

Client Report

October 6, 2010

Measurement of Airborne Sound Transmission Loss in Accordance with ASTM E90, Performed on a Skyfold Classic Operable Partition (in Testing Configuration “4E”)

B3484.3

 **SKYFOLD**
ALL NRC MODELS

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A Client Report based on the results of the IRC Research Project on:


Measurement of Airborne Sound Transmission Loss in Accordance with ASTM E90, Performed on a Skyfold Classic Operable Partition (in Testing Configuration "4E")





for

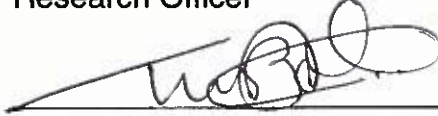
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Montréal, QC
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6 October 2010

Measurement of Airborne Sound Transmission Loss
in Accordance with ASTM E90, Performed on a
Skyfold Classic Operable Partition (in Testing
Configuration "4E") for Skyfold Division of Railtech
Ltd.  SKYFOLD
ALL NRC MODELS

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Report Date: October 6, 2010
Contract No: B3484
Reference: Agreement dated June 3, 2010
Program: Indoor Environment

Specimen Properties:

Element		Actual thickness (mm)	Mass (kg)	Mass/length, area or volume
Operable Partition	Classic 299 mm	299	342.7	44.7 kg/m ²
Total		299	342.7	

Test Specimen Installation:

The test specimen was installed in the NRC-IRC Wall Sound Transmission Facility. The facility test opening measures 2.44 m by 3.66 m. The area was reduced by constructing filler elements, as described above. The perimeter of the filler elements was sealed on both sides to the facility test opening with latex caulk and covered with metal foil tape. The opening in the filler elements for the test specimen measured 3508 mm wide by 2172 mm high. The area used for calculation of airborne sound transmission loss was 7.66 m².

The specimen was opened and closed five times after installation was completed and was tested without further adjustments.

The results in this report apply only to the specimen that was tested. NRC does not represent that the results in this report apply to any other specimen.

**APPENDIX:
Airborne Sound Transmission
Wall Facility**

National Research Council Canada
Institute for Research in Construction
Acoustics Laboratory
1200 Montreal Road, Ottawa, Ontario K1A 0R6
Tel: 613-993-2305 Fax: 613-954-1495

Facility and Equipment: The acoustics test facility comprises two reverberation rooms (referred to in this report as the small and large rooms) with a moveable test frame between the two rooms. In each room, a calibrated Bruel & Kjaer condenser microphone (type 4166 or 4165) with preamp is moved under computer control to nine positions, and measurements are made in both rooms using an 8-channel National Instrument NI4472 system installed in a desktop PC-type computer. Each room has four bi-amped loudspeakers driven by separate amplifiers and noise sources. To increase randomness of the sound field, there are fixed diffusing panels in each room.

Test Procedure: Airborne sound transmission measurements were conducted in accordance with the requirements of ASTM E90-09, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions". Airborne sound transmission loss tests were performed in the forward (receiving room is the large room) and reverse (receiving room is the small room) directions. Results presented in this report are the average of the tests in these two directions. In each case, sound transmission loss values were calculated from the average sound pressure levels of both the source and receiving rooms and the average reverberation times of the receiving room. One-third octave band sound pressure levels were measured for 32 seconds at nine microphone positions in each room and then averaged to get the average sound pressure level in each room. Five sound decays were averaged to get the reverberation time at each microphone position in the receiving room; these times were averaged to get the average reverberation times for the room. A complete description of the test procedure, information on the flanking limit of the facility and reference specimen test results are available on request.

Significance of Test Results: ASTM E90-09 requires measurements in 1/3-octave bands in the frequency range 100 Hz to 5000 Hz. Within those ranges, reproducibility has been assessed by inter-laboratory round robin studies. The standards recommend making measurements and reporting results over a larger frequency range, and this report presents such results, which may be useful for expert evaluation of the specimen performance. The precision of results outside the 100 to 5000 Hz range has not been established, but is expected to depend on laboratory-specific factors.

Sound Transmission Class (STC): was determined in accordance with ASTM E413-04, "Classification for Rating Sound Insulation". The Sound Transmission Class (STC) is a single-figure rating scheme intended to rate the acoustical performance of a partition element separating offices or dwellings. The higher the value of the rating, the better the performance. The rating is intended to correlate with subjective impressions of the sound insulation provided against the sounds of speech, radio, television, music, and similar sources of noise characteristic of offices and dwellings. The STC is of limited use in applications involving noise spectra that differ markedly from those referred to above (for example, heavy machinery, power transformers, aircraft noise, motor vehicle noise). Generally, in such applications it is preferable to consider the source levels and insulation requirements for each frequency band.

Confidence Limits: Acoustical measurement in rooms is a sampling process and as such has associated with it a degree of uncertainty. By using enough microphone and loudspeaker positions, the uncertainty can be reduced and upper and lower limits assigned to the probable error in the measurement. These limits are called 95% confidence limits. They are calculated for each test according to the procedures in ASTM E90-09 and must be less than upper limits given in the standards. These confidence limits do not relate directly to the variation expected when a nominally identical specimen is built, installed and tested (repeatability). Nor do they relate directly to the differences expected when nominally identical specimens are tested in different laboratories (reproducibility).

In Situ Performance: Ratings obtained by this standard method tend to represent an upper limit to what might be measured in a field test, due to structure-borne transmission ("flanking") and construction deficiencies in actual buildings.

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