

Respiratory Protection

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Respiratory Protection

Purpose

To establish uniform guidelines for complying with the requirements of the Occupational Safety and Health Administration (OSHA) for Respiratory Protection, Title 29, 1926.103, this provides procedures for the proper selection, use and care of respiratory protective equipment.

References

Respiratory Protection
 Title 29 Code of Federal Regulations, Part 1910.134; 1926.103
 Access to Employee Exposure and Medical Records
 Title 29 Code of Federal Regulations, Part 1910.20
 NIOSH/MSHA Approvals for Regulators
 Title 30, Part II of the Code of Federal Regulations
 American National Standards Institute (ANSI)
 American National Standards Practices for Respiratory Protection, Z88.2-1980

DEFINITIONS

Abrasive-blasting respirator – A respirator designed to protect the wearer against inhalation of abrasive material and against impact and abrasion from rebounding abrasive material.

Aerosol – A system consisting of particles, solid or liquid, suspended in air.

Air-regulating valve – An adjustable valve used to regulate, but which cannot completely shut off, the airflow to the face piece, helmet, hood, or suit of an air-line respirator.

Air-supply device – A hand-operated or motor-operated blower for the hose mask, or a compressor or other source of respirable air for the air-line respirator.

Approved – Tested and listed as satisfactory by the Bureau of Mines (BM) of the U.S. Department of Interior, or by the National Institute for Occupational Safety and Health (NIOSH) of the U.S. Department of Health and Human Services, or jointly by the Mine Safety and Health Administration (MSHA) of the U.S. Department of Labor and the National Institute for Occupational Safety and Health (NIOSH) of the U.S. Department of Health and Human Services.

Breathing tube – A tube through which air or oxygen flows to the face piece, mouthpiece, helmet, hood, or suit.

Canister--(air-purifying) – A container with a filter, sorbent, or catalyst, or any combination thereof, which removes specific contaminants from the air drawn through it.

Canister—(oxygen-generating) – A container filled with a chemical which generates oxygen by chemical reaction.

Carcinogen – A substance known to cause cancer.

Catalyst – In respirator use, a substance which converts a toxic gas (or vapor) into a less-toxic gas (or vapor).

Ceiling concentration – The concentration of an airborne substance that shall not be exceeded.

Confined space – An enclosure – such as a storage tank, process vessel, boiler, silo, tank car, pipeline, tube, duct, sewer, underground utility vault, tunnel, or pit – having limited means of egress and poor natural ventilation and which may contain hazardous contaminants or be oxygen deficient.

Contaminant – A harmful, irritating, or nuisance materials that is foreign to the normal atmosphere.

Emergency respirator use – Wearing a respirator when a hazardous atmosphere suddenly occurs that requires immediate use of a respirator either for escape from the hazardous atmosphere or for entry into the hazardous atmosphere to carry out maintenance or some other tasks.

Exhalation valve – A device that allows exhaled air to leave a respirator and prevents outside air from entering through the valve.

Eyepiece – A gas-tight, transparent window(s) in a full facepiece, helmet, hood, or suit, through which the wearer may see.

Facepiece – That portion of a respirator that cover the wearer's nose and mouth in a quarter-mask (above the chin) or half-mask (under the chine) facepiece or that covers the nose, mouth, and eyes in a full facepiece. It is designed to make a gas-tight or particle-tight fit with the face and includes the headbands, exhalation valve(s), and connections for an air-purifying device or respirable gas source, or both.

Face shield – A device worn in front of the eyes and a portion of, or all of, the face, whose predominant function is protection of the eyes and face.

Filter – A media component used in respirators to remove solid or liquid particles form the inspired air.

Goggles – A device, which contour-shaped eyecups with glass or plastic lenses, worn over the eyes and held in place by a headband or other suitable means for the protection of the yes and eye sockets.

Hazardous atmosphere – Any atmosphere, either immediately or not immediately dangerous to life and health, which is oxygen deficient, or which contains a toxic or disease-producing contaminant exceeding the legally established Permissible Exposure Limit (EPL) or, where applicable, the Threshold Limit Valve (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH).

Head harness – That part of a facepiece assembly which secures the facepiece to the wearer.

Helmet – That portion of a respirator which shields the eyes, face, neck, and other parts of the head.

Hood – That portion of a respirator which completely covers the head, neck, and

portions of the shoulders.

Immediately Dangerous to Life or Health (IDLH) – Any atmosphere that poses and immediate hazard to life and produces immediate irreversible debilitating effects on health.

Inhalation valve – A device that allows respirable air to enter a respirator and prevents exhaled air from leaving the respirator through the valve.

Irrespirable – Unfit for breathing.

Maximum Use Concentration of filter, cartridge, or canister – The maximum concentration of a contaminant for which an air-purifying filter, cartridge, or canister is approved for use.

Mouthpiece – That portion of a respirator which is held in the wearer's mouth and is connected to an air-purifying device or respirable gas source, or both. It is designed to make a gas-tight or particle-tight fit with the mouth.

Negative pressure respirator – A respirator in which the air pressure inside the respirator-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

Nose clamp – A device used with a respirator equipped with a mouthpiece that closes the nostrils of the wearer (sometimes called a nose clip).

Odor threshold limit – The lowest concentration of a contaminant in air that can be detected by the olfactory sense.

Oxygen deficiency – The concentration of oxygen, by volume, below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen, by volume, is less than 19.5 percent oxygen.

Particle matter – A suspension of fine solid or liquid particles in air, such as: dust, fog, fume, mist, smoke, or spray. Particulate matter suspended in air is commonly known as an aerosol.

Permissible Exposure Limit (PEL) – The legally established time-weighted average (TWA) concentration of a contaminant that shall not be exceeded.

Rescue respirator use – Wearing a respirator for entry into a hazardous atmosphere to rescue a person(s) in the hazardous atmosphere.

Resistance – Opposition to the flow of air, as through a canister, cartridge, particulate filter, orifice, valve, or hose.

Respirable – Suitable for breathing.

Respiratory-inlet covering – That portion of a respirator which connects the wearer's respiratory tract to an air-purifying device or respirable gas source, or both. It may be a face piece, helmet, hood, suite, or mouthpiece/nose clamp.

Routine respirator use – Wearing a respirator as a normal procedure when carrying out a regular and frequently repeated task.

Sanitation – The removal of dirt and the inhibiting of the action of agents that cause infection or disease.

Service life – The period of time that a respirator provides adequate protection to the wearer – for example, the period of time that an air-purifying device is effective for removing a harmful substance from inspired air.

Sorbent – A material which is contained in a cartridge or canister, and which removes toxic gases and vapors from inspired air.

Supplied-air suit – A suit that is impermeable to most particulate and gaseous contaminants and that is provided with an adequate supply of respirable air.

Time-Weighted Average (TWA) – The average concentration of a contaminant in air during a specific time period.

Valve (air or oxygen) – A device which controls the pressure, direction, or rate of flow of air or oxygen.

Vapor – The gaseous stage of a substance that is solid or liquid at ordinary temperature and pressure.

Welding helmet – A device designed to provide protection for the eyes and face against intense radiant energy and molten metal splatter encountered in the welding and cutting of metals.

Window indicator – A device on a cartridge or canister that visually denotes the service life of the cartridge or canister.

GENERAL REQUIREMENTS

Every consideration will be given to the use of effective engineering controls to eliminate or reduce exposure to respiratory hazards to the point where respirators are not required; however, when feasible engineering controls are not effective in controlling toxic substances, appropriate respiratory protective equipment will be provided by the company at no charge to the employee.

These respiratory protective devices will be of the type approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) or acceptable to the U.S. Department of Labor (OSHA) for the specific containment to which the employee is exposed.

Employees required to use respiratory protective devices because of exposure to toxic substances would do so as a condition of employment. Employees required to use respirators will be properly fitted, appropriately tested, medically screened, and thoroughly trained in their use.

PURCHASE OF APPROVED EQUIPMENT

In order to comply with the provisions of OSHA's standard, all respiratory protective equipment purchased by *S.C. Swiderski, LLC* will have been tested by the National Institute for Occupational Safety and Health and will carry a joint NIOSH/MSHA approval number for that specific respirator assembly.

WORK AREA SURVEILLANCE

The Respiratory Protection Standard 29 CFR 1910.134 standard requires "appropriate surveillance." This should include identification of the contaminant, nature of the hazard, concentration at the breathing zone, and, if appropriate, biological monitoring. The Industrial Hygienist, who is conducting the air sampling, should carefully and fully document any apparent deficiencies in surveillance necessary to the respirator program.

RESPIRATOR SELECTION

In selecting the correct respirator for a given circumstance, the following factors must be taken into consideration:

Nature of the Hazard. In order to make subsequent decisions, the nature of the hazard must be identified to ensure that an overexposure does not occur. These include oxygen deficiency, physical properties of the hazard, chemical properties of the hazard,

physiologic effects on the body, actual concentrations of the toxic substances, the Permissible Exposure Limits (PEL), and the warning properties.

Nature of the Hazardous Operation. For proper respirator selecting, it is necessary to know the details of the operations, which require employees to use respiratory devices. These include operation or process characteristics, work area characteristics, materials used or produced during the process, the employee's duties and actions, and any abnormal situation characteristics which may necessitate alternate respirator selection.

Location of the Hazardous Area. This is important in the selection process so that a backup system may be planned if necessary. Respirable air locations must be known prior to entry into a hazardous area so escape or emergency operations may be planned.

Time Respiratory Protection is Required. The length of time a respirator will have to be worn by an employee is a factor that must be evaluated. This is most pronounced when using SCBA equipment, where, by definition, the air supply is finite. However, time is also a factor during routine use of air-purifying respirators when the employee's breathing and comfort become affected by a clogged filter cartridge which needs changing.

Employee's Health. Effective usage of a respirator is dependent on an individual's ability to wear a respirator, as determined by a physician. Most respiratory devices increase physical stress on the body, especially the heart and lungs. Care should be taken to ensure that a medical determination has been made that an individual is capable of wearing a respirator for the duration of the work assignment.

Work Activity. The type of work activities to be performed while wearing a respirator is vitally important in the respirator selection. The proper respirator will be one, which is least disruptive to the task being conducted yet providing the desired protection.

Respirator Characteristics, Capabilities and Limitations. The Tables in Exhibits "A" and "B" have been reproduced from ANSI Z88.2-1980. They provide a description of various respirator characteristics, capabilities, and limitations.

Protection Factors. The protection afforded by respirators is dependent upon the type of respirator used, seal of the facepiece to the face, leakage around valves, and leakage through or around cartridges or canisters. Depending on these criteria, the degree of protection may be ascertained, and a relative safety factor assigned. Protection factors are only applicable if all elements of an effective respirator program are in place and being enforced.

COMFORT

Once the type of respirator has been selected that is applicable and suitable for the purpose intended, the selection process should give consideration to the fit and comfort of the respirator.

The employee should be given the opportunity to select a respirator that provides the most comfortable fit. Since each respirator represents a different size and shape, a respirator which fits better during selection will provide better protection after fit testing. The employee should be shown how to assess a comfortable device and should eliminate those that are obviously ill-fitting.

An assessment of comfort should include the following points:

- Chin properly placed
- Fit across nose bridge
- Positioning of mask on nose
- Room for safety glasses
- Strap tension
- Distance from nose to bridge
- Room to talk
- Tendency to slip
- Cheeks filled out
- Hindrance to movement

ISSUANCE OF EQUIPMENT

The issuance of respirators to employees shall be, at a minimum, based on the following considerations:

- A person must have received appropriate, documented training and must have received medical clearance, where applicable.
- A person who has hair, e.g., beard growth, moustache, sideburns, stubble, low hairline, bangs, which passes between the face and the sealing surface of the respirator facepiece shall not be permitted to wear such a respirator.
- A person who has hair which interferes with the function of a respirator valve(s) shall not be permitted to wear the respirator.
- A corrective vision spectacle which has temple bars or straps which pass between the sealing surface of a full face piece and the wearer's face shall not be permitted.
- A head covering which passes between the sealing surface of a respirator facepiece and the wearer's face shall not be permitted.
- The wearing of a spectacle, a goggle, a face shield, a welding helmet, or other eye and face protective device, which interferes with the seal of a respirator to the

wearer, shall not be permitted.

- If scars, hollow temples, excessively protruding cheekbones, deep creases in facial skin, the absence of teeth or dentures, or unusual facial configurations prevent a seal of a respirator facepiece to a wearer's face, the person shall not be permitted to wear the respirator.
- If missing teeth or dentures prevent a seal of respirator mouthpiece in a person's mouth, the person shall not be allowed to wear a respirator equipped with a mouthpiece.
- If a person has a nose of a shape or size that prevents the closing of the nose by the nose clamp or a mouthpiece/nose-clamp type of escape respirator, the person shall not be permitted to wear this type of respirator.

Where practical, and where the above considerations are deemed acceptable, respirators should be assigned to individual employees for their exclusive use and labeled for identification in such a way as not to affect the performance of the respirator.

MEDICAL SURVEILLANCE REQUIREMENTS

Prior to the use of respiratory protection devices, a medical examination shall be required for all personnel in the following categories:

- Employees who are or may be exposed to OSHA regulated airborne contaminants at or above the established Action Level (AL) or 30 or more days per year.
- Employees who are or may be exposed to OSHA regulated airborne contaminants at or above the established Permissible Exposure Limit (PEL) for 10 or more days per year.
- Employees who are or may be required to use a Self-Contained Breathing Apparatus (SCBA), e.g., as a member of a confined space entry team, as a member of a first aid/rescue team, or during hazardous material response operations.
- Employees who use negative pressure, air purifying respirators in work areas that contain asbestos.

A licensed physician shall determine what physiological and psychological conditions are pertinent for the wearing of different types of respirators. The respirator program administrator or his designee, using guidelines established by the physician, shall determine whether or not a person may be assigned to a task requiring the use of a respirator.

When applicable, medical surveillance, including bioassay, shall be carried out periodically to determine if respirator wearers are receiving adequate respiratory protection. The licensed physician shall determine the requirements of the surveillance program.

Employees included in the medical surveillance program shall, as a minimum, be provided with annual surveillance examinations. If the examining physician determines that any of the examinations should be provided more frequently than specified, S.C. Swiderski, LLC will provide such examinations to affected employees at the frequencies specified by the physician.

MEDICAL FORMS

In addition to the standardized questionnaires, the physician must also be furnished with a copy of the latest OSHA Standard governing the type of exposure the employee will be subjected to. A description of the employee's duties as they relate to the exposure, the anticipated exposure level, a description of the respiratory protection equipment to be used, and any available information from previous medical examinations of the employee must also be furnished to the physician.

At the conclusion of the examination, the physician will submit a written opinion to S.C. Swiderski, LLC. This will contain the results of the examination, any conditions discovered by the physician that will prohibit the employee from using a respirator and any recommendations from the physician regarding the employee's limitations. It will also contain a statement from the physician that he/she has informed the employee of the results of the examination.

The company must furnish a copy of the physician's opinion to the employee within 30 days of its receipt by the company.

SPECIAL PROBLEMS – VISION

When a respirator user must wear corrective lenses, a protective spectacle or goggle, a face shield, a welding helmet, or other eye and face protective device, the item shall be fitted to provide good vision and shall be worn in such a manner as not to interfere with the seal of the respirator to the wearer.

Temple bars or straps of a corrective spectacle which pass between the sealing surface of a full facepiece respirator and the wearer's face may prevent a good seal of the facepiece to the face and therefore such a spectacle shall not be used when a full facepiece respirator is worn. Special corrective lenses, which are made to be mounted inside a full face piece, are available, from each specified respirator manufacturer, and should be provided by the employer for the employee who needs corrective lenses.

The wearing of contact lenses by persons who must wear a respirator in a contaminated atmosphere is prohibited.

TRAINING

Respirators will not be issued to individuals (including company officials, subcontractors, or visitors) who have not received the appropriate respirator training and a medical clearance. Training is available via Paylocity.

Training Program

The extent and frequency of employee training depends primarily on the nature and extent of the hazard. As a minimum, all employees and supervisory personnel will be trained in basic respirator practices. It must be remembered that respirators are effective only when they are acceptable to the employee and worn properly by him/her. Because proper use depends especially upon the wearer's motivation, it is important that the need for the respirator be explained fully.

The basic respirator training program must include:

- A discussion of the nature of airborne contaminants against which the employee must be protected, and why engineering controls have not been effective in controlling exposure to the point where respirators are not required.
- A discussion of why the respirator which has been selected for this job is the proper device for this particular purpose.
- An explanation of the differences between air-purifying and supplied air respirators and how their use is controlled by the amount of exposure.
- Instruction on the respirator's limitations, emphasizing such things as oxygen deficiency, toxic contaminants which are immediately dangerous to life or health, particulates, such as asbestos, which are not immediately dangerous to life or health, and the need to change filter cartridges when indicated to do so by testing, or when breathing resistance increases to an uncomfortable level.
- Instructions in how to inspect the respirator and ensure that it is in proper working condition.
- Instructions on how to put on the respirator, how it should be positioned on the face, how to set strap tension, and how to wear the respirator comfortably.
- Instructions on the method of fit testing used and the proper way to conduct positive and negative pressure tests each time the respirator is put on. During this instruction, the wearer must be made to understand that the respirator cannot be used when conditions prevent a satisfactory facepiece-to-face seal. If this condition cannot be corrected, the employee cannot be allowed into the area requiring the use of a respirator.
- Instructions in the proper care and maintenance of the respirator.
- A discussion on the value of medical surveillance and air-sample monitoring.
- Field training to recognize and cope with any type of emergency while using a respirator.

FITTING

After the employee has been shown how to assess a respirator, he/she should be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a proper fit.

Note: This instruction should take the form of a review and should not be considered the employee's formal training.

The employee should hold each facepiece up to the face and eliminate those that obviously do not give a comfortable or proper fit.

FAMILIARIZATION

Once the proper fitting respirator has been selected, the employee should don the device, adjusting the facepiece and tensioning the straps. The employee should wear the mask for at least five minutes before taking it off and putting it on several times, adjusting the straps each time to become familiar with the respirator and adept at setting the proper tension on the straps.

FIT-TESTING REQUIREMENTS

OSHA requires that respirators be fitted properly, and that they be tested for their facepiece-to-face seal. There are currently two methods acceptable for conducting these tests: Qualitative and Quantitative Fit-Testing. The Qualitative method is a fast, easily conducted test that can be performed almost anywhere, while the Quantitative methods require the use of bulky test chambers and electronic equipment. The Quantitative method applies only to negative pressure, non-powered air-purifying respirators.

Due to the high potential for exposure in the type of work in which *S.C. Swiderski, LLC* is presently involved, the numerous field locations in which fit-testing must be accomplished, the Qualitative fit-testing method will be utilized throughout the *S.C. Swiderski, LLC* organization. In keeping with *S.C. Swiderski, LLC's* high regard for employee safety, corporate policy will continue to require qualitative fit-testing for both negative pressure and powered air-purifying respirators (PAPR).

Qualitative fit-testing is based on the wearer's subjective response to a challenge atmosphere, of which three popular tests are: the irritant smoke test, the odorous vapor test, and the ammonia irritant test. (See Exhibit "C" for procedures). The following represents a brief summary of how to conduct each of these tests.

Irritant Smoke Test: The irritant smoke test is performed by directing an irritant

smoke, usually either stannic chloride or titanous tetrachloride, from a smoke tube towards the respirator being worn. If the wearer cannot detect the irritant smoke, a satisfactory fit is assumed to be achieved.

The respirator wearer will react involuntarily, usually by coughing or sneezing, to a leakage around or through the respirator. Since this type of test provokes an involuntary response from the employee, it is the preferred testing method when available. In this type of qualitative test, the person administering the test should be interested in any response to the smoke and not necessarily to the degree of the response.

When an air-purifying respirator is being tested in this method, it has to be equipped with a high efficiency filter cartridge.

NOTE: The test substances are irritants to the eyes, skin and mucus membranes. Therefore, the respirator wearer should keep his/her eyes closed during testing.

Odorous Vapor Test: The odorous vapor test relies on the respirator wearer's ability to detect an odorous material, usually isoamyl acetate (banana oil) inside the respirator. The test is performed by passing an isoamyl acetate saturated material around the outside of the respirator. If the wearer is unable to smell the chemical, then a satisfactory fit is assumed to be achieved.

When an air-purifying respirator is tested by this method, it should be equipped with an organic-vapor cartridge that removes the test vapor from the air.

NOTE: This test is solely dependent upon the employee's honest response, since there is no involuntary reaction.

Ammonia Irritant Test: The ammonia irritant test relies upon the wearer's ability to detect an irritant organic chemical substance, usually an ammonia inhalant. The test is performed by placing an enclosure over the respirator wearer's head and shoulders and administering the inhalant vapor from an ampule. If the wearer does not react to the chemical, then a satisfactory fit is assumed to be achieved.

NOTE: This test is not dependent on the wearer's honest indication of taste. There is an involuntary response, and therefore is preferred as a method of testing.

FIELD TESTS

There are two tests that are used in the field to check the seal of the respirator. These

are known as the positive and negative pressure sealing tests. Each of these two tests must be performed every time a respirator is put on and prior to entering a contaminated area.

NOTE: Although both the positive and negative pressure tests are considered essential to a good respiratory protection program and should always be used prior to entering an area of exposure, they are recognized solely as a field test and cannot be substituted for the qualitative fit test.

Positive Pressure Test

- This test only applies to those respirators that have an exhalation valve that can be blocked. The exhalation valve cover may have to be removed for the test.
- Close or “block off” the exhalation valve.
- Exhale gently into the facepiece.
- If a slight positive pressure is built up with no apparent outward leakage around the seal, then the face piece-to-face seal is satisfactory.

Negative Pressure Test

- Close the inlet opening or hose of the respirator facepiece with the hand(s), tape, or other means.
- Inhale gently so that the facepiece collapses slightly and hold the breath for ten seconds.
- If the facepiece remains slightly collapsed and no inward leakage occurs, then the facepiece-to-face seal is deemed to be satisfactory.

CARE AND MAINTENANCE

Personnel involved in respirator maintenance must be thoroughly trained. Substitution of parts from different brands or types of respirators invalidates approval of the device. Repairs and adjustments should never be made beyond the manufacturer’s recommendations.

Cleaning the Respirator

Respirators must be cleaned and disinfected after each day’s use when they are

assigned to one individual or after each use if they are assigned to more than one person. The following procedures are recommended for cleaning and disinfecting respirators:

- If required, remove and discard any filters or cartridges.
- Wash facepiece and breathing tube in detergent and warm water (120°) or a cleaner/disinfectant solution. Use a soft brush to facilitate removal of dirt. Cleaner/disinfectant solutions are available from respirator manufacturers or it can be made by using a solution of water and household chemicals, such as two tablespoons of chlorine bleach to one gallon of water, or one teaspoon of tincture of iodine to one gallon of water. A two minute immersion of the respirator into either solution is sufficient for disinfection.
- Rinse completely in clean, warm water.
- Air dry in clean air.
- Clean out other parts as recommended by the manufacturer.
- Inspect the valves, head straps and other parts and replace with new parts if defective.
- Place facepiece in a plastic bag or container for storage in an assigned area.
- Insert new filters or cartridges prior to use, making sure the seals are tight.

Storing the Respirator

When they are not being used, respirators should be individually sealed in plastic bags and stored at convenient locations in order to protect them against dust, sunlight, extreme temperatures, excessive moisture, or damaging chemicals. They should be stored in such a way, that the facepiece and exhalation valve are not being distorted.

Inspecting the Respirator

All respirators should be inspected before and after use and at least monthly by a competent person to ensure that they are in satisfactory working condition. A general inspection check list should include:

- Tightness of connections.
- Conditions of face piece, straps, connecting tubes, and cartridges.
- Condition of exhalation and inhalation valves. If the sides of the exhalation valve gap even slightly, it must be replaced with a new valve.
- Pliability and flexibility of rubber parts. Deteriorated rubber parts must be replaced. Unused rubber parts should be worked, stretched and manipulated with a massaging action.
- Condition of lenses should be checked. Lenses must be tight and scratched or damaged lenses replaced.

- On self-contained breathing apparatus, the charge of the compressed air cylinders should be checked and fully charged.

PROGRAM EVALUATION

The program administrator should periodically assess the effectiveness of the respiratory protection program during all phases of operation in which respirators are being used. Frequent walk-through inspections during these activities should be conducted to monitor and document supervisory and worker compliance with the requirements of the program. In addition to general assessment of the overall respiratory protection program, specific calculations of the respirator cleaning, inspection, maintenance, repair, storage, and use procedures should be frequently conducted to ensure that the desired results of these operations are consistently achieved.

REPORTING RESPIRATOR PROBLEMS

Occasionally, the company may find a defect in the design or performance of a respirator. The best course to follow is to report these findings to the administrator of the company's respiratory protection program, who in turn should report these findings to the S.C. Swiderski, LLC Safety & Compliance Manager.

If the respirator carries with it the approval of the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH), the Corporate Safety Manager will report the findings to the respirator's manufacturers and to NIOSH.

This will be done by notifying the manufacturer of the defect in a report format, and forwarding a copy of the report to NIOSH. The report will include the following:

- The name, address and telephone number of S.C. Swiderski, LLC.
- The name of the respirator's manufacturer.
- The model number of the respirator.
- The name and part number (if possible) of the defective part.
- The lot number and/or serial number of the respirator and/or defective part.
- A brief description of the respirator's use when the defect was discovered.
- A description of the defect.
- A description of the defect's adverse effect on the respirator's performance.

This report should be addressed to the NIOSH Division of Safety Research, Testing and Certification Branch, 944 Chestnut Ridge Rd., Morgantown, West Virginia 26505.

RECORDS

Respirator Training Records

Upon completion of the basic respirator training program, the employee will be required to read and sign a Respirator Training Record (See Exhibit "D") attesting to the fact that they have received the basic training program and feel confident in their ability to use the respirator properly.

The signed and dated Respirator Training Record will then become a part of the employees' medical records and will be retained for the same period of time as those records.

Recordkeeping of Test Results

A summary of the test results for each employee on whom a qualitative fit test was conducted, will be documented on the Respirator Fit Test Record (See Exhibit "E"). This record will then become a part of the employee's medical record and will be retained for the same time period as the medical records.

Care and Maintenance Records

A written record should be maintained of the Care and Maintenance Program. Information contained on this record should include inspection reports, replacement parts used, dates of repair, cleaning and type of disinfectant used and the names of persons doing the work. The respirator should be identified by manufacturer, model and approval number. Records should be retained for a period of five years.

Medical Records

All records pertaining to the employee's medical examination and evaluation must be retained for a period in excess of thirty (30) years.

Additional Information

Additional information about Respiratory Protection can be obtained from the Safety Manager.

EXHIBIT "A"

CAPABILITIES AND LIMITATIONS OF RESPIRATORS AIR-PURIFYING RESPIRATORS

GENERAL LIMITATIONS

Air-purifying respirators do not protect against oxygen-deficient atmospheres or against skin irritations by, or absorption through the skin, or airborne contaminants.

The maximum contaminant concentration against which an air-purifying respirator will protect is determined by the design efficiency and capacity of the cartridge, canister, or filter and the facepiece-to-face seal on the user. For gases and vapors, the maximum concentration for which the air-purifying element is designed is specified by the manufacturer or is listed on labels of cartridges and canisters.

Non-powered air-purifying respirators will not provide the maximum design protection specified unless the face piece of mouthpiece/nose clamp is carefully fitted to the wearer's face to prevent inward leakage. The time period, over which protection is provided is dependent on canister, cartridge, or filter type, concentration of contaminant, humidity levels in the ambient atmosphere, and the wearer's respiratory rate.

The proper type of canister, cartridge, or filter must be selected for the particular atmosphere and conditions. Non-powered air-purifying respirators may cause discomfort due to a noticeable resistance to inhalation. This problem is minimized in powered respirators. Respirator face pieces present special problems to individuals required to wear prescription lenses. These devices do not have the advantage of being small, light, and simple in operation.

Use of air-purifying respirators in atmospheres immediately dangerous to life or health is limited to specific devices under specified conditions.

VAPOR AND GAS-REMOVING RESPIRATORS

Limitations: No protection is provided against particulate contaminants. A rise in canister or cartridge temperature indicates that a gas or vapor is being removed from the inspired air.

An uncomfortably high temperature indicates a high concentration of gas or vapor and requires an immediate return to fresh air.

Use should be avoided in atmospheres where the contaminant(s) lack sufficient

warning properties (that is: odor, taste, or irritation at a concentration in air or above the permissible exposure limit.) Vapor- and gas-removing respirators are not approved for contaminants that lack adequate warning properties.

Not for use in atmospheres immediately dangerous to life or health unless the device is a powered-type respirator with escape provisions.

1. **Full Facepiece Respirator.** Provides protection against eye irritation in addition to respiratory protection.
2. **Quarter Mast and Half Mask Facepiece Respirator.** A fabric covering (face let) available from some manufactures should not be used.
3. **Mouthpiece Respirator.** Shall be used **only** for escape applications. Mouth breathing prevents detection of contaminant by odor. Nose clamp must be securely in place to prevent nasal breathing.

A small lightweight device that can be donned quickly.

PARTICULATE-REMOVE RESPIRATORS

Limitations: Protection against nonvolatile particles only. No protection against gases and vapors.

Not for use in atmospheres immediately dangerous to life or health unless the device is a powered-type respirator with escape provisions.

1. **Full Facepiece Respirator.** Provides protection against eye irritation in addition to respiratory protection.
2. **Quarter Mast and Half Mask Facepiece Respirator.** A fabric covering (facelet) available from some manufactures should not be used unless approved for use with respirator.
3. **Mouthpiece Respirator.** Shall be used **only** for escape applications. Mouth breathing prevents detection of contaminant by odor. Nose clamp must be securely in place to prevent nasal breathing.

A small lightweight device that can be donned quickly.

COMBINATION PARTICULATE- & VAPOR- & GAS-REMOVING RESPIRATORS

The advantages and disadvantages of the component sections of the combination respirator as described above apply.

EXHIBIT "B"

CAPABILITIES AND LIMITATIONS OF RESPIRATORS ATMOSPHERE-SUPPLY RESPIRATORS

Atmosphere-supplying respirators provide protection against oxygen deficiency and toxic atmospheres. The breathing atmosphere is independent of ambient atmospheric conditions.

GENERAL LIMITATIONS

Except for some air-line suits, no protection is provided against skin irritation by materials such as ammonia and hydrogen chloride, or against sorption of materials such as hydrogen cyanide, tritium, or organic phosphate pesticides through the skin. Face pieces present special problems to individuals required to wear prescription lenses. Use of an atmosphere-supplying respirator in atmospheres immediately dangerous to life or health is limited to specific devices under specified conditions.

SELF-CONTAINED BREATHING APPARATUS (SCBA)

The wearer carries his own breathing atmosphere.

Limitations: The period over which the device will provide protection is limited by the amount of air or oxygen in the apparatus, the ambient atmospheric pressure (service life of open-circuit devices is cut in half by a doubling of the atmospheric pressure), and the type of work being performed. Some SCBA devices have a short service life (less than 15 minutes) and are suitable only for escape (self-rescue) from an irrespirable atmosphere.

Chief limitations of SCBA devices are their weight or bulk, or both, limited service life, and the training required for their maintenance and safe use.

(1) **Closed-Circuit SCBA.** The closed-circuit operation conserves breathing air and permits longer service life at reduced weight. The negative-pressure type produces a negative pressure in the respiratory-inlet covering during inhalation, and this may permit inward leakage of contaminants; whereas the positive-pressure type always maintains a positive pressure in the respiratory-inlet covering and is less apt to permit inward leakage of contaminants.

(2) **Open-Circuit SCBA.** The demand type produces a negative pressure in the respiratory-inlet covering during inhalation, whereas the pressure-demand type maintains a positive pressure in the respiratory-inlet covering during inhalation and is

less apt to permit inward leakage of contaminants

SUPPLIES-AIR RESPIRATORS

The respirable air supply is not limited to the quantity the individual can carry, and the devices are lightweight and simple.

Limitations: Limited to use in atmospheres from which the wearer can escape unharmed without the aid of the respirator.

The wearer is restricted in movement by the hose and must return to the respirable atmosphere by retracing his route of entry. The hose is subject to being severed or pinched off.

(1) **Hose Mask.** The hose inlet or blower must be located and secured in a respirable atmosphere.

(a) **Hose mask with blower.** If the blower fails, the unit still provides protection, although a negative pressure exists in the facepiece during inhalation.

(b) **Hose mask without blower.** Maximum hose length may restrict application of device.

(2) **Air-Line Respirator (Continuous Flow, Demand, and Pressure-Demand Types).**

The demand type produces a negative pressure in the facepiece on inhalation, whereas continuous-flow and pressure-demand types maintain a positive pressure in the respiratory-inlet covering and are less apt to permit inward leakage of contaminants.

Air-line suits may protect against atmospheres that irritate the skin or that may be absorbed through the unbroken skin.

Limitations: Air-line respirators provide no protection if the air supply fails. Some contaminants, such as tritium, may penetrate the material of an air-line suit and limit its effectiveness.

Other contaminants, such as fluorine, may react chemically with the material of an air-line suit and damage it.

Combination Airline Respirators with Auxiliary SC Air Supply. The auxiliary self-contained air supply on this type of device allows the wearer to escape from a dangerous atmosphere. This device with auxiliary self-contained air supply is approved for escape and may be used for entry when it contains at least a 15-minute auxiliary self-contained air supply.

EXHIBIT "C"

AIR-PURIFYING RESPIRATOR QUALITATIVE FIT TEST PROCEDURE

Subsequent to respirator training and medical approval, all personnel who request or are required to wear a respirator will be fit-tested with an air-purifying respirator (APR) prior to respirator assignment and use. Fit testing will be accomplished using qualitative methods, which incorporate pressure tests and administration of challenge aerosols (irritants or vapors). Personnel will be allowed to select a respirator that is comfortable and achieves a proper face-to-mask seal.

NOTE: To ensure proper fitting, personnel without clean-shaven faces will not be allowed to undergo fit testing nor will they be allowed to wear respirators on the job. (Moderate length moustaches are permitted if not interference is encountered.)

A written record of the fit-test result will be generated for inclusion into the project's master file and for the employee's records. The Safety Manger shall be responsible for conducting the fit test and generating the appropriate record.

Personnel will be instructed in the use, maintenance, inspection, and limitations of APRs. It will be stressed that any breakthrough (odor, taste, or irritation) or an increased inhalation resistance is reason to exit the respirator use area. Cartridges will be replaced as appropriate or specified by regulation.

RESPIRATOR SELECTION

1. The test subject should understand that he/she is being asked to select the respirator that provides the most comfortable fit for him/her. Each respirator represents a different size and shape and, if fitted and utilized properly, will provide adequate protection.
2. The test subject shall be allowed to select the most comfortable respirator from an array of various sizes and manufacturers that includes at least three sizes of elastomeric face pieces and units of at least two manufacturers.
3. The selection process shall be conducted in a room separate from the fit-test room to prevent olfactory fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to

set strap tension and how to access a “comfortable” respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This will not constitute his formal training on respirator use, only a review.

4. The test subject will hold each face piece up to his face and eliminate those that are obviously not giving a comfortable fit.
5. The more comfortable face pieces will be recorded the most comfortable mask will be worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in Item 6 below. If the test subject is not familiar with using a particular respirator, he/she shall be directed to don the mask several times and to adjust the straps each time, so that he/she becomes adept at setting proper tension on the straps.
6. Assessment of comfort shall include reviewing the following points with the test subject:
 - Proper chin placement
 - Positioning of mask on face
 - Strap tension
 - Room for prescription spectacle insert(s)
 - Room to talk
 - Tendency to slip
 - Cheeks filled out
 - Self-observation in mirror
 - Adequate time for assessment
7. Each test subject shall wear his/her respirator for at least 10 minutes before starting the fit test.

FIT TESTING

Qualitative fit testing involves four distinct steps:

- Performance of positive/negative pressure checks
- Administration of stannic chloride smoke challenge
- Administration of ammonia inhalant vapor challenge
- Administration of isoamyl acetate vapor challenge

The test procedures incorporate aerosols, which are designed to produce an involuntary cough reflex and/or olfactory stimulation subject to face to seal breakthrough or leakage.

Fit Testing Procedure

1. Each respirator used for the fit testing shall be equipped with combination organic vapor and high-efficiency particulate cartridges (black/magenta).
 2. After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for respirator selection, and shall be well-ventilated, as by an exhaust fan, to prevent general room contamination by the challenge aerosol.
 3. This test subject shall conduct the conventional negative- and positive-pressure fit checks (e.g., see ANSI Z889.2-1980). Before conducting the negative- or positive-pressure check, the subject shall be told to check and confirm the mask seal by rapidly moving the head side-to-side and up and down, taking a few deep breaths.
 4. The test subject is now ready for fit testing.
 5. The test conductor shall review this protocol with the test subject before testing.
 6. Advise the test subject that the aerosol can be irritating to the eyes and instruct him/her to keep his eyes closed while the test is performed.
 7. Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part No. 5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to an aspirator bulb.
 8. The test conductor shall direct the stream of irritant aerosol from the tube towards the face seal area of the test subject. The conductor shall begin at least 12 inches from the facepiece and gradually move to within one inch, moving the whole perimeter of the mask
 9. The following exercises shall be performed while the aerosol is challenging the respirator seal. Each shall be performed for one minute.
- Normal breathing
 - Deep breathing, being certain that breaths are deep and regular.
 - Turning head from side-to-side, being certain that movement is complete. Alert the test subject not to bump the respirator on the shoulders. Have the test subject inhale when the head is at either side.
 - Nodding head up and down. Be certain motions are complete and made about

every second. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his head is in the fully up position.

- Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages, which serve the same purposes, may also be used.

Rainbow Passage

“When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it.

“When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.”

- Normal breathing.

Repeat fit testing steps 5 through 9, this time using vapors from an ammonia inhalant ampoule (MSA P/N 2156, or equivalent) as a secondary challenge atmosphere.

Repeat fit testing steps 5 through 9, this time using vapors from an isoamyl acetate ampoule (North P/N 7002, or equivalent) as a third challenge atmosphere.

If the irritant aerosols produce an involuntary reaction (cough) or if the test subject notices odors, the test conductor shall stop the test. In this case, the test respirator is rejected, and another respirator shall be selected.

Each test subject passing the challenge tests without evidence of a response shall be given a sensitivity check of the aerosols to determine whether he reacts to them. Failure to evoke a response shall void the fit test.

After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator shall be tried.

The test subject shall be given the opportunity to select a different facepiece and be re-tested if during the use the chosen facepiece becomes unacceptably uncomfortable.

8. Protection Factors (PF)

If a respirator passes the qualitative tests, it can be work in concentrations determined by the assigned PF. The Maximum Use Concentration (MUC) is calculated by multiplying the TLV of the contaminant by its PF. PFs for air purifying respirators are:

Half-face mask: 10

Full-face mask: 50

Example: $MUC (ppm) = PF \times TLV$ If $TLV = 10 \text{ ppm}$ and $PF = 10$;

Then, $MUC = 10 \times 10 = 100 \text{ ppm}$

Thus, for a substance with a TLV of 10 ppm, and half-mask respirator provides protection up to a maximum concentration of 100 ppm of the substance.

SEMI-ANNUAL TESTING

The qualitative fit-test should be repeated at least once every six months, if the user is assigned a new respirator or whenever one or more of the following occur:

- The employee has a weight change of 20 pounds or more;
- Facial scarring occurs in an area of the face seal;
- The employee has significant dental changes;
- The employee has reconstruction or cosmetic surgery of the face; and
- Any other condition that may interfere with the facepiece seating.

RECORDKEEPING

The Respirator Fit Test Record, show in Exhibit 8, must be completed after each fit test.

EXHIBIT "D"

RESPIRATOR TRAINING RECORD

Employee's Name (print) _____
(Last) (First)

Craft _____ **SSN:** _____

Project Name: _____ **Job No.:** _____

Your signature on this Respirator Training Record will attest to your having received and understood the basic respirator training program which both *S.C. Swiderski, LLC* and the Occupational Safety and Health Administration (OSHA) require as part of an acceptable respiratory protection program.

The basic respirator training program consists of the following elements:

- The reasons for the need of respiratory protection.
- The nature, extent, and effects of respiratory hazards to which the person may be exposed.
- An explanation of why engineering controls are not being applied or are not adequate and of what effort is being made to reduce or eliminate the need for respirators.
- An explanation of the operation and the capabilities and limitations of the respirator selected.
- Instruction in inspecting, donning, checking of the fit of, and wearing the respirator.
- An opportunity for each respirator wearer to handle the respirator, learn how to don and wear it properly, check its seals, wear it in a safe atmosphere, and wear it in a test atmosphere.
- An explanation of how maintenance and storage of the respirator is carried out.
- Instructions in how to recognize and cope with emergency situations.
- Instructions as needed for special respirator use.
- Regulations concerning respirator use.

Employee's Signature _____ Date ____/____/____

Trainer's Signature _____

Trainer's Title _____

EXHIBIT "F"

PROGRAM FOR THE VOLUNTARY USE OF DUST MASKS

This program is designed to protect employee health even though it has been determined that respirators are not required. Filtering face piece dust masks will be allowed for those employees who wish to use them. This program is designed for compliance with OSHA Standard 29 CFR 1910.134(c)(2)(i) with the exception in 1910.134(c)(2)(ii).

The Safety Manager has determined that respirators are not required for the following jobs, tasks, or departments: Concrete, Masonry, Plumbing, Steel, Earthwork, Millwright, and Carpentry.

The use of dust mask respirators by employees is strictly voluntary.

The Safety Manager will provide and employees are to read Appendix D of the OSHA Respirator Standard 29 CFR 1910.134, a copy of which follows:

Appendix D 1910.134 Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warning regarding the respirator's limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or

statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

EXHIBIT "G"

RESPIRATORY PROTECTION PROGRAM FOR THE VOLUNTARY USE OF AIR PURIFYING RESPIRATORS OTHER THAN DUST MASKS (FILTERING FACEPIECES)

This program is designed to protect employee health even though it has been determined that respirators are not required. This program is designed for compliance with OSHA Standard 29 CFR 1910.134(c)(2).

The Safety & Compliance Manger is responsible for administering this program.

The Safety & Compliance Manager has determined that respirators are not required for the following jobs, tasks or departments: Concrete, Masonry, Plumbing, Steel, Earthwork, Millwright, and Carpentry.

The following is required for employees who voluntarily use respirators other than filtering facepieces:

1. The employee will contact Human Resources to initiate the medical evaluation.
2. The designated health care provider is TBD on an individual basis. They will perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire (information required is contained in 1910.134 Appendix C). This evaluation will be administered confidentially at no cost to the employee, during the employee's normal working hours or at a time and place convenient to the employee, and in a manner the employee understands. The employee will have an opportunity to discuss the questionnaire and examination results with the safety officer.

3. The Safety Manager will provide the following supplemental information:
 - a) The type and weight of the respirator to be used by the employee
 - b) The duration and frequency of respirator use (including use for rescue and escape)
 - c) The expected physical work effort
 - d) Additional protective clothing and equipment to be worn
 - e) Temperature and humidity extremes that may be encountered
 - f) A copy of this written respiratory protection program
 - g) A copy of the respiratory protection standard (29 CFR 1910.34)

4. Respirators will be cleaned and disinfected according to the manufacturer's recommendations or those found in Appendix B-2 of the standard.

All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the face piece and exhalation valve.

8. The Safety Manager will provide a copy of and employees are to read Appendix D of the OSHA Respirator Standard 29 CFR 1910.134, a copy of which follows:

Appendix D 1910.134 (Non-Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators you're your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warning regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging.

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It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very

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