

# Laboratory Sound Absorption Testing Using the Reverberation Room

Manufacturer & Product Code:

Decor Systems perforated and slotted panels with DecorSorb D400 Acoustic fabric backing.

Note:

Acoustic fabric DecorSorb D400 was replaced with DecorSorb D440. Acoustic properties retained, appearance approved.

Report by: ER00211/MK

Prepared & Tested by: Mark Kierzkowski  
PhD EngSc CPEng MAAS

This test was carried out using the reverberation room of the Department of Applied Physics, The Royal Melbourne Institute of Technology Limited.

The sound absorption coefficients are determined by measurement of the reverberation times, both when the room is empty and when the room contained the sample, and by use of the surface area of the sample.

## Test Method

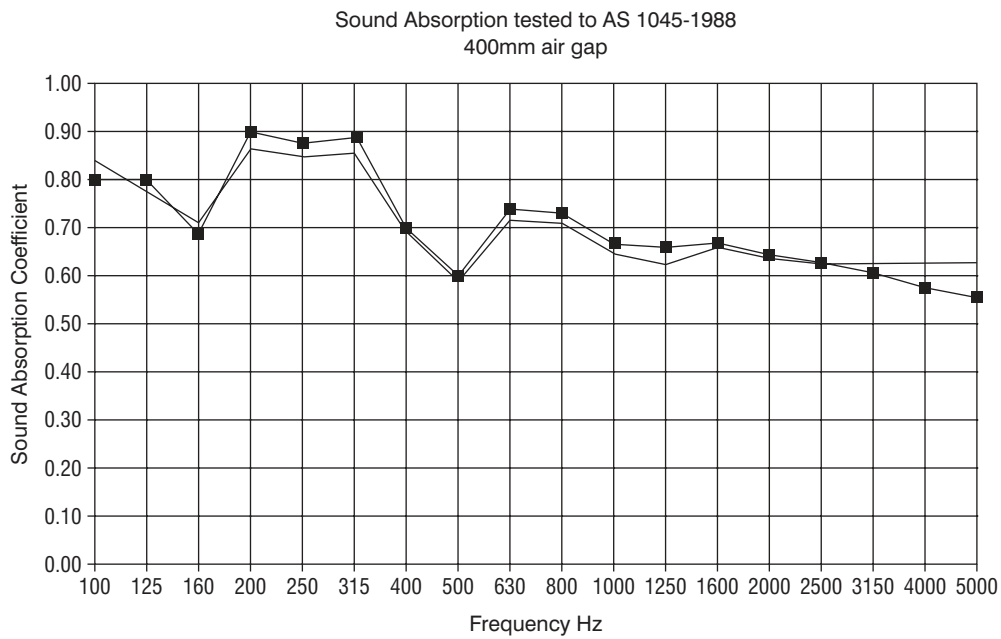
1. Testing has been carried out in accordance with AS1045-1988, "Measurement of absorption coefficients room".
2. The room volume is 200 cubic metres.
3. Diffuse sound field is established by the inclusion of 17 stationary diffusing boards of panelboard.
4. NATA certified instrumentation used for testing.

## Conclusions

DecorSorb D400 acoustic textile laminated onto perforated and slotted panels tested with two different air gaps of 90mm and 400mm returns Noise Reduction Coefficients in the range from 0.65-0.80. Details for different perforation patterns are shown in Figures 1 to 12 while numerical data is collected in Table 1.

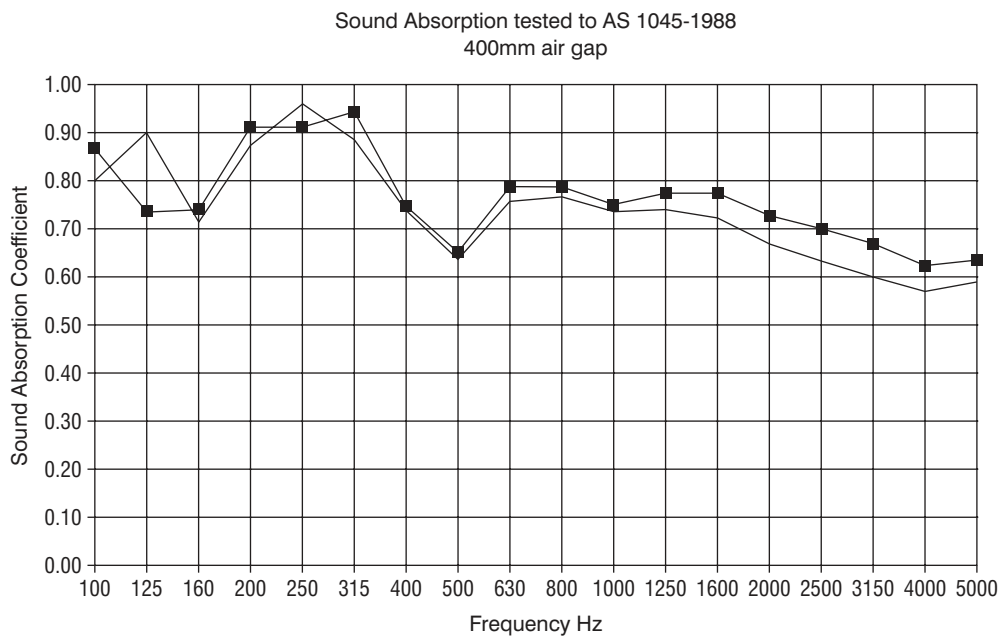
## Test Results

- Flow resistance: The measured flow resistance of the DecorSorb D400 used in these tests was 800 Rayls.
- Sound absorption results:



**FIGURE 1**

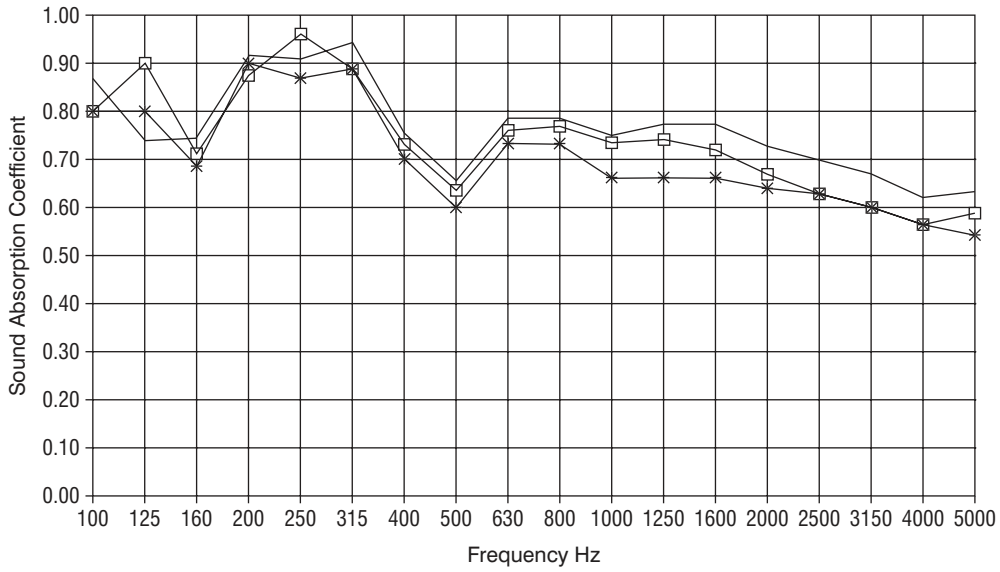
- Slotted MDF board 9mm thick, open area 21% with DecorSorb D400. NRC = 0.70.
- Slotted MDF board 15mm thick, open area 21% with DecorSorb D400. NRC = 0.70.



**FIGURE 2**

- Slotted MDF board 9mm thick, open area 17.2% with DecorSorb D400. NRC = 0.75.
- Slotted MDF board 9mm thick, open area 14% with DecorSorb D400. NRC = 0.75.

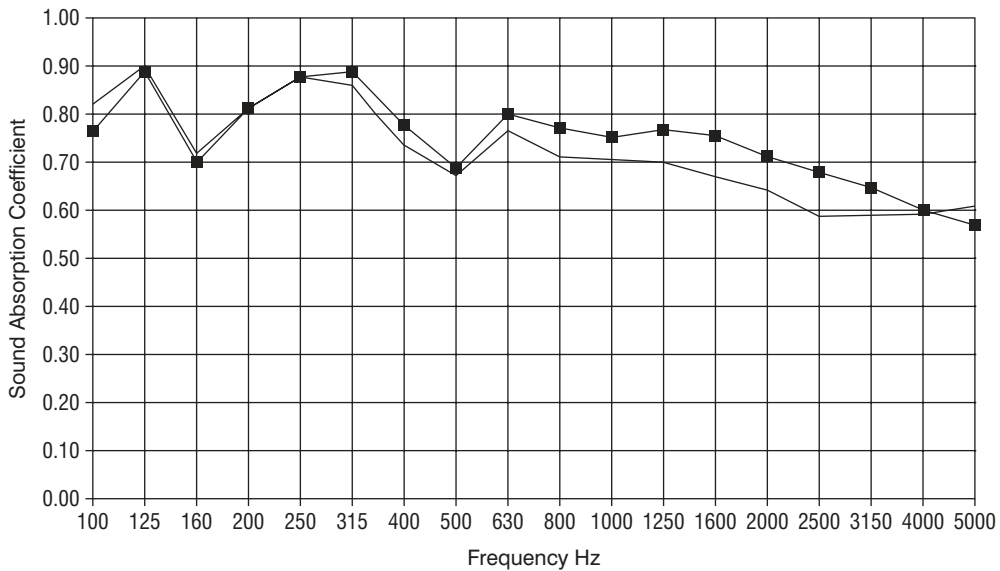
Sound Absorption tested to AS 1045-1988  
400mm air gap



**FIGURE 3**

- Slotted MDF board 9mm thick, open area 21% with DecorSorb D400. NRC = 0.70.
- Solid line — Slotted MDF board 9mm thick, open area 17.2% with DecorSorb D400. NRC = 0.75.
- \*— Slotted MDF board 9mm thick, open area 14% with DecorSorb D400. NRC = 0.75.

Sound Absorption tested to AS 1045-1988  
400mm air gap

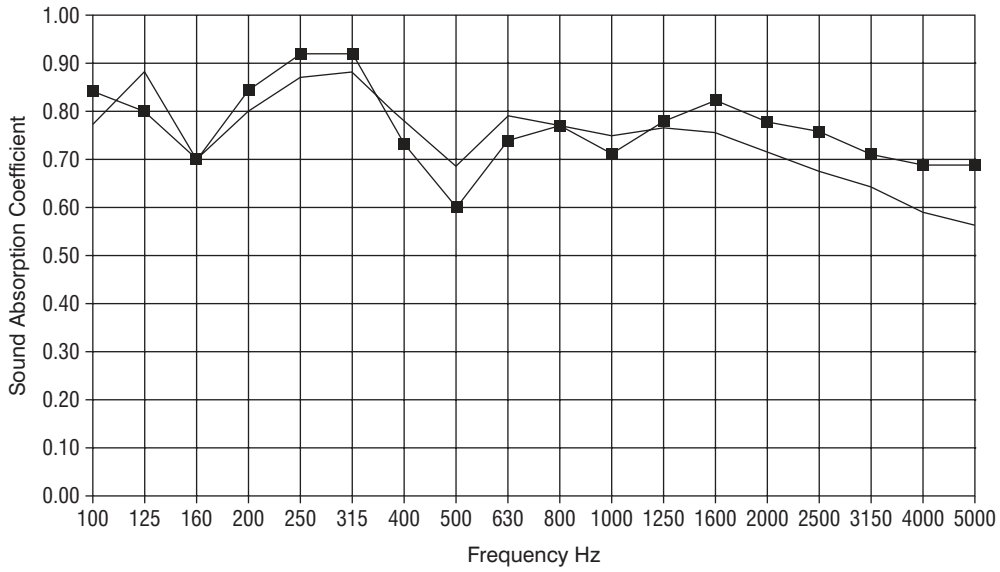


**FIGURE 4**

- Perforated MDF board 6mm thick, open area 10.2% with DecorSorb D400. NRC = 0.75.
- Solid line — Perforated MDF board 12mm thick, open area 10.2% with DecorSorb D400. NRC = 0.70.



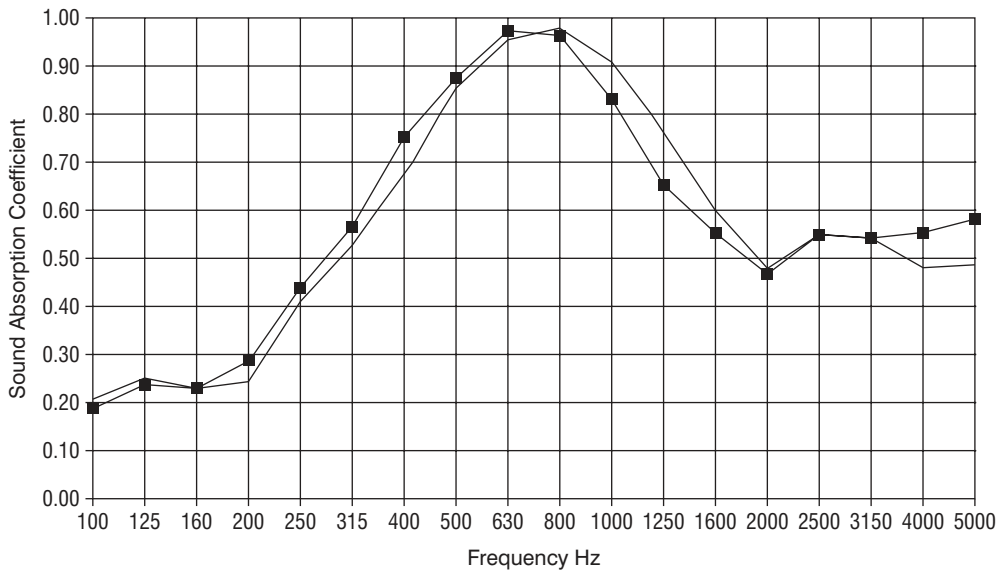
Sound Absorption tested to AS 1045-1988  
400mm air gap



**FIGURE 5**

- Perforated MDF board 6mm thick, open area 25% with DecorSorb D400. NRC = 0.75.
- Perforated MDF board 6mm thick, open area 10.2% with DecorSorb D400. NRC = 0.75.

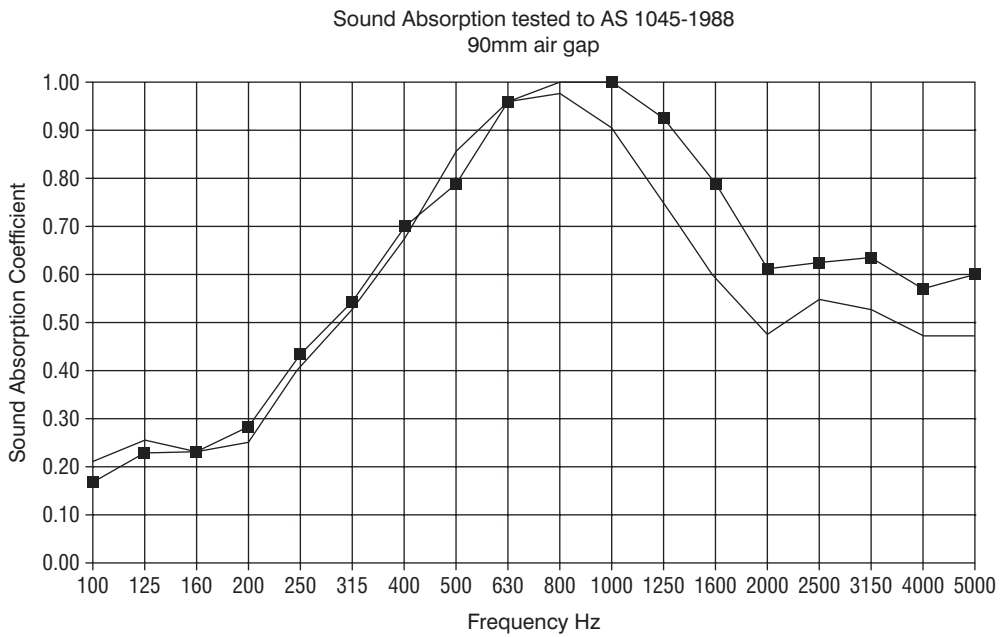
Sound Absorption tested to AS 1045-1988  
90mm air gap



**FIGURE 6**

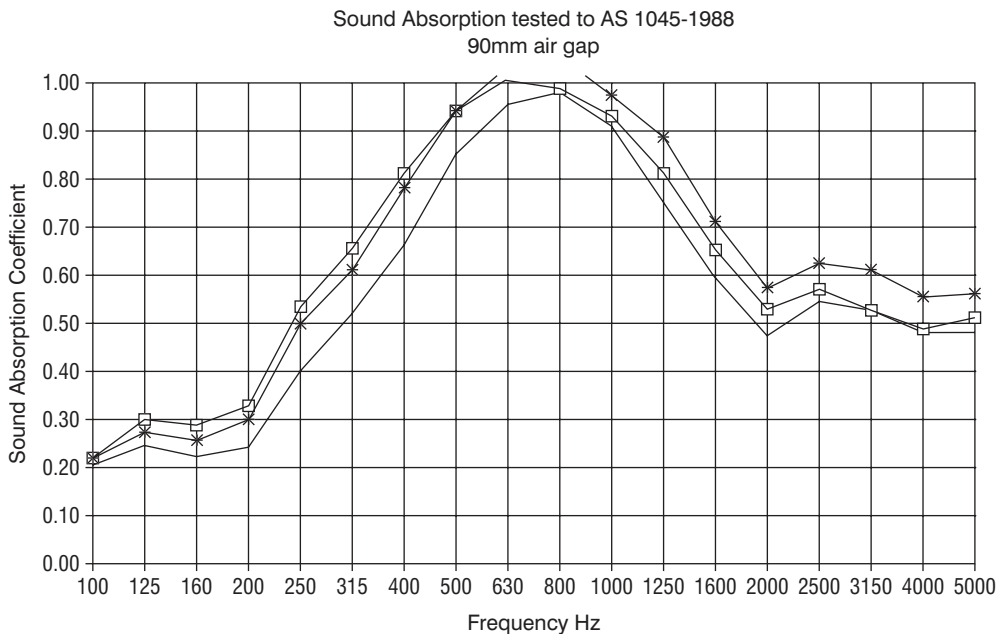
- Slotted MDF board 16mm thick, open area 21% with DecorSorb D400. NRC = 0.65.
- Slotted MDF board 9mm thick, open area 21% with DecorSorb D400. NRC = 0.65.





**FIGURE 7**

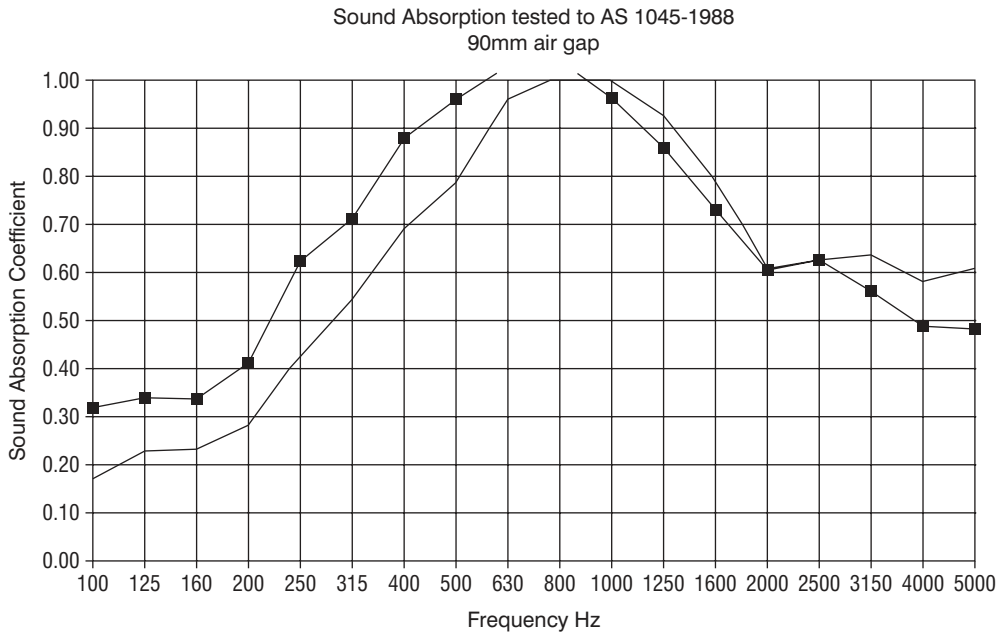
- Perforated MDF board 6mm thick, open area 25% with DecorSorb D400. NRC = 0.70.
- Slotted MDF board 9mm thick, open area 21% with DecorSorb D400. NRC = 0.65.



**FIGURE 8**

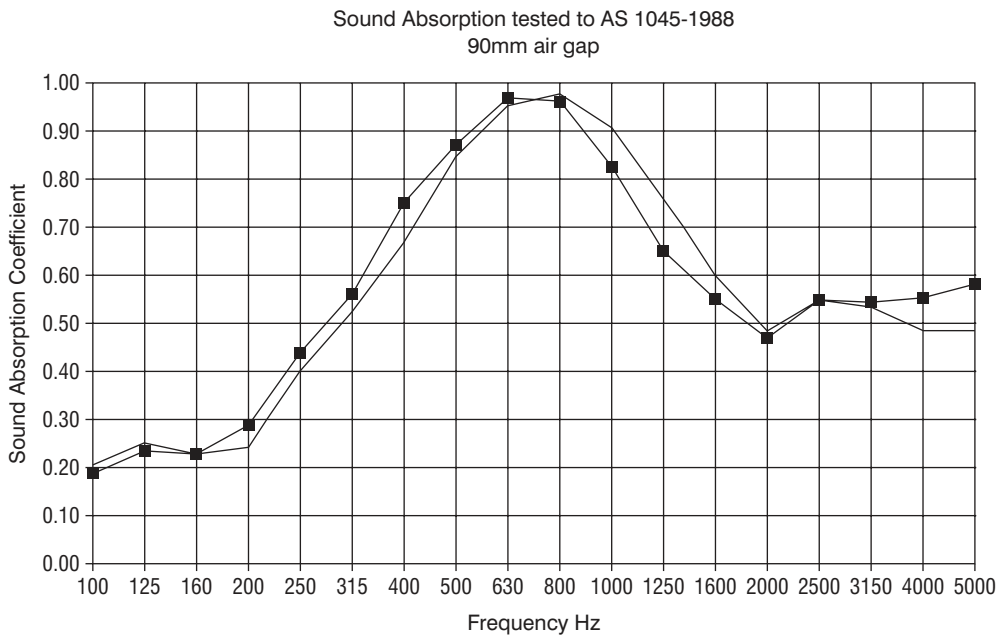
- Slotted MDF board 9mm thick, open area 14% with DecorSorb D400. NRC = 0.75.
- \* Slotted MDF board 9mm thick, open area 17.2% with DecorSorb D400. NRC = 0.75.
- Slotted MDF board 9mm thick, open area 21% with DecorSorb D400. NRC = 0.65.





**FIGURE 9**

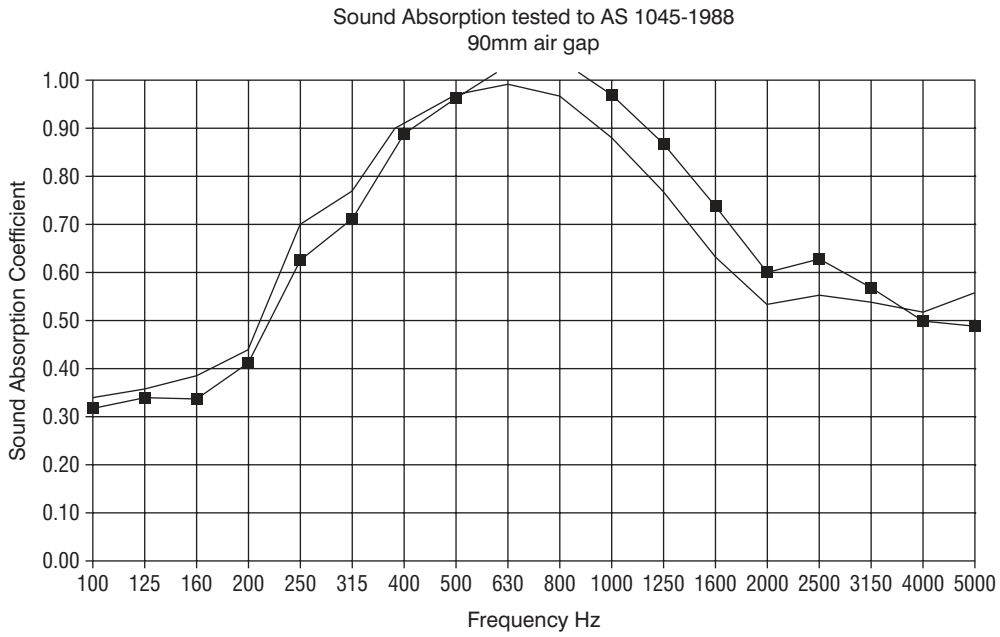
- Perforated MDF board 6mm thick, open area 10.2% with DecorSorb D400. NRC = 0.80.
- Perforated MDF board 6mm thick, open area 25% with DecorSorb D400. NRC = 0.70.



**FIGURE 10**

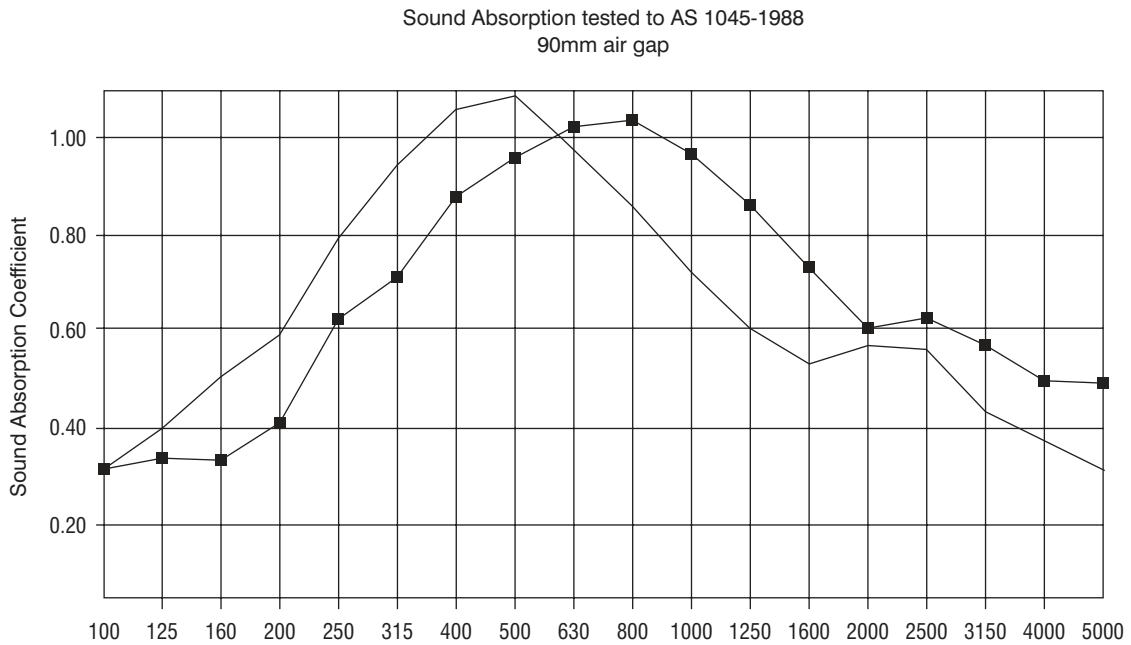
- Slotted MDF board 16mm thick, open area 21% with DecorSorb D400. NRC = 0.65.
- Slotted MDF board 9mm thick, open area 21% with DecorSorb D400. NRC = 0.65.





**FIGURE 11**

- Perforated MDF board 6mm thick, open area 10.2% with DecorSorb D400. NRC = 0.80.
- Perforated MDF board 12mm thick, open area 10.2% with DecorSorb D400. NRC = 0.75.



**FIGURE 12**

- Perforated MDF board 6mm thick, open area 10.2% with DecorSorb D400. NRC = 0.80.
- Perforated MDF board 6mm thick, open area 10.2% with 30kg poly, 80mm thick. NRC = 0.80.



Table 1 – Numerical data for test results

Frequency Hz	90mm gap						400mm gap					
	Perforated MDF board 6mm thick, open area 10.2% with Decororb NRC = 0.80	Perforated MDF board 6mm thick, open area 25% with Decororb NRC = 0.70	Perforated MDF board 12mm thick, open area 10.2% with Decororb NRC = 0.75	Slotted MDF board 9mm thick, open area 14% with Decororb NRC = 0.75	Slotted MDF board 16mm thick, open area 21% with Decororb NRC = 0.65	Slotted MDF board 9mm thick, open area 21% with Decororb NRC = 0.65	Perforated MDF board 6mm thick, open area 10.2% with 30kg poly, 80mm thick NRC = 0.80	Slotted MDF board 9mm thick, open area 21% with Decororb NRC = 0.70	Slotted MDF board 16mm thick, open area 21% with Decororb NRC = 0.70	Slotted MDF board 9mm thick, open area 17.2% with Decororb NRC = 0.75	Slotted MDF board 9mm thick, open area 14% with Decororb NRC = 0.75	Perforated MDF board 12mm thick, open area 10.2% with Decororb NRC = 0.70
100	0.32	0.17	0.34	0.22	0.18	0.22	0.31	0.31	0.87	0.80	0.84	0.82
125	0.34	0.23	0.36	0.28	0.24	0.30	0.40	0.30	0.74	0.90	0.77	0.90
160	0.34	0.23	0.39	0.26	0.23	0.29	0.50	0.69	0.74	0.71	0.71	0.72
200	0.41	0.28	0.44	0.31	0.29	0.33	0.59	0.90	0.92	0.88	0.86	0.80
250	0.62	0.43	0.71	0.51	0.44	0.54	0.80	0.88	0.91	0.96	0.85	0.88
315	0.71	0.54	0.77	0.62	0.56	0.66	0.85	0.89	0.95	0.86	0.86	0.86
400	0.88	0.69	0.93	0.79	0.75	0.81	1.06	0.70	0.75	0.73	0.69	0.73
500	0.98	0.79	0.97	0.93	0.87	0.94	1.09	0.80	0.65	0.84	0.59	0.67
630	1.03	0.96	0.99	1.04	0.97	1.01	0.98	0.74	0.79	0.76	0.72	0.77
800	1.04	1.01	0.97	1.02	0.96	0.99	0.86	0.73	0.79	0.77	0.71	0.71
1000	0.87	1.00	0.88	0.98	0.83	0.93	0.72	0.67	0.76	0.74	0.65	0.70
1250	0.85	0.93	0.76	0.89	0.85	0.82	0.60	0.65	0.78	0.75	0.62	0.70
1800	0.73	0.79	0.62	0.71	0.55	0.65	0.52	0.67	0.78	0.73	0.66	0.87
2000	0.60	0.61	0.63	0.58	0.47	0.64	0.57	0.64	0.73	0.67	0.63	0.64
2500	0.62	0.63	0.55	0.63	0.55	0.58	0.55	0.63	0.71	0.63	0.62	0.58
3150	0.58	0.64	0.53	0.61	0.54	0.53	0.42	0.60	0.67	0.60	0.62	0.59
4000	0.40	0.58	0.51	0.58	0.65	0.49	0.38	0.57	0.62	0.57	0.62	0.59
5000	0.48	0.61	0.55	0.56	0.58	0.51	0.30	0.55	0.64	0.59	0.62	0.61
NRC	0.80	0.70	0.75	0.75	0.65	0.75	0.80	0.70	0.75	0.75	0.70	0.70



# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP1  
 Date of test: 2/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

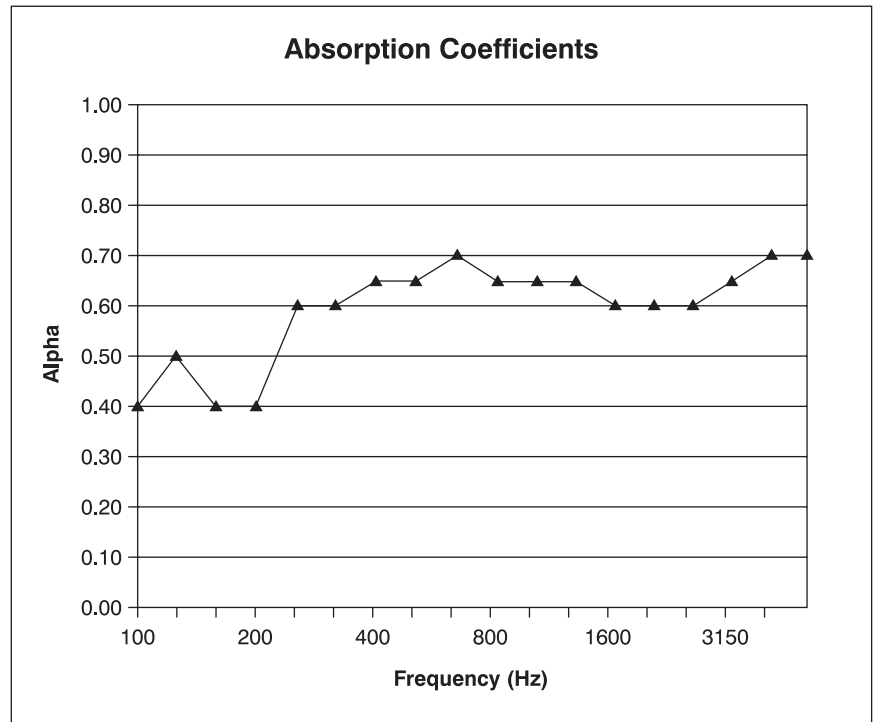
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 16mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: None  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 9

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.40
125	0.50
160	0.40
200	0.40
250	0.60
315	0.60
400	0.65
500	0.65
630	0.70
800	0.65
1000	0.65
1250	0.65
1600	0.60
2000	0.60
2500	0.60
3150	0.65
4000	0.70
5000	0.70

Graph 9



NRC = 0.60

# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP2  
 Date of test: 1/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

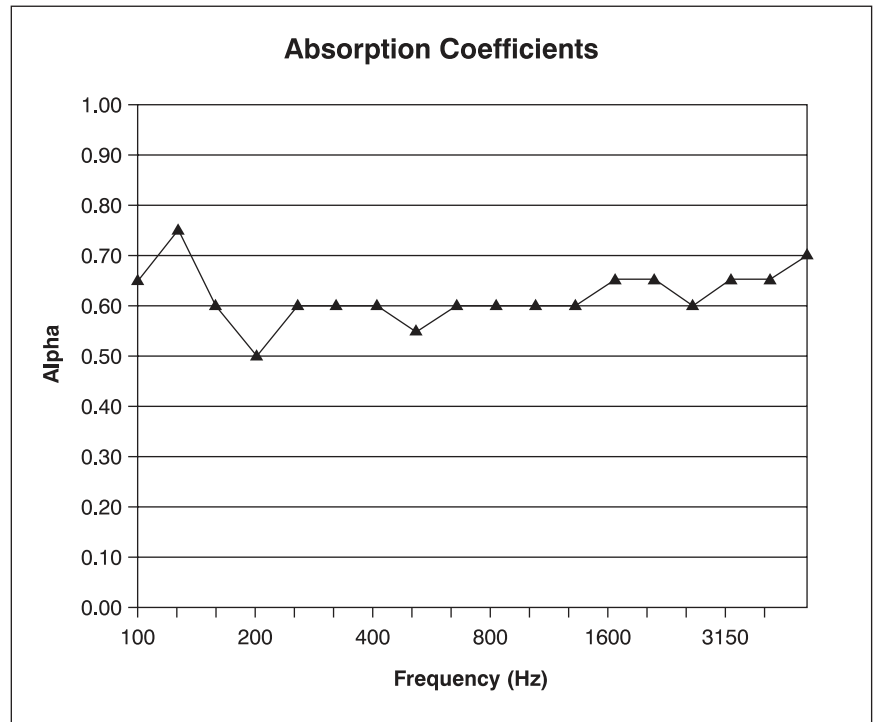
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: None  
 Air gap under panel: 400mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 10

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.65
125	0.75
160	0.60
200	0.50
250	0.60
315	0.60
400	0.60
500	0.55
630	0.60
800	0.60
1000	0.60
1250	0.60
1600	0.65
2000	0.65
2500	0.60
3150	0.65
4000	0.65
5000	0.70

Graph 10



NRC = 0.60

# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP3  
 Date of test: 2/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

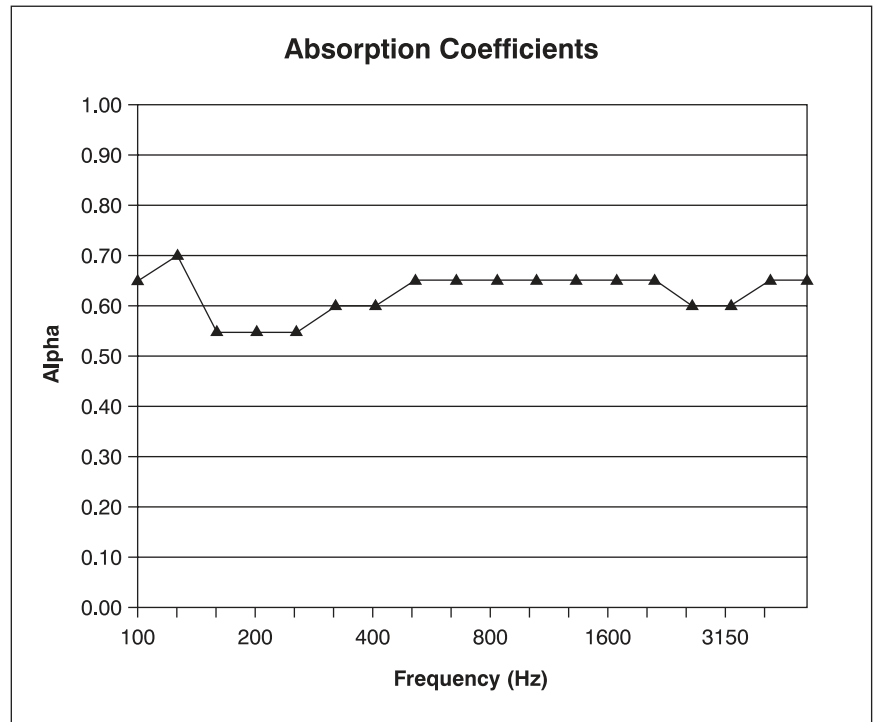
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125/S45  
 Open area: 10.2%  
 Insulation: A8225, 65mm dual density insulation, of mounted directly under panel face  
 Air gap under panel: 400mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 11

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.65
125	0.70
160	0.55
200	0.55
250	0.55
315	0.60
400	0.60
500	0.65
630	0.65
800	0.65
1000	0.65
1250	0.65
1600	0.65
2000	0.65
2500	0.60
3150	0.60
4000	0.65
5000	0.65

Graph 11



NRC = 0.60

# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP4  
 Date of test: 2/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

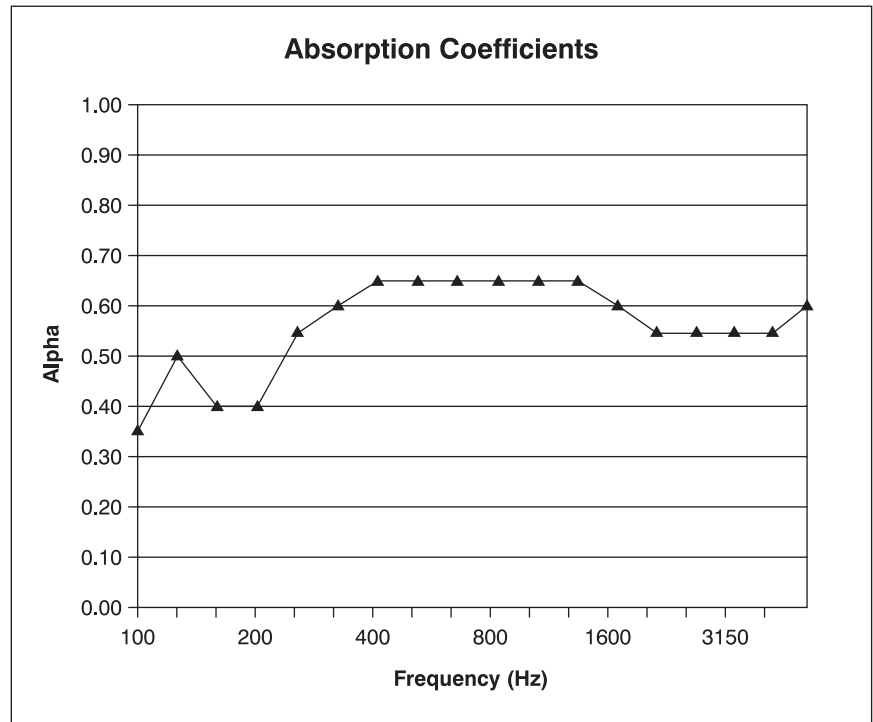
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125/S45  
 Open area: 10.2%  
 Insulation: None  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 12

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.35
125	0.50
160	0.40
200	0.40
250	0.55
315	0.60
400	0.65
500	0.65
630	0.65
800	0.65
1000	0.65
1250	0.65
1600	0.60
2000	0.55
2500	0.55
3150	0.55
4000	0.55
5000	0.60

Graph 12



NRC = 0.60

# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP5  
 Date of test: 3/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

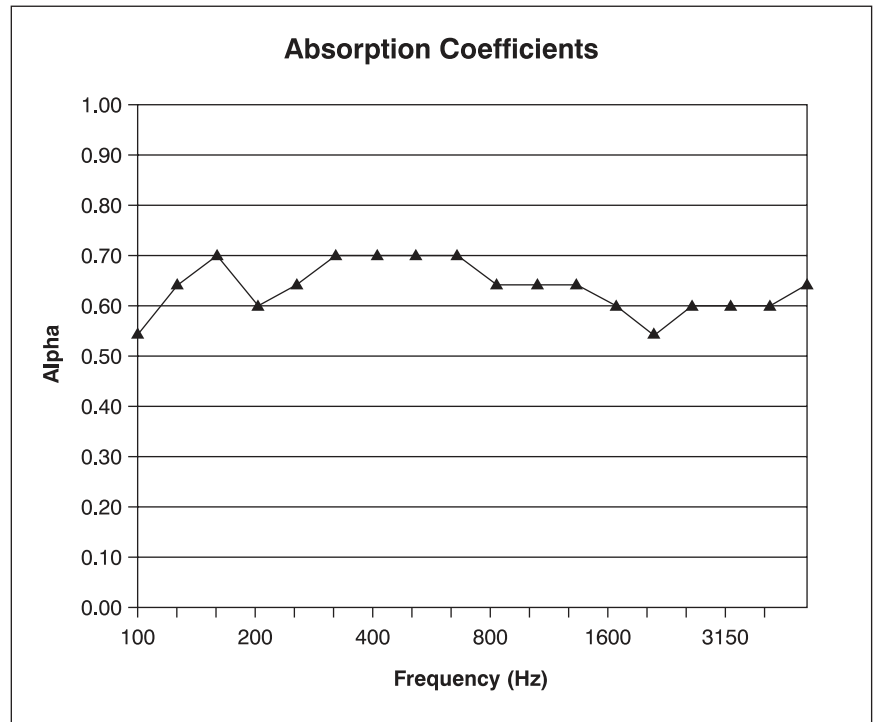
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: A8225, 65mm dual density insulation, mounted on floor of chamber away from the face panel.  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 13

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.55
125	0.65
160	0.70
200	0.60
250	0.65
315	0.70
400	0.70
500	0.70
630	0.70
800	0.65
1000	0.65
1250	0.65
1600	0.60
2000	0.55
2500	0.60
3150	0.60
4000	0.60
5000	0.65

Graph 13



NRC = 0.65

# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP6  
 Date of test: 3/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

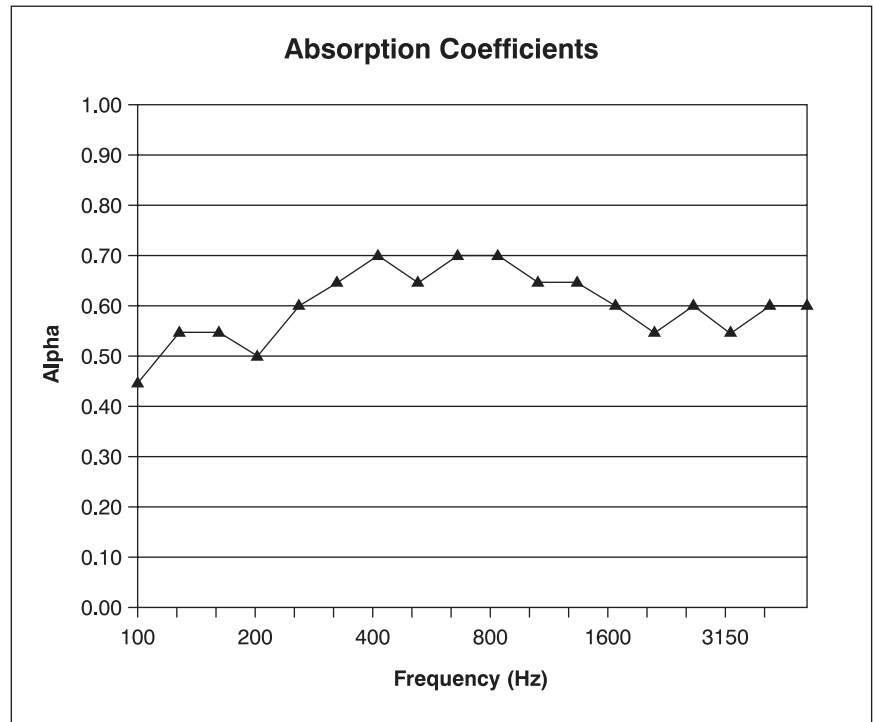
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: ATK3 Insulation mounted on the floor away from panel face  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 14

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.45
125	0.55
160	0.55
200	0.50
250	0.60
315	0.65
400	0.70
500	0.65
630	0.70
800	0.70
1000	0.65
1250	0.65
1600	0.60
2000	0.55
2500	0.60
3150	0.55
4000	0.60
5000	0.60

Graph 14



NRC = 0.60

# decorPly (MDF)

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP7  
 Date of test: 1/06/2004  
 Product: DecorPly (MDF)

Sample tested in the following configuration:

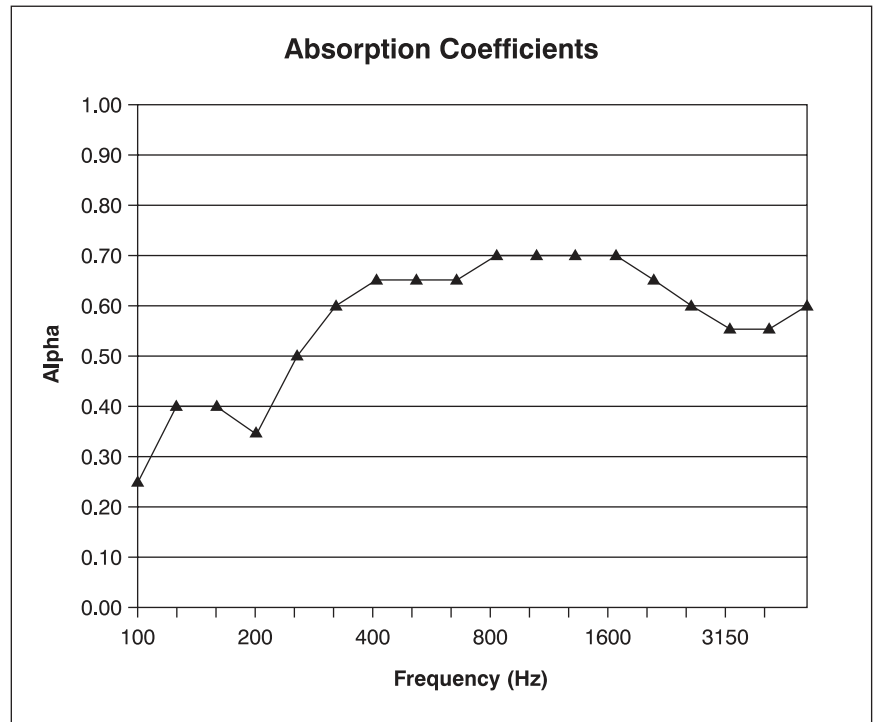
Surface panel: DecorPly (MDF)  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: A8210, 25mm insulation, mounted on floor of chamber away from the face panel  
 Air gap under panel: 50mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 15

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.25
125	0.40
160	0.40
200	0.35
250	0.50
315	0.60
400	0.65
500	0.65
630	0.65
800	0.70
1000	0.70
1250	0.70
1600	0.70
2000	0.65
2500	0.60
3150	0.55
4000	0.55
5000	0.60

Graph 15



NRC = 0.60

# decorPly

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP7A  
 Date of test: 1/06/2004  
 Product: DecorPly

Sample tested in the following configuration:

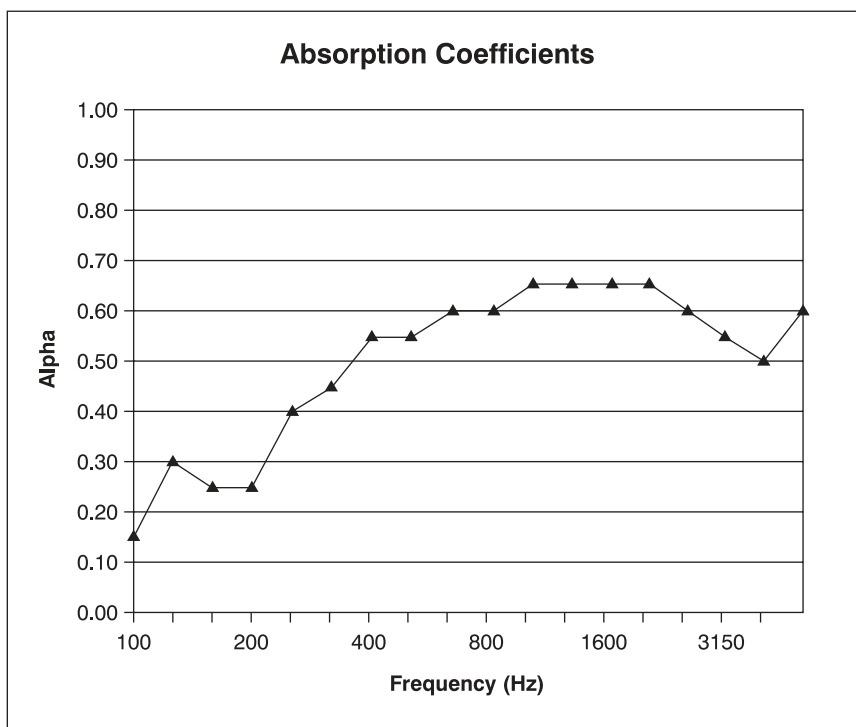
Surface panel: DecorPly  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: None  
 Air gap under panel: 50mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 16

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.15
125	0.30
160	0.25
200	0.25
250	0.40
315	0.45
400	0.55
500	0.55
630	0.60
800	0.60
1000	0.65
1250	0.65
1600	0.65
2000	0.65
2500	0.60
3150	0.55
4000	0.50
5000	0.60

Graph 16



NRC = 0.55





# decorPly

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP8  
 Date of test: 2/06/2004  
 Product: DecorPly

Sample tested in the following configuration:

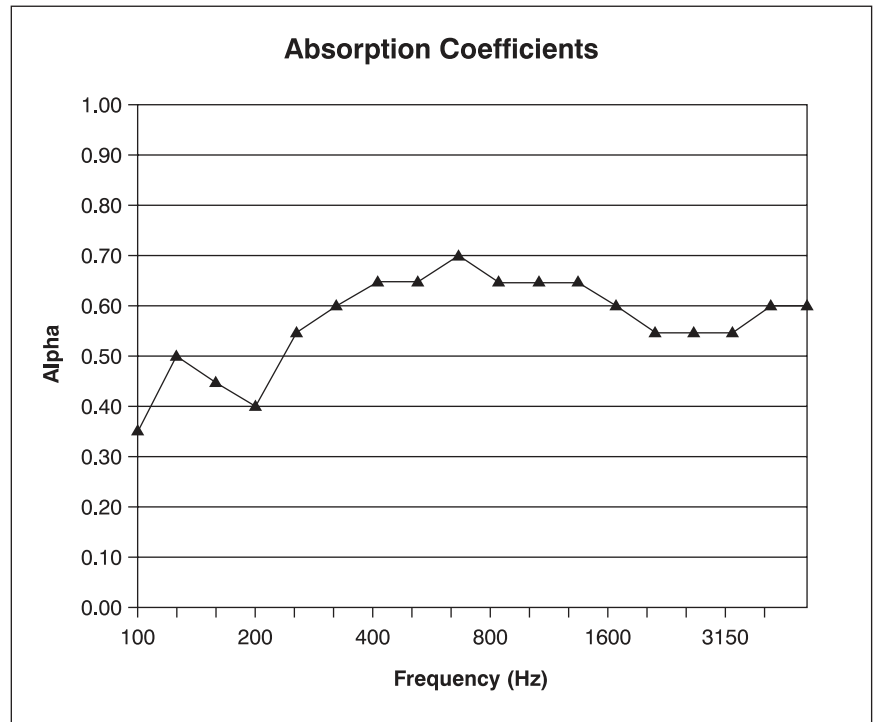
Surface panel: DecorPly  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AP250D/70  
 Open area: 12.3%  
 Insulation: None  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 17

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.35
125	0.50
160	0.45
200	0.40
250	0.55
315	0.60
400	0.65
500	0.65
630	0.70
800	0.65
1000	0.65
1250	0.65
1600	0.60
2000	0.55
2500	0.55
3150	0.55
4000	0.60
5000	0.60

Graph 17



NRC = 0.60

# decorPly

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP9  
 Date of test: 3/06/2004  
 Product: DecorPly

Sample tested in the following configuration:

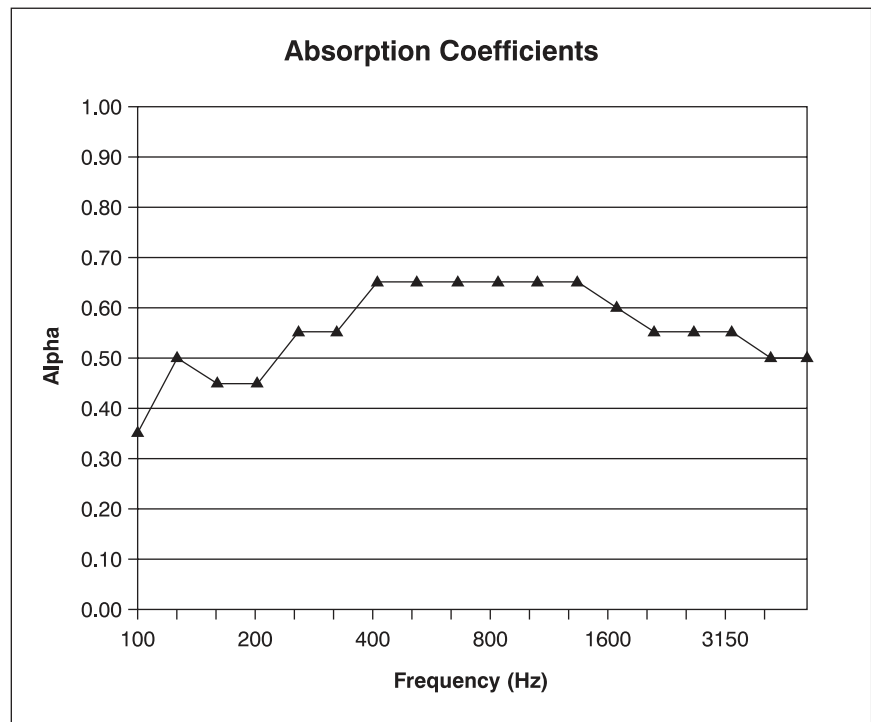
Surface panel: DecorPly  
 Material: MDF with DecorSorb backing  
 Panel thickness: 9mm  
 Panel type: AS250S/100  
 Open area: 12.6%  
 Insulation: None  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 18

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.35
125	0.50
160	0.45
200	0.45
250	0.55
315	0.55
400	0.65
500	0.65
630	0.65
800	0.65
1000	0.65
1250	0.65
1600	0.60
2000	0.55
2500	0.55
3150	0.55
4000	0.50
5000	0.50

Graph 18



NRC = 0.60

# decorPly

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMP11  
 Date of test: 3/06/2004  
 Product: DecorPly

Sample tested in the following configuration:

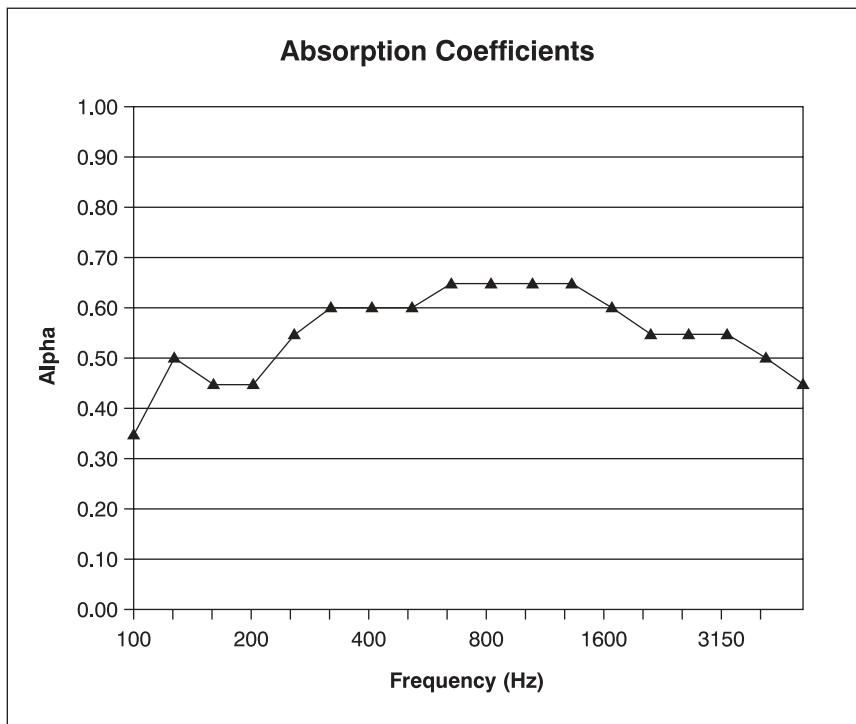
Surface panel: DecorPly  
 Material: MDF with DecorSorb backing  
 Panel thickness: 6mm  
 Panel type: AP250/S100  
 Open area: 12.6%  
 Insulation: None  
 Air gap under panel: 90mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 20

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.35
125	0.50
160	0.45
200	0.45
250	0.55
315	0.60
400	0.60
500	0.60
630	0.65
800	0.65
1000	0.65
1250	0.65
1600	0.60
2000	0.55
2500	0.55
3150	0.55
4000	0.50
5000	0.45

Graph 20



NRC = 0.60



# decorPly

Test Method: AS 1045-1988, MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM.

RMIT Test No.: 121I/04-069/PD  
 Report No.: A03RMST1  
 Test No.: A03D44RMT1  
 Date of test: 1/06/2004  
 Product: DecorPly

Sample tested in the following configuration:

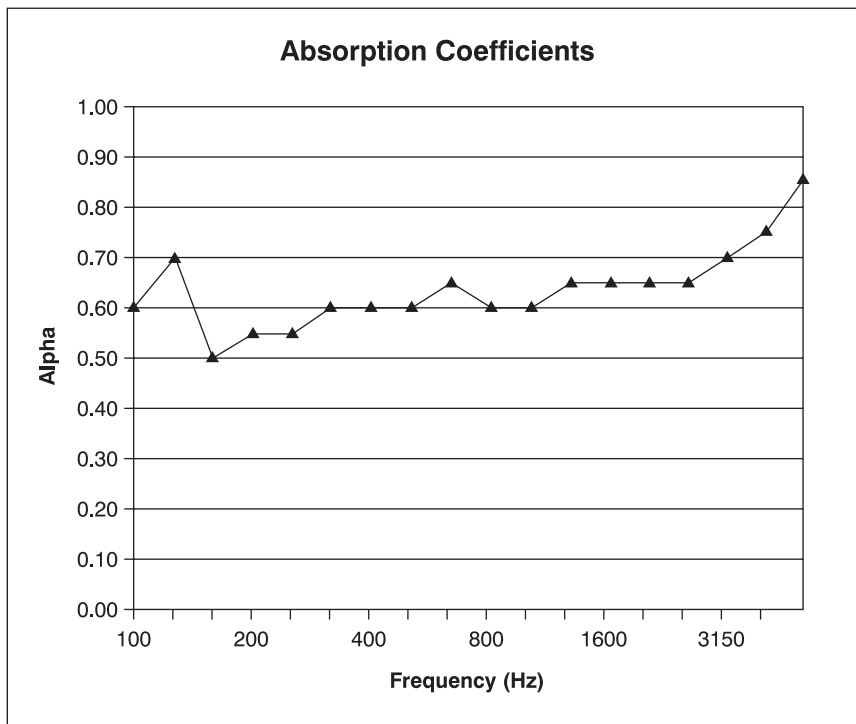
Surface panel: DecorPly  
 Material: MDF with DecorSorb backing  
 Panel thickness: 16mm  
 Panel type: AP125S/45  
 Open area: 10.2%  
 Insulation: None  
 Air gap under panel: 400mm  
 Sample size: 8.64 square metres

The perimeter of the sample was enclosed with an MDF frame.

Table 28

Frequency (Hertz)	Sound Absorption Coefficient (Alpha)
100	0.60
125	0.70
160	0.50
200	0.55
250	0.55
315	0.60
400	0.60
500	0.60
630	0.65
800	0.60
1000	0.60
1250	0.65
1600	0.65
2000	0.65
2500	0.65
3150	0.70
4000	0.75
5000	0.85

Graph 28



NRC = 0.60



# Appendix 1

## Absorption Material Specifications

<b>Decor Systems Product Reference</b>	<b>Product Specifications</b>
A8210, 25mm Insulation	25mm polyester @ 28kg/m <sup>3</sup>
A8225, 65mm Dual Density Insulation	65mm dual layer polyester, comprising 40mm face layer @20kg/m <sup>3</sup> and 25mm back layer @ 40kg/m <sup>3</sup>
ATK3 Insulation	65mm polyester @ 7.7kg/m <sup>3</sup>