



SAFETY DIRECTIVE

Title: **Respiratory Protection Program**
Issuing Department: Town Manager's Safety Office
Effective Date: July 1, 2014
Approved: Gilbert Davidson, Town Manager
Type of Action: New

1.0 PURPOSE

The purpose of this program is to set forth uniform policies and procedures concerning the use of respirators for the Town of Marana and its employees. All use of respirators by Town of Marana employees shall conform to these policies and procedures.

The guidelines in this program are designed to help reduce employee occupational exposure to particulate matter, radionuclides, gases, vapors and/or oxygen deficiency.

The policies and procedures contained in this section are intended to assist in identifying and complying with OSHA Safety Standards. In all cases where there is a difference between specific OSHA standards and the Respiratory Protection policies set forth in this directive, the stricter of the two shall apply.

2.0 DEPARTMENTS AFFECTED

This Administrative Directive shall apply to all Town of Marana departments and employees.

3.0 REFERENCES

3.1 OSHA Standard 29 CFR 1910.1001 or OSHA 29 CFR 1926.1101 – Asbestos

3.2 National Institute for Occupational Safety and Health (NIOSH)

3.3 Mine Safety and Health Administration (MSHA)

3.4 Bureau of Mines (BM)

4.0 DEFINITIONS

4.1 Abrasive blasting respirator: A respirator designed to protect the wearer from inhalation, impact and abrasion of materials used or generated in abrasive blasting.

4.2 Aerosol: Particles, solid or liquid, suspended in air.

- 4.3 Airline respirator: An atmosphere supplying respirator in which the respirable gas is not designed to be carried by the wearer.
- 4.4 APF - Assigned Protection Factor: The expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users.
- 4.5 APR - Air purifying respirator: A respirator in which ambient air is passed through an air purifying element which removes the contaminant. Air is passed through the air purifying element either by means of breathing action or by a blower.
- 4.6 Canister/Cartridge: A container with a filter, sorbent, or catalyst, or combination which removes specific contaminants from the air passed through it.
- 4.7 Ceiling concentration: The concentration of an airborne substance that shall not be exceeded during any part of the working exposure.
- 4.8 Certified: Evaluated and listed as permissible by the National Institute for Occupational Safety and Health (NIOSH), the Mine Safety and Health Administration (MSHA), or Bureau of Mines (BM).
- 4.9 Confined space: An enclosed space that has the following characteristics: it is not designed for continuous human occupancy; has restricted entry and egress; and may contain potential or known hazards.
- 4.10 Contaminant: A harmful, irritating, or nuisance airborne material.
- 4.11 Continuous flow respirator: An atmosphere supplying respirator which provides a continuous flow of respirable gas to the respiratory inlet covering.
- 4.12 Demand respirator: An atmosphere supplying respirator which releases respirable air to the face piece only when a negative pressure is created by inhalation.
- 4.13 Disposable respirator: A respirator for which maintenance is not intended and which is designed to be discarded after excessive resistance, sorbent exhaustion, physical damage or end of service life renders it unsuitable for use. Refer to Appendix D for further information.
- 4.14 Dust: An aerosol consisting of mechanically produced solid particles derived from the breaking up of larger particles. Dusts are generally larger particles than fumes.
- 4.15 Employee Disclosure of Respiratory Health: After an initial medical evaluation prior to wearing a respirator in the workplace, employees will be required to complete a disclosure of respiratory health prior to annual respirator fit-testing. The form can be located in Appendix E of this directive.
- 4.16 End of service life indicator: A system that warns the user of the approach of the end of adequate respiratory protection.
- 4.17 Escape only respirator: A respirator intended only for use during emergency egress from a hazardous atmosphere.
- 4.18 Exposure limit: The maximum allowable concentration of a contaminant in the air to which an individual may be exposed. These may be time weighted averages, short term limits or ceiling limits.

- 4.19 Filter: A component used in respirators to remove solid or liquid aerosols from the inspired air.
- 4.20 Fit check: A test conducted by the wearer to determine when the respirator is properly seated to the face.
- 4.21 Fit factor: A quantitative measure of the fit of a particular respirator to a particular individual.
- 4.22 Fit test: The use of a challenge agent or air pressure to evaluate the fit of a respirator on an individual.
- 4.23 Fume: Solid aerosols formed by condensation of heated metals. Fumes generally have a smaller particle size when compared to dusts.
- 4.24 Gas: A fluid that has neither independent shape nor volume and tends to expand indefinitely.
- 4.25 Hazard ratio: A number obtained by dividing the concentration of a contaminant by its exposure limit.
- 4.26 Hazardous atmosphere: An atmosphere that contains contaminants in excess of exposure limits or is oxygen deficient.
- 4.27 Helmet: A hood that offers head protection against impact and penetration.
- 4.28 High efficiency filter: A filter which removes from air 99.97% or more of aerosols having a diameter of 0.3 micrometers.
- 4.29 Hood: A respiratory inlet covering which completely covers the head, neck, and may cover portions of the shoulders.
- 4.30 IDLH - Immediately Dangerous to Life or Health: Any atmosphere that poses an immediate hazard to life or poses immediate irreversible debilitating effects on health.
- 4.31 LC-50: The lethal concentration of a chemical in air to kill 50% of the test subjects (i.e. mammals, insects, fish, etc.).
- 4.32 LD-50: The lethal dose of a chemical or drug required to kill 50% of the test subjects.
- 4.33 Loose fitting face piece: A respiratory inlet covering that is designed to form a partial seal with the face, does not cover the neck and shoulders and may or may not offer head protection against impact and penetration.
- 4.34 Maximum use concentration (MUC): The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.
- 4.35 Mist: An aerosol composed of liquid particles.

- 4.36 Mouth piece and nose clamp assembly: A respiratory inlet covering that is held in the wearer's mouth and must be used in conjunction with a nose clip.
- 4.37 N95 Respirator: (Also N, P, R - designations from 95-100). A paper type respirator that may or may not contain and exhalation port or valve. The letter designation signifies the protection type, while the following number designation signifies the protection factor.
- 4.38 Negative pressure respirator: S respirator in which the air pressure inside the respiratory inlet covering is negative during inhalation with respect to the ambient air pressure.
- 4.39 Occupational Health Professional: An individual whom, by experience and education, is competent at recognizing, evaluating and controlling health hazards in the workplace.
- 4.40 Poor warning properties: A substance is said to have poor warning properties when its odor, taste or irritation effects are not detectable or not persistent at concentrations at or below recommended exposure limits.
- 4.41 Positive pressure respirator: A respirator in which the pressure inside the respiratory inlet covering is normally positive with respect to ambient air pressure.
- 4.42 PAPR - Powered air purifying respirator: An air purifying respirator that uses a blower to force ambient air through purifying elements, canisters, cartridges, etc.
- 4.43 Pressure demand respirator: A positive pressure respirator that releases respirable air when the positive pressure is reduced inside the face piece by inhalation.
- 4.44 Qualified employee: An employee who has successfully passes a medical exam, received respirator training, and has been fit tested.
- 4.45 Qualitative fit test: A pass/fail test that relies on the subject's sensory response to detect the challenge agent.
- 4.46 Quantitative fit test: A fit test that uses an instrument to measure a challenge agent or pressure differential inside and outside the respirator.
- 4.47 Radionuclide: An atom which spontaneously emits particles, gamma, or X radiation.
- 4.48 Respirator: A personal device designed to protect the wearer from the inhalation of hazardous atmospheres.
- 4.49 Respiratory inlet covering: The portion of a respirator that 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, suit or mouth piece/nose clamp.
- 4.50 Respiratory Program Coordinator (Competent Person): The designated employee in each department or division who is responsible for the general administration of the Respiratory Protection Program for that department or division.
- 4.51 Sanitization: The removal of contaminants and the inhibiting of the action of the agents that cause infection or disease.
- 4.52 SCBA - Self-contained breathing apparatus: An atmosphere supplying respirator in which the respirable gas source is designed to be carried by the wearer.
- 4.53 Service life: The period of time that a respirator provides adequate protection to the wearer.

- 4.54 Sorbent: A material that is contained in a cartridge or canister and removes specific gases and vapors from the inhaled air.
- 4.55 STEL - Short Term Exposure Limit: The average concentration of a contaminant in air during a specific time period. Usually STELs are calculated for 30 minutes.
- 4.56 Suit: A respiratory inlet covering designed to cover the entire body. Does not include protective clothing that only provides skin protection.
- 4.57 SAR - Supplied Air Respirator: An atmosphere supplying respirator in which the respirable gas source is supplied to the user via a hose. The breathing air supply can come from compressed gas cylinders, air compressor, or air pump.
- 4.58 Tight fitting face piece: A respiratory inlet covering that is designed to form a complete seal with the face. A half face piece (includes quarter masks, disposable masks, and masks with elastomeric face pieces) covers the nose and mouth; a full face piece covers the nose, mouth, and eyes.
- 4.59 Town Physician: The outside physician or occupational health agency used by the Town for occupational medicine needs.
- 4.60 TWA - Time-weighted average: The average concentration of a contaminant in air during a specific time period; usually TWAs are calculated for 8 hours.
- 4.61 Vapor: The gaseous phase of matter that normally exists in a liquid or solid state at standard temperature and pressure.
- 4.62 Voluntary use: Use of a respirator to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards.

5.0 POLICIES AND PROCEDURES

5.1 Education and Training

- 5.1.1 Employees required to wear respirators and supervisors required to oversee the work activities of employees required to wear respirators shall be given information and annual training which includes the following:
 - 5.1.1.1 Respiratory hazards and the consequences of improper respirator use;
 - 5.1.1.2 Engineering and administrative control measures;
 - 5.1.1.3 Respirator selection process;
 - 5.1.1.4 Capabilities and limitations of the respirator;
 - 5.1.1.5 Methods of donning the respirator and checking its fit and operation;
 - 5.1.1.6 Proper wearing of the respirator;
 - 5.1.1.7 Respirator maintenance and storage;
 - 5.1.1.8 Recognition and response to emergency situations.
- 5.1.2 The Respiratory Program Administrator (Competent Person) will receive additional training which will include annual refresher training to be provided by the Town's Safety Coordinator or other designated trainer.

5.2 General

- 5.2.1 Where feasible, exposure to contaminants will be eliminated or reduced by engineering controls (i.e., general and local ventilation, enclosure, isolation, or substitution of a less hazardous process or material).
- 5.2.2 If engineering controls are not feasible, the use of administrative controls (i.e., rotating jobs, shift changes) may be used, where not prohibited by law, to control exposures to contaminants.
- 5.2.3 The use of respiratory protective equipment is required when engineering or administrative controls are not feasible or while engineering controls are being initiated.

5.3 Medical Determination

5.3.1 Initial Evaluation

- 5.3.1.1 The Town shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace.
- 5.3.1.2 In determining the employee's ability to use a respirator, the Town shall obtain a written recommendation from the Town Physician. The recommendation shall include only the following information:
 - 5.3.1.2.1 Any limitations on respirator use related to medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
 - 5.3.1.2.2 The need, if any, for follow-up medical evaluations; and
 - 5.3.1.2.3 A statement from the Town Physician that the employee has received a copy of the Town Physician's written recommendations.

5.3.2 Additional Evaluations

- 5.3.2.1 The department shall conduct an additional fit test whenever the employee reports, or the employer, Town Physician, supervisor, or program administrator makes visual observations of changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to:
 - 5.3.2.1.1 Facial scarring
 - 5.3.2.1.2 Dental changes
 - 5.3.2.1.3 Cosmetic surgery
 - 5.3.2.1.4 Obvious change in body weight
- 5.3.2.2 The Town shall provide additional employee medical evaluations for respirator use when:
 - 5.3.2.2.1 An employee reports medical signs or symptoms that are related to the use of a respirator while being fit-tested

- 5.3.2.2.2 Information from the Employee Disclosure of Respiratory Health, or direct observations made during fit testing indicate a need for employee reevaluation
- 5.3.2.2.3 A change occurs in workplace conditions (e.g. physical work effort, protective clothing, temperature, etc.) that may result in a substantial increase in the physiological burden placed on an employee
- 5.3.2.2.4 An employee is specifically assigned to the work operations involving Asbestos Mitigation/Abatement, or is potentially exposed to asbestos while obtaining samples for testing, where engineering and work practice controls are not feasible and require the assignment to wear a respirator with a protection factor equivalent to the class of abatement performed. Employees under this assignment shall comply with all medical testing and surveillance as required by OSHA Standard 29 CFR 1910.1001 or 1926.1101 – Asbestos.

5.4 Respirator Selection

5.4.1 The selection of the proper type of respirator shall be based on the following:

- 5.4.1.1 Type of work being done;
- 5.4.1.2 Respiratory hazard;
- 5.4.1.3 Location of worksite;
- 5.4.1.4 Duration of tasks requiring respiratory protection;
- 5.4.1.5 The activities of workers in the hazardous area;
- 5.4.1.6 Physical and functional capabilities of respirators;
- 5.4.1.7 Respiratory protection factors.

5.4.2 Questions to utilize in determining the respiratory hazard:

- 5.4.2.1 What is the oxygen concentration?
- 5.4.2.2 What contaminant may be present in the workplace?
- 5.4.2.3 What is the exposure limit or toxicity of the contaminant? (i.e. OSHA - Permissible Exposure Limit, ACGIH - Threshold Limit Value, NIOSH - Relative Exposure Limit, LD-50, LC-50, etc.)
- 5.4.2.4 Does a comprehensive standard exist for the contaminant? (i.e. lead, asbestos, cadmium)
- 5.4.2.5 What is the concentration of contaminants?
- 5.4.2.6 What are the physical characteristics of the contaminant? (i.e. particle size, vapor pressure, boiling point, specific gravity).
- 5.4.2.7 Can the contaminant be absorbed through the skin, produce skin sensitization or be corrosive to the skin or eyes?
- 5.4.2.8 Does the contaminant have a known odor, taste or irritation effect?

5.4.3 Respirators are specifically designed to protect against specific air contaminants. Different respirators protect against different contaminants. Use of an improper

- respirator may reduce or eliminate the intended protection. Injury or illness may result from the use of an improperly chosen respirator.
- 5.4.4 The Town of Marana has selected respirators that provide protection for their intended use. All respirators used by Town of Marana employees have been approved by the National Institute for Occupational Safety and Health (NIOSH) and/or the Mine Safety and Health Administration (MSHA).
- 5.4.5 The Town of Marana shall specify and provide the appropriate respirator for jobs where respirators are necessary.
- 5.4.5.1 Employees shall not substitute other respirators.
- 5.4.5.2 Employees shall not supply their own respirators, unless for voluntary use as described in this directive.
- 5.5 Fit Testing. A qualitative and/or quantitative respirator fit test shall be used for all negative pressure respirators to determine the ability of each respirator wearer to obtain a satisfactory fit. Fit testing shall be conducted annually. Fit testing shall be conducted every 6 months for employees working with asbestos.
- 5.5.1 Qualitative fit testing. The respirator wearer is challenged with irritant smoke, an odorous vapor, or other suitable agent. An appropriate filter cartridge is used to remove the challenge agent. If the respirator wearer cannot detect the challenge agent, then the respirator fits. This test is either pass or fail.
- 5.5.2 Quantitative fit testing. The respirator fit is tested by instrumentation that measures either the relationship between the concentration of a challenge material inside the respirator versus outside the respirator, or the respirator leak rate related to the difference of pressure between inspiration and expiration. The respirator wearer shall be required to perform a series of exercises during the fit test.
- 5.6 Assigned Protection Factors (APFs). Employers must use the assigned protection factors listed in Appendix A to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), employers must ensure that the assigned protection factor is appropriate to the mode of operation in which the respirator is being used.
- 5.7 Cartridge Selection and End of Service Life Indicator
- 5.7.1 For protection against gases and vapors, the Town shall provide an atmosphere-supplying respirator, or an air purifying respirator, provided that the respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant.
- 5.7.2 If there is no ESLI appropriate for conditions in the applicable workplace, the Town shall implement a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data. The Town shall select and develop a cartridge change out schedule based upon:

- 5.7.2.1 Experimental test
- 5.7.2.2 Manufacturer's recommendation
- 5.7.2.3 Math model
- 5.8 Facial hair. Respirators shall NOT be worn if facial hair contacts any portion of the face piece. Beards, long sideburns, or long mustaches shall not be worn by respirator users or may require trimming to afford the proper fit.
- 5.9 Respirator Assignment. Only those employees who have been medically qualified, received training, and have been fit tested will be allowed to wear respirators, other than for voluntary use of an N95 Respirator.
- 5.10 Identification Cards. Employees who have completed the medical exam, respirator training, and pertinent respirator fit testing will be issued a color-coded Identification Card. The Respirator ID Card and a photo ID must be presented prior to receiving a respirator for work. Employees will only receive the type of respirator for which they qualify (i.e., trained and fit tested).
- 5.11 Respirator Storage. All respirators must be stored in a clean, uncontaminated area when not in use. Zip-lock or other type plastic bags are available for storing reusable respirators. Disposable-type respirators will be stored in plastic bags prior to use.
- 5.12 Respirator Maintenance
 - 5.12.1 Disposable respirators will be disposed of with other contaminated material at the end of each shift or use.
 - 5.12.2 Reusable respirators must be inspected and cleaned after each use. Particular attention should be given to the rubber or plastic parts which can deteriorate. Respirator face pieces must be cleaned with soap and water. Shared reusable respirators will be sanitized prior to use.
 - 5.12.3 SCBAs will be inspected at least monthly or after each use. Regulator and warning devices must be checked to ensure their proper function. All other maintenance will be conducted according to manufacturers' requirements.
 - 5.12.4 Emergency rescue equipment must be cleaned and disinfected immediately after each use. Records must be kept of inspection dates and findings. The respirator manufacturer's instructions must be followed for any repair. Repair or replacement of parts shall meet the manufacturer's recommendations. Regulator repair shall only be performed by factory certified technicians.
- 5.13 Program and Work Area Surveillance. The Town of Marana's Safety Coordinator will periodically evaluate the respirator program to ensure that it is effectively protecting the employees' health. The evaluation will include a survey of employee complaints, suggestions, and periodic air monitoring to evaluate the effectiveness of controls and current work practices.
- 5.14 IDLH Atmospheres. Persons wearing SCBAs or Supplied Air Respirators (SARs) in Immediately Dangerous to Life and Health (IDLH) atmospheres must be accompanied by an attendant, or second person, equipped with the appropriate personal protective equipment. This attendant shall be present in the event of an emergency and maintain

constant communication with the first employee. Employees using SCBAs or SARs or a combination of both in confined spaces must wear retrieval equipment (e.g., safety harness and lifeline). See Town of Marana Safety Directive: Confined Space Program for more information.

- 5.15 Breathing Air Quality. All breathing air systems used for SCBAs and SARs shall meet the requirements for Grade D breathing air as described in Compressed Gas Association Commodity Specifications.
- 5.16 Voluntary Use. A respirator can be provided for voluntary use, or an employee may provide their own respirator. Certain precautions must be considered to be sure that the respirator is adequate for the conditions and the respirator itself does not present a hazard. Refer to Appendix F.

6.0 RESPONSIBILITIES

- 6.1 The Safety Coordinator has overall responsibility for the Town's safety programs. The Safety Coordinator shall consult with the Town Manager regarding appropriate changes and amendments to this administrative directive.
- 6.2 Department heads, managers and supervisors are responsible for ensuring that the requirements of this directive are fully implemented in their work areas.
- 6.3 The department head of each department that utilizes respirators shall be responsible for the enforcement of compliance with this program, which includes appropriate disciplinary action for any Town employee failing to follow this policy and program.
- 6.4 Each department or division will designate an individual to be responsible for the general administration of the Respiratory Protection Program. The designated individual, the Respiratory Program Coordinator (Competent Person), in each department will be responsible for and will facilitate the following:
 - 6.4.1 Coordinate all aspects of this program.
 - 6.4.2 Develop standard operating procedures for employees who are required to wear respirators.
 - 6.4.3 Participate with Town Manager's Safety Office in annual evaluation of this program.
 - 6.4.4 Coordinate, through Town Manager's Safety Office, baseline and periodic air monitoring to evaluate the level of employee exposure.
 - 6.4.5 Coordinate, through Town Manager's Safety Office, appropriate respiratory protection required for maximum employee protection.
 - 6.4.6 Assure that employees receive an initial medical evaluation prior to attending training and wearing of any respirator.
 - 6.4.7 Assure that employees shall receive a follow-up medical evaluation and/or medical examination based upon a positive response to questions posed in the OSHA medical evaluation respirator questionnaire or whose initial medical evaluation or changes in the employee's medical health demonstrates the need for continuing medical monitoring regarding an employee's ability to wear a respirator.

- 6.4.8 Coordinate, through Town Manager's Safety Office, training for employees required to wear respirators.
- 6.4.9 Authorize departmental purchases of Town Manager's Safety Office-approved respiratory equipment.
- 6.4.10 Perform and document periodic audits of respirator use, maintenance, and storage consistent with manufacturers' guidelines. Perform monthly inspections of SCBAs.
- 6.4.11 Authorize purchase, at Town expense, of spectacle kits and prescription lenses for employees requiring prescription eyewear while wearing full face respirators.
- 6.5 Lead personnel, such as Supervisors, shall be responsible for:
 - 6.5.1 The implementation of this program including enforcement of employee compliance.
 - 6.5.2 Providing time for employees to obtain medical exams and respirator training, for completion of the Employee's Disclosure of Respiratory Health documentation (Appendix G) and respirator fit-testing.
 - 6.5.3 Communication to the Respiratory Program Coordinator regarding any medical conditions, signs or symptoms observed in employees that may be related to their ability to use a respirator.

7.0 ATTACHMENTS

- 7.1 Appendix A – Table of Assigned Protection Factors
- 7.2 Appendix B - Classification of Respiratory Hazards According to Biological Effect
- 7.3 Appendix C - Classification of Respiratory Hazards According to Their Properties Which Influence Respirator Selection
- 7.4 Appendix D - Classification, Capabilities, and Limitations of Respirators
- 7.5 Appendix E - Standard Operation Procedures
- 7.6 Appendix F - Voluntary Use of Disposable Respirators/Voluntary Use of N95 Respirators Acknowledgment Forms
- 7.7 Appendix G - Employee's Disclosure of Respiratory Health Form

Appendix A Table of Assigned Protection Factors⁵

| Type of respirator ^{1, 2} | Quarter mask | Half mask | Full face piece | Helmet / hood | Loose-fitting face |
|---|--------------|-----------------|-----------------|-----------------------|--------------------|
| 1. Air-Purifying Respirator | 5 | ³ 10 | 50 | ..... | ..... |
| 2. Powered Air-Purifying Respirator (PAPR) | ..... | 50 | 1,000 | ⁴ 25/1,000 | 25 |
| 3. Supplied-Air Respirator (SAR) or Airline Respirator | | | | | |
| • Demand mode | ..... | 10 | 50 | ..... | ..... |
| • Continuous flow mode | ..... | 50 | 1,000 | ⁴ 25/1,000 | 25 |
| • Pressure-demand or other positive-pressure mode | ..... | 50 | 1,000 | ..... | ..... |
| 4. Self-Contained Breathing Apparatus (SCBA) | | | | | |
| • Demand mode | ..... | 10 | 50 | 50 | ..... |
| • Pressure-demand or other positive-pressure mode (e.g., open/closed circuit) | ..... | ..... | 10,000 | 10,000 | ..... |

Notes:

1Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

2The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

3This APF category includes filtering face pieces, and half masks with elastomeric face pieces.

4The employer must have evidence provided by the respirator manufacturer that testing of these respirators, demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting face piece respirators, and receive an APF of 25.

5These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d) (2) (ii).

Appendix B

Classification of Respiratory Hazards According to Biological Effect

The purpose of this appendix is to list and briefly describe various categories of respiratory hazards.

OXYGEN DEFICIENCY

Minimum oxygen requirement = 19.5%

| <u>Conc.</u> | <u>Physiological Effects</u> |
|--------------|--|
| 16-12% | Loss of peripheral vision, increased breathing volume accelerated heartbeat, impaired attention and thinking, impaired coordination. |
| 12-10% | Very faulty judgment, very poor muscular coordination, muscular exertion causes fatigue that may cause permanent heart damage, intermittent respiration. |
| 10-6% | Nausea, vomiting, inability to perform vigorous movement, unconsciousness followed by death. |
| < 6% | Spastic breathing, convulsive movements, death in minutes. |

GAS AND VAPOR CONTAMINANTS

| | |
|----------------------------------|--|
| Asphyxiants | Interfere with utilization of oxygen in the body. |
| Simple Asphyxiants | Physiologically inert substances that dilute oxygen in the air. (e.g. nitrogen, methane, hydrogen, helium). |
| Chemical Asphyxiants | Low concentrations interfere with supply or utilization of oxygen in the body (e.g. carbon monoxide, hydrogen cyanide, nitrides). |
| Irritants (e.g. ozone, | are corrosive in action and typically result in irritation and inflammation of the respiratory tract, eyes, and skin ammonia, formaldehyde, sulfur dioxide, chlorine, nitrogen dioxide). |
| Anesthetics | cause loss of feeling and sensation with unconsciousness and possible death (e.g. nitrous oxide, hydrocarbons, ethers, carbon tetrachloride, and benzene). |
| Sensitizers | cause increased probability of physiological reactions (e.g. isocyanates, epoxy resins). |

| | |
|--------------------------------|--|
| <i>Systemic Poisons</i> | damage organs and systems in the body (e.g. mercury, phosphorus, hydrogen sulfide). |
| <i>Carcinogens</i> | produce cancer in some individuals after a latent period (e.g. vinyl chloride, benzene). |

PARTICULATE CONTAMINANTS

| | |
|----------------------------------|---|
| <i>Relatively inert</i> | May cause discomfort and minor irritation, but generally without injury at reasonable concentrations (e.g. marble, gypsum). |
| <i>Pulmonary-fibrosis</i> | Produces nodulation and fibrosis in the lung, possibly leading to complications (e.g. asbestos, silica). |
| <i>Carcinogens</i> | Produce cancer in some individuals after latent period (e.g. asbestos, chromates, radioactive particles). |
| <i>Chemical irritants</i> | Produce irritation, inflammation, and ulceration in upper respiratory tract (e.g. acid mists, basic mists). |
| <i>Systemic Poisons</i> | Produce pathologic reactions in various systems of the body (e.g. lead, manganese, cadmium). |
| <i>Allergy</i> | Produce reactions such as itching, sneezing, and asthmas (e.g. pollens, spices, animal fur). |
| <i>Febrile-reactions</i> | Produces chills followed by fever (e.g. fumes of zinc and copper). |

Appendix C

Classification of Respiratory Hazards According to Their Properties Which Influence Respirator Selection

The purpose of this appendix is to provide basic information on the physical and chemical properties of chemicals which influence choice of respirator.

GAS AND VAPOR CONTAMINANTS

| | |
|------------------------------|--|
| <i>Inert</i> | Substances that do not react with other substances under most conditions but create a respiratory hazard by displacing air and producing oxygen deficiency (e.g. helium, neon, argon, nitrogen). |
| <i>Acidic</i> | Substances that are acids (pH <7) or that react with water to produce an acid (e.g. hydrogen chloride, acetic acid, carbon dioxide, hydrogen cyanide). |
| <i>Alkaline</i> | Substances that are basic (pH >7) or that react with water to produce an alkali (e.g. ammonia, amines, phosphine, arsine). |
| <i>Organic</i> | Compounds that contain carbon. Classifications include aliphatic hydrocarbons (e.g. methane, ethane, propane, butane, hexane) aromatic hydrocarbons (e.g. benzene, toluene, xylene, phenol) alcohols (e.g. isopropyl alcohol) ketones (e.g. MEK) halides (e.g. chloroform, carbon tetrachloride) aldehydes (e.g. formaldehyde), etc. |
| <i>Organometallic</i> | Compounds in which metals are chemically bonded to organic groups (e.g. ethyl silicate, tetraethyl lead). Hydrides Compounds which hydrogen is chemically bonded to metals and certain other elements (e.g. diborane, tetraborane). |

PARTICULATE CONTAMINANTS

Particles produced by mechanical means and disintegration processes such as grinding, crushing, drilling, blasting, and spraying; or by physiochemical reactions such as combustion, vaporization, distillation, sublimation, calcination and condensation.

| | |
|---------------------|--|
| <i>Dust</i> | A solid, mechanically produced particle with sizes varying from submicroscopic to visible or macroscopic (e.g. metal dust from sanding operations, nuisance dust). |
| <i>Spray</i> | A liquid, mechanically produced particle with sizes generally in the visible or macroscopic range (e.g. paint overspray). |
| <i>Fume</i> | A solid condensation particle of extremely small particle size, generally less than one micrometer in diameter (e.g. zinc oxide fumes formed during welding operations). |
| <i>Mist</i> | A liquid condensation particle with sizes ranging from submicroscopic to visible or macroscopic (e.g. oil mist in metal tooling operations) |
| <i>Fog</i> | A mist of sufficient concentration to perceptibly obscure vision. |
| <i>Smoke</i> | A system which includes the products of combustion, pyrolysis, or chemical reaction of substances in the form of visible and invisible solid and liquid particles and gaseous products in air. Smoke is usually of sufficient concentration to perceptibly obscure vision. |

Appendix D

Classification, Capabilities, and Limitations of Respirators

Self-Contained Breathing Apparatus (SCBA)

A supply of air, oxygen, or oxygen-generating material carried by the wearer. Normally equipped with a full face piece, but may be equipped with a quarter-mask face piece, half-mask face piece, helmet, hood, or mouthpiece and nose clamp.

1. Open-Circuit SCBA
 - A. Demand type.
 - B. Pressure Demand type.

The amount of time a user is protected is limited by the volume of air that can be supplied by the system and the rate of air usage. Factors such as cylinder size, rebreather capacities, atmospheric pressure, and physical activity of the wearer all affect the length of time a SCBA may last.

Limitations of SCBAs are their weight, bulk, service life, and training required for their maintenance and safe use.

Supplied Air Respirator (SAR)

A supply of air is provided to the wearer by a hose connected to the source of breathing air.

2. Air-Line Respirator.
 - A. Continuous flow class.
 - B. Demand type.
 - C. Pressure demand type.

The respirable air supply is not limited. The devices are lightweight and simple to operate. Limited to use in atmospheres that are **NOT** Immediately Dangerous to Life and Health (IDLH). The wearer is restricted in movement by the length and weight of the hose.

Combination Air-Line/Auxiliary Self-Contained Air Supply

Primarily an air-line system equipped with an emergency escape bottle.

Air-Purifying Respirators (APR)

Ambient air passes through a filter, cartridge, or canister, which removes particles, vapors, gases, or a combination of these contaminants prior to being inhaled by the wearer.

1. Negative Pressure

- Breathing action filters air. Includes disposable dust, mist, fume respirators.
2. Powered Air Purifying Respirator (PAPR) Blower provides filtered air to user.

NOTE: Under certain conditions, PAPRs may be provided to employees required to wear negative pressure respirators for long periods of time.

Air-purifying respirators do **NOT** protect against oxygen-deficient atmospheres. Protection from airborne contaminants is **LIMITED** to design of the filtering devices and face seal. Labels on cartridges used for gases and vapors indicate the maximum airborne concentration for their approved use. Particulate filters have a life expectancy dependent on air concentration, duration of use, and efficiency of filter media.

Combination SAR/APR and SCBA/APR

Supplied-air respirator supplied with an air-purifying respirator for added protection in the event the SAR should fail.

Air-purifying respirator supplied with an escape bottle for added protection when the atmosphere may exceed safe conditions.

Appendix E
STANDARD OPERATION PROCEDURES

Department _____ Phone _____

1) Selection of Respirators

The following areas where respirators are used;

- 1)
- 2)
- 3)

2) In the areas listed above, the following chemical and/or hazards exist;

Area _____ Chemical and/or Hazard

- 1)
- 2)
- 3)

3) The respirator selected for the employees in those areas are:

Area _____ Chemical and/or Hazard

- 1)
- 2)
- 3)

4) Procedures for routine respirator use;

5) Respirator cleaning requirements;

6) Emergency procedures and/or potential dangerous atmospheres;

Program Administrator _____ Date _____

Industrial Hygienist _____ Date _____

Sample - Standard Operation Procedure

Department: Safety

Phone:-4728

1) Selection of Respirators

The following areas where respirators are used;

- 1) FD&M asbestos team (Air Monitoring)
- 2) Solid Waste - Landfill operations (Air Monitoring)

2) In the areas listed above, the following chemical and/or hazards exist;

| | <u>Area</u> | <u>Chemical and/or Hazard</u> |
|----|------------------------|-------------------------------|
| 1) | Asbestos Team | Asbestos |
| 2) | Solid Waste (Landfill) | Nuisance Dust |

3) The respirator selected for the employees in those areas are:

| | <u>Area</u> | <u>Chemical and/or Hazard</u> |
|----|---------------|-------------------------------|
| 1) | Asbestos Team | MSA ½ face w/HEPA filter |
| 2) | Sanitation | 3-M 9920 dust, mist, fume |

4) Procedures for routine respirator use;

- 1) ½ face HEPA respirators worn during all operations involving exposures to less than 10X the asbestos PEL.
- 2) Dust, mist, fume respirators worn during all operations at the Los Reales landfill.

5) Respirator cleaning requirements;

- 1) MSA ½ face HEPA respirators are dismantled, used filters are discarded, rubber and plastic parts are washed in soap and water, parts are air dried prior to re-assembly.
- 2) 3-M Dust, mist, fume respirators are discarded after use.

6) Emergency procedures and/or potential dangerous atmospheres;

- 1) In the event of an emergency call 911. In the event of changing atmospheric conditions additional respiratory protection will be evaluated for added protection.
- 2) In the event of an emergency call 911. No additional respiratory hazards are expected at the landfill.

Program

Administrator _____ Date _____

Industrial

Hygienist _____ Date _____

Appendix F

Voluntary Use of Disposable Respirators/ Voluntary Use of N95 Respirators Acknowledgment Forms

Voluntary Use of Disposable Respirator Acknowledgement Form

You have voluntarily chosen to wear a disposable respirator provided through the Town of Marana. OSHA requires the Town of Marana to provide to anyone voluntarily using such a respirator the following information:

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 warnings 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. 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 designated 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.

In addition, voluntary N95 disposable respirator users should understand the following:

- Respirators should be disposed of and replaced with a new one each time they are removed.
- Talking while wearing a respirator may limit its effectiveness.
- Use of an N95 type disposable respirator will limit exposure to non-oily particulate hazardous substances but cannot guarantee exposure prevention.
- Town of Marana Safety Office (382-1972) should be contacted prior to the use of a respirator if you have any questions or concerns.

I, _____, hereby agree that I have received, read, understood and had an opportunity to ask questions about Town of Marana safety policies and procedures. Any additional questions I may have may be directed to Town Manager's Safety Office (382-1972).

By signing this form, you are acknowledging that you have read and understand all of its content.

Employee Signature

Employee #

Date

Voluntary Use of an N95 Disposable Respirator Acknowledgement Form

You have voluntarily chosen to wear an N95 disposable respirator. OSHA requires the Town of Marana to provide to anyone voluntarily using such a respirator the following information:

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:

5. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
6. 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.
7. Do not wear you respirator into atmospheres containing contaminants for which your respirator is not designated 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.
8. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

In addition, voluntary N95 disposable respirator users should understand the following:

- Respirators should be disposed of and replaced with a new one each time they are removed.
- Talking while wearing a respirator may limit its effectiveness.
- Use of an N95 type disposable respirator will limit exposure to non-oily particulate hazardous substances but cannot guarantee exposure prevention.
- Town Manager's Safety Office (382-1972) should be contacted prior to the use of a respirator if you have any questions or concerns.

I, _____, hereby agree that I have received, read, understood and had an opportunity to ask questions about Town of Marana safety policies and procedures. Any additional questions I may have may be directed to Town Manager's Safety Office (382-1972).

By signing this form, you are acknowledging that you have read and understand all of its content.

Employee Signature

Employee #

Date

Appendix G

Employee's Disclosure of Respiratory Health

The Town shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is initially fit tested or required to use the respirator in the workplace.

The Town shall provide additional employee medical evaluations conducted by the Town Physician for respirator use whenever the employee reports, or the employer, Town Physician, supervisor, or program administrator makes visual observations of changes in the employee's physical condition that could affect respirator fit; an employee reports medical signs or symptoms that are related to the use of a respirator while being fit-tested; information from the Employee Disclosure of Respiratory Health, or direct observations made during fit testing indicate a need for employee reevaluation; a change occurs in workplace conditions that may result in a substantial increase in the physiological burden placed on an employee; an employee is specifically assigned to the work operations involving Asbestos Mitigation/Abatement, or is potentially exposed to asbestos while obtaining samples for testing, where engineering and work practice controls are not feasible and require the assignment to wear a respirator with a protection factor equivalent to the class of abatement performed.

Wearing a respirator of any type is physically demanding. To ensure employees are physically able to work under the demands of respiratory protection, employees are encouraged to report changes in their respiratory health since a previous respirator fit-test that may affect their ability to wear a respirator. Those health changes include, but are not limited to:

- Change in cardiac health or development of a cardiac related condition;
- Development of a disease affecting the respiratory system;
- Viral infection of the respiratory system;
- Bacterial infection of the respiratory system;
- Fungal infection of the respiratory system;
- Surgery involving the heart, respiratory or circulatory systems;
- An invasive injury to the respiratory system, including fractures to the ribs or sternum.

I have read the Employee's Disclosure of Respiratory Health and have not experienced any changes to my health during the previous year that will affect my ability to wear a respirator.

I have read the Employee's Disclosure of Respiratory Health and have or may have experienced a change in my health during the past year. I request a formal medical evaluation prior to respirator fit-testing.

Employee Name: _____ Employee Number: _____

Signature: _____ Date: _____

REVISION HISTORY

| <i>REV</i> | <i>DESCRIPTION OF CHANGE</i> | <i>DATE</i> |
|------------|------------------------------|-------------|
| OR | Original Release | 7/1/14 |

Caution: A copy of this Administrative Directive is an uncontrolled document. It is your responsibility to ensure you are using the current version. The electronic version is the only acceptable and controlled Administrative Directive.