Results

1 Sound Transmission Loss Improvement due to the Vibration Isolation Clips

Complete sets of measurements and calculations for determination of the primary wall and test sample wall acoustical transmission loss were calculated and detailed numerically and graphically in spreadsheets appended to this report. These one-third octave transmission loss results were rounded to the nearest deciBel (as required by AS1191-1985), the improvement due to the vibration isolation clips determined the two sets of data and the difference between them presented in the summary transmission loss table below:

Summary of Transmission Loss Results

1/3 Octave Band Centre Frequency (Hz)	Transmission Loss of Primary Wall with Direct Mounted Plasterboard dB re 1pW	Transmission Loss of Test Wall with Vibration Isolated Plasterboard dB re 1pW	Transmission Loss Improvement Due to Clips dB re 1pW
80	24	26	2
100	21	27	6
125	19	31	12
160	20	36	16
200	18	40	22
250	28	44	16
315	36	51	15
400	33	54	21
500	34	57	23
630	40	60	20
800	42	62	20
1000	42	61	19
1250	44	63	19
1600	43	64	21
2000	38	61	23
2500	36	57	21
3150	40	62	22
4000	45	68	23
5000	48	70	22

Note on criteria application procedure used to determine STC.

Note Determination of Sound Transmission Class for a test sample requires comparison of the measured sound transmission loss with the value for each transmission class rating listed in the STC tables for each one third octave band centre frequency, 125Hz to 4000Hz. The wall STC value, which is expressed as a class rating only (not as deciBels), as determined by these tables is reached when either or both of the following requirements are met:

(a) The test sample transmission loss at any one frequency in the range 125Hz to 4000Hz must not lie more than 8dB below that of the STC graph value at the same frequency and,

(b) The total sum obtained from the addition of unfavourable deficiencies as defined in the "Rw determination" description above) must not add to more than 32dB. They are listed in the STC table above.

2 Outdoor-Indoor Transmission Class

The first column of the table (below) lists the centre frequencies of the one third octave bands measured. The second column specifies levels of the "A-weighted" reference spectrum required by ASTM E1332
to determine OITC. The third column contains the transmission loss coefficients for each one third octave band in the frequency range 80Hz to 4000Hz (used to determine test sample STC rating).

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The fourth column represents the difference between column two and three converted to sound energy. The summation of this energy, converted back to deciBels is taken as the OITC value of the test sample.

OITC Rating of the Primary Wall

1/3 Octave Band Centre Frequency (Hz)	Normalised A-Weighted Spectrum (dB)	Test Sample Transmission Loss (dB)	Transmitted Sound Energy (Watts)	Wall OITC Rating
80	-19.6	36	2.754E-06	
100	-17.2	40	1.905E-06	
125	-15.2	42	1.905E-06	
160	-15.5	45	8.913E-07	
200	-14.0	48	6.310E-07	
250	-13.7	52	2.692E-07	
315	-12.7	54	2.138E-07	
400	-11.9	54	2.570E-07	
500	-10.3	52	5.888E-07	
630	-11.0	41	6.310E-06	
800	-10.9	44	3.236E-06	
1000	-11.1	48	1.230E-06	
1250	-10.5	52	5.623E-07	
1600	-11.1	55	2.455E-07	
2000	-10.9	59	1.023E-07	
2500	-11.8	62	4.169E-08	
3150	-13.9	64	1.622E-08	
4000	-15.1	67	6.166E-09	
		Sum of Total Energy	2.117E-05	
		OITC = -10 * log(Sum of total energy) =		47

OITC Rating of the Test Wall Containing the Vibration Isolation Clips

1/3 Octave Band Centre Frequency (Hz)	Normalised A-Weighted Spectrum (dB)	Test Sample Transmission Loss (dB)	Transmitted Sound Energy (Watts)	Wall OITC Rating
80	-19.6	26	2.754E-05	
100	-17.2	27	3.802E-05	
125	-15.2	31	2.399E-05	
160	-15.5	36	7.079E-06	
200	-14.0	40	3.981E-06	
250	-13.7	44	1.698E-06	
315	-12.7	51	4.266E-07	
400	-11.9	54	2.570E-07	
500	-10.3	57	1.862E-07	
630	-11.0	60	7.943E-08	
800	-10.9	62	5.129E-08	
1000	-11.1	61	6.166E-08	
1250	-10.5	63	4.467E-08	
1600	-11.1	64	3.090E-08	
2000	-10.9	61	6.457E-08	
2500	-11.8	57	1.318E-07	
3150	-13.9	62	2.570E-08	
4000	-15.1	68	4.898E-09	
		Sum of Total Energy	1.037E-04	
		OITC = -10 * log(Sum of total energy) =		40

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3. Criteria Comparison

The summarised criterion results are presented in the table below for comparison purposes. Acoustical transmission loss inprovement in the one third octave bands covering the frequency range 80Hz to 5000Hz due to the installation of vibration isolation clips in the primary wall are summarised in a table presented on page 4 of this report

	Criterion Summary Table		
	STC	OITC	Rw(C;Ctr)
Primary Wall	STC36	OITC 28	= 36(-2;-6)
Test Wall	STC55	OITC40	= 54(-3;-10)

Conclusion

A "primary" timber framed wall, constructed as described, achieved a Sound Transmission Class rating of STC36 and an OITC rating of 28. The ISO 717-1 rating was determined as Rw (C; Ctr) =36(-2;-6) and the 100Hz to 5kHz "linear" and "A-Weighted" transmission loss average values were 35dB and 30 dBA respectively.

Th e wall was modified by removing the plasterboard sheet on one side, installing furring channels and vibration isolation clips and the plasterboard sheet was replaced. Subsequent acoustical transmission loss tests achieved a Sound Transmission Class rating of STC55 and an OITC rating of 40 . The ISO 717-1 rating was determined to be Rw (C; Ctr) =54(-3;-10) and the 100Hz to 5kHz "linear" and "A-Weighted" transmission loss average values were 54dB and 49 dBA respectively.

It should be noted that the control (primary) wall contained resonances with significant acoustical energy levels within the 125Hz, 200Hz, 400Hz and 500Hz one-third octave bands which disappeared when the resilient sound isolation clips were added. It also should be noted that the isolation clips and furring channels did not affect the plasterboard coincidence frequency at approximately 2000Hz. The apparent damping of these resonances was directly responsible for the significant difference in measurements and criteria recorded (above). Past experience with these vibration isolation clips on walls free from transmitted acoustical resonances has shown that it is reasonable to expect an improvement of approximately STC10.

Date of test: 27th October 2000

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