Santa Barbara City College
EBS Building
Supply Airflow Testing Report FINAL

Presented to:

SBCC
721 Cliff Drive
Santa Barbara, CA 93109

Testing Date: Feb./ March 2021
Re-Tested: July 2021

Presented by:
Palt & Associates, Inc.
Sarah Palt

This is to certify that Palt and Associates Inc. has inspected and tested the system described herein to their optimum performance capabilities. The test and inspection has been performed in accordance with the most current industry standards and following NEBB procedures. Palt and Associates is a California State Licensed air and water balance contractor and carries a D-62 license. We certify the results of this test to be true and accurate. We certify the results of this testing to be true and accurate.

Certification Number:  P21-012.9 FINAL

Sarah Palt, CEO
## Contents

1. Overview ................................................................................................................................. 3
1.1. Definitions ............................................................................................................................. 3
2. HVAC System ............................................................................................................................. 3
2.1. Room Data ............................................................................................................................ 4
4. Data Analysis ............................................................................................................................. 5
5. Test Data Summary .................................................................................................................... 6
5.1. Recommendations: ............................................................................................................... 9
5.2. Portable HEPA Filters: ......................................................................................................... 10
6. Conclusion and Discussion: ....................................................................................................... 10
7. APPENDIX ............................................................................................................................... 11
7.1. Detailed building summary .................................................................................................. 11
7.1.1. EBS Building First Floor ............................................................................................... 11
7.1.2. EBS Building Second Floor .......................................................................................... 12
7.1.3. EBS Building Third Floor ............................................................................................ 13
7.2. Equipment Calibration Certificates ...................................................................................... 14
7.3. ASHRAE Standard 62.1-2019 Table L-1 ............................................................................ 16
7.4. Building Floor Layout ........................................................................................................... 20
7.5. Detailed room data sheets ................................................................................................... 23
1. Overview

The following is the report for the airflow test study conducted at the Santa Barbara City College beginning of 2021. The scope of work was to test supply airflows for all indicated classrooms, lecture halls and offices to determine Air Change Rates for each room / area. Outside airflows were calculated for each room using building DDC information.

The following report lists the result for the **EBS Building (EBS = Earth and Biological Science Building)** on the Main Campus.

1.1. Definitions

SA = Supply Airflow
OSA = Outside Airflow = fresh air

Air Change Rate: How many times the air in a defined space is changed out per hour; ACR is calculated as follows: \( ACR = \frac{Total\ SA\ (CFM) \times 60}{Room\ Volume\ (CFT)} \)

ASHRAE Standard 62.1-2019: Standard listing supply and OSA amounts to calculated new design buildings. The Standard also includes a table (Table L-1) providing check values for ventilation rates for existing buildings. This table and calculated outside airflows are check values ONLY and based on assumed and standardized default settings. In no way can these values determine a PASS/FAIL criteria for any rooms. It is only to provide check values, assuming default values for occupancy and a multi-zone HVAC system to simplify calculations.

2. HVAC System

Each tested HVAC system was set to maximum airflow capacity at the time of testing. The numbers listed in this report give the maximum possible supply airflow for each area with the current HVAC system (exceptions are noted in the attached data sheets).

**FIRST FLOOR:**

- **Original Testing Feb. 2021:**
  The first floor has an OSA setting of 50% and the VAV duct static pressure was recorded with 1.75“WC at the time of testing.

- **REV 1: 7/8/2021:**
  OSA was changed to 100% in May 2021. Certain rooms were re-tested to verify change in OSA did not change overall airflow in the area.
SECOND FLOOR:

- **Original Testing Feb. 2021:**
  OSA setting of 100%. The duct static pressure was recorded with 1.5"WC at the time of testing.

- **REV 1: 7/8/2021:**
  Duct static pressure was recorded with 2.75"WC; VFD setting increased to 75%.

THIRD FLOOR:

- **Original Testing Feb. 2021:**
  The third floor has 100% OSA. The duct static pressure was recorded with 1.9"WC at the time of testing. Exception is Room 309 which is supplied by AH-4 with 20% OSA. Damper setting could be manually changed if needed.

- **REV 1: 7/8/2021:**
  AH-3 set to 1.75"WC static pressure and 100% OSA. Filters were changed before testing. VAV setting for Room 332 was set to 75%. AH-4 (Room 309) OSA was set to 75%.

### 2.1. Room Data

Room areas (in square feet) were given to Palt and Associates by SBCC and were NOT measured or verified on site. Room height of each individual room was measured by Palt and Associates on site.

All data taken are listed in the attached data sheets, organized by building and floor. Each data sheet lists room area, room height, calculated room volume, testes Supply Airflow and Supply Air Change Rates.

Outside Air amounts (OSA) were NOT tested. OSA was calculated by using the DDC systems information (provided by SBCC) for each individual system and are noted in the data sheets. These numbers are used to calculate the Outside Air Change Rate, which differs from the Supply Air Change Rate (less), unless the system provides 100% outside air.

The subject of this report is to report tested airflows only. Assumptions based on these data regarding health and safety of occupants are in no way the responsibility of Palt and Associates Inc. This airflow study can only report test data at one point in time (at the time of testing) and help evaluate the condition and performance of the mechanical HVAC system tested.

Note: HVAC design calculations in California are based on minimum energy consumption. Conditioning of outside air requires energy and is set to the minimum amount.
3. Supply Airflow Testing

Airflow measurements were obtained using a Shortridge Instruments ADM860 Air Data Multimeter with a Flowhood adapter (tent) wherever possible. If the use of the Flowhood was not feasible due to ceiling height (lecture halls, theatres, gym) the main supply air duct for the specific area was traversed using a Shortridge Multimeter with Airfoil adapter. Small holes were drilled into the ductwork and velocity readings were taken across the entire opening of the duct. The average velocity was multiplied by the open area of the duct to calculate the supply airflow.

4. Data Analysis

Required air change rates (ACR) and outside airflow depends on multiple factors: Size and volume of room, usage of room, and occupancy. A minimum Outside Air Amount of ACR = 4-6 for classrooms can be used as a guideline ONLY. Correct requirements per ASHRAE Standard have to be calculated for each room specifically.

To verify and check ventilation rates, ASHRAE Standard 62.1-2019 includes a table listing “Combined Outdoor Air Rate” in CFM/SQFT for different Occupancy Categories. This list is NOT intended for design purpose and is used to provide check values ONLY, with assumed default values to simplify calculations.

Using this table, outdoor airflow rates were calculated for each room and compared to the current, tested outdoor airflow rates.
5. Test Data Summary

The following table shows a summary of the main tested data compiled during the airflow study. More detailed information for each area tested are arranged at the end of this report.

**EBS Building First Floor:**

<table>
<thead>
<tr>
<th>Room #</th>
<th>Category</th>
<th>Total SA Airflow</th>
<th>Calculated OSA Airflow</th>
<th>ASHRAE STANDARD 62.1-2019 Table L-1 Ventilation Check Table</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tested</td>
<td></td>
<td>Min. required OSA Airflow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CFM</td>
<td>CFM</td>
<td>CFM</td>
</tr>
<tr>
<td>101</td>
<td>Tutoring Room</td>
<td>505</td>
<td>505</td>
<td>25</td>
</tr>
<tr>
<td>102</td>
<td>Lecture Room</td>
<td>1,950</td>
<td>1,950</td>
<td>788</td>
</tr>
<tr>
<td>109</td>
<td>Storage &amp; Prep</td>
<td>961</td>
<td>961</td>
<td>110</td>
</tr>
<tr>
<td>110</td>
<td>Office</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>111</td>
<td>Office</td>
<td>36</td>
<td>36</td>
<td>11</td>
</tr>
<tr>
<td>112</td>
<td>Office</td>
<td>38</td>
<td>38</td>
<td>11</td>
</tr>
<tr>
<td>113</td>
<td>Office</td>
<td>36</td>
<td>36</td>
<td>11</td>
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<tr>
<td>114</td>
<td>Conference Room</td>
<td>628</td>
<td>628</td>
<td>73</td>
</tr>
<tr>
<td>115</td>
<td>Science Lab</td>
<td>1,484</td>
<td>1,484</td>
<td>907</td>
</tr>
<tr>
<td>116</td>
<td>Office</td>
<td>89</td>
<td>89</td>
<td>12</td>
</tr>
<tr>
<td>117</td>
<td>Office</td>
<td>253</td>
<td>253</td>
<td>12</td>
</tr>
<tr>
<td>118</td>
<td>Office</td>
<td>277</td>
<td>277</td>
<td>12</td>
</tr>
<tr>
<td>119</td>
<td>Office</td>
<td>327</td>
<td>327</td>
<td>39</td>
</tr>
<tr>
<td>123</td>
<td>Science Lab</td>
<td>1,252</td>
<td>1,252</td>
<td>994</td>
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<tr>
<td>124</td>
<td>Storage</td>
<td>120</td>
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</tr>
<tr>
<td>125-1</td>
<td>Tutoring Room</td>
<td>31</td>
<td>31.0</td>
<td>16</td>
</tr>
<tr>
<td>125-2</td>
<td>Tutoring Room</td>
<td>29</td>
<td>29</td>
<td>16</td>
</tr>
</tbody>
</table>

Rooms 115 & 123 were re-tested after OSA was increased to 100% to verify overall supply airflow did not change for any of the rooms by the increase in OSA.

Individual Fan Coil for Room 110 is still broken.
EBS Building Second Floor:

<table>
<thead>
<tr>
<th>Room #</th>
<th>Category</th>
<th>Total SA Airflow</th>
<th>Calculated OSA Airflow</th>
<th>Min. required OSA Airflow</th>
<th>Within ASHRAE Requirements</th>
<th>Recommendation</th>
<th>Re-tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CFM</td>
<td>CFM</td>
<td>CFM</td>
<td>Yes / No</td>
<td></td>
<td>7/8/21</td>
</tr>
<tr>
<td>201</td>
<td>Botany Lab</td>
<td>535</td>
<td>535</td>
<td>644</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Botany Lab</td>
<td>737</td>
<td>737</td>
<td>644</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Biology Lab</td>
<td>580</td>
<td>580</td>
<td>644</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Biology Lab</td>
<td>809</td>
<td>809</td>
<td>644</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>209</td>
<td>Environ Zoology Lab</td>
<td>932</td>
<td>932</td>
<td>644</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>Marine Biology Lab</td>
<td>636</td>
<td>636</td>
<td>644</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>Marine Biology Lab</td>
<td>840</td>
<td>840</td>
<td>644</td>
<td>YES</td>
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<td></td>
</tr>
<tr>
<td>211</td>
<td>Library</td>
<td>62</td>
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<td></td>
</tr>
<tr>
<td>211</td>
<td>Library</td>
<td>55</td>
<td>55</td>
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</tr>
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<td>212</td>
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<td>259</td>
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<td>YES</td>
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<td></td>
</tr>
<tr>
<td>212</td>
<td>Office</td>
<td>179</td>
<td>179</td>
<td>13</td>
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</tr>
<tr>
<td>213</td>
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<td>13</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>213</td>
<td>Office</td>
<td>98</td>
<td>98</td>
<td>13</td>
<td>YES</td>
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<td></td>
</tr>
<tr>
<td>215</td>
<td>Computer Class room</td>
<td>439</td>
<td>439</td>
<td>333</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>216</td>
<td>Computer / Server</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
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<tr>
<td>218</td>
<td>Office</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>218</td>
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<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>219</td>
<td>Chemicals / Glassware</td>
<td>328</td>
<td>328</td>
<td>570</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>219</td>
<td>Chemicals / Glassware</td>
<td>623</td>
<td>623</td>
<td>570</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
</tbody>
</table>

Highlighted in grey are the areas that were re-tested on 7/8/2021. Most areas now meet the ASHRAE requirements with exception of Room 211, and 216 (still has 0 airflow and must be checked by Facility).
### EBS Building Third Floor:

<table>
<thead>
<tr>
<th>Room #</th>
<th>Category</th>
<th>Total SA Airflow</th>
<th>Calculated OSA Airflow</th>
<th>Min. required OSA Airflow</th>
<th>Within ASHRAE Requirements</th>
<th>Recommendation</th>
<th>Re-tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>Lecture</td>
<td>2,124</td>
<td>2,124</td>
<td>1,934</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Office</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>305</td>
<td>Office</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>7/8/21</td>
</tr>
<tr>
<td>306</td>
<td>Office</td>
<td>112</td>
<td>112</td>
<td>12</td>
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<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>307</td>
<td>Office</td>
<td>135</td>
<td>135</td>
<td>7</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>308</td>
<td>Office</td>
<td>129</td>
<td>129</td>
<td>7</td>
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<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>309</td>
<td>Lecture</td>
<td>3,207</td>
<td>2,405</td>
<td>2,275</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>312</td>
<td>Bio Med Lab</td>
<td>1,018</td>
<td>1,018</td>
<td>644</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>Micro Lab</td>
<td>971</td>
<td>971</td>
<td>644</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>314</td>
<td>Office</td>
<td>258</td>
<td>258</td>
<td>11</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>Office</td>
<td>279</td>
<td>279</td>
<td>11</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>319</td>
<td>Office</td>
<td>127</td>
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<td></td>
</tr>
<tr>
<td>320</td>
<td>Office</td>
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<td>0</td>
<td>10</td>
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<td>See section 5.1, 1 thru 4</td>
<td></td>
</tr>
<tr>
<td>321</td>
<td>Office</td>
<td>101</td>
<td>101</td>
<td>10</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
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</tr>
<tr>
<td>322</td>
<td>Office</td>
<td>135</td>
<td>135</td>
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<td>See section 5.1, 1 thru 3</td>
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</tr>
<tr>
<td>323</td>
<td>Office</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>324</td>
<td>Office</td>
<td>167</td>
<td>167</td>
<td>12</td>
<td>YES</td>
<td>See section 5.1, 1 thru 3</td>
<td></td>
</tr>
<tr>
<td>328</td>
<td>Micro Prep</td>
<td>0</td>
<td>0</td>
<td>123</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>331</td>
<td>Storage &amp; Prep</td>
<td>139</td>
<td>139</td>
<td>174</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>332</td>
<td>Bio Tech Prep</td>
<td>124</td>
<td>124</td>
<td>144</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>333</td>
<td>Office</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>334</td>
<td>Office</td>
<td>148</td>
<td>148</td>
<td>6</td>
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<td>See section 5.1, 1 thru 3</td>
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</tr>
<tr>
<td>335</td>
<td>Inoculation Room</td>
<td>0</td>
<td>0</td>
<td>46</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>2/23/21</td>
</tr>
<tr>
<td>335</td>
<td>Inoculation Room</td>
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<td>0</td>
<td>46</td>
<td>NO</td>
<td>See section 5.1, 1 thru 4</td>
<td>7/8/21</td>
</tr>
</tbody>
</table>

**REV 1:**

Fan Coil for Office 305 and 320 are still broken (re-tested 7/8/2021).

Rooms 328, 333 and 335 still don’t have airflow (facility to check / repair).

Room 323 was re-tested and balanced 7/8/2021.
5.1. Recommendations:

The following list are recommendations applicable for all areas - especially for the areas with outside airflows below minimum ASHRAE recommendations:

1. Increase mechanical outside airflow from current minimum setting to maximum setting wherever possible; re-calculate calculated outside airflows for new OSA settings and reevaluate outside airflows.

2. Open windows to increase outside air amount and fresh air circulation throughout the room; this method cannot be “tested”, as airflow testing can only be performed for mechanical systems (airflow amount through an open window will change depending on outside air conditions, wind, temperature etc.); however, it will increase the outside airflow in the classroom. Strategically placed fans in front of windows will help outside air circulation throughout the room. If necessary, smoke studies can be performed to help visualize airflow pattern and currents throughout the classroom.

3. Minimize class density; above listed recommended outside airflows per ASHRAE Table L-1 assume standard occupancy

4. Place portable HEPA filter air purifiers in classrooms of concern. These units recirculate room air at a specified rate (can be tested) through a system of pre- and HEPA filters and help provide clean filtrated air to the area.
5.2. **Portable HEPA Filters:**

As listed in 5.1 Recommendations #4; portable HEPA filter units can be added to the rooms that did not pass ASHRAE requirements. SBCC recently purchased a large number of these portable filters that have been distributed throughout the campus. If placed in a room, these units recirculate room air constantly throughout their HEPA filters and internal UV light system, providing filtered cleaned air to the room. Airflow readings were taken of multiple units throughout the campus (at full speed). Average airflow of the small units MA-50 are 400 CFM and the medium units MA-112 are 537 CFM.

The following table shows the results of the above listed rooms that did not pass ASHRAE requirements with OSA provided from the HVAC system only. With an additional portable HEPA filter placed in each room, the results are as follows:

<table>
<thead>
<tr>
<th>Room #</th>
<th>Category</th>
<th>Added HEPA Filter</th>
<th>OSA (HVAC + HEPA)</th>
<th>ASHRAE Requ.</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>CFM</strong></td>
<td><strong>Size</strong></td>
<td><strong>CFM</strong></td>
<td><strong>CFM</strong></td>
</tr>
<tr>
<td>110</td>
<td>Office</td>
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6. **Conclusion and Discussion:**

All tested airflow listed in this report can only be used to evaluate the condition of the HVAC system. The original design parameters for the rooms and buildings are currently unknown. All comparison values are recommendations only, using comparison tables and current mechanical standards as references. These standards are meant to evaluate the HVAC systems only and cannot in any way be used in regard to health and safety recommendations. Recommendations listed in this report are based on current CDC, NEBB and similar organizations knowledge, recommendations, and suggestions.

Common best practice recommendations for all areas:

- Run HVAC system continuously; at a minimum perform building flush-outs by running mechanical airflows two hour prior and two hours past building occupancy
- Continue to use MERV 13 Filters in all HVAC Systems with monthly check up on filter loading / change out
- Continue to clean and sanitize all areas in use
- Continue to request face covering to be always worn on campus
- Continue to minimize close contact and maintain a safe distance
- Increase total Supply Airflow if Supply Airflow Rate is low
- Increase OSA airflow to maximum possible amount
- Open windows in all areas possible and whenever spaces are occupied
- Place portable HEPA filter units in areas of concern

Further options of upgrading the mechanical systems are currently available, for example installation of UV lights inside HVAC units or Ionization units in supply air ducts. However, these methods are costly and are not short term / fast options as they require major changes to the mechanical systems. Their effectiveness must be evaluated regarding their costs (installation and maintenance) and installation duration.

7. APPENDIX

7.1. Detailed building summary

7.1.1. EBS Building First Floor

<table>
<thead>
<tr>
<th>Room #</th>
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<th>Calculated OSA Airflow</th>
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ASHRAE STANDARD 62.1-2019 Table L-1 Ventilation Check Table

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<td>5.3 971 5.3</td>
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<tr>
<td>319</td>
<td>Office</td>
<td>902 127</td>
<td>8.5 127 8.5</td>
<td></td>
<td></td>
<td></td>
<td>92</td>
<td>Office</td>
<td>0.11 10</td>
<td>1555%</td>
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<tr>
<td>320</td>
<td>Office</td>
<td>902 0</td>
<td>0.0 0 0.0</td>
<td></td>
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<td>-100%</td>
</tr>
<tr>
<td>321</td>
<td>Office</td>
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<td>6.7 101 6.7</td>
<td></td>
<td></td>
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<td>Office</td>
<td>0.11 10</td>
<td>898%</td>
</tr>
<tr>
<td>322</td>
<td>Office</td>
<td>902 135</td>
<td>9.0 135 9.0</td>
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<td></td>
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<td>92</td>
<td>Office</td>
<td>0.11 10</td>
<td>1234%</td>
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<td>902 0</td>
<td>0.0 0 0.0</td>
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<td>Office</td>
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<td>902 167</td>
<td>11.1 167 11.1</td>
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<td>216</td>
<td>Science Laboratory</td>
<td>0.57 123</td>
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<td>331</td>
<td>Storage &amp; Prep</td>
<td>2,959 139</td>
<td>2.8 139 2.8</td>
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<td>305</td>
<td>Science Laboratory</td>
<td>0.57 174</td>
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<tr>
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<td>Bio Tech Prep</td>
<td>2,520 124</td>
<td>3.0 124 3.0</td>
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<td></td>
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<td>Science Laboratory</td>
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<td>-23%</td>
</tr>
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<td>333</td>
<td>Office</td>
<td>800 0</td>
<td>0.0 0 0.0</td>
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<td>-100%</td>
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<tr>
<td>335</td>
<td>Inoculation Room</td>
<td>744 0</td>
<td>0.0 0 0.0</td>
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<td>80</td>
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<td>0.57 46</td>
<td>-100%</td>
</tr>
<tr>
<td>335</td>
<td>Inoculation Room</td>
<td>744 0</td>
<td>0.0 0 0.0</td>
<td></td>
<td></td>
<td></td>
<td>80</td>
<td>Science Laboratory</td>
<td>0.57 46</td>
<td>-100%</td>
</tr>
</tbody>
</table>
## 7.2. Equipment Calibration Certificates

### Allometrics

1425 B Atlantis Dr, Webster, Tx 77598  
(800) 528-2246 Fax (281) 474-5482  
www.allometrics.com

### Calibration Certificate

**001102024**

| Customer: | PALT AND ASSOC INC  
| Serial Number: | M95752RF5  
| Manufacturer: | SHORTRIDGE INSTRUMENTS  
| Model Number: | ADM-860  
| Location: |  
| Work Order: | 00112424  
| Test Result: | PASS  
| Cal Date: | 8/17/2020  
| Next Cal Date: | 08/17/2021  
| Date of Issue: | 08/17/2020  
| Performed At: | ALLOMETRICS LABORATORY  
| Performed By: | TFIREBAUGH  

Calibrations by Allometrics are performed in accordance with the principles of ISO 9001:2013. Allometrics maintains a Quality Management System accredited to ISO/IEC 17025:2017. The use of the Accrediting Body’s logo is exclusive to calibrations where the contractual obligations meet the minimum requirements as specified by ISO/IEC 17025:2005 and the Accrediting Body. For additional information regarding Allometrics' accredited status visit the A2LA website and view scope 2039.01.

The standards listed under the Test Equipment section and used in this calibration are traceable through NIST (National Institute for Standards and Technology) to the SI (International System of Units).

**TEST ENVIRONMENT**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.58°C</td>
<td>45.8 %</td>
</tr>
</tbody>
</table>

**UIUT CONFORMITY TEST DATA**

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Test Point</th>
<th>Unit</th>
<th>Minimum</th>
<th>Maximum</th>
<th>As Found</th>
<th>P/F</th>
<th>As Left</th>
<th>P/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Absolute Pressure</td>
<td>30.01</td>
<td>inHg</td>
<td>29.31</td>
<td>30.71</td>
<td>30.02</td>
<td>P</td>
<td>30.02</td>
<td>P</td>
</tr>
<tr>
<td>2</td>
<td>Differential Pressure</td>
<td>0.0500</td>
<td>inHg</td>
<td>0.0480</td>
<td>0.0520</td>
<td>0.0508</td>
<td>P</td>
<td>0.0508</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>0.1250</td>
<td>inHg</td>
<td>0.1215</td>
<td>0.1285</td>
<td>0.1228</td>
<td>P</td>
<td>0.1228</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.2250</td>
<td>inHg</td>
<td>0.2195</td>
<td>0.2305</td>
<td>0.2274</td>
<td>P</td>
<td>0.2274</td>
<td>P</td>
<td></td>
</tr>
<tr>
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<td>1.0000</td>
<td>inHg</td>
<td>0.979</td>
<td>1.021</td>
<td>0.992</td>
<td>P</td>
<td>0.992</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2.0000</td>
<td>inHg</td>
<td>1.959</td>
<td>2.041</td>
<td>2.001</td>
<td>P</td>
<td>2.001</td>
<td>P</td>
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</tr>
<tr>
<td>7</td>
<td>3.6000</td>
<td>inHg</td>
<td>3.527</td>
<td>3.673</td>
<td>3.571</td>
<td>P</td>
<td>3.571</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>27.00</td>
<td>inHg</td>
<td>26.46</td>
<td>27.54</td>
<td>26.73</td>
<td>P</td>
<td>26.73</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Low Velocity Confirmation</td>
<td>100</td>
<td>fpm</td>
<td>90</td>
<td>110</td>
<td>101</td>
<td>P</td>
<td>101</td>
<td>P</td>
</tr>
<tr>
<td>10</td>
<td>w/ pitot tube</td>
<td>500</td>
<td>fpm</td>
<td>478</td>
<td>522</td>
<td>498</td>
<td>P</td>
<td>498</td>
<td>P</td>
</tr>
</tbody>
</table>

**TEST EQUIPMENT**

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<th>Description</th>
<th>Asset ID</th>
<th>Cal. Due Date</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1516</td>
<td>2/8/2021</td>
<td></td>
</tr>
<tr>
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<td>1516A</td>
<td>2/8/2021</td>
<td></td>
</tr>
<tr>
<td>OMEGA/W3T4401-D/WIND TUNNEL SYSTEM</td>
<td>1904</td>
<td>11/26/2021</td>
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</table>

**PROCEDURE**

<table>
<thead>
<tr>
<th>Procedure Name</th>
<th>Revision</th>
<th>Description</th>
<th>Date</th>
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<tr>
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<td>C</td>
<td>CALIBRATION PROCEDURE FOR PRESSURE DEVICES</td>
<td>11/4/2019</td>
</tr>
</tbody>
</table>

**COMMENTS**

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04.ISO9001.01  
Page 1 of 1
Calibration Certificate

001102026

Customer: PALT AND ASSOC INC
6110 WILD HORSE PL
PASO ROBLES, CA, 93446-8408

Serial Number: M891011RFS
Asset ID: M891011RFS
Model Number: ADM-860

Manufacturer: SHORTRIDGE INSTRUMENTS

Test Result: PASS
Cal Date: 8/17/2020
Next Cal Date: 08/17/2021
Date of Issue: 08/17/2020

Performed By: TIREBAUGH

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The standards listed under the Test Equipment section and used in this calibration are traceable through NIST (National Institute for Standards and Technology) to the SI (International System of Units).

ACCEPTANCE OF THIS CERTIFICATION OR CALIBRATION DOCUMENT OR THE CONTINUED USE OF THE EQUIPMENT LISTED ON THIS DOCUMENT INDICATES AGREEMENT WITH ALLOMETRICS INC. TERMS AND CONDITIONS AS FOUND AT https://www.allometrics.com/terms-and-conditions/ AND AGREEMENT THAT THOSE CONDITIONS GOVERN ANY TRANSACTION RELATED TO THE CERTIFICATION, CALIBRATION, REPAIR OR USE OF ANY EQUIPMENT LISTED ON OR ASSOCIATED WITH THIS DOCUMENT.

**TEST ENVIRONMENT**

Temperature: 20.58 °C
Humidity: 45.8 %

**UUT CONFORMITY TEST DATA**

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Test Point</th>
<th>Unit</th>
<th>Minimum</th>
<th>Maximum</th>
<th>As Found</th>
<th>P/F</th>
<th>As Left</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>30.02</td>
<td>inHg</td>
<td>29.32</td>
<td>30.72</td>
<td>30.30</td>
<td>P</td>
<td>30.30</td>
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<tr>
<td>2</td>
<td>Differential Pressure</td>
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<td>in wc</td>
<td>0.0480</td>
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<td>0.0487</td>
<td>P</td>
<td>0.0487</td>
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<tr>
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<td></td>
<td>0.1250</td>
<td>in wc</td>
<td>0.1215</td>
<td>0.1285</td>
<td>0.1273</td>
<td>P</td>
<td>0.1273</td>
<td>P</td>
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<tr>
<td>4</td>
<td></td>
<td>0.2250</td>
<td>in wc</td>
<td>0.2195</td>
<td>0.2305</td>
<td>0.2234</td>
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<td>P</td>
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<tr>
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<td>Low Velocity Confirmation</td>
<td>100</td>
<td>fpm</td>
<td>90</td>
<td>110</td>
<td>101</td>
<td>P</td>
<td>101</td>
<td>P</td>
</tr>
<tr>
<td>10</td>
<td>w/ pitot tube</td>
<td>500</td>
<td>fpm</td>
<td>478</td>
<td>522</td>
<td>497</td>
<td>P</td>
<td>497</td>
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**TEST EQUIPMENT**

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<th>Asset ID</th>
<th>Cal. Due Date</th>
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<td>11/26/2021</td>
</tr>
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<td>11/26/2021</td>
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<td>1904</td>
<td>11/26/2021</td>
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**PROCEDURE**

<table>
<thead>
<tr>
<th>Procedure Name</th>
<th>Revision</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>QWI 19-45</td>
<td>C</td>
<td>CALIBRATION PROCEDURE FOR PRESSURE DEVICES</td>
<td>11/4/2019</td>
</tr>
</tbody>
</table>

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### 7.3. ASHRAE Standard 62.1-2019 Table L-1

(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

**INFORMATIVE APPENDIX L**

**VENTILATION RATE CHECK TABLE**

Table L-1 is not for design purposes. It is intended to provide check values. Default rate per unit area is based on a multiple-zone system with default occupancy and default $E_v$ that equals 0.75. This is the default $E_v$ in the simplified rate when $D > 0.60$.

**Table L-1 Check Table for the Ventilation Rate Procedure**

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<thead>
<tr>
<th>Occupancy Category</th>
<th>Combined Outdoor Air Rate ($R_c$)</th>
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<tr>
<td></td>
<td>cfm/ft²</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Animal Facilities</th>
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</thead>
<tbody>
<tr>
<td>Animal exam room (veterinary office)</td>
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<tr>
<td>Animal imaging (MRI/CT/PET)</td>
<td>0.51</td>
</tr>
<tr>
<td>Animal operating rooms</td>
<td>0.51</td>
</tr>
<tr>
<td>Animal postoperative recovery room</td>
<td>0.51</td>
</tr>
<tr>
<td>Animal preparation rooms</td>
<td>0.51</td>
</tr>
<tr>
<td>Animal procedure room</td>
<td>0.51</td>
</tr>
<tr>
<td>Animal surgery scrub</td>
<td>0.51</td>
</tr>
<tr>
<td>Large-animal holding room</td>
<td>0.51</td>
</tr>
<tr>
<td>Necropsy</td>
<td>0.51</td>
</tr>
<tr>
<td>Small-animal-cage room (static cages)</td>
<td>0.51</td>
</tr>
<tr>
<td>Small-animal-cage room (ventilated cages)</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correctional Facilities</th>
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</thead>
<tbody>
<tr>
<td>Booking/waiting</td>
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<td>Cell</td>
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</tr>
<tr>
<td>Dayroom</td>
<td>0.28</td>
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<td>Guard stations</td>
<td>0.18</td>
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</table>

<table>
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</tr>
<tr>
<td>Classrooms (ages 5 through 8)</td>
<td>0.49</td>
</tr>
<tr>
<td>Classrooms (ages 9 plus)</td>
<td>0.63</td>
</tr>
<tr>
<td>Computer lab</td>
<td>0.49</td>
</tr>
<tr>
<td>Daycare sickroom</td>
<td>0.57</td>
</tr>
<tr>
<td>Daycare (through age 4)</td>
<td>0.57</td>
</tr>
<tr>
<td>Lecture classroom</td>
<td>0.73</td>
</tr>
<tr>
<td>Lecture hall (fixed seats)</td>
<td>1.58</td>
</tr>
<tr>
<td>Libraries</td>
<td>0.23</td>
</tr>
<tr>
<td>Media center</td>
<td>0.49</td>
</tr>
</tbody>
</table>
### Table L-1 Check Table for the Ventilation Rate Procedure (Continued)

<table>
<thead>
<tr>
<th>Occupancy Category</th>
<th>Combined Outdoor Air Rate ($R_c$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cfm/ft²</td>
</tr>
<tr>
<td>Multisuse assembly</td>
<td>1.08</td>
</tr>
<tr>
<td>Music/theater/dance</td>
<td>0.55</td>
</tr>
<tr>
<td>Science laboratories</td>
<td>0.57</td>
</tr>
<tr>
<td>University/college laboratories</td>
<td>0.57</td>
</tr>
<tr>
<td>Wood/metal shop</td>
<td>0.51</td>
</tr>
<tr>
<td><strong>Food and Beverage Service</strong></td>
<td></td>
</tr>
<tr>
<td>Bars, cocktail lounges</td>
<td>1.24</td>
</tr>
<tr>
<td>Cafeteria/fast-food dining</td>
<td>1.24</td>
</tr>
<tr>
<td>Kitchen (cooking)</td>
<td>0.36</td>
</tr>
<tr>
<td>Restaurant dining rooms</td>
<td>0.94</td>
</tr>
<tr>
<td><strong>Food and Beverage Service, General</strong></td>
<td></td>
</tr>
<tr>
<td>Break rooms</td>
<td>0.25</td>
</tr>
<tr>
<td>Coffee stations</td>
<td>0.21</td>
</tr>
<tr>
<td>Conference/meeting</td>
<td>0.41</td>
</tr>
<tr>
<td>Corridors</td>
<td>0.08</td>
</tr>
<tr>
<td>Occupiable storage rooms for liquids or gels</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Hotels, Motels, Resorts, Dormitories</strong></td>
<td></td>
</tr>
<tr>
<td>Barracks sleeping areas</td>
<td>0.21</td>
</tr>
<tr>
<td>Bedroom/living room</td>
<td>0.15</td>
</tr>
<tr>
<td>Laundry rooms (central)</td>
<td>0.23</td>
</tr>
<tr>
<td>Laundry rooms within dwelling units</td>
<td>0.23</td>
</tr>
<tr>
<td>Lobbies/prefunction</td>
<td>0.38</td>
</tr>
<tr>
<td>Multipurpose assembly</td>
<td>0.88</td>
</tr>
<tr>
<td><strong>Miscellaneous Spaces</strong></td>
<td></td>
</tr>
<tr>
<td>Banks or bank lobbies</td>
<td>0.23</td>
</tr>
<tr>
<td>Bank vaults/safe deposit</td>
<td>0.11</td>
</tr>
<tr>
<td>Computer (not printing)</td>
<td>0.11</td>
</tr>
<tr>
<td>Freezer and refrigerated spaces (&lt;50°F [10°C])</td>
<td>0.03</td>
</tr>
<tr>
<td>General manufacturing (excludes heavy industrial and processes using chemicals)</td>
<td>0.33</td>
</tr>
<tr>
<td>Pharmacy (prep area)</td>
<td>0.31</td>
</tr>
<tr>
<td>Photo studios</td>
<td>0.23</td>
</tr>
<tr>
<td>Shipping/receiving</td>
<td>0.19</td>
</tr>
<tr>
<td>Sorting, packing, light assembly</td>
<td>0.23</td>
</tr>
<tr>
<td>Telephone closets</td>
<td>0.00</td>
</tr>
<tr>
<td>Transportation waiting</td>
<td>1.08</td>
</tr>
<tr>
<td>Warehouses</td>
<td>0.09</td>
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</table>
### Table L-1 Check Table for the Ventilation Rate Procedure (Continued)

<table>
<thead>
<tr>
<th>Occupancy Category</th>
<th>Combined Outdoor Air Rate ($R_c$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cfm/ft²</td>
</tr>
<tr>
<td><strong>Office Buildings</strong></td>
<td></td>
</tr>
<tr>
<td>Breakrooms</td>
<td>0.49</td>
</tr>
<tr>
<td>Main entry lobbies</td>
<td>0.15</td>
</tr>
<tr>
<td>Occupiable storage rooms for dry materials</td>
<td>0.09</td>
</tr>
<tr>
<td>Office space</td>
<td>0.11</td>
</tr>
<tr>
<td>Reception areas</td>
<td>0.28</td>
</tr>
<tr>
<td>Telephone/data entry</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>Outpatient Health Care Facilities</strong></td>
<td></td>
</tr>
<tr>
<td>Birthing room</td>
<td>0.44</td>
</tr>
<tr>
<td>Class 1 imaging rooms</td>
<td>0.19</td>
</tr>
<tr>
<td>Dental operatory</td>
<td>0.51</td>
</tr>
<tr>
<td>General examination room</td>
<td>0.36</td>
</tr>
<tr>
<td>Other dental treatment areas</td>
<td>0.11</td>
</tr>
<tr>
<td>Physical therapy exercise area</td>
<td>0.43</td>
</tr>
<tr>
<td>Physical therapy individual room</td>
<td>0.35</td>
</tr>
<tr>
<td>Physical therapeutic pool area</td>
<td>0.64</td>
</tr>
<tr>
<td>Prosthetics and orthotics room</td>
<td>0.51</td>
</tr>
<tr>
<td>Psychiatric consultation room</td>
<td>0.21</td>
</tr>
<tr>
<td>Psychiatric examination room</td>
<td>0.21</td>
</tr>
<tr>
<td>Psychiatric group room</td>
<td>0.41</td>
</tr>
<tr>
<td>Psychiatric seclusion room</td>
<td>0.15</td>
</tr>
<tr>
<td>Urgent care examination room</td>
<td>0.36</td>
</tr>
<tr>
<td>Urgent care observation room</td>
<td>0.21</td>
</tr>
<tr>
<td>Urgent care treatment room</td>
<td>0.44</td>
</tr>
<tr>
<td>Urgent care triage room</td>
<td>0.51</td>
</tr>
<tr>
<td>Speech therapy room</td>
<td>0.21</td>
</tr>
<tr>
<td><strong>Public Assembly Spaces</strong></td>
<td></td>
</tr>
<tr>
<td>Auditorium seating area</td>
<td>1.08</td>
</tr>
<tr>
<td>Courtrooms</td>
<td>0.55</td>
</tr>
<tr>
<td>Legislative chambers</td>
<td>0.41</td>
</tr>
<tr>
<td>Libraries</td>
<td>0.23</td>
</tr>
<tr>
<td>Lobbies</td>
<td>1.08</td>
</tr>
<tr>
<td>Museums (children’s)</td>
<td>0.56</td>
</tr>
<tr>
<td>Museums/galleries</td>
<td>0.48</td>
</tr>
<tr>
<td>Places of religious worship</td>
<td>0.88</td>
</tr>
</tbody>
</table>
### Table L-1 Check Table for the Ventilation Rate Procedure (Continued)

<table>
<thead>
<tr>
<th>Occupancy Category</th>
<th>Combined Outdoor Air Rate ($R_c$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cfm/ft²</td>
</tr>
<tr>
<td><strong>Retail</strong></td>
<td></td>
</tr>
<tr>
<td>Sales (except as below)</td>
<td>0.31</td>
</tr>
<tr>
<td>Barbershop</td>
<td>0.33</td>
</tr>
<tr>
<td>Beauty and nail salons</td>
<td>0.83</td>
</tr>
<tr>
<td>Coin-operated laundries</td>
<td>0.36</td>
</tr>
<tr>
<td>Mall common areas</td>
<td>0.48</td>
</tr>
<tr>
<td>Pet shops (animal areas)</td>
<td>0.34</td>
</tr>
<tr>
<td>Supermarket</td>
<td>0.16</td>
</tr>
<tr>
<td><strong>Sports and Entertainment</strong></td>
<td></td>
</tr>
<tr>
<td>Bowling alley (seating)</td>
<td>0.69</td>
</tr>
<tr>
<td>Disco/dance floors</td>
<td>2.75</td>
</tr>
<tr>
<td>Gambling casinos</td>
<td>1.44</td>
</tr>
<tr>
<td>Game arcades</td>
<td>0.44</td>
</tr>
<tr>
<td>Gym, sports arena (play area)</td>
<td>0.43</td>
</tr>
<tr>
<td>Health club/aerobics room</td>
<td>1.15</td>
</tr>
<tr>
<td>Health club/weight rooms</td>
<td>0.35</td>
</tr>
<tr>
<td>Spectator areas</td>
<td>1.58</td>
</tr>
<tr>
<td>Stages, studios</td>
<td>1.01</td>
</tr>
<tr>
<td>Swimming (pool and deck)</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>Transient Residential</strong></td>
<td></td>
</tr>
<tr>
<td>Dwelling unit</td>
<td>0.10</td>
</tr>
</tbody>
</table>

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7.4. Building Floor Layout
7.5. **Detailed room data sheets**
## Building: EBS-01
### Room: 101  Tutoring Room

| Room Area: 228 SQFT | Room Height: 9.8 FT | Room Volume: 2,223.0 CFT |

**Tested Supply Airflow =** 505.0 CFM  
**Tested SA Air Change Rate =** 13.6 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 505.0 CFM

**Calc. OSA Air Change Rate =** 13.6 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>246</td>
</tr>
<tr>
<td>SA#2</td>
<td>259</td>
</tr>
<tr>
<td>Total</td>
<td>505</td>
</tr>
</tbody>
</table>

## Building: EBS-01
### Room: 102  Lecture Room

| Room Area: 1,080 SQFT | Room Height: 9.5 FT | Room Volume: 10,260.0 CFT |

**Tested Supply Airflow =** 1,950.0 CFM  
**Tested SA Air Change Rate =** 11.4 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 1,950.0 CFM

**Calc. OSA Air Change Rate =** 11.4 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
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<td>339</td>
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<tr>
<td>SA#2</td>
<td>302</td>
</tr>
<tr>
<td>SA#3</td>
<td>0</td>
</tr>
<tr>
<td>SA#4</td>
<td>312</td>
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<tr>
<td>Total</td>
<td>953</td>
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</tbody>
</table>

<table>
<thead>
<tr>
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<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#5</td>
<td>317</td>
</tr>
<tr>
<td>SA#6</td>
<td>351</td>
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<tr>
<td>SA#7</td>
<td>329</td>
</tr>
<tr>
<td>SA#8</td>
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</tr>
<tr>
<td>Total</td>
<td>997</td>
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</tbody>
</table>
### EBS-01

**Storage & Prep**

- **Room Area:** 998 SQFT
- **Room Height:** 9.1 FT
- **Room Volume:** 9,081.8 CFT

Tested Supply Airflow = 961.0 CFM

| Tested SA Air Change Rate = 6.3 AC/hr |

<table>
<thead>
<tr>
<th>OSA % (DDC):</th>
<th>100%</th>
</tr>
</thead>
</table>

**OSA % changed to 100% May 2021**

OSA calculated = 961.0 CFM

| Calc. OSA Air Change Rate = 6.3 AC/hr |

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>174</td>
</tr>
<tr>
<td>SA#2</td>
<td>254</td>
</tr>
<tr>
<td>SA#3</td>
<td>150</td>
</tr>
<tr>
<td>SA#4</td>
<td>383</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>961</strong></td>
</tr>
</tbody>
</table>

### EBS-01

**Office**

- **Room Area:** 98 SQFT
- **Room Height:** 9.8 FT
- **Room Volume:** 955.5 CFT

Tested Supply Airflow = 0.0 CFM

| Tested SA Air Change Rate = 0.0 AC/hr |

<table>
<thead>
<tr>
<th>OSA % (DDC):</th>
<th>100%</th>
</tr>
</thead>
</table>

**OSA % changed to 100% May 2021**

OSA calculated = 0.0 CFM

| Calc. OSA Air Change Rate = 0.0 AC/hr |

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>
Building: EBS-01
Room: 111 Office

Room Area: 103 SQFT
Room Height: 9.8 FT
Room Volume: 1,009.4 CFT

Tested Supply Airflow = 36.0 CFM
Tested SA Air Change Rate = 2.1 AC/hr

OSA % (DDC): 1 100%
OSA % changed to 100% May 2021
OSA calculated = 36.0 CFM

Calc. OSA Air Change Rate = 2.1 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

Building: EBS-01
Room: 112 Office

Room Area: 103 SQFT
Room Height: 9.8 FT
Room Volume: 1,009.4 CFT

Tested Supply Airflow = 38.0 CFM
Tested SA Air Change Rate = 2.3 AC/hr

OSA % (DDC): 1 100%
OSA % changed to 100% May 2021
OSA calculated = 38.0 CFM

Calc. OSA Air Change Rate = 2.3 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
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<th>CFM</th>
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</thead>
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<tr>
<td><strong>Total</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>
Building: EBS-01
Room: 113 Office

Room Area: 98 SQFT
Room Height: 9.8 FT
Room Volume: 955.5 CFT

Tested Supply Airflow = 36.0 CFM
Tested SA Air Change Rate = 2.3 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 36.0 CFM

Calc. OSA Air Change Rate = 2.3 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

Building: EBS-01
Room: 114 Conference Room

Room Area: 665 SQFT
Room Height: 9.8 FT
Room Volume: 6,483.8 CFT

Tested Supply Airflow = 628.0 CFM
Tested SA Air Change Rate = 5.8 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 628.0 CFM

Calc. OSA Air Change Rate = 5.8 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
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<td>SA#2</td>
<td>305</td>
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<tr>
<td>Total</td>
<td>628</td>
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</tbody>
</table>
Building: EBS-01
Room: 115 Science Lab  Tested 02/23/2021

Room Area: 1,243 SQFT
Room Height: 9.8 FT
Room Volume: 12,119.3 CFT

Tested Supply Airflow = 1,484.0 CFM

Tested SA Air Change Rate = 7.3 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 1,484.0 CFM

OSA % changed to 100% May 2021

Calc. OSA Air Change Rate = 7.3 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>253</td>
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<tr>
<td>SA#2</td>
<td>268</td>
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<tr>
<td>SA#3</td>
<td>227</td>
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<td>SA#5</td>
<td>269</td>
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<tr>
<td>SA#6</td>
<td>241</td>
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<tr>
<td>Total</td>
<td>1,484</td>
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</tbody>
</table>

Building: EBS-01
Room: 115 Science Lab  Re-Tested 07/08/2021

Room Area: 1,243 SQFT
Room Height: 9.8 FT
Room Volume: 12,119.3 CFT

Tested Supply Airflow = 1,486.0 CFM

Tested SA Air Change Rate = 7.4 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 1,486.0 CFM

OSA % changed to 100% May 2021

Calc. OSA Air Change Rate = 7.4 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>254</td>
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<tr>
<td>SA#2</td>
<td>277</td>
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<tr>
<td>SA#3</td>
<td>231</td>
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<td>SA#5</td>
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</tr>
<tr>
<td>SA#6</td>
<td>239</td>
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<tr>
<td>Total</td>
<td>1,486</td>
</tr>
</tbody>
</table>
Building: EBS-01
Room: 116 Office
Room Area: 110 SQFT
Room Height: 10.1 FT
Room Volume: 1,111.0 CFT

Tested Supply Airflow = 89.0 CFM
Tested SA Air Change Rate = 4.8 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 89.0 CFM

Calc. OSA Air Change Rate = 4.8 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
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<tbody>
<tr>
<td>SA#1</td>
<td>89</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>89</strong></td>
</tr>
</tbody>
</table>

Building: EBS-01
Room: 117 Office
Room Area: 110 SQFT
Room Height: 10.1 FT
Room Volume: 1,111.0 CFT

Tested Supply Airflow = 253.0 CFM
Tested SA Air Change Rate = 13.7 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 253.0 CFM

Calc. OSA Air Change Rate = 13.7 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>253</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</tr>
</tbody>
</table>
### Building: EBS-01

**Room:** 118 Office

<table>
<thead>
<tr>
<th>Room Area: 110 SQFT</th>
<th>Room Height: 8.8 FT</th>
<th>Room Volume: 962.5 CFT</th>
</tr>
</thead>
</table>

Tested Supply Airflow = 277.0 CFM

**Tested SA Air Change Rate = 17.3 AC/hr**

OSA % (DDC): 1 100%

OSA calculated = 277.0 CFM

**Calc. OSA Air Change Rate = 17.3 AC/hr**

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>277</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

### Building: EBS-01

**Room:** 119 Office

<table>
<thead>
<tr>
<th>Room Area: 350 SQFT</th>
<th>Room Height: 10.1 FT</th>
<th>Room Volume: 3,535.0 CFT</th>
</tr>
</thead>
</table>

Tested Supply Airflow = 327.0 CFM

**Tested SA Air Change Rate = 5.6 AC/hr**

OSA % (DDC): 1 100%

OSA calculated = 327.0 CFM

**Calc. OSA Air Change Rate = 5.6 AC/hr**

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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<tbody>
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<td>SA#1</td>
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</tbody>
</table>
Building: EBS-01  
Room: 123 Science Lab  
Tested 02/23/2021

Room Area: 1,362 SQFT  
Room Height: 9.7 FT  
Room Volume: 13,170.5 CFT 

Tested Supply Airflow = 1,252.0 CFM  
**Tested SA Air Change Rate = 5.7 AC/hr**

OSA % (DDC): 1 100%  
OSA % changed to 100% May 2021

OSA calculated = 1,252.0 CFM  

**Calc. OSA Air Change Rate = 5.7 AC/hr**

Testing Method: Flow Hood

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<tr>
<td>SA#6</td>
<td>149</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

Building: EBS-01  
Room: 123 Science Lab  
Re-Tested 07/08/2021

Room Area: 1,362 SQFT  
Room Height: 9.7 FT  
Room Volume: 13,170.5 CFT 

Tested Supply Airflow = 1,216.0 CFM  
**Tested SA Air Change Rate = 5.5 AC/hr**

OSA % (DDC): 1 100%  
OSA % changed to 100% May 2021

OSA calculated = 1,216.0 CFM  

**Calc. OSA Air Change Rate = 5.5 AC/hr**

Testing Method: Flow Hood

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</table>
**Building:** EBS-01  
**Room:** 124  
**Room Area:** 110 SQFT  
**Room Height:** 9.8 FT  
**Room Volume:** 1,072.5 CFT

Tested Supply Airflow = 120.0 CFM  
Tested SA Air Change Rate = 6.7 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 120.0 CFM  

**Calc. OSA Air Change Rate = 6.7 AC/hr**

Testing Method: Flow Hood

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**Building:** EBS-01  
**Room:** 125-1  
**Room Area:** 148 SQFT  
**Room Height:** 9.8 FT  
**Room Volume:** 1,443.0 CFT

Tested Supply Airflow = 31.0 CFM  
Tested SA Air Change Rate = 1.3 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 31.0 CFM  

**Calc. OSA Air Change Rate = 1.3 AC/hr**

Testing Method: Flow Hood

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</table>
Building: EBS-01
Room: 125-2 Tutoring Room

Room Area: 148 SQFT
Room Height: 9.8 FT
Room Volume: 1,443.0 CFT

Tested Supply Airflow = 29.0 CFM

Tested SA Air Change Rate = 1.2 AC/hr

OSA % (DDC): 1 100%
OSA % changed to 100% May 2021
OSA calculated = 29.0 CFM

Calc. OSA Air Change Rate = 1.2 AC/hr

Testing Method: Flow Hood

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</table>
Building: EBS-02
Room: 201 Botany Lab Tested 2/23/2021

Room Area: 1,130 SQFT
Room Height: 9.9 FT
Room Volume: 11,187.0 CFT

Tested Supply Airflow = 535.0 CFM
Tested SA Air Change Rate = 2.9 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 535.0 CFM
Calc. OSA Air Change Rate = 2.9 AC/hr

Testing Method: Flow Hood

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</table>

Building: EBS-02
Room: 201 Botany Lab Re-Tested 7/8/2021

Room Area: 1,130 SQFT
Room Height: 9.9 FT
Room Volume: 11,187.0 CFT

Tested Supply Airflow = 737.0 CFM
Tested SA Air Change Rate = 4.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 737.0 CFM
Calc. OSA Air Change Rate = 4.0 AC/hr

Testing Method: Flow Hood

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</table>
Building: EBS-02
Room: 202 Biology Lab  
Tested 2/23/2021

Room Area: 1,130 SQFT
Room Height: 9.9 FT
Room Volume: 11,187.0 CFT

Tested Supply Airflow = 580.0 CFM

Tested SA Air Change Rate = 3.1 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 580.0 CFM

Calc. OSA Air Change Rate = 3.1 AC/hr

Testing Method: Flow Hood

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Building: EBS-02
Room: 202 Biology Lab  
Re-Tested 7/8/2021

Room Area: 1,130 SQFT
Room Height: 9.9 FT
Room Volume: 11,187.0 CFT

Tested Supply Airflow = 809.0 CFM

Tested SA Air Change Rate = 4.3 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 809.0 CFM

Calc. OSA Air Change Rate = 4.3 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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<tbody>
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</table>
### Building: EBS-02  
Room: 209  Environ Zoology Lab

| Room Area: | 1,130 SQFT |
| Room Height: | 9.7 FT |
| Room Volume: | 10,927.1 CFT |

Tested Supply Airflow = 932.0 CFM  
**Tested SA Air Change Rate = 5.1 AC/hr**

OSA % (DDC): 1 100%  
OSA calculated = 932.0 CFM  
**Calc. OSA Air Change Rate = 5.1 AC/hr**

Testing Method: Flow Hood

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<th>CFM</th>
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</tbody>
</table>
Building: EBS-02  
Room: 210  Marine Biology Lab  
Tested 2/23/2021

Room Area: 1,130 SQFT  
Room Height: 9.9 FT  
Room Volume: 11,187.0 CFT

Tested Supply Airflow = 636.0 CFM  
Tested SA Air Change Rate = 3.4 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 636.0 CFM  
Calc. OSA Air Change Rate = 3.4 AC/hr

Testing Method: Flow Hood

<table>
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<td>SA#6</td>
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<td><strong>Total</strong></td>
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</table>

Building: EBS-02  
Room: 210  Marine Biology Lab  
Re-Tested 7/8/2021

Room Area: 1,130 SQFT  
Room Height: 9.9 FT  
Room Volume: 11,187.0 CFT

Tested Supply Airflow = 840.0 CFM  
Tested SA Air Change Rate = 4.5 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 840.0 CFM  
Calc. OSA Air Change Rate = 4.5 AC/hr

Testing Method: Flow Hood

<table>
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<th>CFM</th>
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<tbody>
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</table>
Building: EBS-02
Room: 211 Library  Tested 2/23/2021

Room Area: 300 SQFT
Room Height: 9.3 FT
Room Volume: 2,790.0 CFT

Tested Supply Airflow = 62.0 CFM
Tested SA Air Change Rate = 1.3 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 62.0 CFM

Calc. OSA Air Change Rate = 1.3 AC/hr

Testing Method: Flow Hood

<table>
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<td>Total</td>
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Building: EBS-02
Room: 211 Library  Re-Tested 7/8/2021

Room Area: 300 SQFT
Room Height: 9.3 FT
Room Volume: 2,790.0 CFT

Tested Supply Airflow = 55.0 CFM
Tested SA Air Change Rate = 1.2 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 55.0 CFM

Calc. OSA Air Change Rate = 1.2 AC/hr

Testing Method: Flow Hood

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<th>CFM</th>
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</table>
Building: EBS-02
Room: 212 Office
Tested 2/23/2021

Room Area: 116 SQFT
Room Height: 9.9 FT
Room Volume: 1,148.4 CFT

Tested Supply Airflow = 259.0 CFM
Tested SA Air Change Rate = 13.5 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 259.0 CFM

Calc. OSA Air Change Rate = 13.5 AC/hr

Testing Method: Flow Hood

<table>
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<th>CFM</th>
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</table>

Building: EBS-02
Room: 212 Office
Re-Tested 7/8/2021

Room Area: 116 SQFT
Room Height: 9.9 FT
Room Volume: 1,148.4 CFT

Tested Supply Airflow = 179.0 CFM
Tested SA Air Change Rate = 9.4 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 179.0 CFM

Calc. OSA Air Change Rate = 9.4 AC/hr

Testing Method: Flow Hood

<table>
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<td>Total</td>
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</tbody>
</table>
Building: EBS-02  
Room: 213 Office  
Tested 02/23/2021

- Room Area: 120 SQFT  
- Room Height: 9.9 FT  
- Room Volume: 1,188.0 CFT

Tested Supply Airflow = 0.0 CFM  
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

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Building: EBS-02  
Room: 213 Office  
Re-Tested 07/08/2021

- Room Area: 120 SQFT  
- Room Height: 9.9 FT  
- Room Volume: 1,188.0 CFT

Tested Supply Airflow = 98.0 CFM  
Tested SA Air Change Rate = 4.9 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 98.0 CFM

Calc. OSA Air Change Rate = 4.9 AC/hr

Testing Method: Flow Hood

<table>
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</table>
Building: EBS-02
Room: 215  Computer Class room

Room Area: 680 SQFT
Room Height: 9.7 FT
Room Volume: 6,575.6 CFT

Tested Supply Airflow = 439.0 CFM
Tested SA Air Change Rate = 4.0 AC/hr

OSA % (DDC): 1  100%
OSA calculated = 439.0 CFM

Calc. OSA Air Change Rate = 4.0 AC/hr

Testing Method: Flow Hood

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</table>

Building: EBS-02
Room: 216  Computer / Server  Re-Tested on 07/08/2021

Room Area: 61 SQFT
Room Height: 9.9 FT
Room Volume: 603.9 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1  100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
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</tbody>
</table>
Building: EBS-02
Room: 218 Office
Tested 02/23/2021

Room Area: 64 SQFT
Room Height: 9.9 FT
Room Volume: 633.6 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

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<tr>
<td>Total</td>
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</tr>
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</table>

Building: EBS-02
Room: 218 Office
Re-Tested 07/08/2021

Room Area: 64 SQFT
Room Height: 9.9 FT
Room Volume: 633.6 CFT

Tested Supply Airflow = 94.0 CFM
Tested SA Air Change Rate = 8.9 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 94.0 CFM

Calc. OSA Air Change Rate = 8.9 AC/hr

Testing Method: Flow Hood

<table>
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</table>
Building: EBS-02
Room: 219  Chemicals / Glassware  Tested 02/23/2021

Room Area: 1,000 SQFT
Room Height: 9.7 FT
Room Volume: 9,670.0 CFT

Tested Supply Airflow = 328.0 CFM
Tested SA Air Change Rate = 2.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 328.0 CFM

Calc. OSA Air Change Rate = 2.0 AC/hr

Testing Method: Flow Hood

<table>
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</table>

Building: EBS-02
Room: 219  Chemicals / Glassware  Re-Tested 07/08/2021

Room Area: 1,000 SQFT
Room Height: 9.7 FT
Room Volume: 9,670.0 CFT

Tested Supply Airflow = 623.0 CFM
Tested SA Air Change Rate = 3.9 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 623.0 CFM

Calc. OSA Air Change Rate = 3.9 AC/hr

Testing Method: Flow Hood

<table>
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</table>
Building: EBS-03
Room: 301 Lecture

Room Area: 1,224 SQFT
Room Height: 11.9 FT
Room Volume: 14,565.6 CFT

Tested Supply Airflow = 2,124.0 CFM

Tested SA Air Change Rate = 8.7 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 2,124.0 CFM

Calc. OSA Air Change Rate = 8.7 AC/hr

Testing Method: Flow Hood

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<td>385</td>
</tr>
<tr>
<td>SA#3</td>
<td>306</td>
</tr>
<tr>
<td>SA#4</td>
<td>367</td>
</tr>
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<td>SA#5</td>
<td>284</td>
</tr>
<tr>
<td>SA#6</td>
<td>324</td>
</tr>
<tr>
<td>Total</td>
<td>2,124</td>
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</tbody>
</table>

Building: EBS-03
Room: 305 Office

Room Area: 117 SQFT
Room Height: 9.8 FT
Room Volume: 1,146.6 CFT

Tested Supply Airflow = 0.0 CFM

Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
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<td>Total</td>
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</table>

Checked 07/08/2021, still broken
<table>
<thead>
<tr>
<th>Building: EBS-03</th>
<th>Room: 306 Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Area: 112 SQFT</td>
<td>Room Height: 9.8 FT</td>
</tr>
<tr>
<td>Room Volume: 1,097.6 CFT</td>
<td></td>
</tr>
</tbody>
</table>

Tested Supply Airflow = 112.0 CFM  
Tested SA Air Change Rate = 6.1 AC/hr  

OSA % (DDC): 1 100%  
OSA calculated = 112.0 CFM  

Calc. OSA Air Change Rate = 6.1 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>Total</td>
<td>112</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Building: EBS-03</th>
<th>Room: 307 Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Area: 63 SQFT</td>
<td>Room Height: 9.7 FT</td>
</tr>
<tr>
<td>Room Volume: 611.1 CFT</td>
<td></td>
</tr>
</tbody>
</table>

Tested Supply Airflow = 135.0 CFM  
Tested SA Air Change Rate = 13.3 AC/hr  

OSA % (DDC): 1 100%  
OSA calculated = 135.0 CFM  

Calc. OSA Air Change Rate = 13.3 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>Total</td>
<td>135</td>
</tr>
</tbody>
</table>
Building: EBS-03  
Room: Office

Room Area: 63 SQFT  
Room Height: 9.8 FT  
Room Volume: 617.4 CFT

Tested Supply Airflow = 129.0 CFM  
Tested SA Air Change Rate = 12.5 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 129.0 CFM

Calc. OSA Air Change Rate = 12.5 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
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<tr>
<td><strong>Total</strong></td>
<td><strong>129</strong></td>
</tr>
</tbody>
</table>

Building: EBS-03  
Room: Lecture

Room Area: 1,440 SQFT  
Room Height: 13.2 FT  
Room Volume: 19,008.0 CFT

Tested Supply Airflow = 3,206.7 CFM  
Tested SA Air Change Rate = 10.1 AC/hr

OSA % (DDC): 0.75 75%  
OSA increased to 75% on 7/8/2021  
OSA calculated = 2,405.0 CFM

Calc. OSA Air Change Rate = 7.6 AC/hr

Testing Method: Duct Traverse / Airfoil

Ins. Duct Diameter: 29" x 20"  
Duct Area = 4.0 SQFT

<table>
<thead>
<tr>
<th></th>
<th>692</th>
<th>1,008</th>
<th>1,107</th>
<th>1,088</th>
<th>1,055</th>
<th>998</th>
<th>1,011</th>
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</thead>
<tbody>
<tr>
<td>685</td>
<td>879</td>
<td>983</td>
<td>934</td>
<td>805</td>
<td>842</td>
<td>755</td>
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<tr>
<td>516</td>
<td>726</td>
<td>593</td>
<td>516</td>
<td>470</td>
<td>478</td>
<td>378</td>
<td></td>
</tr>
</tbody>
</table>

Average Velocity = 796 FPM  
Supply Airflow = 3,206.7 CFM

Air Handler: AH-4
Building: EBS-03
Room: 312  Bio Med Lab

Room Area: 1,130 SQFT
Room Height: 9.8 FT
Room Volume: 11,074.0 CFT

Tested Supply Airflow = 1,018.0 CFM

Tested SA Air Change Rate = 5.5 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 1,018.0 CFM

Calc. OSA Air Change Rate = 5.5 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>179</td>
</tr>
<tr>
<td>SA#2</td>
<td>199</td>
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<tr>
<td>SA#3</td>
<td>103</td>
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<tr>
<td>SA#4</td>
<td>186</td>
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<td>SA#6</td>
<td>172</td>
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<tr>
<td>Total</td>
<td>1,018</td>
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</tbody>
</table>

Building: EBS-03
Room: 313  Micro Lab

Room Area: 1,130 SQFT
Room Height: 9.8 FT
Room Volume: 11,074.0 CFT

Tested Supply Airflow = 971.0 CFM

Tested SA Air Change Rate = 5.3 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 971.0 CFM

Calc. OSA Air Change Rate = 5.3 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>165</td>
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<tr>
<td>SA#2</td>
<td>175</td>
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<tr>
<td>SA#3</td>
<td>139</td>
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<tr>
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<tr>
<td>SA#6</td>
<td>155</td>
</tr>
<tr>
<td>Total</td>
<td>971</td>
</tr>
</tbody>
</table>
Building: EBS-03  
Room: 314 Office

Room Area: 100 SQFT  
Room Height: 10.0 FT  
Room Volume: 1,000.0 CFT

Tested Supply Airflow = 258.0 CFM
Tested SA Air Change Rate = 15.5 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 258.0 CFM

Calc. OSA Air Change Rate = 15.5 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>258</td>
</tr>
<tr>
<td>Total</td>
<td>258</td>
</tr>
</tbody>
</table>

Building: EBS-03  
Room: 315 Office

Room Area: 100 SQFT  
Room Height: 10.0 FT  
Room Volume: 1,000.0 CFT

Tested Supply Airflow = 279.0 CFM
Tested SA Air Change Rate = 16.7 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 279.0 CFM  
OSA % Changed to 100%

Calc. OSA Air Change Rate = 16.7 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>Total</td>
<td>279</td>
</tr>
</tbody>
</table>
Building: EBS-03
Room: 319 Office

Room Area: 92 SQFT
Room Height: 9.8 FT
Room Volume: 901.6 CFT

Tested Supply Airflow = 127.0 CFM
Tested SA Air Change Rate = 8.5 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 127.0 CFM

Calc. OSA Air Change Rate = 8.5 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>127</strong></td>
</tr>
</tbody>
</table>

Building: EBS-03
Room: 320 Office

Room Area: 92 SQFT
Room Height: 9.8 FT
Room Volume: 901.6 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
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<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

Checked 07/08/2021, still broken
Building: EBS-03
Room: 321 Office

Room Area: 92 SQFT
Room Height: 9.8 FT
Room Volume: 901.6 CFT

Tested Supply Airflow = 101.0 CFM
Tested SA Air Change Rate = 6.7 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 101.0 CFM

Calc. OSA Air Change Rate = 6.7 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
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<tr>
<td><strong>Total</strong></td>
<td><strong>101</strong></td>
</tr>
</tbody>
</table>

Building: EBS-03
Room: 322 Office

Room Area: 92 SQFT
Room Height: 9.8 FT
Room Volume: 901.6 CFT

Tested Supply Airflow = 135.0 CFM
Tested SA Air Change Rate = 9.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 135.0 CFM

Calc. OSA Air Change Rate = 9.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>135</strong></td>
</tr>
</tbody>
</table>
Building: EBS-03
Room: 323 Office Tested 02/23/2021

Room Area: 92 SQFT
Room Height: 9.8 FT
Room Volume: 901.6 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
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<tbody>
<tr>
<td>SA#1</td>
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</tr>
<tr>
<td>Total</td>
<td>0</td>
</tr>
</tbody>
</table>

Building: EBS-03
Room: 323 Office Re-Tested 07/08/2021

Room Area: 92 SQFT
Room Height: 9.8 FT
Room Volume: 901.6 CFT

Tested Supply Airflow = 167.0 CFM
Tested SA Air Change Rate = 11.1 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 167.0 CFM

Calc. OSA Air Change Rate = 11.1 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>167</td>
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<tr>
<td>Total</td>
<td>167</td>
</tr>
</tbody>
</table>
### Building: EBS-03

**Room:** 324 Office

- **Room Area:** 108 SQFT
- **Room Height:** 9.8 FT
- **Room Volume:** 1,058.4 CFT

<table>
<thead>
<tr>
<th>Tested Supply Airflow</th>
<th>171.0 CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tested SA Air Change Rate</strong></td>
<td>9.7 AC/hr</td>
</tr>
</tbody>
</table>

- **OSA % (DDC):** 1 100%
- **OSA calculated =** 171.0 CFM

<table>
<thead>
<tr>
<th>Calc. OSA Air Change Rate</th>
<th>9.7 AC/hr</th>
</tr>
</thead>
</table>

**Testing Method:** Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>171</strong></td>
</tr>
</tbody>
</table>
Building: EBS-03
Room: 328 Micro Prep
Tested 02/23/2021

Room Area: 216 SQFT
Room Height: 9.3 FT
Room Volume: 2,008.8 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>SA#2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

---

Building: EBS-03
Room: 328 Micro Prep
Re-Tested 07/08/2021; no airflow

Room Area: 216 SQFT
Room Height: 9.3 FT
Room Volume: 2,008.8 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>0</td>
</tr>
<tr>
<td>SA#2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>
Building: EBS-03
Room: 331 Storage & Prep  Tested 02/23/2021

Room Area: 305 SQFT
Room Height: 9.7 FT
Room Volume: 2,958.5 CFT

Tested Supply Airflow = 139.0 CFM
Tested SA Air Change Rate = 2.8 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 139.0 CFM

Calc. OSA Air Change Rate = 2.8 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>139</strong></td>
</tr>
</tbody>
</table>

Building: EBS-03
Room: 331 Storage & Prep  Re-Tested 07/08/2021

Room Area: 305 SQFT
Room Height: 9.7 FT
Room Volume: 2,958.5 CFT

Tested Supply Airflow = 134.0 CFM
Tested SA Air Change Rate = 2.7 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 134.0 CFM

Calc. OSA Air Change Rate = 2.7 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>134</strong></td>
</tr>
</tbody>
</table>
Building:  EBS-03
Room:  332  Bio Tech Prep  Tested 02/23/2021

Room Area:  252 SQFT
Room Height:  10.0 FT
Room Volume:  2,520.0 CFT

Tested Supply Airflow =  124.0  CFM

Tested SA Air Change Rate =  3.0  AC/hr

OSA % (DDC):  1  100%
OSA calculated =  124.0  CFM

Calc. OSA Air Change Rate =  3.0  AC/hr

Testing Method:  Flow Hood

<table>
<thead>
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<th>CFM</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>SA#2</td>
<td>70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>124</strong></td>
</tr>
</tbody>
</table>

Building:  EBS-03
Room:  332  Bio Tech Prep  Re-Tested 07/08/2021

Room Area:  252 SQFT
Room Height:  10.0 FT
Room Volume:  2,520.0 CFT

Tested Supply Airflow =  329.0  CFM

Tested SA Air Change Rate =  7.8  AC/hr

OSA % (DDC):  1  100%
OSA calculated =  329.0  CFM

Calc. OSA Air Change Rate =  7.8  AC/hr

Testing Method:  Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
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<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>SA#2</td>
<td>190</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>329</strong></td>
</tr>
</tbody>
</table>
Building: EBS-03
Room: 333 Office Tested 02/23/2021

Room Area: 80 SQFT
Room Height: 10.0 FT
Room Volume: 800.0 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
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<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>Total</td>
<td>0</td>
</tr>
</tbody>
</table>

Building: EBS-03
Room: 333 Office Re-Tested 07/08/2021

Room Area: 80 SQFT
Room Height: 10.0 FT
Room Volume: 800.0 CFT

Tested Supply Airflow = 0.0 CFM
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
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<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td>Total</td>
<td>0</td>
</tr>
</tbody>
</table>
**Building:** EBS-03  
**Room:** 334 Office

| Room Area: | 56 SQFT |
| Room Height: | 10.0 FT |
| Room Volume: | 560.0 CFT |

- **Tested Supply Airflow** = 148.0 CFM  
  - **Tested SA Air Change Rate** = 15.9 AC/hr

- **OSA % (DDC):** 1 100%
- **OSA calculated =** 148.0 CFM

  - **Calc. OSA Air Change Rate** = 15.9 AC/hr

**Testing Method:** Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
</tr>
</tbody>
</table>

Palt Associates Inc.
Building: EBS-03  
Room: 335  
Inoculation Room  
Tested 02/23/2021

Room Area: 80 SQFT  
Room Height: 9.3 FT  
Room Volume: 744.0 CFT  

Tested Supply Airflow = 0.0 CFM  
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
<td>0</td>
</tr>
<tr>
<td>SA#2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
</tr>
</tbody>
</table>

Building: EBS-03  
Room: 335  
Inoculation Room  
Re-Tested 07/08/2021

Room Area: 80 SQFT  
Room Height: 9.3 FT  
Room Volume: 744.0 CFT  

Tested Supply Airflow = 0.0 CFM  
Tested SA Air Change Rate = 0.0 AC/hr

OSA % (DDC): 1 100%  
OSA calculated = 0.0 CFM

Calc. OSA Air Change Rate = 0.0 AC/hr

Testing Method: Flow Hood

<table>
<thead>
<tr>
<th>Register</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA#1</td>
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</tr>
<tr>
<td>SA#2</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>0</td>
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</table>