Approval Block

<table>
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<tr>
<th>Prepared by</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Evan Parnell</td>
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<td>08 NOV 2013</td>
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<td>Reviewed by</td>
<td>Signature</td>
<td>Date</td>
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<td>Kristal Jewell</td>
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<td>08 NOV 2013</td>
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Historical Reference Section:

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<th>Revision Affected</th>
<th>Explanation of Change</th>
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<td>Changed Company Logo</td>
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<td>Test Procedure</td>
<td>9.A.3</td>
<td>B</td>
<td>Added Paragraph 3 – If Airflow Visualization Can Not Be Filmed</td>
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1. Purpose

This document provides instruction for performing air flow visualization tests.

2. Scope

This procedure shall be followed by personnel performing cleanroom certifications. Additional testing and or deviation from this SOP shall be agreed upon prior to the start of testing.

3. References

1. Institute of Environmental Sciences Contamination Control Division Recommended Practice IES-RP-006.2 “Testing Cleanrooms”
4. Material Safety Data Sheets (MSDS) located immediately outside the cleanroom.

4. Equipment and Materials

   Equipment:
   1. Smoke Generator – Rosco Alpha 900 Fog Machine or equivalent
   2. Smoke Generator – Clean Air Trekker or equivalent
   3. Smoke Sticks – Hill TelTru Smoke Sticks
   4. Video Camera
   5. Lighting as required.

5. Safety

   1. Wear proper cleanroom gowning attire as specified by facility SOP or as instructed by facility point of contact.
2. Avoid lifting heavy equipment. Wait for help from another employee prior to lifting any heavy equipment.

3. Avoid reaching while working on a ladder. Move the ladder to ensure proper access to your concern. Do not step on the top two rungs of a step ladder.

4. Refer to manufacturer’s safety precautions and Material Safety Data Sheet (MSDS) for appropriate protective equipment and safe handling procedures when using chemicals.

6. Responsibility

1. It is the responsibility of the President to maintain this document and oversee these activities.

1. It is the responsibility of the individual(s) performing this task to follow this procedure.

7. Preliminary Operations

1. Collect all materials and equipment necessary to conduct the certification.

2. Wipe down all equipment in accordance with the facility SOP or use a 70% isopropyl alcohol, 30% water solution unless otherwise instructed by the facility point of contact.

8. Cleanroom Operational Phases

Testing may be performed at different stages as characterized by the completeness of the cleanroom installation and operational modes as defined below.

Stage 1 As-Built-Facility: A cleanroom which is complete and operating with all services connected and functioning, following initial clean down. There is to be no process equipment or operating personnel within the facility.
Stage 2  At-Rest-Facility: A cleanroom with is complete and operating. The room is to be fully populated with process equipment staged in a non-operational mode. There shall be no operating personnel present.

Stage 3  Operating Facility: A cleanroom in normal operation fully populated with functioning process equipment and operating personnel.

NOTE: At times it will be necessary to take exception to strict compliance with the aforementioned testing stages. Deviation or interaction among the stages may be required due to availability or operational status of the process equipment. These situations shall be identified and acknowledged as part of the contractual agreement.

9. TEST PROCEDURES AND ACCEPTANCE CRITERIA

A. Air Flow Visualization Test

1. Purpose

These tests are performed to help with the visualization of airflow patterns within rooms or equipment. The tests are performed by introducing a fog immediately downstream of the HEPA filter(s) or supply duct and video taping the air flow pattern.

2. Apparatus

A fog machine generates large volumes of fog. The Rosco Alpha 900 fog machine heats Roscoe fog solution and generates a high density fog. The Clean Air Trakker uses ultrasound to transform water into fog. The Clean Air Trakker generates a less dense but cleaner fog (same cleanliness as the water introduced into the unit – WFI water yields an equivalent cleanliness fog) and is used in active class 100 cleanrooms at the facilities request. Smoke sticks may be used for equipment or finite areas.
3. Air Flow Visualization Procedure

Prior to introducing the fog, film a page that identifies the facility, location, component ID and date of test. State “Start of air flow visualization investigation for ------ (information listed above)”.

Introduce the fog downstream of the filter(s) or supply duct under test in a manner that will allow the best visualization of the airflow pattern. Film the smoke flow. Adjust the camera to capture critical elements of the smoke patterns (reflux, laminar, turbulence, exiting unit, flow over or around components, etc.). Clearly describe the introduction of the fog, the flow patterns observed and existing conditions.

If the smoke flow cannot be filmed (lighting, contrast, angle, rooms size) clearly describe the critical elements of the smoke patterns (reflux, laminar, turbulence, exiting unit, flow over or around components, etc.) on a diagram. Utilize arrows to show observed airflow patterns. Identify the airflow on a scale of 1-5 with 1 being minimal and 5 being maximum airflow.

Upon completion of the airflow visualization investigation, film a page that identifies the facility, location, component ID and date of test. State “End of air flow visualization investigation for ------ (information listed above)”.

4. Acceptance

Acceptance for the airflow visualization investigation shall be as agreed upon by the customer and ATS.