### Laboratory Certification

<table>
<thead>
<tr>
<th>Report number/Date</th>
<th>EMIT1104, 2/19/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>Section 01350</td>
</tr>
<tr>
<td>Original report number &amp; date if recalculation</td>
<td></td>
</tr>
<tr>
<td>Certified by (Name/Title)</td>
<td>Alfred T. Hodgson, Research Director</td>
</tr>
<tr>
<td>Signature</td>
<td>2/20/04</td>
</tr>
</tbody>
</table>

### Manufacturer Information

<table>
<thead>
<tr>
<th>Manufacturing company</th>
<th>Rendered by manufacturer and released to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>City/State/Country</td>
<td>Acoustical Surfaces, Inc., 123 Columbia Court North, Chaska, MN 55318</td>
</tr>
<tr>
<td>Contact name/Title</td>
<td>JR Anderson, President</td>
</tr>
<tr>
<td>Phone number</td>
<td>(952) 448-5300</td>
</tr>
<tr>
<td>Product name/Number</td>
<td>Echo Eliminator™</td>
</tr>
<tr>
<td>Product category/Subcategory</td>
<td>Sound Absorption</td>
</tr>
<tr>
<td>Manufacturer’s ID</td>
<td>BLP11027-F</td>
</tr>
<tr>
<td>Date manufactured</td>
<td>1/20/04</td>
</tr>
<tr>
<td>Date collected</td>
<td>1/20/04</td>
</tr>
<tr>
<td>Date shipped</td>
<td>1/23/04</td>
</tr>
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</table>

### Client Information (If different)

<table>
<thead>
<tr>
<th>Organization</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>City/State/Country</td>
<td></td>
</tr>
<tr>
<td>Contact name/Title</td>
<td></td>
</tr>
<tr>
<td>Phone number</td>
<td></td>
</tr>
</tbody>
</table>

### Architectural Project Information (Section 01350)

<table>
<thead>
<tr>
<th>Organization</th>
<th>LAUSD</th>
</tr>
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<tbody>
<tr>
<td>City/State/Country</td>
<td>Los Angeles, CA</td>
</tr>
<tr>
<td>Project name</td>
<td>Low Emitting Schools Initiative</td>
</tr>
<tr>
<td>Type of building</td>
<td>School</td>
</tr>
<tr>
<td>Contact name/Title</td>
<td>John Zinner, Zinner Consultants</td>
</tr>
<tr>
<td>Phone number</td>
<td>310-828-4639</td>
</tr>
</tbody>
</table>

### Specimen Information

<table>
<thead>
<tr>
<th>Date received</th>
<th>1/28/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory tracking number</td>
<td>205001</td>
</tr>
<tr>
<td>Specimen preparation</td>
<td>Cut specimen from center of panel</td>
</tr>
<tr>
<td>Conditioning period start date &amp; duration</td>
<td>1/30/04, 10 days</td>
</tr>
<tr>
<td>Test period start date &amp; duration</td>
<td>2/9/04, 96 hours</td>
</tr>
</tbody>
</table>
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Page 2, Pass/Fail Summary, Chamber Conditions, Building Parameters

Summary - The protocol used to perform this VOC emission test is given under Laboratory Certification, Page 1. Scientific Certification Systems (SCS) Low Emitting Material tests and Project-Specific Section 01350 (Special Environmental Requirements) tests are conducted following the full Section 01350 guidelines with prior conditioning of the test specimen as given for the Collaborative for High Performance Schools (CHPS) program (refer to http://www.chps.net).

Table 1. Pass/fail results of emission test for identified VOCs with chronic RELs. Only VOCs detected above quantitation limits are reported. If no VOCs are listed in Table 1, the material passes the Section 01350 VOC emission requirements.

<table>
<thead>
<tr>
<th>Substance</th>
<th>CAS No.</th>
<th>½ REL µg m⁻³</th>
<th>Standard Classroom</th>
<th>Hypothetical Office</th>
<th>Other Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>50-00-1</td>
<td>16.5</td>
<td>Pass</td>
<td>Pass</td>
<td>na</td>
</tr>
</tbody>
</table>

Table 2. Chamber conditions for 96-h test period

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material exposed area</td>
<td>A_c</td>
<td>m²</td>
<td>0.0316</td>
</tr>
<tr>
<td>Chamber volume</td>
<td>V_c</td>
<td>m³</td>
<td>0.067</td>
</tr>
<tr>
<td>Loading ratio</td>
<td>L_c</td>
<td>m² m⁻³</td>
<td>0.47</td>
</tr>
<tr>
<td>Inlet gas flow rate</td>
<td>Q</td>
<td>m³ h⁻¹</td>
<td>0.067 ± 0.003</td>
</tr>
<tr>
<td>Ventilation rate</td>
<td>a_c</td>
<td>h⁻¹</td>
<td>1.0 ± 0.05</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td></td>
<td>23 ± 1</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>%</td>
<td></td>
<td>50 ± 5</td>
</tr>
</tbody>
</table>

Table 3. Parameters used to calculate building VOC concentrations

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>Wall Materials</th>
<th>Other Materials/Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material exposed area</td>
<td>A_B</td>
<td>m³</td>
<td>94.6</td>
<td>na</td>
</tr>
<tr>
<td>Building volume</td>
<td>V_B</td>
<td>m³</td>
<td>231</td>
<td>na</td>
</tr>
<tr>
<td>Ceiling height</td>
<td>m</td>
<td></td>
<td>2.59</td>
<td>na</td>
</tr>
<tr>
<td>Loading ratio</td>
<td>L_B</td>
<td>m² m⁻³</td>
<td>0.41</td>
<td>na</td>
</tr>
<tr>
<td>Ventilation rate</td>
<td>a_B</td>
<td>h⁻¹</td>
<td>0.9</td>
<td>na</td>
</tr>
<tr>
<td>Ventilated vol. fraction</td>
<td>v_l</td>
<td>m³ h⁻¹</td>
<td>0.9</td>
<td>na</td>
</tr>
<tr>
<td>Vent. flow rate per area</td>
<td>(m³ h⁻¹)/m²</td>
<td>1.98</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

- b. Volume & ceiling height from East End Project, Products Passed Section 01350, Calif. Integrated Waste Management Board. For floor & ceiling materials, 100% coverage is assumed. For wall materials, material exposed area is wall paint area for the building (http://www.ciwb.ca.gov/GreenBuilding/Specs/EastEnd/)

* Soundproofing Products  •  Sonex™ Ceiling & Wall Panels  •  Sound Control Curtains  •  Equipment Enclosures  •  Acoustical Baffles & Banners  •  Solid Wood & Veneer Acoustical Ceiling & Wall Systems  •  Professional Audio Acoustics  •  Vibration & Damping Control  •  Fire Retardant Acoustics  •  Hearing Protection  •  Moisture & Impact Resistant Products  •  Floor Impact Noise Reduction  •  Sound Absorbers  •  Noise Barriers  •  Fabric Wrapped Wall Panels  •  Acoustical Foam (Egg Crate)  •  Acoustical Sealants & Adhesives  •  Outdoor Noise Control  •  Assistive Listening Devices  •  OSHA, FDA, ADA Compliance  •  On-Site Acoustical Analysis  •  Acoustical Design & Consulting  •  Large Inventory  •  Fast Shipment  •  No Project too Large or Small  •  Major Credit Cards Accepted
Page 3, Results of VOC Emission Test

Table 4. VOC emission test results*. Only VOCs detected above quantitation limits are reported. Individual VOCs with chronic RELs are listed first, followed by compounds on other lists of toxicants, followed by unlisted abundant compounds

<table>
<thead>
<tr>
<th>Substance</th>
<th>CAS No.</th>
<th>Surrogate?</th>
<th>Chronic REL µg m⁻³</th>
<th>CARB TAC Cat.</th>
<th>Prop 65 List?</th>
<th>96-h Chamber Conc. µg m⁻³</th>
<th>Emission Factor µg m⁻³ h⁻¹</th>
<th>Classroom Conc. µg m⁻³</th>
<th>Office Conc. µg m⁻³</th>
<th>Other Bldg. Conc. µg m⁻³</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>45.6</td>
<td>96.6</td>
<td>48.8</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50-00-1</td>
<td>33</td>
<td>T-IIa</td>
<td></td>
<td>Yes</td>
<td>1.1</td>
<td>2.4</td>
<td>1.2</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>64-19-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>296**</td>
<td>627</td>
<td>317</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

*Parameters and reported values are defined and explained in Table 6

**Acetic acid has low TVOC response; it’s concentration exceeds TVOC concentration

Table 5. TVOC and formaldehyde 24- and 48-hour chamber concentrations

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration, µg m⁻³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24-h</td>
</tr>
<tr>
<td>TVOC</td>
<td>115</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>LQ</td>
</tr>
</tbody>
</table>

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- OSHA, FDA, ADA Compliance • On-Site Acoustical Analysis • Acoustical Design & Consulting • Large Inventory • Fast Shipment • No Project too Large or Small • Major Credit Cards Accepted
We Identify and S.T.O.P. Your Noise Problem

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Page 4, Definitions, Notes to Tables

Table 6. Definition of parameters and notes to tables

<table>
<thead>
<tr>
<th>Parameter/Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS No.</td>
<td>Chemical Abstract Service identification number for chemical substance</td>
</tr>
<tr>
<td>Surrogate?</td>
<td>“Yes” indicates compound was quantified by GC/MS total-ion-current (TIC) method using mixture of 12 common hydrocarbons as calibration reference</td>
</tr>
<tr>
<td>Chronic REL</td>
<td>Chronic Reference Exposure Level (REL) established by Cal/EPA Office of Environmental Health Hazard Assessment, Aug. 2003 and adopted by Section 01350 as target IAQ limit for building; for formaldehyde, IAQ limit is 33 μg m⁻³ rather than REL. No material may contribute more than 1/2 IAQ limit for any REL compound</td>
</tr>
<tr>
<td>CARB TAC Cat.</td>
<td>Toxic Air Contaminant (TAC) on Cal/EPA Air Resources Board list, Dec. 1999, with toxic category indicated</td>
</tr>
<tr>
<td>Prop 65 List?</td>
<td>“Yes” indicates compound is chemical known to cause cancer or reproductive toxicity listed by Calif. Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), Feb. 2003</td>
</tr>
<tr>
<td>96-h Chamber Conc.</td>
<td>Measured chamber VOC concentration at final 96-h time point minus any analytical blank or blank concentration for empty chamber operated following same procedure. Lower limit of quantitation (LOQ) for individual VOCs on lists of toxicants is 2 μg m⁻³, based on a 2 ng limit for a 1-liter sample. LOQ for TVOC is 20 μg m⁻³. LOQ for formaldehyde and acetaldehyde is given below</td>
</tr>
<tr>
<td>Emission Factor</td>
<td>Mass of compound emitted per square meter of material per hour (calculations shown below). Reporting limits for emission factors are established by LOQ or reporting limit for chamber concentration and material’s exposed surface area</td>
</tr>
<tr>
<td>Classroom/Office/Other Bldg. Conc.</td>
<td>Concentrations for standard school classroom, hypothetical office building, or specific project building calculated using parameters given in Table 3 (calculations shown below)</td>
</tr>
<tr>
<td>TVOC</td>
<td>Total Volatile Organic Compounds quantified by GC/MS TIC method using mixture of 12 common hydrocarbons as calibration reference</td>
</tr>
<tr>
<td>Formaldehyde &amp; acetaldehyde</td>
<td>Volatile aldehydes quantified by HPLC following ASTM Method D 5197-97. LOQ for formaldehyde and acetaldehyde is approximately 1 μg m⁻³.</td>
</tr>
<tr>
<td>Individual VOCs</td>
<td>Quantified by thermal desorption GC/MS following EPA Methods TO-1 and TO-17. Compound was quantified using multipoint calibration prepared with pure substance unless otherwise indicated (see Surrogate?). VOCs with chronic RELs are listed first, followed by other TAC and Prop. 65 compounds. Additional abundant VOCs at or above reporting limit of 5 μg m⁻³ are listed last. VOCs are listed in order of decreasing volatility within each group</td>
</tr>
<tr>
<td>“&lt;”</td>
<td>“Less than” concentrations established by LOQ</td>
</tr>
<tr>
<td>“LQ”</td>
<td>Indicates calculated value is below quantitation based on concentration LOQ</td>
</tr>
<tr>
<td>“na”</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Page 5, Equations Used in Calculations, Comments

Calculations - An emission factor (EF) in $\mu g\ m^{-3}\ h^{-1}$ for a chamber test is calculated using Equation 1:

$$EF = \frac{Q (C - C_0)}{A_C}$$  \hspace{1cm} (1)

where $C$ is the VOC chamber concentration ($\mu g\ m^{-3}$) and $C_0$ is the substrate or chamber blank VOC concentration ($\mu g\ m^{-3}$). The remaining parameters are defined in Table 2. A building concentration ($C_B$) in $\mu g\ m^{-3}$ is calculated using Equation 2, and parameters are defined in Table 3.

$$C_B = \frac{EF \cdot A_B}{V_B \cdot V_{fB} \cdot a_B}$$  \hspace{1cm} (2)

Comments: None