

# DECONTAMINATION PROCEDURES FOR MONITORS EXPOSED TO CHEMICAL WARFARE AGENTS

## INTRODUCTION

This note suggests decontamination procedures for RAE Systems monitors following exposure to especially toxic chemical or biological materials, including warfare agents. Decontamination (“decon”) solutions typically consist of liquids that oxidize and/or hydrolyze nerve agents and kill biological agents. Alkaline hypochlorite solution is a commonly used decon agent and is highly corrosive.

## DISCLAIMER

These procedures are intended to give guidelines as to parts that are resistant to potentially corrosive decon solutions. Because we cannot foresee all possible uses and because RAE Systems scientists are not certified industrial hygienists, the user should modify the procedures according to their own judgements, to accommodate their own particular use situation.

## GENERAL PROCEDURES

During use, protect the instrument as much as possible by using the rubber boot and rubber cap over the data and charging ports. In general, metal and soft plastic components are subject to damage by decon solutions, and therefore exposure should be limited to that necessary to deactivate the agent.

**1. Short-Term Decon.** Decontaminate the instrument after each use as follows:

- Remove the unit from the “hot zone.”
- Allow it to pump in a secondary “warm” zone for 15 minutes to clear vapors out of the sample train and inside of the housing.
- Turn off the unit.
- Remove the rubber boot and port cap and soak in decon solution.
- Remove any inlet filters, soak in decon solution, and discard.
- Wipe the outside of the instrument with a moist, but not dripping wet, cloth containing decon solution. After appropriate reaction time, wipe it clean with water and allow it to dry.

**2. Long-Term Decon.** After the first exposure, we recommend that the units be opened and a wipe test performed to see if there are any significant residues on the inside of the instrument on the circuit board, sensors, and sensor cover plate. After repeated exposures, a more thorough decontamination may become necessary. The intervals of such a thorough decon can only be determined by the user under the particular conditions of use. We recommend a more thorough wipe test of the major sample train parts after the first 10 uses, to determine if the frequency should be increased or reduced. Follow the decon procedures outlined here:

### MultiRAE Plus

- First perform the daily decon procedures described previously, under General Procedures.
- Open the unit, remove the sensor cover plate, and soak briefly in decon solution.
- Remove the pump and any connecting tubing. Disassemble the pump diaphragm section. Briefly soak the tubing and plastic and rubber pump parts in decon solution.
- Remove the sensors and wipe with a moist decon cloth. If the original wipe tests showed a build-up of agent on the sensors, then discard the sensors and replace with new ones (except for the PID).
- Remove the PID sensor metal mesh cap and pull out the Teflon sensor. Loosen the sensor screws and partially separate the sensor layers. Briefly soak in decon solution, rinse it with clean water, dip it into methanol, and then allow it to air dry for several hours.
- Remove the lamp and clean it with dry methanol.

**Important:** Do not use decon solution!

- Wipe out the inside of the instrument and sensor connections as well as possible using a methanol-dampened (not wet) cloth. Decontaminate the cloth and discard it.
- Reassemble all parts and add new filter(s).

### MiniRAE 2000 & ppbRAE

- First perform the daily decon procedures described earlier, under General Procedures.
- Unscrew the probe cap, remove the probe, and remove any filters inside or attached to it. Briefly soak the cap, probe, and filters in decon solution, and discard the filters.
- Pull the Teflon PID sensor straight out. Briefly soak it in decon solution, rinse it with clean water, dip it into methanol, and then allow it to air dry for several hours. Do not disassemble the sensor. Carefully examine the sensor leads and electrodes. If there are any signs of corrosion, the sensor may need to be replaced.
- Remove the lamp and clean it with dry methanol.

**Important:** Do not use decon solution!

- Open the battery cover and rear housing panel.
- Remove the pump and connecting tubing. Disassemble the pump diaphragm section. Briefly soak the tubing and plastic and rubber pump parts in decon solution. Rinse and dry, or replace the tubing and pump diaphragm.
- Wipe out the inside of the instrument, lamp housing, and pump parts as well as possible using a methanol-dampened (not wet) cloth. Decontaminate the cloth and discard it.
- Reassemble all parts and add new filter(s).

### ToxiRAE II

- First perform the daily decon procedures described earlier, under General Procedures.
- Unscrew the sensor cap and take out any filter inside. Briefly soak the cap and filter in decon solution and discard the filter.
- Pull the Teflon PID sensor straight out. Loosen the sensor screws and partially separate the sensor layers. Briefly soak it in decon solution, rinse it with clean water, dip it into methanol, and then allow it to air dry for several hours.
- Remove the lamp and clean it with dry methanol.

**Important:** Do not use decon solution!

- Remove the housing screw and open the rear housing panel.
- Wipe out the inside of the instrument and sensor area as well as possible using a methanol-dampened (not wet) cloth. Decontaminate the cloth and discard it.
- Reassemble all parts and add new filter(s).

### Remote Probes

In some cases, agent tests are performed using a remote probe so that the user does not need to enter the "hot zone" containing the active agent. Most often these probes consist of Teflon tubing with metal or plastic/rubber connectors. Remote probes may be decontaminated by pumping decon solution through them and wiping down the outside surfaces, or they can be discarded. Soft rubber or plastic connectors generally should be discarded after decontamination.

**Caution:** Some chemical warfare agents will be absorbed into the probe materials and reduce the readings. Therefore, use the shortest length of probe possible.