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**Respiratory Protection Program**

**Ragon Institute**  
**400 Technology Square**  
**Cambridge, MA 02139**

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## LIST OF ABBREVIATIONS AND ACRONYMS

- BSL-3** Biosafety Level Three
- CFR** Code of Federal Regulations
- OSHA** U.S. Occupational Safety and Health Administration
- PAPR** Powered Air Purifying Respirators
- PLHCP** physician or other licensed healthcare professional
- Ragon** Ragon Institute
- RPP** Respiratory Protection Program

## 1. POLICY

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This Respiratory Protection Program (RPP) applies to the use of respiratory protection for any employees entering the Biosafety Level Three (BSL-3) research laboratory at the Ragon Institute (Ragon) located at 400 Technology Square in Cambridge, Massachusetts.

Ragon requires that employees use respiratory protection if entering a BSL-3 research laboratory. This RPP outlines and describes how Ragon implements the use of respiratory protection in compliance with the U.S. Occupational Safety and Health Administration (OSHA) Respiratory Protection Standard (OSHA Title 29 Code of Federal Regulations [CFR] Section 1910.134),<sup>1</sup> and details the individuals responsible for the tasks that will be performed to implement the program. These include the following:

- Roles and responsibilities under the RPP
- Recordkeeping
- Respirator and cartridge selection
- Medical evaluations
- Training
- Use, storage, and care
- Program evaluation

Compliance with this RPP is required for all use of respiratory protection at Ragon, and all provisions of the RPP are to be followed whenever respirators are required to be worn.

## 2. PURPOSE

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The purpose of this RPP is to:

- Ensure the health and safety of employees related to the use of respiratory protection.
- Establish procedures to evaluate tasks to determine if the use of respiratory protection is required and to select appropriate respirator types.
- Define roles and responsibilities under the RPP.
- Ensure that employees are appropriately trained and medically cleared for respirators.
- Establish procedures for proper maintenance, storage, cleaning, and inspection of respirators.
- Maintain compliance with regulations pertaining to respirator use.

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<sup>1</sup> OSHA 29 CFR 1910.134. Occupational Safety and Health Standards. *Code of Federal Regulations*. Title 29, Part 1910, Section 134. Respiratory Protection. Washington, DC: U.S. Occupational Safety and Health Administration. [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=12716](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716)

### 3. RESPONSIBILITIES

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The RPP Administrator (Yong Xie) or his designee is responsible for determining when the use of respirators is needed and which type of respiratory protective equipment is appropriate. The RPP Administrator will also ensure that all staff required to use respirators are properly trained and medically cleared by competent individuals. The RPP Administrator or their designee is also responsible for:

- Reviewing compliance with this RPP and with regulations pertaining to respirator use.
- Conduct periodic reviews of the RPP (e.g., annual review).
- Retain all documentation related to this RPP and the use of respiratory protection.
- Approval and purchase of all respiratory protection equipment.
- Ensuring training and medical clearance is completed prior to use.

Currently the use of respiratory protection at the Ragon Institute is limited to the BSL-3 laboratory and is a requirement for entry into the laboratory.

Individuals who are required to wear respirators for protection against respiratory hazards are expected to comply with the following requirements:

- Ensuring that they are medically cleared to wear a respirator prior to use.
- Wearing only those respirators that they are fit tested and trained to wear.
- Inspecting the respirator for deterioration and working condition before and after each use.
- Recognizing indications that cartridges and/or filters are at the end of their service life.
- Cleaning and sanitizing reusable respirators after each use and storing carefully in a protected location.
- Directing questions or concerns regarding respiratory protection to the RPP Administrator.

### 4. RECORDKEEPING

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The RPP Administrator maintains all records as required by 29 CFR 1910.134, including:

- This RPP
- Medical evaluation recommendation records
- Training records

The RPP and individual records are available to employees covered under this RPP upon request. A copy of the RPP is located in the BSL-3 laboratory anteroom and the Environmental Health & Safety desk at Room 963.

## 5. RESPIRATOR USE EVALUATION

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- An evaluation of hazards or potential hazards shall serve as the basis of determining whether respiratory protection is required and will determine what type of respirator is to be used by Ragon employees. This evaluation will be conducted by the RPP Administrator or his/her designee. This may involve consulting with employees on specific job tasks as well as using outside consultants. Currently the use of respiratory protection in the BSL-3 laboratory is required due to research with the following agents that are infectious via inhalation:
  - *Mycobacterium tuberculosis*
  - West Nile virus
  - Chikungunya virus
  - Japanese encephalitis virus
  - Powassan virus
- Respirators will only be used in limited situations; such as instances in which engineering controls are not feasible or effective in reducing hazards or while controls are being instituted. In the BSL-3 laboratory, the use of a respirator is required at all times due to the risk of infection via inhalation.
- Only respirators in clean and good working order will be used for respiratory protection.
- Persons who are issued respirators must:
  - Be medically approved to wear a respirator prior to use (refer to Section 7).
  - Be trained on the proper use of respirators and their limitations prior to use (Section 8).
  - Fit testing is not required for the use of loose-fitting Powered Air Purifying Respirators (PAPRs), which are currently in use at Ragon.

## 6. RESPIRATOR SELECTION CRITERIA

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- Only National Institute for Occupational Safety and Health approved respirators will be selected for use. Ragon shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
- Respirators to be used at any given time will be selected on the basis of the hazard, and the nature and magnitude of exposure.
- Specific cartridge types and change-out schedules for respirators that require them will be selected on the basis of the hazard, and the nature and magnitude of exposure.

- Respiratory protection available for Ragon employees includes Powered Air Purifying Respirators (PAPRs), which are required to be worn when entering the BSL-3 laboratory. Table A.1 in Appendix A lists available respirators and the tasks where they are required.

## 7. MEDICAL EVALUATION PROCESS

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Medical evaluations are required for all employees who wear respirators upon assignment of the respirator and annually, thereafter.

An assigned Massachusetts General Hospital physician or other licensed healthcare professional (PLHCP) will perform initial medical clearance examinations as required by OSHA. Employees will be required to complete the OSHA medical questionnaire; the medical questionnaire is available in Appendix C of the OSHA Standard (OSHA 29 CFR 1910.134). The medical questionnaire will be confidential, and presented in a way that the Ragon employee understands the content. The PLHCP will provide Ragon with a written recommendation regarding the employee's ability to use the respirator from the PLHCP. Ragon will adhere to the recommendations provided by the PLHCP. Medical evaluation recommendation records are maintained by the RPP Administrator.

Re-evaluation will be conducted under the following circumstances:

- The employee reports physical symptoms or conditions that may be related to the ability to use the respirator.
- It is identified that an employee may have a medical problem during respirator use.
- If the PLHCP determines that an employee needs re-evaluation.
- A change occurs in the workplace conditions that may result in an increased physiological hazard to the employee.

## 8. TRAINING

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The RPP Administrator shall ensure that individuals required to wear respiratory protection receive appropriate respirator training. Training shall be conducted for all employees who wear respirators upon assignment of the respirator and annually thereafter. Training is conducted by the RPP Administrator or their designee. All training is documented and training records are maintained by the RPP Administrator or his designee.

Respirator training shall include the following as a minimum scope of instruction:

- Basic explanation of the purpose of respirators and the basis for proper selection.

- Discussion on the limitations of respirators and how to recognize warning properties of contaminants.
- How to examine the respirator for defects, worn or broken parts, and other factors that may cause the respirator to malfunction.
- Instructions on how to properly don, adjust, and fit respirators.
- Instructions on cleaning, general maintenance, and proper storage of respirators.
- How and when to replace particulate and chemical cartridges on the air-purifying, negative pressure type respirators.

The hands-on training will particularly focus on the proper fitting of respirators, replacing cartridges, and examining the device for broken or worn parts. It will also include donning and doffing procedures.

## 9. RESPIRATOR INSPECTION

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- All respirators are to be inspected by the wearer each time they are used prior to and following use to ensure that they are clean and in good working order.
- PAPR inspections should include the following check points:
  - Tightness of connections and condition of hood.
  - Broken or malfunctioning parts.
  - Battery charge.
  - Flow check.
  - Presence, condition, and availability of particulate and chemical cartridges for air purifying respirators.
  - Pliability and/or deterioration of any rubber or elastomer respirator parts.
- Any deficiencies noted should be repaired or the respirator replaced prior to use.
- All major repairs or replacement of parts on reusable respirators should be performed by the manufacturer. Components and parts from various respirator manufacturers are not interchangeable.
- The RPP Administrator or his/her designee should also periodically spot check the condition of respirators and assure that an adequate supply of filters, cartridges, and other needed accessories are available.

## 10. CLEANING AND FILTER CHANGE-OUT SCHEDULE

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- Reusable respirators are to be cleaned and disinfected as often as necessary to be maintained in a sanitary condition. Those issued for the exclusive use of one worker should be cleaned after each day's use or more often, if necessary.
- Cleaning of respirators before and after each use will be the responsibility of the individual who has used the respirator. Cleaning may be accomplished by wiping all surfaces of the respirator with a disinfecting wipe as outlined in the BSL-3 laboratory procedures (this document may be obtained from the Biosafety Officer or the BSL-3 Core Facility Manager).
- At a minimum, respirator cartridges must be replaced based upon the change out schedule determined during the selection process described in Sections 5 and 6, and immediately if the cartridge becomes soiled, wet, damaged or there is any indication of breakthrough. Refer to Table A.1 in Appendix A for established minimum change out schedules for available respirators.

## 11. STORAGE

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- Respirators should be stored away from dust, sunlight, heat, extreme cold, excessive moisture, chemicals, and risk of mechanical damage. They should also be stored or placed in a manner to prevent the face piece (plastic or rubber) from becoming distorted and exhalation valves from becoming damaged.
- All respirator donning, doffing, sanitizing and active storage is confined to the BSL-3 laboratory anteroom.

## 12. RESPIRATORY PROTECTION PROGRAM EVALUATION

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The Ragon RPP Administrator and/or their designee will review this RPP annually. Several factors must be evaluated to determine program effectiveness. These include, but are not limited to:

- Are hazards being correctly identified?
- Are the appropriate respirators being used for the hazards being encountered?
- Are the respirators being used in an appropriate manner?
- Are the respirators being properly cleaned and maintained?
- Have all workers received appropriate medical evaluation, and training?
- Are all aspects of the respiratory protection standard adequately addressed?

Table B.1 in Appendix B outlines the revision history of this RPP, based on this review process.



**APPENDIX A  
APPROVED RESPIRATORS**

<b>Table A.1</b> Approved Respirators as of February 2017, Ragon Institute			
<b>Respirator Type</b>	<b>Cartridge Type</b>	<b>Cartridge Change Out Schedule</b>	<b>Task Required</b>
3M Versaflo Powered Air Purifying Respirator (PAPR)	High efficiency particulate air (HEPA) filter	At least annually	Required for all personnel who enter into the BSL-3 research laboratory

<b>Table A.2</b> 3M Versaflo Components and Model Numbers, Ragon Institute	
<b>Component Name</b>	<b>Model Number</b>
Hood	S-950
Power Blower	TR-300
Breathing Tube (with disposable sleeve)	BT-30
Belt (non-porous)	TR-327

**APPENDIX B**  
**RESPIRATORY PROTECTION PROGRAM REVISION HISTORY**

<b>Table B.1 Respiratory Protection Program Revision History, Ragon Institute</b>		
<b>Revision Number</b>	<b>Date</b>	<b>Description of Change</b>
-	September 2013	Initial program document
1.00	January 2015	Yearly review and update of document
2.00	April 2016	Yearly review and update of document
3.00	February 2017	Yearly review and update of document, added the following viruses: Chikungunya, West Nile, Japanese encephalitis, and Powassan.