



# Environmental Endotoxin Sampling Guide



Endotoxins are molecules that have certain characteristic toxic effects. They are now recognized as a class of compounds found in the outer membrane of certain (“Gram-negative”) bacteria. Since these Gram-negative bacteria are widespread in the environment, so are endotoxins. High levels have been reported from a variety of environments, such as cotton mills, agriculture or wastewater treatment facilities, industrial washwater mists, and contaminated room humidifiers, where water and Gram-negative bacteria can be expected to be present. The most important kinds of reservoirs are recirculated water-based fluids that produce aerosols.

## Summary of Procedures

Air samples are collected on endotoxin-free membrane filters, stored desiccated wherever possible, or stored at 4°C. Endotoxin analysis can be done on air, water, dust, or bulk specimens.

CAUTION: There are no accepted threshold values, so relative value comparisons have to be made between the suspect area, and a non-suspect one under similar environmental conditions. Since endotoxin levels may be significant in outside air, the latter may not be suitable for background levels, especially in environments known to have high levels of Gram negative bacteria (see above, 1<sup>st</sup> paragraph). All sampling utensils must be certified endotoxin-free, and PVC and polypropylene materials cannot be used due to their affinity and binding with endotoxin.

## Materials

### Fluids and Bulk samples:

1. Collect in endotoxin-free (preferably glass, alternatively polystyrene) containers.

### Equipment Needed For Air Sampling:

1. Low-flow pump
2. Rotameter
3. Flexible tubing
4. Endotoxin-free polystyrene cassettes with 37mm diameter 0.2 µm polycarbonate membrane filters and AP40 glass-fiber backing pads. **These must be specially treated to remove all endotoxins, please order from EMSL.**
5. Sterile surgical gloves should be worn when sampling.

## Sampling Procedure

### For air sampling:

1. Caution must be taken to avoid breathing on, touching, or otherwise exposing the sampling containers to human contamination.
2. For indoor sampling, ensure that all doors and windows are closed.
3. Calibrate pump to 1.5 liters/minute
4. Using gloves, connect cassette to pump with the red-capped end toward the pump. **Collect air samples for 4 hours per sample.**



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5. Disconnect cassette and replace the protective covering back on both the inlet and outlet of the cassette. **Wrap entire cassette in original packing and seal with tape.**

## **For fluids and bulk specimens:**

1. Collect specimen in an endotoxin-free container. 4 mL is typically sufficient.

## **For all matrices:**

1. Label with sample information.
2. Complete an EMSL Chain of Custody (COC), available on the website ([www.emsl.com](http://www.emsl.com)), detailing client name and information, project name or number, sample #, and a description of the area.
3. Ship samples to EMSL Analytical, Inc. as soon as possible. **Fluid samples must be shipped with ice packs.**

## **Quality Control Suggestions**

1. Multiple specimens need to be collected at a site in order to compare a possibly affected area with an unaffected one.
2. The containers used for test materials must be neither cracked nor broken, and with the packing material still intact.

## **References**

Milton, Donald K. "Bioaerosols" (CRC Press Inc., 1995) 77-86.

SKC Inc., 863 Valley View Road, Eighty Four, PA 15330. "Procedure for Collection of Air Samples for Endotoxin Testing."