OSHA Requirements for a Respiratory Protection Program:

RULES FOR RESPIRATORS

In the midst of the current SARS-COV-2 crisis there has been a lot of back and forth regarding respirators. CDC/NIOSH has announced crisis alternative strategies for respirators and respirator usages which deviate from normal practice and previous policy. OSHA has followed suit announcing several policies to allow for waivers in its respirator rule and how it is to be enforced.

What follows here is a brief review and interpretation of the OSHA standard for respirators and respiratory protection (officially known as 29 CFR 1910.134) as it has been used up until the current crisis. In effect what is outlined here is a ‘strict’ interpretation or ‘best practices’ which all should know even if the COVID-19 pandemic creates pressures and obstacles to its achievement. And hopefully, what we will return to once the crisis passes. According to OSHA waivers will end when the crisis ends.

OSHA Requirements for a Respirator Program
The pivotal foundation of OSHA’s Respiratory Protection Standard is the development of a Respiratory Protection Program. This is the blueprint that establishes why which and how respirators are selected used and maintained. Training the user is a pivotal element of all respiratory protection programs. Why? Because assigning and choosing and using a respirator is not like picking a pair of bowling shoes off the rack at the local bowling alley.

Respirators must be designed for the hazards on the site. Different hazards require different respirators; different levels of the same hazard may require a different respirator. A respirator that is effective to protect against particles may be useless to project against gases or vapors. Emergencies require special respirators. And conditions like lack of oxygen or other IDLH (Immediately Dangerous to Life and Health) conditions will require special respirators.

Respirators were first developed to protect against industrial and mining inhalation hazards. Respirator design selection and use has been based on measuring chemical, dust, and gas levels in the atmosphere of the work environment and comparing these measured levels to published permissible exposure limits (PELs/RELs/OELs etc). Permissible Exposure limits indicate at what exposure level a chemical or dust or gas can produce harmful health effects. The respirator is chosen to assure that the wearer is not being exposed to these harmful levels. It is better to lower exposure.
through engineering controls like direct ventilation or enclosed a toxin in an isolation hood. But there are circumstances where respirators are unavoidable.

A NIOSH study conducted in 1994 uncovered 149 deaths @60,000 illnesses attributed to respiratory hazards.

But respirators are now used to protect against biohazards. In contrast respiratory protection for biohazards like SARS-CoV-2 or TB cannot be selected based on similar chemical or dust exposure levels because we do not have such exposure levels for biohazards and it is difficult to effectively measure biohazard levels in the air of the work environment. Respiratory protection is mostly a pass fail approach. If there are contagious individuals coming into the work environment usually to be treated then that would trigger using respiratory protection. In this domain OSHA has in the past designated selected work activities and areas that generate high biohazard aerosols as high risk, and other activities and areas as medium or low risk and based respirator selection to correspond to risk.

**Types of Respirators:**
Respirators come in two basic families. The first are Air Purifying Respirators (APRs). Respirators of this type reduce toxins in the surrounding air using filters, sorbent canisters/cartridges by capturing particles, vapors, fumes, gases before they are inhaled by the wearer.

APRs range from Filtering Facepiece respirators (NRP 95/99/100) to quarter, half and full face elastomeric respirators. Filtering Facepiece respirators like N95s the whole respirator is the filter; whereas elastomeric respirators have reusable masks made of rubber and silicone and use exchangeable filters, cartridges, and canisters that can be replaced.

The second family of respirators protect the user by supplying breathing air that is independent of the surrounding work atmosphere; they do not filter toxins present in the immediate environment. These respirators supply breathing air into the respirator mask from an outside source. One type is a Supplied–Air Respirator (SAR) or airline respirator that supply breathable air through an airline attached to a compressor, or airtanks. Another type perhaps more familiar because firefighters use them is the Self-Contained Breathing Apparatus (SCBA); this type supply breathable air from a tank carried on the worker’s back.
Only a NIOSH-certified respirator should be selected and used, according to the OSHA standard. The National Institute for Occupational Safety and Health (NIOSH) tests and approve respirators. An approved respirator is one that has the NIOSH logo (with a NIOSH TC number) on it or on APR filters, cartridges/canisters. NIOSH Certified Equipment List can be accessed at https://www2a.cdc.gov/drds/cel/cel_form_code.asp.

The Respiratory Protection Program
Written operating procedures for the selection and use of respirators must be established by the employer. Respirator selection should be based on the nature and extent (levels in the work area) of the hazard.

\[\{{\{\text{Data examining respirator uses during the period 1990-2012 found 174 cases of a respirator-related fatality: of these 38 were due to lack of a respirator in a hazardous atmosphere, another 34 were due to problems with airline respirators.}\}}\]\]

Medical Evaluations
In order to assign respirators employers must provide a medical evaluation to determine an employee’s ability to use a respirator before any employ is required to wear a respirator. The employer has to contact a physician or licensed health care professional (referred by OSHA as the PLHCP) who will conduct the medical evaluation. A PLHCP must determine that there is no medical condition that would make it unsafe for an employee to wear the assigned respirator(s). [The PLHCP should be made familiar with conditions and hazards (temperature/humidity extremes e.g.) at the worksite, and if workers must wear additional protective clothing or equipment.]

The PLHCP must use the OSHA mandatory questionnaire to obtain medical information. The PLHCP may require more thorough medical examination {tests or diagnostic procedures e.g.,} if information obtained on the questionnaire indicates the need.

Additional medical evaluations may arise if the PLHCP (or the program administrator of the Respiratory Protection Program) is informed by the worker about medical symptoms connected to respirator use, or observations made during fit testing and subsequent program evaluation indicates a need for employee reevaluation.
**FIT Testing**

A worker must be *fit tested* on the type of respirator they will wear to assure that it will protect against the associated hazards. Fit testing must be performed before the employee is required to wear the respirator in the workplace. And the PLHCP medical evaluation of that employee must be prior to fit-testing. Why is fit testing important?

APR respirators are effective if they channel air the user inhales through the appropriate filter, cartridge/canister that capture toxins. To do this most effectively the mask itself must fit tightly under the chin and around the face and or head, and the straps must be firmly and correctly fitted around the head. (This is why beards are prohibited when wearing tight-fitting respirators.) If the fit is not snug toxins (and with biological threats, the microorganisms) can leak into the mask along the sides or under the chin and will not be captured by the filter, canister/cartridge. And this defeats the protective purpose of wearing the respirator in the first place.

Fit testing is not nor a simple process but requires technical training, experience and expertise. Why? Any respirator is rated as to how well they protect the worker; each has an assigned protection factor (APR) that indicates how well that respirator [or class of respirators] protects the user. In addition there are workplace exposures which automatically require a respirator that is more protective (has a higher assigned protection factor). Fit testing involves a set of OSHA approved protocols that involves evaluating the fit of a respirator on that individual and involves using certain test agents or calibration equipment systems in a test chamber as well as applying fit factors correctly. It cannot be done on-line of from a distance. It is very much a hands on procedure that takes some time as usually many different respirator models may have to be evaluated for the tested worker.

- Fit testing must repeated at least annually.
- Fit testing may be conducted whenever changes occur that could affect the proper fit of the respirator.

Some facilities have experienced fit testers on staff. Others will need to reach out. An employer can contact local occupational health and safety professional programs, the local OSHA office compliance assistance officer for direction. Or national industrial hygiene and professional organizations such as the American Industrial Hygiene Association (AIHA.org), American Society of Safety Professionals ASSP.org.
**Program Administrator**

*Employers* must designate an administrator to run the entire respiratory protection program. This person must be knowledgeable on a wide range of responsibilities: --

- *What OSHA requires of a Respiratory Protection Program.*
- *Training of employees on the respiratory hazards to which they are exposed, and training on the elements of the respiratory protection program that impact their use of respirators.*
- *Procedures for selecting respirators for use in the workplace.*
- *Medical evaluations of employees required to use respirators.*
- *Fit testing procedures for tight-fitting respirators.*
- *Procedures for proper use of respirators in routine and reasonably anticipated scenarios.*
- *Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.*
- *Procedures for respirator change schedules.*
- *Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere supplying respirators.*
- *Program evaluation of the respiratory protection program.*

**Some Selected Critical Elements of the OSHA Respiratory standard**

Workers must be instructed in the proper use and limitations of their respirator(s).

A program for the care and maintenance of respirators should include:
- inspect for defects or malfunction
- cleaning and disinfecting
- repair
- storage

*Respirators* should be inspected before and after each use. Inspection should include checking for any leakage, for the tightness of the connections, for the condition of the straps, headbands, valves, connecting tubes and filters cartridges/canisters. (With air supplied systems: condition of the tank, lines, connections, regulators, alarms, etc.)
A respirator's seal on the face should be checked each time it is used. This is called a seal check and should not be confused with a fit test which is the process that determines right respirator for use by each worker.

Respirators that are used for emergencies should be automatically inspected at least monthly.

*Respirators* should be regularly cleaned and disinfected; if used by more than one worker, or in emergencies, after each use.

Work areas must be monitored to make sure that levels of the specific toxin that the respirator is used for have not risen beyond the respirator's capacity.

A respiratory protection program should be evaluated to see if its working. The program administrator should check to see if respirators are being used correctly, and if there are any changes in the work environment that call for an upgrade.

(This is a basic review; we recommend you consult the OSHA website (www.osha.gov) for more details.)

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