises as QLFTs, plus an additional “grimace” test where the subject smiles or frowns for 15 seconds.
A fit factor of at least 100 is required for half-mask respirators and a minimum fit factor of 500 for a full facepiece negative-pressure respirator.
Learn more about Quantitative Fit Testing of Respirators (PDF, 346 KB)

References and Resources:

https://www.3m.com/3M/en_US/respiratory-protection-us/support/center-for-respiratory-protection/fit-testing/

https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppA