

Introduction

Urban Foliage distribute and installs Mossart Wall Panels. The panels are assembled with preserved reindeer moss adhered with a hot melt adhesive (Rainbow RS-8386SL) to Coroplast® polypropylene sheets. Urban Foliage are interested to know the sound-absorption to provide acoustical data to designers and potential customer. Urban Foliage asked the BCIT Centre for Architectural Ecology – Acoustics Lab to evaluate the sound-absorption of the Mossart Wall Panels.

Methodology

Sound absorption was measured by the reverberation –room method, based on the standard ASTM C423. The test were performed in the reverberation room at BCIT, CARI Campus. The room has a dimension of 3.56 m x 4.47 m x 5.58 m high. The temperature and relative humidity in the room were measured throughout the acoustical evaluation. Each sample was assembled with 18 large panels (average size 0.92 x 0.31) and 5 small panels (average size (0.57 x 0.30)).



Figure 1 - 5.93 m² Mossart, 18 Large panel, 5 small panel assembly

Results

Table 1 NRC and SAA

	Sample	NRC	SAA
A	6.8 Kg/m ²	0.51	0.51
B	7.7 Kg/m ²	0.43	0.44

Table 1 indicates NRC and the SAA of the samples at the two levels of levels of moisture, Sample A was dry and Sample B was at equilibrium with 50% relative humidity in the room. The absorption of building materials has been typically quantified by the noise reduction coefficient (NRC) which is a single number rating calculated as the average of one octave band absorption coefficients of the 250 Hz, 500 Hz, 1000 Hz and 2000 Hz frequency bands. The NRC is cited in most specifications and design criteria. However, there is a current trend to specify the Sound Absorption Average (SAA) single number rating calculated

as the average of one-third octave band absorption coefficients in the expanded range from 200 Hz to 2000 Hz frequency bands. Table 2 indicates the frequency dependent absorption coefficients.

Table 2 Absorption Coefficients

Absorption Coefficients					
Hz	SAMPLE		Hz	SAMPLE	
	A	B		A	B
200	0.25	0.30	1600	0.47	0.40
250	0.31	0.39	2000	0.51	0.47
315	0.37	0.48	2500	0.59	0.47
400	0.46	0.42	3150	0.65	0.51
500	0.47	0.39	4000	0.83	0.57
630	0.45	0.45	5000	0.82	0.57
800	0.46	0.37	6300	0.86	0.51
1000	0.43	0.37	8000	0.88	0.55
1250	0.44	0.42	-	-	-

Discussion

First, the Mossart Wall Panels have significant sound-absorption characteristics, as such, they have the potential to be marketed as an acoustical treatment. The signal number ratings, NRC and SAA are in the range of ¾" - 1" fibre board, or. carpet on underlay pad.

To put the absorption coefficient values that were measured in context, consider the absorption coefficient of a typical suspended acoustical ceiling is about 0.5; an area of ceiling of 10 m² has an absorption area of 5 m². The same contribution to room absorption could be provided by a 5 m² area of Mossart Wall Panel.

The absorption of the wall panels is low at low frequencies. Thus, the panels may not be very useful to cancel standing waves in small rooms like studios and music-practice rooms or reduce low-frequency intrusive noise from mechanical equipment. In both samples the absorption tends to be relatively high at mid-high frequencies. Absorption in this range can be useful in classrooms and conference rooms to improve speech intelligibility associated with the quality of verbal communication

The increase brittleness of the reindeer moss due to reduced moisture content improves the acoustical properties of the panels, this benefit increases with frequency.

Framing the edge of the wall panels with a wood or stainless frame will have minimal, and non-perceivable decrease on the total room absorption performance of the panels.

The absorption coefficients provided in this report can be used in numerical models and in advanced acoustical software to predict the overall effect of the Mossart Wall Panels in rooms and their contribution to an improved acoustical environment.

