

## Increased Microbiological Challenge Test with Fan Filter Unit (FFU) Simulating Person Walking Past the Cabinet

### Objective of Experiment

This test demonstrates that the cabinet will maintain operator protection even with an external air disturbance such as people walking past the cabinet. In this experiment, Fan Filter Unit (FFU) was used to generate air disturbance to simulate the person walking in front of the cabinet, FFU is used in contamination control environments such as cleanrooms. It consist of a small fan, controller, and a ULPA filter enclosed in a box. It maintains specific and uniform airflow.

### Experiment Method

*Measuring FFU air velocity per IEST-RP CC002.2*

A calibrated airflow meter was set up within the interior of the cabinet to measure filter airflow at a distance of 15 cm / 6 inches from the filter face. The filter face was divided into a suitable number of grids. The grids are 15cm from the walls and 30cm Cartesian apart.

### Procedure

The LA2-4A2 with serial number 2004-7328 biosafety cabinet was used in this experiment and set at nominal setpoint (inflow velocity of 0.53m/s and downflow velocity of 0.35m/s). The FFU was positioned at the left side of the front aperture with a distance of 16cm from the sash tract of the cabinet, its blowing wind was perpendicular to the inflow path of the cabinet and its centre coincide with centre of sash opening.

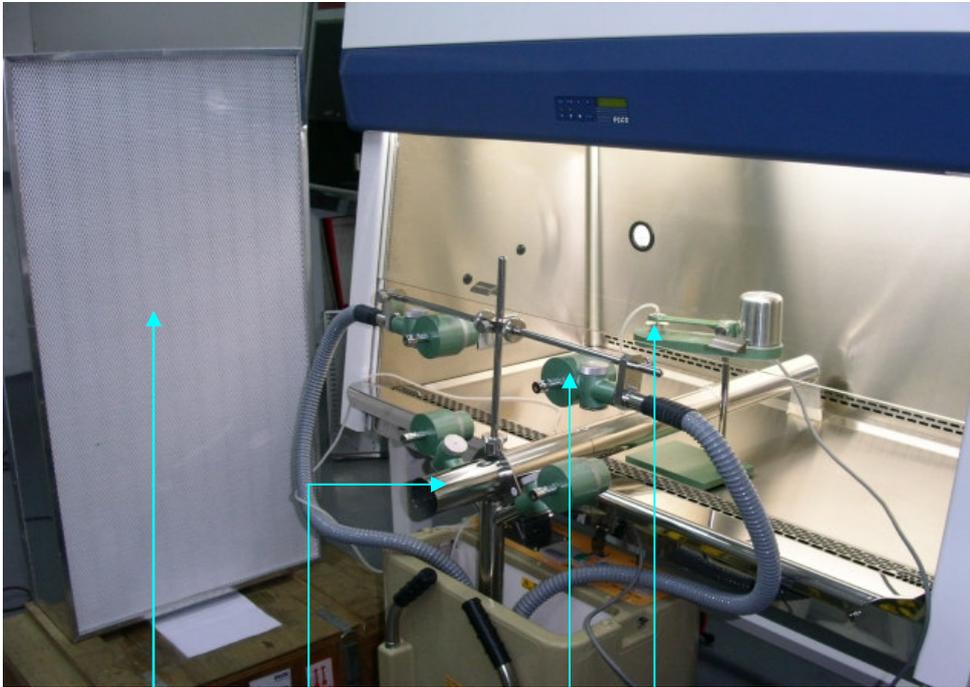
For the personnel/operator protection test, KI discus was used, according to study, this is more stringent than the microbiological test method and more difficult to pass. The KI Discus was placed in front of the cabinet and the stainless steel cylinder was placed in the centre of the work tray to simulate normal operating conditions (the airflow disturbance of operator's arm). The disc was placed inside the work zone to discharge the Potassium iodide spray outwards. Four (4) suction cones were placed outside the cabinet as it simulate the breathing of the operator working on the cabinet. The suction cone has a filter membrane inside to suck the Potassium iodide released by the disc.

### Acceptance

The total number of brown dots recovered from each filter membrane shall not exceed more than 62. This will correspond to aperture protection factor of 100,000 meaning that for every 100,000 particles liberated behind the sash window, only 1 manages to escape. If there 's no brown dot captured, this translates to aperture protection factor of greater than 6,200,000.

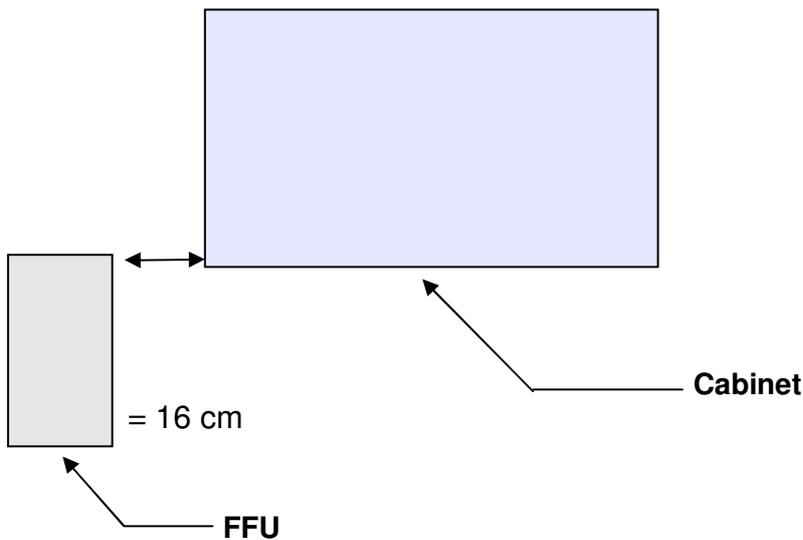


## Experiment Set-up



FFU      Cylinder      Suction cone      Disc

## Diagram



## Results

### KI Discus

<b>X1</b>	0	<b>Y1</b>	0
<b>X</b>	0	<b>Y</b>	0

### Airflow reading

FFU Air Velocity  
 Temp: 27.0°C  
 Td: 16.0°C

#### Before Correction

<b>Using DAQ</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
	0.74	0.85	0.90	0.63	0.89	0.98	0.95	0.74

**Ave:** 0.84 m/s

#### After Correction

<b>Using DAQ</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
	0.77	0.89	0.94	0.66	0.93	1.02	0.99	0.77

**Ave:** 0.87 m/s

## Conclusion:

This experiment simulate the effect of a person moving past in front of the cabinet having air disturbance (air curtain is destroyed and large volumes of air may be sucked from the cabinet into the laboratory). And from the test result, it showed that the cabinet performs well as it maintains perfect containment even when cross draft of 0.87m/s was generated.