EXPRO
هيئة كفاءة الإنفاق والمشروعات الحكومية
Expenditure Efficiency & Projects Authority

National Manual for Assets and Facilities Management Volume 10, Chapter 4

Respiratory Protective Equipment Procedure

Document No. EOM-KSH-PR-000004 Rev 001

Document Submittal History:

Revision:	Date:	Reason For Issue
000	28/03/2020	For Use
001	18/08/2021	For Use

THIS NOTICE MUST ACCOMPANY EVERY COPY OF THIS DOCUMENT

IMPORTANT NOTICE

This document, ("Document") is the exclusive property of Government Expenditure & Projects Efficiency Authority.

This Document should be read in its entirety including the terms of this Important Notice. The government entities may disclose this Document or extracts of this Document to their respective consultants and/or contractors, provided that such disclosure includes this Important Notice.

Any use or reliance on this Document, or extracts thereof, by any party, including government entities and their respective consultants and/or contractors, is at that third party's sole risk and responsibility. Government Expenditure and Projects Efficiency Authority, to the maximum extent permitted by law, disclaim all liability (including for losses or damages of whatsoever nature claimed on whatsoever basis including negligence or otherwise) to any third party howsoever arising with respect to or in connection with the use of this Document including any liability caused by negligent acts or omissions.

This Document and its contents are valid only for the conditions reported in it and as of the date of this Document.

Table of Contents

1.0 PURPOSE

Some Operations and/or Maintenance work performed in and around facilities, entities, and associated contractors throughout the Kingdom of Saudi Arabia involves activities which produces dust, vapors, and particulates (e.g., manufacturing, cleaning, intrusive work). Due to the health hazards associated with inhalation exposure to constituents generated by these activities it is necessary for Entities, and/or their contractors, to implement a procedure to give the requirements and guidance for providing training, medical evaluation, documentation, and use of respiratory protection.

2.0 SCOPE

The scope of this procedure is to provide means to the user to create a custom procedure outlining and detailing the requirements and responsibilities when facility/contract tasks require the use of respiratory protection. This procedure applies throughout the Kingdom of Saudi Arabia to Operations and Maintenance functions and activities on, in, and around government owned facilities and projects.

3.0 DEFINITIONS

Definitions	Description
Air-Line Supplied Respirator (ALSR)	An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user but is provided via an umbilical air-line (hose) system from a fixed source.
Air-Purifying Respirator	A respirator with an air-purifying filter, cartridge, or canister that physically or chemically removes specific air contaminants by passing ambient air through the air-purifying element.
Atmosphere-Supplying Respirator	A respirator that supplies the user with breathing grade air from a source independent of the ambient atmosphere, and includes air-line supplied-air respirators (ALSARs) and self-contained breathing apparatus (SCBA) units.
Canister or Cartridge	A container with a filter, sorbent, or catalyst, or combination of these items, that removes specific contaminants from the ambient air prior to that air passing through the inhalation valve on negative pressure respirators or prior to being forced through the user's breathing zone in powered air purifying respirators (PAPRs).
Demand Respirator	An atmosphere-supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.
Doff	To take off one's respiratory protection equipment.
Don	To put on one's respiratory protection equipment.
Employee Exposure	Exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection. Employee exposure means exposure to noise without regard to use of hearing protection.
End-of-Service-Life Indicator (ESLI)	A system that warns the respirator user of the approach of the end of adequate respiratory protection—for example, that the sorbent is approaching saturation or is no longer effective.
Escape Bottle	A cylinder of breathing air worn by the user which may provide air to an ALS respirator user under emergency conditions should the air source or air-line be compromised or fail.
Escape-Only Respirator	A respirator intended to be used only for emergency exit.
Field Fit Check	The positive and negative pressure check to ensure a good fit and proper working condition of the respirator by the user each time a respirator is donned and throughout the shift as the device is readjusted on the face.

Definitions	Description
Filter or Air-Purifying Element	A cartridge or filter component used on a respirator to remove solid or liquid aerosols from the inspired air.
Filtering Face Piece (Dust Mask)	A negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.
Fit Factor	A quantitative estimate of the fit of a respirator make and model to a specific individual, derived from the ratio of the concentration of a substance in ambient air to its concentration inside the respirator during the quantitative fit test. NOTE: The fit factor shall never be used in place of the assigned protection factor for determination of the maximum use concentration (MUC) of any respirator use scenario.
Helmet	A rigid respiratory inlet covering that also provides head protection against impact and .
High Efficiency Particulate Air (HEPA) Filter	A filter that is at least 99.97% efficient in removing monodispersed particles of 0.3 micrometers in diameter.
Hood	A respiratory inlet covering the head and neck and may also cover portions of the shoulders and torso.
HWP	Hazardous Work Permit
Immediately Dangerous to Life or Health (IDLH)	An atmosphere that poses an immediate threat to life that would cause irreversible adverse health effects, or that would impair an individual's ability to escape from a dangerous atmosphere.
Loose-Fitting Face Piece	A respiratory inlet cover is designed to form a partial seal with the face.
Maximum Use Concentration (MUC)	The highest ambient contaminant concentration against which a given respirator system can be used for protection of the user. It is determined by multiplying the permissible exposure limit (PEL) by the assigned protection factor for the selected respirator
Negative Pressure Respirator (Tight Fitting)	A respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.
Oxygen Deficient Atmosphere	An atmosphere with an oxygen content below 19.5% by volume.
Physician or other Licensed Health Care Professional (PLHCP)	Means an individual whose legally permitted scope of practice (i.e., license, registration or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all the necessary health care services applicable to respiratory protection.
Positive Pressure Demand Respirator	A positive pressure atmosphere- supplying respirator that admits breathing air to the face piece when the positive pressure is reduced inside the face piece by inhalation.
Positive Pressure Respirator	A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.
Pounds per Square Inch (psig)	Gauge that indicates the pressure is relative to atmospheric pressure.
Powered Air-Purifying Respirator (PAPR)	An air-purifying respirator that uses a blower to force the ambient air through air- purifying elements to the inlet covering.
Protection Factor (PF)	Ratio of the airborne concentrations inside the respirator piece to the airborne concentrations outside the respirator piece. Assigned PF is established by the testing agency and is the designated level of protection for a given respiratory type.
Qualified Person	One who by extensive knowledge, training, and experience is competent in administering the respiratory protection program (i.e., the HSSE Representative).

Definitions	Description
Qualitative Fit Test (QLFT)	Determination of respirator leakage by use of a test agent outside of the respirator face piece such as isoamyl acetate (banana oil), sucrose, or irritant smoke (stannic chloride). If the test subject senses the test agent, leakage is indicated. A qualitative fit test does not result in assignment of a fit factor, but does provide for assignment of the given respirator's protection factor if the test is successful.
RPA	Respirator Program Administrator
SCBA	Self-Contained Breathing Apparatus

4.0 REFERENCES

1. OSHA CFR 29 1910 Subpart I Respiratory Protection
2. OSHA CFR 29 1910 Subpart Z Toxic and Hazardous Substances
3. EOM-KSS-PR-000001 General Safe Work Requirements Procedure
4. EOM-KSS-PR-000003 Personal Protective Equipment Procedure
5. EOM-KSS-PR-000007 Confined Space Entry Procedure

5.0 RESPONSIBILITIES

5.1 Facility / Contract Manager

Responsibility for implementing and supporting this procedure and ensuring personnel actively participate.

5.2 HSE Representative

The HSE Representative, in conjunction with the Respirator Program Administrator (RPA), is responsible for supporting the implementation and administration of this procedure and will:

- Conduct a Job Hazard Analysis to ensure that only respiratory protection appropriate for the conditions of exposure is utilized.
- Determine the necessary process to medically qualify employees.
- Coordinate fit testing of each employee for the respirator selected.
- Ensure the issuance of proper clearance to qualified employees.
- Identify approved respiratory protective equipment.
- Coordinate instruction and training in the use, basis of selection, inspection, maintenance, sanitary care, storage, cartridge or canister replacement protocol, and limitations of respiratory protective equipment being used.
- Coordinate the repair or replacement of respiratory protective equipment as may be required due to wear and deterioration.
- Ensure that routinely used respiratory equipment is regularly cleaned, inspected, and sanitized.
- Ensure that the applicable employee supervisors are trained by the guidelines of this procedure and are monitoring to ensure that their employees are complying with user responsibilities.
- Establish a site-specific Respiratory Protection Program comply the requirements of applicable national regulatory requirements.
- Establish the medical evaluation process required to approve employees for respirator use. The medical evaluation process for the site shall be outlined in the HSE Execution Plan. The Medical Questionnaire shall be used (see **Attachment 2 - EOM-KSH-TP-000004 - Respirator User Medical Questionnaire Template**).
- Ensure that each employee designated to wear a respirator has the appropriate medical clearance documented. Periodically review the status of respirator wearers and update as needed. A list shall be developed by craft and shall be supplied to the facility used to issue and clean respirators. The User Clearance Form (see **Attachment 1 - EOM-KSH-TP-000003 - Respirator Wearer Clearance Form Template**) along with the Employee Statement of Medical Condition Form (see

Attachment 3 - EOM-KSH-TP-000005 - Employee Statement of Medical Condition Form Template) shall be used for this purpose.
- Ensure that employees designated to use respirators are fit tested.
- Refer to the guidelines for fit testing (per applicable national regulations) and the Respirator Fit Test Record (see **Attachment 4 - EOM-KSH-TP-000006 - Respirator Fit Test Record Template**).
- Define the type of respirators to be used at the project and coordinate the resources for issuance, maintenance, cleaning, and repair (see **Attachment 5 - EOM-KSH-TP-000007 - Respirator Maintenance Log Template**).
- Ensure that routinely used respiratory protective equipment is regularly inspected, cleaned, and sanitized (see **Attachment 5 - EOM-KSH-TP-000007 - Respirator Maintenance Log Template**).
- Provide a regularly updated list of approved respirator wearers by craft to the respirator issuer. Ensure that respirator issuer is trained and qualified to dispense respiratory protective equipment.
- Coordinate a periodic review of the status of respirator wearers and update as needed.
- Establish record keeping as required by applicable national guidelines.
- Review and comment on subcontractor respiratory protection plans.
- Post the “Notice to Employees-Respirator Records” poster in a conspicuous location.

5.3 Supervisor

Supervision will ensure the HSE Representative is contacted prior to starting work whenever the Hazard Work Permit (HWP), or the applicable Job Hazard Analysis (JHA) and Pre-Job Briefing, requires the use of respiratory protection.

5.4 Employees

- Be clean-shaven and have hair cut to ensure a proper fit.
- Notify the HSE Department if corrective lenses are needed while wearing a full-face respirator. This shall be determined at the time of the user’s fit test.
- Use only approved respiratory equipment.
- Inspect respirators and perform a face piece field fit check each time the respirator is donned and periodically while in use.
- Use respirators per manufacturer’s instructions.
- Not use or pass respiratory equipment from one employee to another.
- Inspect, clean, maintain, and store the respirator as instructed.

6.0 REQUIREMENTS – GENERAL

Whenever respiratory protective equipment, including military protective masks and emergency use self-rescuer devices, is required, a written respiratory protection program shall be developed and implemented. Before use, an industrial hygienist, health physicist, or certified safety professional (or equivalent professional certification) should determine the suitability of a respirator for any intended purpose. Respirators shall not be substituted for engineering or environmental control methods without approval of the Respirator Program Administrator (RPA).

No employee can be assigned work that requires the use of a respirator unless it has been determined that the employee is physically able to perform the work while using the designated equipment.

The name of the RPA, respirator issuer(s), and responsible parties for the cleaning, inspection, and repair of respirators shall be determined and identified in the HSE Execution Plan.

The HSE Representative, in coordination with the RPA, shall determine the appropriate respiratory protection to be used, and based on the information available (e.g., manufacturer's data, site air monitoring data, work methods), develop the cartridge change-out schedule for air purifying respirators. Respirators to be used on the project, along with the cartridge change-out schedule and any supporting data, shall be identified and included in the HSE Execution Plan.

Any employee who cannot wear a negative pressure respirator shall be given a powered air-purifying respirator (PAPR), or his/her job scope changed to one that does not require a respirator. IF a PAPR is supplied, THEN care should be taken that all requirements associated with it shall be followed.

6.1 Records

Medical records will be maintained by a Health Care Professional. An opportunity shall be afforded the employee to discuss the questionnaire and evaluation with the care provider. Medical records are to remain confidential.

6.2 Medical Evaluations

No employee can be assigned for work that requires a respirator until it has been determined that they are physically able to perform the work required while wearing a respirator.

All employees required to wear a respirator shall be given a baseline and an annual medical assessment by a physician. A variety of Health Care Professionals may perform this assessment, depending on the scope of practice permitted by the licensing, registration, or certification agencies.

The Health Care Professional shall make this determination after evaluating the following employee information:

- Respirator User Medical Questionnaire (see **Attachment 2 - EOM-KSH-TP-000004 - Respirator User Medical Questionnaire Template**).
- Complete a physical and fit test as specified by the PLHCP. This shall include:
  - Respirator user wearer clearance form (Exhibit B)
  - A complete physical examination, with emphasis on the respiratory and cardiovascular systems and digestive tract.
  - Blood pressure, pulse rate, height, weight, etc.
- X-rays, but only if required by specific requirements (e.g., acrylonitrile, asbestos).
- Medical evaluations and fit testing are required to be completed at least annually or as required by changes in the employee's physical condition (some respiratory protection usage may require semi-annual fit testing per applicable regulatory requirements).
- After the evaluation, the attending physician will sign off on the appropriate form and forward it to the HSE Representative.

6.3 Training

The training coordinator or qualified person, shall train each respirator user in the proper respirator donning and doffing techniques, user fit check methods, use, limitations, inspection, maintenance, cleaning, storage, and care of the respirators to be used.

Training shall include potential emergency situations that may occur on site and the actions the user should take if an emergency occurs. It is recommended that, training is to be repeated annually. A training attendance roster must be completed and signed by the trainer and employee attending the training.

Prior to use, the Respirator Program Administrator shall perform, or cause to have performed, the appropriate fit test on everyone expected to become a respirator user. Fit testing may not occur prior to the medical evaluation and approval for respirator use by the Health Care Professional.

Evaluation procedures used to determine the effectiveness of this procedure and a respirator user's part in the evaluation shall be included in training of employees.

Refresher training will be administered at least annually, or when one of the following conditions occurs:

- Changes in the workplace or the type of respirator render previous training obsolete or inadequate;
- Deficiencies in an employee's demonstrated knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill;
- Any other situation in which retraining appears necessary to ensure safe respirator use.

6.4 Respirator Fit Test

Each respirator shall be fit tested to the wearer to ensure minimum face piece leakage. The fit test shall be conducted for both half-face and full-face respirators, as needed. The fit test shall be performed on the respirator type, make, model, and size the employee will wear. Only clean-shaven persons will wear a respirator.

As a minimum, qualitative fit testing shall be performed before workers use any tight-fitting face piece (negative pressure) respirators. The preferred method, however, is quantitative. Employees shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes and models.

6.5 Frequency

Fit testing will be completed annually, except when regulations require more frequent testing (i.e., when respirators are used for protection against asbestos, benzene, lead, vinyl chloride). The RPA shall maintain records of fit testing and medical qualification. Fit testing is also required if there is a change in facial appearance (e.g., gain or loss of weight, extensive dental work), or when a type, make, model, or size change in respirator occurs.

6.6 Documentation

Each respirator fit test shall be documented. This record shall be submitted to the HSE Representative for retention for a period of two years. All subsequent fit test records will also be forwarded to the HSE Representative. Copies of the most current fit test shall also be kept onsite.

6.7 Fit Testing Methods

Qualitative fit testing shall be performed and documented using a method as prescribed by applicable regulatory agencies.

Quantitative fit testing is mandatory with certain national regulations and preferred in lieu of qualitative testing for all other applications.

Positive pressure respirators must be fit tested in the negative pressure mode, regardless of the mode normally used. The HSE Representative shall notify employees when annual re-testing is required.

7.0 CLEANING, MAINTENANCE, STORAGE AND INSPECTION

The Entity shall establish a system to ensure that respirators are properly stored, maintained, inspected, and cleaned per manufacturer's recommendations.

Respirator users who have respirators assigned for their personal use must inspect and clean their respirators at least daily when used, or more frequently, if necessary.

Respirators, including self-contained breathing apparatus (SCBA) used for emergency purposes and respirators used for escape, will be inspected monthly or after each use, whichever is more frequent. These

respirators will be protected from the elements. A tag shall be maintained affixed to the device or its protective case or housing. Each inspection shall be logged on the tag and include:

- Inspector's initials.
- Inspection date.
- Status and inspection findings with comment as necessary.

Inspection information shall also be entered in the respiratory protection maintenance log. The HSE Representative or designee will conduct and document frequent random inspections to ensure that respirators are properly maintained.

Respirators shall always be placed on a flat surface; respirators are not to be hung by their straps and shall be stored in a cool, dry location with moderate temperatures.

Respiratory protection equipment shall not be subjected to extreme temperatures, hot or cold, and shall be stored to protect against direct sunlight or heat, chemical contamination, or distortion of its pliable synthetic materials.

Respirator parts from one respirator manufacturer shall not be exchanged with those of another. Respirators found to be defective during inspection shall be repaired immediately or tagged “out of service” or discarded.

Air purifying chemical cartridges, available for protection against specific chemical compounds, are to be used for that hazard only. Further, the sorbent service life and, hence, the effectiveness will depend on the activity of the wearer (breathing rate, etc.) and the specific type, volatility, and concentration of the chemical.

All air-purifying respirators cleaned onsite shall be inspected frequently and results of inspection recorded on the respirator maintenance log. Respirators cleaned offsite by subcontractors shall be subject to periodic QA/QC inspection by the program administrator or designee, and a review of the facilities and procedures used by subcontractors may be conducted. Subcontractor inspections shall be documented in the log (see **Attachment 5 - EOM-KSH-TP-000007 - Respirator Maintenance Log Template**).

Self-contained breathing apparatus and other emergency respirators shall additionally be inspected before each use and during periods of storage. The complete airline respiratory system will be inspected before each use. Hose masks and blower, when used, shall be inspected at least monthly and before each use for proper operation.

When replacing worn or deteriorated parts, only those made specifically for the device shall be used, and the repair work shall be recorded. Respirator certification is voided if parts other than the specified part for a specific respirator are used.

Air-purifying cartridges shall be replaced when an end-of service life indicator (ESLI) indicates, or per the replacement schedule specified for the job. They should also be replaced at the first trace of contaminant odor, other user-detected warning property, or any increased resistance to breathing while wearing the respirator.

7.1 Respirator Selection

Respiratory protective devices will be used whenever engineering controls are not feasible and when airborne contaminants exceed or are anticipated to exceed published regulatory standards.

These devices will be specified per the concentration and type of the airborne contamination present or expected at each work site. Consideration of other job site conditions such as heat stress, visibility and lighting, low temperatures, and other safety issues will be factored into the selection process.

Before a respirator can be issued to protect the worker from a respiratory hazard, the HSE Department must be contacted to evaluate chemical or radiological hazards present at the work area.

In the selection of respiratory protective equipment, the following factors will be considered:

- Nature and basis of the hazard (e.g., dust, mist, spray, fume, vapor, gas, or combination).
- Potential for an oxygen deficient atmosphere.
- Potential for other IDLH atmospheric conditions.
- Extent of the hazard.
- Contaminant(s) present.
- Concentration of the contaminant(s).
- Characteristics and limitations of the available respirators.
- Expected activity of the worker.
- Fit testing.

The following respiratory protective equipment will be used in atmospheres that are oxygen-deficient or immediately dangerous to life or health:

- All SCBAs must be inspected and documented every 30 days and after each use.
- Positive-pressure demand combination airline respirator with 15-minute escape (egress) provision.
- Airline continuous flow, helmet, hood, or suit with escape provisions.
- When the device is a combination SCBA and airline respirator, either a manual or automatic valve will be provided to change to the self-contained air supply if the airline supply fails.
- A standby person, equipped with an SCBA, is required for work immediately dangerous to life or health (IDLH), types of confined spaces that require an airline with escape pack and respiratory protection for purposes other than nuisance odor or nuisance dust (NOTE: 15-minute SCBA units will be used only for emergency egress and not for rescue work or re-entry).

Atmosphere supplying respirators will be used in areas where the contaminant levels are expected or have been determined to exceed the maximum airborne concentration for the air-purifying respirator to be used, if the contaminant airborne concentration is unknown, or if the contaminant of concern is considered to have “poor” warning properties. Protection against particulate contaminants shall be selected based on particulate filter elements.

Respirators used in non-IDLH atmospheres require an end of service life indicator or a change schedule documented and implemented that will ensure that filter cartridges are changed out before the end of their service life. This change schedule will be documented in the HSE Execution Plan along with the decision logic used to determine the appropriate time/use limitations. The change-out schedule is highly site-specific and will consider factors such as workplace contaminant concentration, the presence of other contaminants, airflow through the filters, temperature, and humidity.

7.2 Use and Limitations

Air-purifying respirators will not be used for rescue work when atmospheric contaminants are unknown; in IDLH or oxygen deficient environments; when the contaminants of concern have 'poor' warning properties; or when air monitoring data does not exist to document the ambient contaminant levels. (Exception: Certain escape respirators or gas masks selected for a given emergency escape purpose). Due to their inability to protect against oxygen deficiency, APRs are intended for use with no more than 2 percent by volume of most toxic gases.

Chemical cartridge respirators are intended for limited use in a toxic atmosphere. Regardless of the written change schedule, cartridges will be changed whenever the wearer detects the odor of the contaminant or has an increased resistance to breathing.

Respirators issued for the exclusive use of an employee will be marked with the employee’s name, badge number, or other unique identification number. Respirator user will not be allowed to select respirator type or cartridge, and will only use the respiratory protection equipment specified.

Canisters and cartridges will be specifically selected for the toxic gas and concentration to be encountered. Canister masks that bear the label “ALL-SERVICE,” “UNIVERSAL,” or something similar will not be used.

An effective seal between the face piece and face to prevent inward leakage must be obtained. Air-purifying respirators, along with demand-type respirators, operate under negative pressure when the wearer inhales; thus, some inward leakage of contaminant may be possible in the absence of an airtight seal.

Temple bars of eyeglasses will not extend through the sealing edge of the full-face respirator. Full-face masks that have been developed with systems for mounting corrective lenses inside the face piece are preferred. The wearer's use of eyeglasses or goggles should not interfere with a half-mask face piece. User seal checks shall be performed each time a user dons a respirator.

7.3 Precautions

Respirators usually provide a satisfactory pathway for speech transmission over short distances in relatively quiet areas. An alternate form of communication between workers will be established where respirators are to be used in high noise areas.

To prevent face pieces from fogging up in low temperature, anti-fog compounds may be used to coat the inside of the full-face-piece lens. Several respirator manufacturers also provide nose cups for their full-face-piece respirators which channel the moisture-laden exhaled air directly out through the exhalation valves.

Pure oxygen will not be used for respiratory protection. Hoses for air supply will be selected to resist chemicals to which they may be exposed. All air fittings associated with airline supply and SCBA equipment shall be incompatible with other gas systems onsite.

7.4 Voluntary Use

An employee may request to use a respirator in situations where respirator use is not required by regulation or by procedure. In such a case, the employer must determine that such respirator use will not in itself create a hazard. Factors such as heat stress and limited visibility are among the issues to be considered. When voluntary respirator use is permitted, the following items apply:

- The Company, when allowing such use, must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and the respirator is cleaned, stored, and maintained so its use does not present a health hazard to the user.
- ***Exception:*** When employees sole use of respirators involves the voluntary use of filtering face pieces (dust masks), the Company is not required to maintain a written respiratory protection program.

8.0 BREATHING AIR QUALITY SYSTEM

Compressor Supplied Breathing Air - Compressed air that used in supplied air respirators, such as SCBAs, shall be high purity. Regardless of country/region of operation, Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989. Pure oxygen shall never be substituted for compressed air.

The specifications for Grade D breathing air are:

- Oxygen content of 19.5% - 23.5%.
- Hydrocarbon (condensed) of 5 mg per cubic meter of air or less.
- CO content of 10 ppm or less.
- CO_2 content of 1000 ppm or less.
- Lack of noticeable odor.
- Air supplied in cylinders shall not have a dew point greater than -45.6°C.

Breathing air may be supplied to respirators from cylinders or compressor systems. Oxygen content shall not exceed 23.5% except in systems specifically designed for oxygen distribution.

Where practical, breathing-air compressor shall be used. Compressors shall be situated to avoid entry of ambient contaminated air or exhaust into the breathing-air system and suitable in-line air. An oil-less compressor is preferred over an oil-lubricated compressor. All compressor systems shall be equipped and maintained in accordance with the manufacturer's specifications or better. Oil-lubricated compressors shall be equipped with a high-temperature shut off and/or an alarm system and alarm actuation system to safeguard against exposure to carbon monoxide, compressor failure, and monitor failure. If only a high-temperature alarm is used, the air shall be tested daily for carbon monoxide unless specified otherwise by the RPA. Test results shall be documented (continuous CO monitors are highly recommended). Filters shall be entrained for removal of water and oil from the breathing air. A receiver vessel of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere shall be installed in the event of compressor failure.

Additional requirements for compressor supplied breathing air are:

- System constructed to prevent entry of contaminated air into the breathing air system.
- Minimize moisture content so that the dew point at 1 atmosphere is 5.56ºC below ambient temperature.
- If equipped with in-line air-purifying sorbent beds and/or filters, these sorbent beds and filters are to be maintained and cleaned or changed, per the manufacturer's recommendations. A tag affixed to the compressor shall indicate the most recent change date and the signature of the individual authorized to make the change.
- Breathing air containers must be marked/indicated as such, in accordance with applicable transportation regulations.

9.0 CASCADE SYSTEMS

Breathing-air cylinders shall be legibly identified, with the word "BREATHING AIR" by means of stenciling, stamping, or labeling as near to the valve end as practical. Cascade systems shall be equipped with low pressure warning bells (e.g., Pak alarm) or similar warning devices to indicate air pressure in the manifold below 500 psig.

When a cascade system is used to supply breathing air, one employee shall be assigned as Safety Watch within audible range of the low-pressure alarm. When a cascade system is used to recharge SCBA air cylinders, it shall be equipped with a high-pressure supply hose and coupling rated at a capacity of at least 3000 psig.

Air-line couplings shall be incompatible with outlets for other gas-systems to prevent inadvertently supplying air-line respirators with non-respirable gases or oxygen. The air pressure at the hose connection to positive-pressure respiratory equipment shall be within the range specified in the approval of the equipment by the manufacturer.

Cylinders shall be stored and handled to prevent damage to the cylinder or valve. Cylinders shall be stored upright with the protective valve cover in place and in such a way as to prevent the cylinder from falling (e.g., supported with substantial rope or chain in the upper one third of the cylinder, or in racks designed for this purpose). Cylinders shall not be dropped, dragged, rolled, or allowed to strike each other or to be struck violently. Cylinders shall never be exposed to temperatures exceeding 52ºC. Cylinders with visible external damage, evidence of corrosion damage, or exposure to fire shall not be accepted or used.

Only cylinders within current hydrostatic test periods shall be used. Cylinders must be pressure-tested annually by a certified tester. Valves and regulators used on cascade delivery to air-line supplied respirators or for SCBA refilling shall not be used for any other service. Breathing air cylinder source quality shall be verified via vendor or Bechtel certification testing or other QA/QC procedures.

10.0 PROGRAM EVALUATION

All respiratory protection program procedures, will be reviewed on a periodic basis by the RPA. The Entity respiratory protection program will be evaluated on basis by the HSE Representative to determine the program effectiveness. Evaluation will include the following:

- Review of current airborne contaminant monitoring data to insure sufficient protection is afforded all respirator users.
- Review of technical information.
- Compliance with regulations.
- Review of medical qualifications.
- Review of medical requirements.
- Review of training qualifications.
- Review of training documents and plans.
- Review of respirator fit-test documentation.
- Review of reports of respirator or cartridge failures.
- Review of maintenance and cleaning procedures and logs.
- Review of inspection procedures.
- Record keeping requirements.
- Consultation with respirator wearers to determine their views on the effectiveness of the program.

11.0 ATTACHMENTS

1. EOM-KSH-TP-000003 - Respiratory Wearer Clearance Form Template
2. EOM-KSH-TP-000004 - Respirator User Medical Questionnaire Form Template
3. EOM-KSH-TP-000005 - Employee Statement of Medical Condition Form Template
4. EOM-KSH-TP-000006 - Respirator Fit Test Record Template
5. EOM-KSH-TP-000007 - Respirator Maintenance Log Template

Attachment 1 - EOM-KSH-TP-000003 - Respirator Wearer Clearance Form Template

Respirator User Clearance for _____

National Identification Number or Iqama Number _____ Company: _____

The above-named individual has completed the required/mandated medical questionnaire, appropriate medical exam(s) and respirator fit test on _____

1. Follow-up medical examination required: _Yes _No

If Yes: Consisting of the following tests/evaluations/results

_____

2. This individual is medically fit for respirator use:_Yes _No

3. Pulmonary function test: ____ Yes* _____No

Type of PFT: _____QLFT ____QNFT*

QLFT: _____ ISA _ Saccharin Bitrex ____ IS _____ Pass _____ Fail _____NA

QNFT: _____ GA CNC (Portacount)* CNP Fit factor _____ * Preferred

The use of a respirator may be associated with other physical stresses, such as having to wear restrictive protective clothing and to carry heavy equipment. Accordingly, this fit test included these possibilities. If this is a new employee, information for questions 10 through 19 of part B of the medical questionnaire (if used) shall be supplied by a statement from the employer's HSE Representative or their designee.

This test has been conducted according to OSHA 29 CFR 1910.134 Appendix A and using the information provided in the medical questionnaire mandated by 29 CFR 1910.134 Appendix C.

Recommendations (according to ANSI Z 88.6)
Class I _____ **(**no restrictions) Class **II** _ specific restrictions **Class III** _____(not permitted)
Class II restrictions _____

APPROVAL IS FOR THE FOLLOWING RESPIRATOR(S)

Type **Air Purifying:** ___1/2FP ___ FFP ____ FiltFP ____ PAPR only

Air Supplying: __ SAR(airline)_____SCBA

Brand _____ Size ___ SM ____ MED ____ LG ___XLG

Other/Comments _____

_____ _____
(Signature of authorized Health Care Provider) (Date)

Attachment 2 - EOM-KSH-TP-000004 - Respirator User Medical Questionnaire Template

Instructions for use: *This Attachment is copied directly from OSHA regulations. The appropriate sections of this questionnaire must be selected by the author and included in the site-specific procedure.*

Respiratory Protection- Mandatory Medical Questionnaire

Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one)? ____Yes No

To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:_____

2. Your name:_____

3. Your age (to nearest year):_____

4. Sex (circle one): _____ Male ____ Female

5. Your height: _____ ft. (or meters) _____ in. (or centimeters)

6. Your weight: _____ lbs. (or kilos)

7. Your job title:_____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code or country/city codes, as applicable): _____

9. The best time to phone you at this number: _____

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one)? Yes/No

11. Check the type of respirator you will use (you can check more than one category):
a. _____ N, R, or P disposable respirator (filter-mask, non- cartridge type only).
b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one)? Yes/No

If "yes," what type(s):_____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month? Yes/No

2. Have you ever had any of the following conditions?
   a. Seizures (fits): Yes/No
   b. Diabetes (sugar disease): Yes/No
   c. Allergic reactions that interfere with your breathing: Yes/No
   d. Claustrophobia (fear of closed-in places): Yes/No
   e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?
   a. Asbestosis: Yes/No
   b. Asthma: Yes/No
   c. Chronic bronchitis: Yes/No
   d. Emphysema: Yes/No
   e. Pneumonia: Yes/No
   f. Tuberculosis: Yes/No
   g. Silicosis: Yes/No
   h. Pneumothorax (collapsed lung): Yes/No
   i. Lung cancer: Yes/No
   j. Broken ribs: Yes/No
   k. Any chest/lung injuries, problems, or surgeries: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath: Yes/No
   b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
   c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
   d. Have to stop for breath when walking at your own pace on level ground: Yes/No
   e. Shortness of breath when washing or dressing yourself: Yes/No
   f. Coughing that produces phlegm (thick sputum): Yes/No
   g. Coughing that wakes you early in the morning: Yes/No
   h. Coughing that occurs mostly when you are lying down: Yes/No
   i. Coughing up blood in the last month: Yes/No
   j. Wheezing: Yes/No
   k. Chest pain when you breathe deeply: Yes/No

5. Have you ever had any of the following cardiovascular or heart problems?
   a. Heart attack: Yes/No
   b. Stroke: Yes/No
   c. Angina: Yes/No
   d. Heart failure: Yes/No
   e. Swelling in your legs or feet (not caused by walking): Yes/No
   f. Heart arrhythmia (heart beating irregularly): Yes/No
   g. High blood pressure: Yes/No
   h. Any other heart problem that you've been told about: Yes/No

6. Have you ever had any of the following cardiovascular or heart symptoms?
   a. Frequent pain or tightness in your chest: Yes/No
   b. Pain or tightness in your chest during physical activity: Yes/No
   c. Pain or tightness in your chest that interferes with your job: Yes/No
   d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
   e. Heartburn or indigestion that is not related to eating: Yes/ No
   f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you currently take medication for any of the following problems?
   a. Breathing or lung problems: Yes/No

b. Heart trouble: Yes/No
c. Blood pressure: Yes/No
d. Seizures (fits): Yes/No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)
a. Eye irritation: Yes/No
b. Skin allergies or rashes: Yes/No
c. Anxiety: Yes/No
d. General weakness or fatigue: Yes/No
e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire? Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face piece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently)? Yes/No

11. Do you currently have any of the following vision problems?
a. Wear contact lenses: Yes/No
b. Wear glasses: Yes/No
c. Color blind: Yes/No
d. Any other eye or vision problem: Yes/No

12. Have you ever had an injury to your ears, including a broken ear drum? Yes/No

13. Do you currently have any of the following hearing problems?
a. Difficulty hearing: Yes/No
b. Wear a hearing aid: Yes/No
c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury? Yes/No

15. Do you currently have any of the following musculoskeletal problems?
a. Weakness in any of your arms, hands, legs, or feet: Yes/No
b. Back pain: Yes/No
c. Difficulty fully moving your arms and legs: Yes/No
d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
e. Difficulty fully moving your head up or down: Yes/No
f. Difficulty fully moving your head side to side: Yes/No
g. Difficulty bending at your knees: Yes/No
h. Difficulty squatting to the ground: Yes/No
i. Climbing a flight of stairs or a ladder carrying more than 11.5kg: Yes/No
j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B: Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen? Yes/No
If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions? Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals? Yes/No

If "yes," name the chemicals if you know them:

_____

_____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below?
   a. Asbestos: Yes/No
   b. Silica (e.g., in sandblasting): Yes/No
   c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
   d. Beryllium: Yes/No
   e. Aluminum: Yes/No
   f. Iron: Yes/No
   g. Tin: Yes/No
   h. Dusty environments: Yes/No
   i. Any other hazardous exposures: Yes/No

   If "yes," describe these exposures:

_____

_____

_____

4. List any second jobs or side businesses you have:

_____

_____

5. List your previous occupations: _____

6. List your current and previous hobbies:

_____

_____

7. Have you been in the military services? Yes/No
   If "yes," were you exposed to biological or chemical agents (either in training or combat)? Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications)? Yes/No
   If "yes," name the medications if you know them:_____

10. Will you be using any of the following items with your respirator(s)?
    a. HEPA Filters: Yes/No
    b. Canisters (for example, gas masks): Yes/No
    c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?
    a. Escape only (no rescue): Yes/No
    b. Emergency rescue only: Yes/No
    c. Less than 5 hours per week: Yes/No
    d. Less than 2 hours per day: Yes/No
    e. 2 to 4 hours per day: Yes/No
    f. Over 4 hours per day: Yes/No

12. During the period, you are using the respirator(s), is your work effort:
    a. Light (less than 200 kcal per hour): Yes/No

    If "yes," how long does this period last during the average shift: _____hr. _____ min.

Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (.5 – 1.5kg.) or controlling machines.

b. Moderate (200 to 350 kcal per hour): Yes/No
If "yes," how long does this period last during the average shift: _____hr. _____min.

Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 16kg) at trunk level; walking on a level surface about 3.5km/h or down a 5-degree grade about 4.8km/h; or pushing a wheelbarrow with a heavy load (about 45.4kg.) on a level surface.

c. Heavy (above 350 kcal per hour): Yes/No
If "yes," how long does this period last during the average shift: _____hr. _____ min.

Examples of heavy work are lifting a heavy load (about 23kg.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 3.5km/h; climbing stairs with a heavy load (about 23kg).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator? Yes/No
If "yes," describe this protective clothing and/or equipment:
_____
_____

14. Will you be working under hot conditions (temperature exceeding 25°C? Yes/No

15. Will you be working under humid conditions? Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):
_____
_____

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):
_____
_____

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance:_____
Estimated maximum exposure level per shift:_____
Duration of exposure per shift_____
Name of the second toxic substance:_____
Estimated maximum exposure level per shift:_____
Duration of exposure per shift:_____
Name of the third toxic substance:_____
Estimated maximum exposure level per shift:_____
Duration of exposure per shift:_____
The name of any other toxic substances that you'll be exposed to while using your respirator:
_____
_____
_____

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and wellbeing of others (for example, rescue, security):
_____

Special Instructions:

1. Answers to questions 10 through 15 of part A are only required for full face respirator users. The site HSE Representative must determine if they are needed.
2. Part B of this questionnaire is not mandatory. The site HSE Representative and the Health Care Provider must agree as to which of the questions are appropriate.
3. New Hires: If this questionnaire is filled out prior to a prospective employee being hired, any answers to questions 10 through 19 of part B must be supplied by the site HSSE representative and shown to the employee when they fill out this form (depending which questions are used).
4. Existing Employees: This questionnaire must be allowed to be filled out during normal working hours at a time and place convenient to the employee

Attachment 3 - EOM-KSH-TP-000005 - Employee Statement of Medical Condition Form Template

_____
(Print Employee Name)

To the best of my knowledge, I,_____, have no medical conditions which would interfere with wearing a respirator while engaged in hazardous exposure situations. I understand that heart disease, high blood pressure, lung disease, or presence of a perforated eardrum require specific medical evaluation by a physician before safe use of a respirator can be determined.

_____
(Signature of Employee) (Date)

REPORT OF MEDICAL EVALUATION

The employee listed above has been given an examination by me and at this time there is no medical contraindication to the employee named above wearing a respirator to allow working in hazardous exposure environments.

Other Comments:

_____

_____

_____
(Physician's Signature) (Date)

Attachment 4 - EOM-KSH-TP-000006 - Respirator Fit Test Record Template

Last Name: **First Name:**

PORTACOUNT PLUS FIT TEST SOFTWARE
FitPlus Version B
TSI Incorporated

FIT TEST REPORT

SSN (or ID Number):
Test Date:
Next Test Due:
Operator Name:
Respirator Model:
-Type (Half/Full):
-Size:
-Manufacturer:
-Approval Number:
Notes :

Test Date:
Test Time:

TEST DATA

Fit Factor Pass Level: 100

Ex.	Ambient (Part/cc)	Mask (part/cc)	Fit Factor	Pass/Fail
NB	18400	0.27	67900.0	PASS
DB	16300	0.74	22000.0	PASS
SS	15200	0.19	79700.0	PASS
UD	14400	1.20	11900.0	PASS
T	13600	2.45	5550.0	PASS
G	12900	0.24	53700.0	PASS *
B	12200	1.96	6220.0	PASS
NB	11700	1.33	8790.0	PASS

* Not included in overall Fit Factor

Overall Fit Factor = 11400-0 **PASS**

Operator _____

Date _____

Name _____

Date _____

Attachment 5 - EOM-KSH-TP-000007 - Respirator Maintenance Log Template

FACILITY/CONTRACT NUMBER:	LOCATION:	DEPARTMENT:

NAME	BADGE NUMBER	DATE	WASHED AND CLEANED	CARTRIDGE CHANGED	DAMAGED PARTS REPLACED (IF ANY)	INTLS