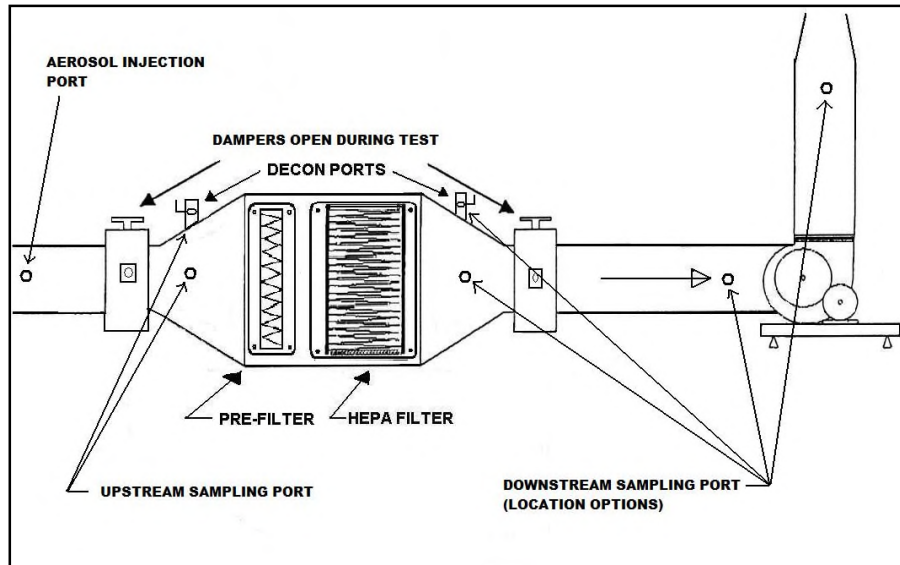


## **HEPA FILTER CHALLENGE ON BIBO FILTER EQUIPMENT** *(Overall Challenge Testing Method, IEST-RC-CC0034.1)*



*IEST-RP-CC0034.1, Section 6.2.3 - Aerosol Photometer Total Leakage Test Method*

### **AEROSOL INJECTION & SAMPLING PORTS – SIZING AND LOCATION GUIDELINES**

Per IEST-RP-CC0034.1, Section 6.2.3, the following are guidelines for sizing and location of ports required for “Overall Total Leakage Test Method” for duct-mounted HEPA filter systems:

**Upstream Aerosol Injection:** Minimum 1” Port with Plug (Cap) is mounted at an accessible point on the upstream duct. We recommend a 1” **full-bore** ball valve or pipe nipple with cap; material to suit duct. **IMPORTANT:** Injection port(s) must be several duct diameters from the HEPA/ULPA filter(s) to allow for sufficient mixing of aerosol for upstream and downstream sampling. A **minimum of 8-10 duct diameters upstream** of the filter bank is recommended by IEST.

**NOTE: The installing contractor is responsible for provision of the Upstream Aerosol Injection port.**

**Upstream Sampling Port:** Upstream sampling of DOP (Dispersed Oil Particulate) aerosol concentration can be taken via a 1” minimum diameter port located in the duct (or in the inlet transition) or wherever there is good air mixing upstream of the HEPA filter(s).

**Downstream Sampling Port:** Downstream sampling of DOP aerosol (Emery 3004 Aerosol or equal) concentration can be taken via a 1” minimum diameter port located in the outlet duct or discharge stack in a location deemed to have good air mixing and/or providing a representative sample of filtered air.

### **Total Leakage (Overall Penetration) Test Procedure**

Depending on the size of the housing/system being tested, either a “cold smoke generator” (<500cfm) or a “Hot smoke generator” (500+ cfm) is used to heat and disperse the Emery 3004 (PAO oil) challenge upstream of the HEPA filter.

In the picture at top right a Cer-Tech® cold DOP generator is used to pump challenge aerosol into an access hatch in the ductwork upstream of the HEPA filter. This method is used where the pick-up location is very distant from the filter housing or when the pick-up location is not readily accessible.



Alternatively, when the contained space is located in close proximity to the filter housing, the Emery 3004 is injected at the return/exhaust air grill located within the control space (isolation room) in the hospital. In the middle picture you can see the Emery 3004 aerosol being drawn into the low-level return air grille.



A photometer is then used to measure concentrations of the Emery 3004 smoke both upstream and downstream of the HEPA filter. In the picture at bottom right, you can see the probe inserted thru the housing's ball valve. The difference in the measurements of smoke concentrations upstream and downstream of the HEPA filter determines the penetration (or conversely the efficiency) of the HEPA filter(s). The filter(s) system is given a pass or fail depending upon the challenge criteria which typically is 0.01% allowable penetration on 0.3 micron particles of dispersed oil particulate (DOP) aerosol.

**IAS RECOMMENDATION: We recommend a HEPA filter DOP challenge on all new Bag-in/Bag-out Filter Equipment (using the Overall Penetration Method) at time of filter equipment commissioning. This provides assurance to the customer that the HEPA filter(s) meet performance specifications (99.97% @ 0.3 micron minimum efficiency) upon filter equipment start-up.**

