ROXUL AFB
Acoustical Fire Batts

Interior Wall Sound Control and Fire Protection

- Fire resistant
- Higher density than conventional insulations
- Excellent sound absorption
- Sag resistant fit

ROXUL
The Better Insulation
Two separate challenges... one effective solution

Wall systems in today’s commercial and industrial buildings must do more than simply subdivide space. They need to significantly reduce unwanted transmission of noise from one area of a building to another and they must also contribute to the safety and protection of everyone in the building against the spread of fire. ROXUL AFB mineral wool insulation does both.

Fire resistance means added protection

Fire isn’t something we think about on a daily basis but when it happens, the wall systems become a critical line of defense against the spread of flames. A National Research Council of Canada (NRC) study A4051.1 by M.A. Sultan and G.D. Lougheed, entitled “Results of Fire Resistance Test On Full-Scale Insulated and Non-Insulated Gypsum Board Protected Wall Assemblies” determined that a wall cavity insulated with mineral fibre provided a 54% increase in the fire resistance rating. The report states:

“Insulation Effects — Mineral Fibre — In non-loadbearing (1x2), unbalanced, (1-layer gypsum one side and 2-layers gypsum the other) assemblies, the installation of the mineral fibre insulation in the wall cavity provided a 54% increase in the fire resistance rating compared to a non-insulated assembly.”

None of the other insulating materials had any effect.

Increased mass means better sound control

Research shows that an increase in transmission loss is expected with an increase in mass, so better sound transmission control can be achieved by either increasing a wall system’s thickness or substituting a denser material. Since sound transmission is based upon the entire wall system and not the individual elements, an increase in mass will improve the performance of the entire wall system, i.e., double layering of gypsum board is more effective acoustically over a single layer system. How then do you compare the individual components for acoustics?

Another test method, measures the absorption properties of “acoustic materials” on their own, and is called the Coefficients at Frequencies test and is by far a much more accurate analysis to perform a product to product comparison. For example “conventional” glass fibre products will not absorb as well at low frequencies than the heavier Roxul AFB, absorbing much more of the low frequency sound produced by lower frequency noise such as conversation, projection/video equipment and ventilation systems.

The reality is that much of the sound that must be controlled in commercial applications is produced in the low frequency, or bass, range. In a test entitled “COMPAARED ACOUSTICAL TESTING AT LOW FREQUENCIES”, conducted by HGC Engineering of Mississauga, Ontario, the performance of ROXUL AFB was compared to the performance of glass fibre insulation in the lower 1/3 octave bands. The normal and random incident sound coefficients were calculated based on tests performed in accordance with ASTM standard E1050-90. The test concluded:
“As evidenced by these data, the Roxul products appear to provide more low frequency absorption than the glass fibre products.

### Density and airflow resistivity for samples of absorptive material.

<table>
<thead>
<tr>
<th>Material</th>
<th>Density (kg/m³)</th>
<th>Airflow Resistivity (mks rayls/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Fibre</td>
<td>12.2 ± 0.4</td>
<td>4800 ± 400</td>
</tr>
<tr>
<td>Glass Fibre</td>
<td>11.7 ± 1.0</td>
<td>3600 ± 200</td>
</tr>
<tr>
<td>Roxul AFB</td>
<td>44.2 ± 1.7</td>
<td>16600 ± 900</td>
</tr>
<tr>
<td>Roxul AFB</td>
<td>51.9 ± 2.2</td>
<td>15000 ± 500</td>
</tr>
</tbody>
</table>

### Random Incidence Sound Absorption Coefficients, in 1/3 Octave Bands

<table>
<thead>
<tr>
<th>Sample</th>
<th>63</th>
<th>80</th>
<th>100</th>
<th>125</th>
<th>160</th>
<th>200</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Fibre 1</td>
<td>.15</td>
<td>.18</td>
<td>.21</td>
<td>.25</td>
<td>.32</td>
<td>.43</td>
<td>.54</td>
</tr>
<tr>
<td>Glass Fibre 2</td>
<td>.15</td>
<td>.17</td>
<td>.19</td>
<td>.22</td>
<td>.28</td>
<td>.37</td>
<td>.46</td>
</tr>
<tr>
<td>Roxul AFB 1</td>
<td>.18</td>
<td>.22</td>
<td>.28</td>
<td>.33</td>
<td>.40</td>
<td>.50</td>
<td>.62</td>
</tr>
<tr>
<td>Roxul AFB 2</td>
<td>.18</td>
<td>.23</td>
<td>.29</td>
<td>.35</td>
<td>.41</td>
<td>.52</td>
<td>.65</td>
</tr>
<tr>
<td>Glass Fibre Avg</td>
<td>.15</td>
<td>.18</td>
<td>.20</td>
<td>.24</td>
<td>.30</td>
<td>.40</td>
<td>.50</td>
</tr>
<tr>
<td>Roxul AFB Avg</td>
<td>.18</td>
<td>.23</td>
<td>.29</td>
<td>.34</td>
<td>.41</td>
<td>.51</td>
<td>.64</td>
</tr>
</tbody>
</table>

The results above demonstrated clearly that, because of its inherently higher density and manufacturing process, ROXUL AFB delivers dramatically better airflow resistivity compared to glass fibre. If an insulation demonstrates high air flow resistivity, then it will deliver better sound attenuation.

The capability of an insulating material to absorb sound waves is expressed by the sound absorption coefficients. The higher the coefficients, the better the sound absorption. Clearly ROXUL AFB consistently outperforms glass fibre proving to be a more effective barrier to the absorption of low frequency sound.”
ROXUL AFB™
WALL SYSTEMS

Commercial wall system performance using ROXUL AFB

In the following 15 commercial wall systems, ROXUL AFB delivers excellent Fire Resistance Ratings and Sound Transmission (STC). The right-hand column shows the results of acoustical tests done on these ROXUL AFB wall systems at the internationally-recognized Riverbank Acoustical Laboratories. For other wall constructions not shown here, please contact Roxul technical services. For further details on the illustrated constructions, consult the UL or ULC Design Manual. All STC Ratings are based on Type X gypsum board.

<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th>DESCRIPTION</th>
<th>TRANSMISSION LOSS</th>
</tr>
</thead>
</table>
| 1            | 1.  Single layer wall.  
1/8” (15.9mm) gypsum board  
3/4” (92mm) steel studs spaced  
24” (610 mm) centers  
3” (76mm) Roxul AFB  
  
Sound Transmission Class (STC):  
52 (RAL-TL95-195)  
Fire Resistance:  
1 hour (UL design no. V417 and U465)  
1 hour (ULC W447)  
  |  | ![Graph](graph1.png) |
| 2            | 2.  Single layer wall.  
1/8” (12.7mm) gypsum board  
3/4” (92mm) steel studs spaced  
24” (610 mm) centers  
3” (76mm) Roxul AFB  
  
Sound Transmission Class (STC):  
51 (RAL-TL96-269)  
Fire Resistance:  
1 hour (UL design no. U448 and ULC design no W433)  
  |  | ![Graph](graph2.png) |
1/8” (12.7mm) gypsum board  
3/4” (92mm) steel studs spaced  
24” (610 mm) centers  
1/2” (38mm) Roxul AFB  
  
Sound Transmission Class (STC):  
46 (RAL-TL90-195)  
Fire Resistance:  
1 hour (UL design no. U448 and ULC design no W433)  
<p>|  | <img src="graph3.png" alt="Graph" /> |</p>
<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th>DESCRIPTION</th>
<th>TRANSMISSION LOSS</th>
</tr>
</thead>
</table>
| Single layer wall.  
\( \frac{3}{4} '' \) (15.9mm) gypsum board  
\( \frac{3}{8} '' \) (64mm) steel studs spaced  
\( 24 '' \) (610mm) centers  
\( \frac{1}{2} '' \) (64mm) Roxul AFB  

Sound Transmission Class (STC):  
46 (RAL-TL96-270)  

Fire Resistance:  
1 hour (NBC of Canada 1995 and UL design no. U448) |  | ![Transmission loss graph](Image) |
| Single layer wall.  
\( \frac{3}{8} '' \) (12.7mm) gypsum board  
\( \frac{3}{8} '' \) (64mm) steel studs spaced  
\( 24 '' \) (610mm) centers  
\( \frac{1}{2} '' \) (64mm) Roxul AFB  

Sound Transmission Class (STC):  
44 (RAL-TL96-285)  

Fire Resistance:  
1 hour (UL design no. U448 and ULC design no W433) |  | ![Transmission loss graph](Image) |
| Single layer wall with resilient metal channels on one side  
\( \frac{3}{4} '' \) (15.9mm) gypsum board  
\( \frac{3}{8} '' \) (92mm) steel studs spaced  
\( 24 '' \) (610 mm) centers  
Resilient metal channels spaced horizontally at \( 24 '' \) (610 mm) centers  
\( 3 '' \) (76mm) Roxul AFB  

Sound Transmission Class (STC):  
53 (RAL-TL96-289)  

Fire Resistance:  
1 hour (UL design no. V417 and U465)  
1 hour (ULC W447) |  | ![Transmission loss graph](Image) |
| Single layer wall with resilient metal channels on one side  
\( \frac{3}{4} '' \) (12.7mm) gypsum board  
\( \frac{3}{8} '' \) (92mm) steel studs spaced  
\( 24 '' \) (610 mm) centers  
Resilient metal channels spaced horizontally at \( 24 '' \) (610 mm) centers  
\( 3 '' \) (76mm) Roxul AFB  

Sound Transmission Class (STC):  
53 (RAL-TL96-288)  

Fire Resistance:  
1 hour (UL design no. U448) |  | ![Transmission loss graph](Image) |
<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th>DESCRIPTION</th>
<th>TRANSMISSION LOSS</th>
</tr>
</thead>
</table>
| 8            | Unbalanced wall  
5/8" (15.9mm) gypsum board, single layer one side; double layer other  
3/4" (92mm) steel studs spaced  
24" (610mm) centers  
3" (76mm) Roxul AFB/ 3/3" (89mm) AFB  
**Sound Transmission Class (STC):**  
56 (RAL-TL96-264)  
**Fire Resistance:**  
1 1/2 hour (NBC of Canada 1995)*  
1 hour (UL design no. V417)  
*NB. 3/3" (89mm) AFB only |
| 9            | Unbalanced wall  
5/8" (12.7mm) gypsum board, single layer one side; double layer other  
2/3" (64mm) steel studs spaced  
24" (610mm) centers  
1 1/8" (38mm) Roxul AFB  
**Sound Transmission Class (STC):**  
50 (RAL-TL90-196)  
**Fire Resistance:**  
1 hour (NBC of Canada 1995) and UL design no. U44B |
| 10           | Double layer wall  
2 layers of 5/8" (15.9mm)  
gypsum board on both sides  
3 3/8" (92mm) steel studs spaced  
24" (610mm) centers  
3" (76mm) Roxul AFB  
**Sound Transmission Class (STC):**  
57 (RAL-TL96-268)  
**Fire Resistance:**  
2 hours (UL design no. U411 and V419) |
| 11           | Double layer wall  
2 layers of 5/8" (12.7mm)  
gypsum board on both sides  
3/4" (92mm) steel studs spaced  
24" (610mm) centers  
1 1/8" (38mm) Roxul AFB  
**Sound Transmission Class (STC):**  
56 (RAL-TL90-196)  
**Fire Resistance:**  
2 hours (UL design no. U412 and V418) |
<table>
<thead>
<tr>
<th>CONSTRUCTION DESCRIPTION</th>
<th>TRANSMISSION LOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Double layer wall</strong></td>
<td><strong>Transmission loss (dB)</strong></td>
</tr>
<tr>
<td>2 layers of 3/8&quot; (15.9mm) gypsum board on both sides</td>
<td>Frequency (Hz)</td>
</tr>
<tr>
<td>2/8&quot; (64mm) steel studs spaced 24&quot; (610 mm) centers</td>
<td>100 160 250 400 630 1000 1600 2500 4000</td>
</tr>
<tr>
<td>1½&quot; (38mm) Roxul AFB</td>
<td></td>
</tr>
<tr>
<td><strong>Sound Transmission Class (STC):</strong></td>
<td></td>
</tr>
<tr>
<td>56 (RAL-TL90-193)</td>
<td></td>
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<tr>
<td><strong>Fire Resistance:</strong></td>
<td></td>
</tr>
<tr>
<td>2 hours (UL design no. U411 and V419, NBC of Canada)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Single layer wall, wood studs</strong></th>
<th><strong>Transmission loss (dB)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; (15.9mm) gypsum board</td>
<td>Frequency (Hz)</td>
</tr>
<tr>
<td>2&quot; by 4&quot; wood studs spaced 16&quot; (406mm) centers</td>
<td>100 160 250 400 630 1000 1600 2500 4000</td>
</tr>
<tr>
<td>3&quot; (76mm) Roxul AFB</td>
<td></td>
</tr>
<tr>
<td><strong>Sound Transmission Class (STC):</strong></td>
<td></td>
</tr>
<tr>
<td>38 (RAL-TL96-265)</td>
<td></td>
</tr>
<tr>
<td><strong>Fire Resistance:</strong></td>
<td></td>
</tr>
<tr>
<td>1 hour (UL design no. U305)</td>
<td></td>
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</tbody>
</table>

<table>
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<tr>
<th><strong>Single layer wall, wood studs</strong></th>
<th><strong>Transmission loss (dB)</strong></th>
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<tr>
<td>3/8&quot; (12.7mm) gypsum board</td>
<td>Frequency (Hz)</td>
</tr>
<tr>
<td>2&quot; by 4&quot; wood studs spaced 16&quot; (406mm) centers</td>
<td>100 160 250 400 630 1000 1600 2500 4000</td>
</tr>
<tr>
<td>3&quot; (76mm) Roxul AFB</td>
<td></td>
</tr>
<tr>
<td><strong>Sound Transmission Class (STC):</strong></td>
<td></td>
</tr>
<tr>
<td>38 (RAL-TL96-266)</td>
<td></td>
</tr>
<tr>
<td><strong>Fire Resistance:</strong></td>
<td></td>
</tr>
<tr>
<td>45 min. (UL design no. U317)</td>
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</tbody>
</table>
Water and moisture resistant

ROXUL AFB will not absorb water or hold moisture. Once installed, its fire resistant and sound attenuating properties will not be compromised by water or moisture and it will help protect your walls and studs from the potentially damaging effects of water and moisture as well.

Sag resistant fit

ROXUL AFB provides superior sag resistance and fit, critical to optimum performance. Once installed, ROXUL AFB stays firmly in place and won’t slump down in the wall cavity over time. This means fire protection and sound control that lasts.

Other important advantages

ROXUL AFB does not attract attention from rodents, does not promote the growth of fungi or mildew, and will not deteriorate over time or contribute to corrosion.

Warranty

As Roxul Inc. has no control over installation design and workmanship, accessory materials or application conditions, Roxul Inc. does not warrant the performance or results of any installation containing Roxul Inc. products. Roxul Inc.’s overall liability and the remedies available are limited by the general terms and conditions of sale.

The limited warranty in the terms and conditions is in lieu of all other warranties and conditions expressed or implied, including the warranties of merchantability and fitness for a particular purpose.