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STUDIO ABSORBERS

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Recent years have seen a proliferation of small radio stations e.g. Community and Incremental, where the revenues are small and the consequential returns on investment will be small. Likewise, Broadcasters have seen an increase in competition and the prospect of deregulation looming large. All this, when taken against the current economic climate of high interest rates, means that the client wants workable solutions at minimum cost and maximum flexibility.

As Acousticians and Studio Designers involved in these enterprises, it requires us to look at all the old and new methods of Studio Design and Construction. Then evolve a low cost approach that will meet the performance criteria in the cheapest manner.

During this period the price of premises and office accommodation have also risen, the consequence of which is that studios are now shoe-horned into smaller and smaller areas. Acoustic Specifications have been relaxed, but the client still expect a good sound within this small envelope. Together with good aesthetics and, yet be robust enough to withstand the abuse experienced in heavily trafficked production areas (24 hours a day).

To meet these demands AES has produced a range of high efficiency absorption modules, that can be easily and effectively utilized in these compact low cost environments. Whether it be for a radio studio, an editing or dubbing suite, control room or voice booth. The main criteria of the design being to give, as much low frequency control as possible, whilst still providing useful mid and high frequency control. The result being a range of polished wood slotted membrane absorbers, which is further supplemented by a range of fabric finished units.

The polished wood was used because of its hard wearing capability and universal aesthetic appeal. The normal perforated hole approach was changed to slots because of the psychological side effects, and to reduce rigidity. The wood was chosen because of its ease of machining, flexural strength, and mass. This resulted in the selection of veneered plywood with a range of thickness from 3mm to 12mm. This is flexibly fixed to a series of timber studs with a variety of air spaces. Currently available options range from 50mm to 200mm. The cavity behind the plywood was filled with a composition of Rw6 and Rw3 mineral wool, and in some instances a plastic heavy membrane.

For the fabric covered absorbers a different type of approach was utilized, this involved the construction of a frame to take a plastic fabric fixing strip. This frame was then infilled with combinations of various densities of mineral wool, and in some instances a floating membrane was also incorporated. The fabric finishes chosen were of acoustically transparent type, being of either plain or crepe weave. The materials range from 100% polyester to nylon or wool. Again, these materials were selected for their abrasion resistance, in addition to other normal features such as colour fastness, tear and tensile performances. All samples were tested in a reverberation chamber to establish the acoustic absorption characteristics.

In all cases, the absorbers can be treated to control flammability.

The absorption characteristics for the basic units are shown in Figures 1 to 10.

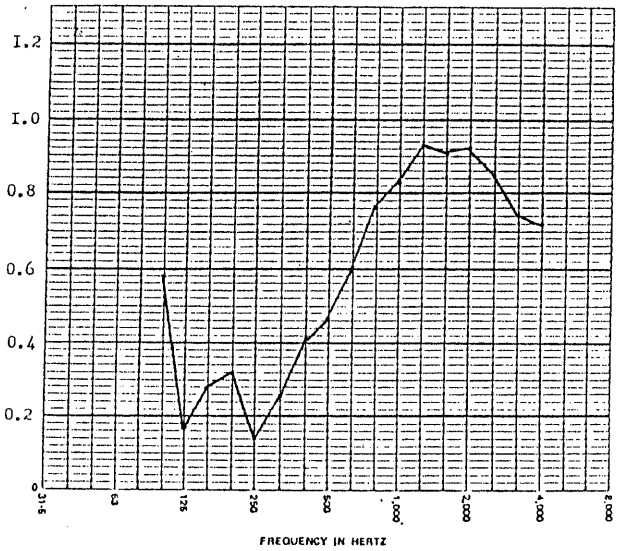
Units starting with the prefix 'F' (as in FHA) are Fabric finished. Units with the letter 'T' (as in TAMA) are Timber finished.

A = Absorption.

M = Flexible Membrane with heavy mass.

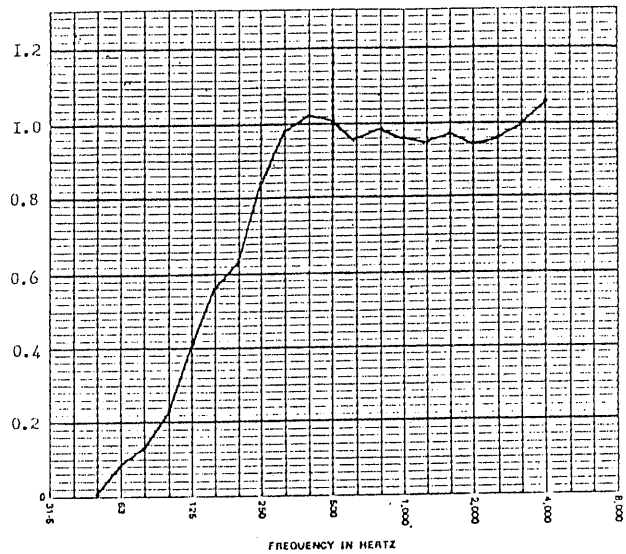
Note: Figure below 100 Hz can only be indicative due to limits imposed by size of reverberation chamber.

Sample	TAMA 30-50-25	DATE	16-08-90	JOB No.



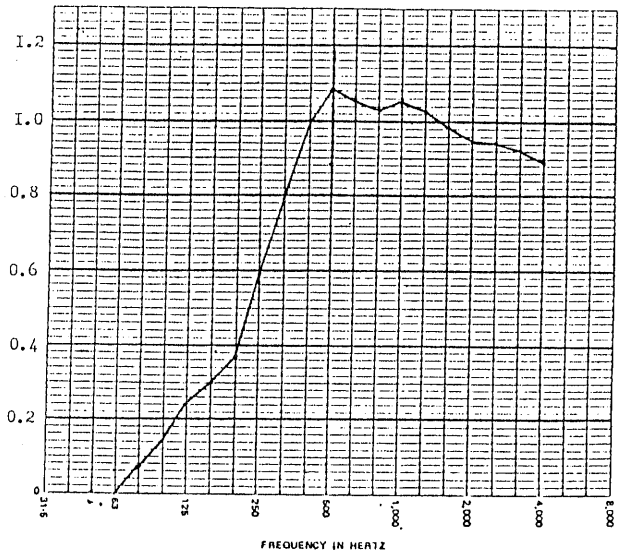
Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	I/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50				50			
63				63			
80				80			
100	0.58			100			
125	0.17	0.34		125			
160	0.28			160			
200	0.32			200			
250	0.14	0.15		250			
315	0.25			315			
400	0.41			400			
500	0.46	0.49		500			
630	0.60			630			
800	0.76			800			
1000	0.83	0.85		1000			
1250	0.93			1250			
1600	0.91			1600			
2000	0.92	0.89		2000			
2500	0.85			2500			
3150	0.74			3150			
4000	0.72	0.73		4000			
Weighting							

Sample	DATE	JOB No.
FAHA 50-25	02-04-90	



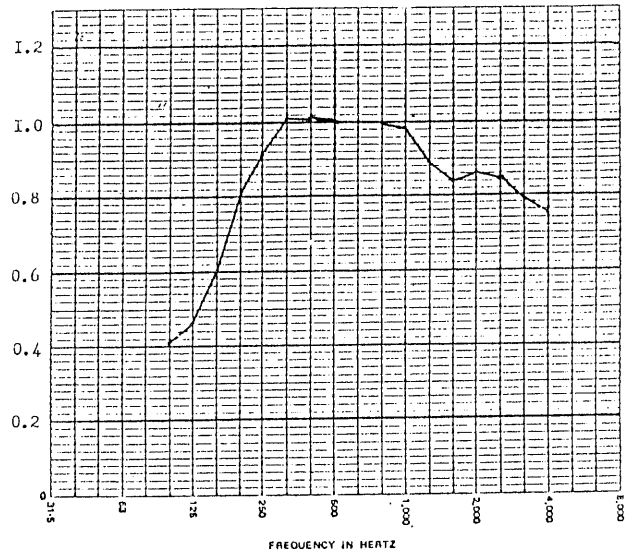
Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	1/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50	0.01			50			
63	0.08	0.07		63			
80	0.13			80			
100	0.23			100			
125	0.41	0.40		125			
160	0.56			160			
200	0.63			200			
250	0.84	0.81		250			
315	0.98			315			
400	1.02			400			
500	1.01	1.00		500			
630	0.96			630			
800	0.98			800			
1000	0.96	0.96		1000			
1250	0.95			1250			
1600	0.97			1600			
2000	0.94	0.96		2000			
2500	0.96			2500			
3150	1.00			3150			
4000	1.06	1.04		4000			
Weighting							

Sample	FHA 50-25	DATE 16-08-90	JOB No.



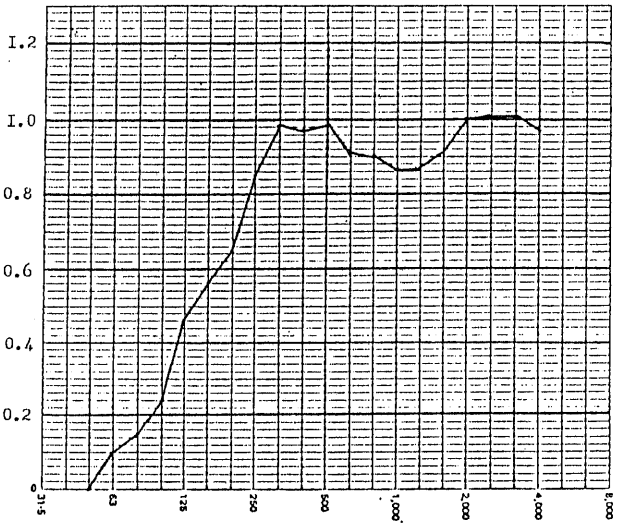
Absorption Coefficient					REVERBERATION TIME (SECS)			
Fre(Hz)	1/3Oct.	Octave			Fre(Hz)	T30	T20	EDT
50	0.00				50			
63	0.06	0.04			63			
80	0.07				80			
100	0.14				100			
125	0.24	0.23			125			
160	0.30				160			
200	0.37				200			
250	0.59	0.58			250			
315	0.79				315			
400	1.00				400			
500	1.08	1.04			500			
630	1.05				630			
800	1.03				800			
1000	1.05	1.04			1000			
1250	1.03				1250			
1600	0.98				1600			
2000	0.95	0.96			2000			
2500	0.95				2500			
3150	0.92				3150			
4000	0.89	0.89			4000			
Weighting								

Sample T 80-25	DATE 16-08-90	JOB No.



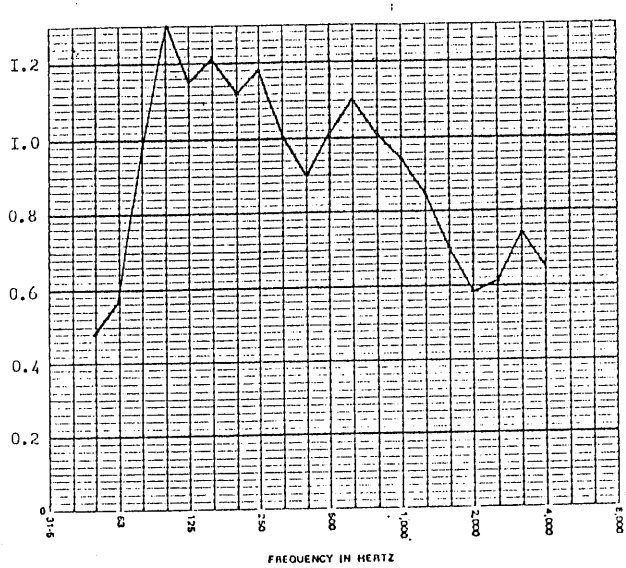
Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	1/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50				50			
63				63			
80				80			
100	0.41			100			
125	0.46	0.49		125			
160	0.60			160			
200	0.81			200			
250	0.91	0.93		250			
315	1.08			315			
400	1.08			400			
500	1.01	1.03		500			
630	1.00			630			
800	0.98			800			
1000	0.92	0.93		1000			
1250	0.89			1250			
1600	0.84			1600			
2000	0.86	0.85		2000			
2500	0.85			2500			
3150	0.79			3150			
4000	0.75	0.75		4000			
Weighting							

Sample	FAHAHA 50	DATE 02-04-90	JOB No.



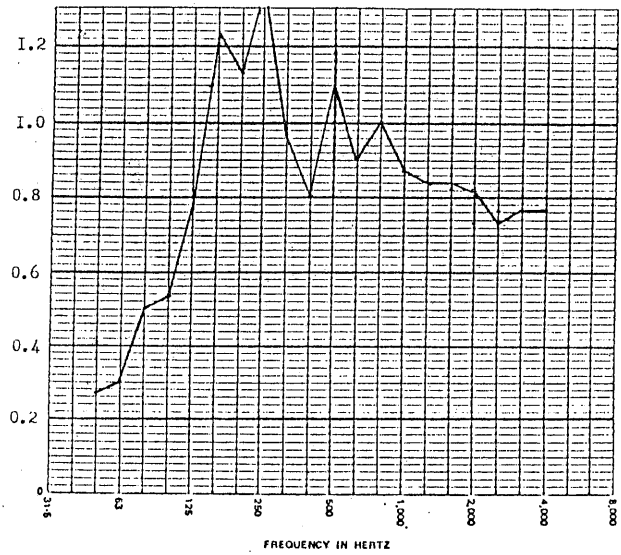
Absorption Coefficient					REVERBERATION TIME (SECS)			
Fre(Hz)	I/3Oct.	Octave			Fre(Hz)	T30	T20	EDT
50	0.01				50			
63	0.10	0.08			63			
80	0.15				80			
100	0.24				100			
125	0.46	0.42			125			
160	0.56				160			
200	0.64				200			
250	0.85	0.82			250			
315	0.98				315			
400	0.97				400			
500	0.98	0.95			500			
630	0.91				630			
800	0.90				800			
1000	0.86	0.88			1000			
1250	0.87				1250			
1600	0.91				1600			
2000	1.00	0.98			2000			
2500	1.03				2500			
3150	1.03				3150			
4000	0.94	0.95			4000			
Weighting								

Sample	T 210	DATE	16-08-90	JOB No.



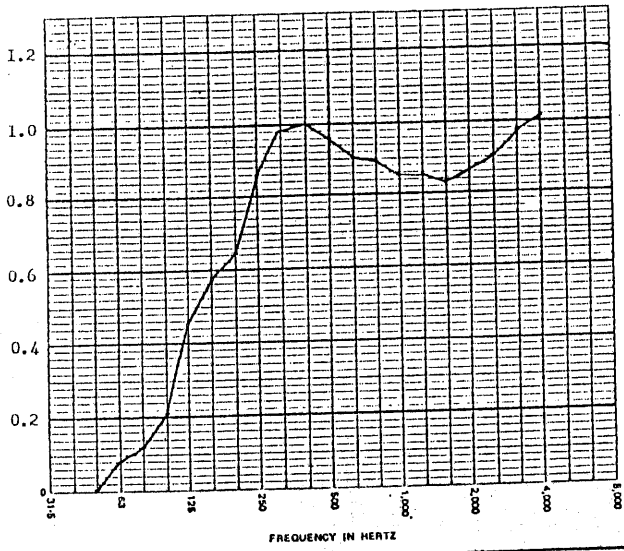
Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	1/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50	.48			50			
63	.57	0.68		63			
80	.98			80			
100	1.25			100			
125	1.15	1.20		125			
160	1.21			160			
200	1.12			200			
250	1.18	1.10		250			
315	1.00			315			
400	.90			400			
500	1.03	1.01		500			
630	1.10			630			
800	1.02			800			
1000	.94	0.94		1000			
1250	.85			1250			
1600	.70			1600			
2000	.58	0.63		2000			
2500	.61			2500			
3150	.74			3150			
4000	.66	0.70		4000			
Weighting							

Sample	T I40	DATE	16-08-90	JOB No.



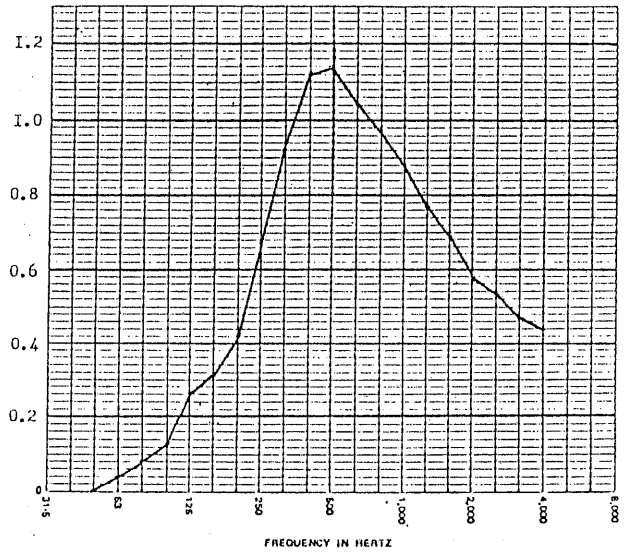
Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	I/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50	0.27			50			
63	0.30	0.36		63			
80	0.50			80			
100	0.53			100			
125	0.77	0.84		125			
160	1.23			160			
200	1.13			200			
250	1.41	1.17		250			
315	0.97			315			
400	0.80			400			
500	1.11	0.92		500			
630	0.85			630			
800	1.01			800			
1000	0.87	0.91		1000			
1250	0.84			1250			
1600	0.84			1600			
2000	0.82	0.80		2000			
2500	0.73			2500			
3150	0.76			3150			
4000	0.76	0.76		4000			
Weighting							

Sample	FAHA 50	DATE 02-04-90	JOB No.



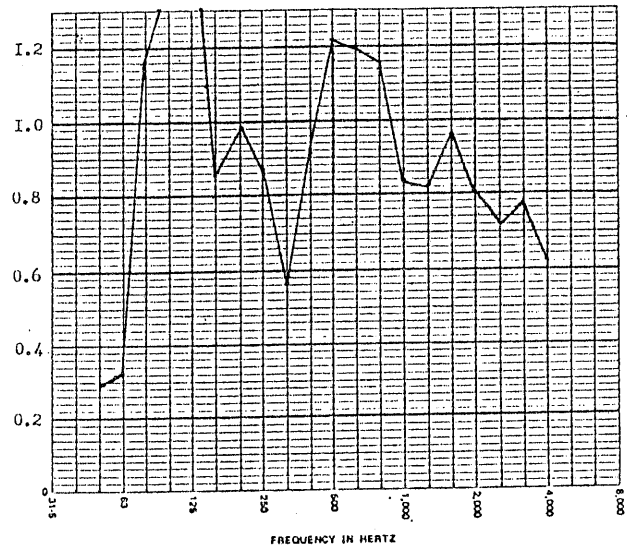
Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	1/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50	0.01			50			
63	0.08	0.06		63			
80	0.12			80			
100	0.21			100			
125	0.45	0.41		125			
160	0.57			160			
200	0.64			200			
250	0.85	0.82		250			
315	0.98			315			
400	1.00			400			
500	0.96	0.96		500			
630	0.91			630			
800	0.89			800			
1000	0.85	0.86		1000			
1250	0.85			1250			
1600	0.83			1600			
2000	0.86	0.86		2000			
2500	0.90			2500			
3150	0.97			3150			
4000	1.01	0.98		4000			
Weighting							

Sample	DATE	JOB No.
FHA 50-5	16-08-90	



Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	T/30ct.	Octave		Fre(Hz)	T30	T20	EDT
50	0.02			50			
63	0.04	0.03		63			
80	0.08			80			
100	0.13			100			
125	0.26	0.23		125			
160	0.31			160			
200	0.42			200			
250	0.67	0.67		250			
315	0.92			315			
400	1.12			400			
500	1.13	1.10		500			
630	1.04			630			
800	0.97			800			
1000	0.88	0.87		1000			
1250	0.77			1250			
1600	0.69			1600			
2000	0.57	0.60		2000			
2500	0.53			2500			
3150	0.47			3150			
4000	0.44	0.44		4000			
Weighting							

Sample T 070	DATE 16-08-90	JOB No.



Absorption Coefficient				REVERBERATION TIME (SECS)			
Fre(Hz)	1/3Oct.	Octave		Fre(Hz)	T30	T20	EDT
50	0.29			50			
63	0.32	0.59		63			
80	1.16			80			
100	1.36			100			
125	1.35	1.23		125			
160	0.85			160			
200	0.98			200			
250	0.87	0.80		250			
315	0.56			315			
400	0.91			400			
500	1.22	1.11		500			
630	1.19			630			
800	1.16			800			
1000	0.83	0.94		1000			
1250	0.82			1250			
1600	0.96			1600			
2000	0.80	0.82		2000			
2500	0.72			2500			
3150	0.77			3150			
4000	0.62	0.70		4000			
Weighting							