

University of Nairobi
Department of Architecture
(Environmental Science - Paper No.1)

NOISE - CONTROL PERFORMANCE
OF SELECTED LIGHT - WEIGHT
PARTITIONS
LOCALLY MANUFACTURED //

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Part I - Testing Procedure

A selection of ten different light-weight partitions locally manufactured - see table page 5 - has been tested in order to receive informations about their performance in regard to sound transmission loss.

The following equipment has been used:

- source room with sound generator - Bruel & Kjaer, Random Noise Generator Type 1402
- receiving room(unechoic chamber) - Bruel & Kjaer, Precision Sound Level Meter Type 2203
Bruel & Kjaer, Octave Filter Set Type 1613
- size of test panel 48x50 cm.

For each one-octave band filter a reference reading has been executed and consequently several response readings, out of which a mean-value has been calculated, all in dB(A).

The Sound Transmission Class method (American Society for Testing & Materi ASTM) has been used for rating.

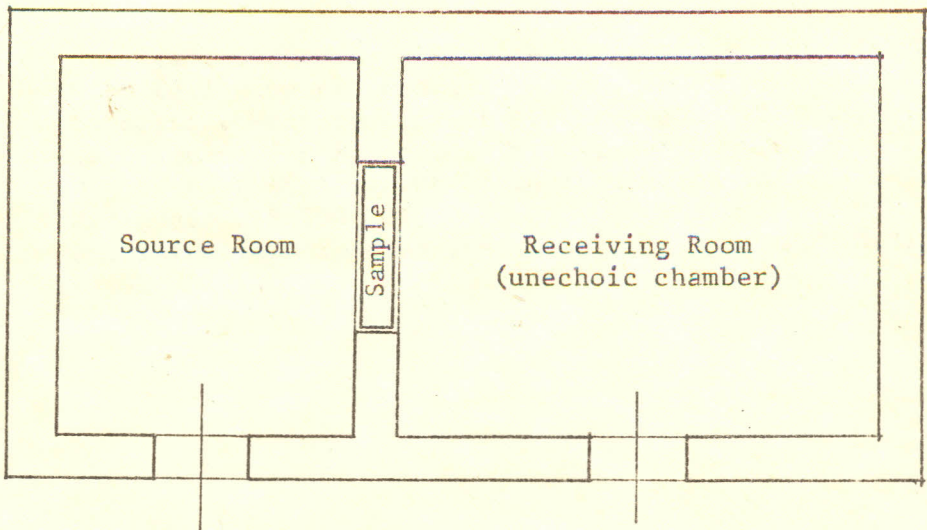


Fig.1 - Testing order

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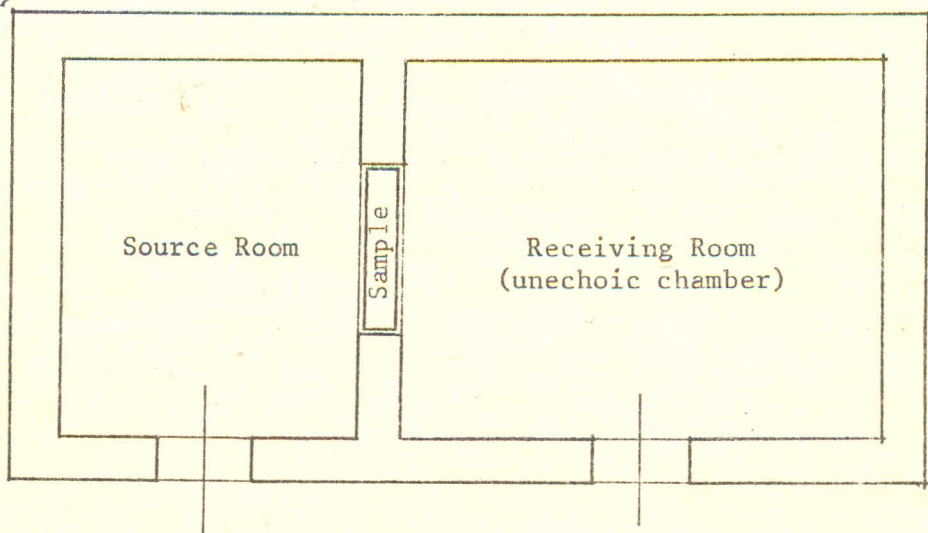


Fig.1 - Testing order

Part II - Sound Transmission Class (STC) Rating

The STC is a single-number rating of airborne sound transmission performance of a partition at different frequencies. The higher the STC rating, the more efficient is the partition for reducing sound transmission in the test frequency range.

According to the STC rating procedure as specified in the American Society for Testing & Materials (ASTM) annual book of standards, the sound transmission loss TL of a specimen of a partition is measured at 16 third-octave bands with centre frequencies from 125 to 4000 Hz.

For technical reasons this procedure has been altered to 6 one-octave band measurements with centre frequencies from 125 to 4000 Hz. See page 5 to 8.

The following conditions must be fulfilled:

1. the maximum deviation of the test curve below the contour at a single test frequency shall not exceed 8 dB;
2. the sum of the deviations at all 6 frequencies of the test curve below the contour shall not exceed 12 dB - that means an average deviation of 2 dB.

When the STC contour is adjusted to the highest position that meets the above requirements, The STC rating is read from the vertical scale of the test curve as the TL value corresponding to the intersection of the STC contour and the 500 Hz ordinate.

Quoted from: M.D.Egan, Concepts in Architectural Acoustics, ISBN 0-07-019055 with following references:
Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions, ASTM Designation E 90-70;
Measurement of Airborne Sound Insulation in Buildings, ASTM Designation E 336-70T;
Determination of Sound Transmission Class, ASTM Designation E 413-70T.

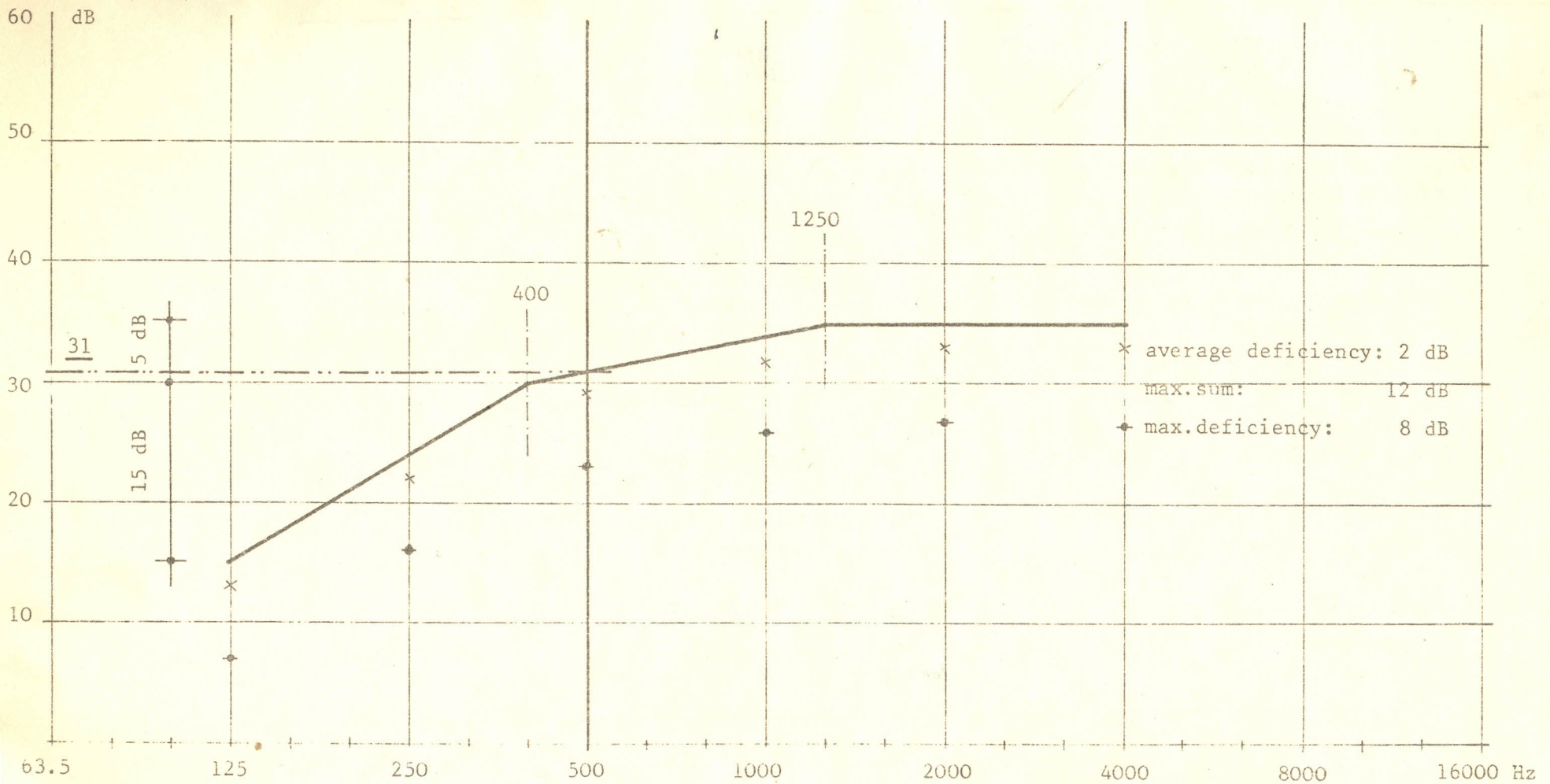
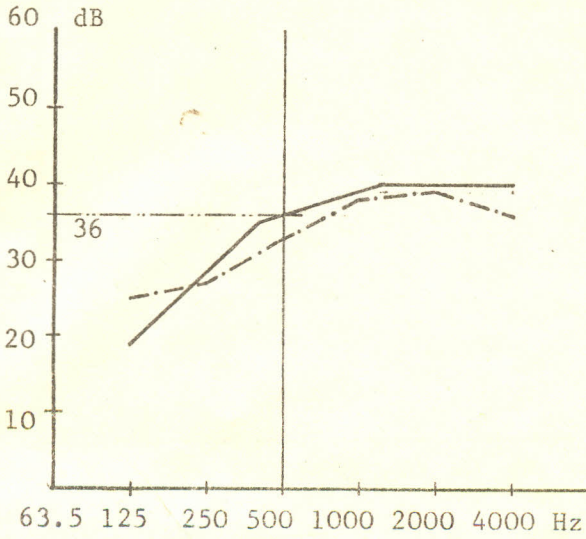


Fig.2 - Typical sound transmission class contour / here : STC 31

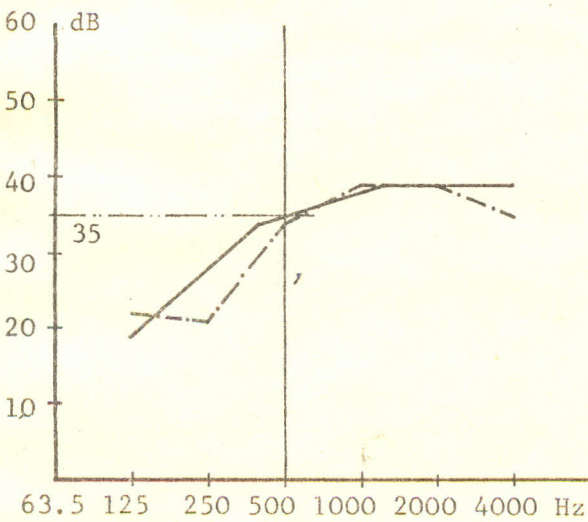
Sample No.	Description	Depth	Manufacturer	Weight kg/m ²	STC Rating
1	2 x 4mm hardboard + 40mm blockwood	48 mm	Timsales Ltd. Nairobi	27.4	36
2	2 x 14mm chipboard + 42mm air space	70 mm	-	23.1	35
3	2 x 4mm hardboard + 40mm blockwood perforated Ø 30mm/45mm centre	48 mm	Timsales Ltd. Nairobi	22.5	35
4	2 x 2mm cardboard + compressed straw	55 mm	Stramit Ltd. Ruaraka	20.9	34
5	2 x 2.5mm hardboard + 40mm paperboard eggcrate	45 mm	Jogoo Ind.Ltd. Nairobi	13.9	33
6	2 x 2.5 hardboard + 40mm softboard (4 layers)	45 mm	Jogoo Ind.Ltd. Nairobi	19.5	29
7	2 x 4mm plywood + 40mm honey-comb	45 mm	Jogoo Ind.Ltd. Nairobi	11.6	28
8	2 x 4mm plywood + 32mm paperboard eggcrate	40 mm	Swan Singh Ltd. Nairobi	10.1	28
9	2 x 2.5mm plywood + 40mm rubber foam	45 mm	Jogoo Ind.Ltd. Nairobi	9.4	28
10 10	2 x 2.5mm hardboard + 40mm styropor	45 mm	Jogoo Ind.Ltd. Nairobi	10.9	26
11	2 x 10mm gypsumboard + 22mm chipboard	42 mm	imported	25.8	35
12	styropor only	40 mm	-	0.8	15



No.1 Weight: 27.4 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	25	STC 36
250	27	
500	33	
1000	38	
2000	39	
4000	36	

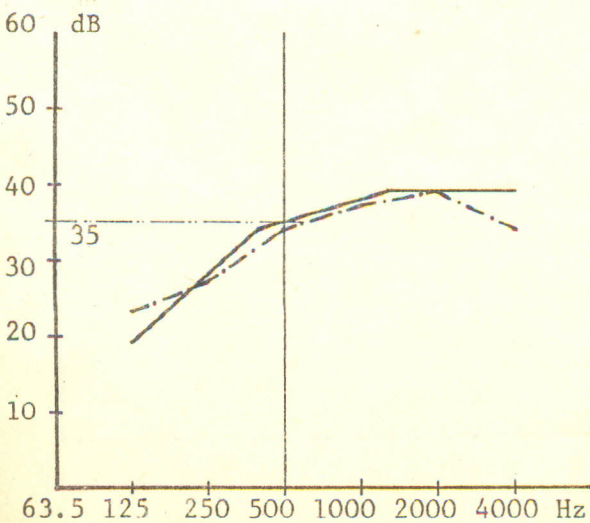
Six-frequency average TL = 33 dB



No.2 Weight: 23.1 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	22	STC 35
250	21	
500	34	
1000	39	
2000	39	
4000	35	

Six-frequency average TL = 32 dB

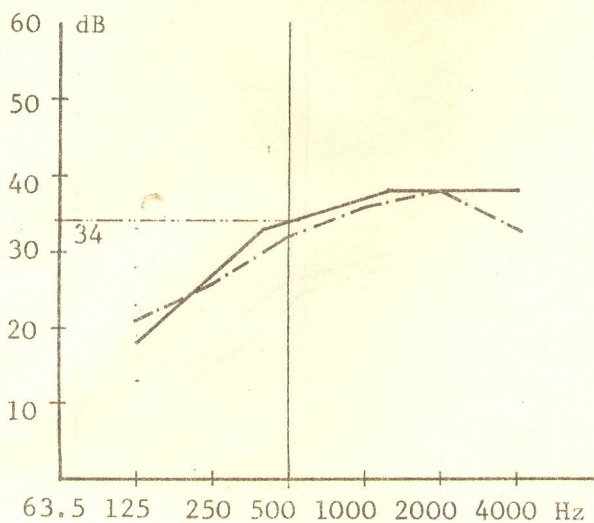


No.3 Weight: 22.5 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	23	STC 35
250	27	
500	34	
1000	37	
2000	39	
4000	34	

Six-frequency average TL = 32 dB

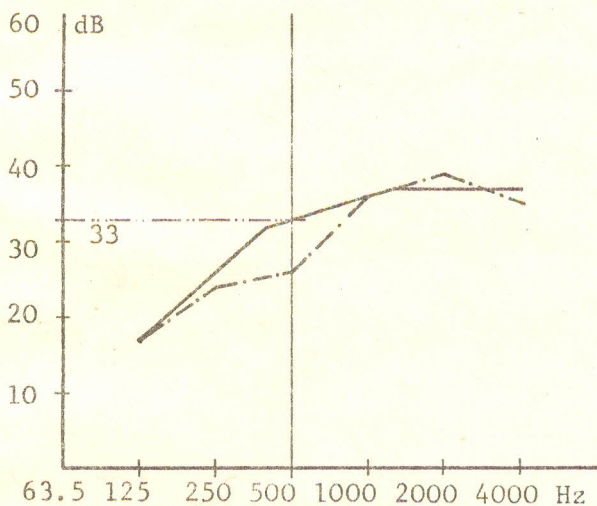
* Measured at 6 octave-bands with cent



No. 4 Weight: 20.9 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	21	STC 34
250	26	
500	32	
1000	36	
2000	38	
4000	33	

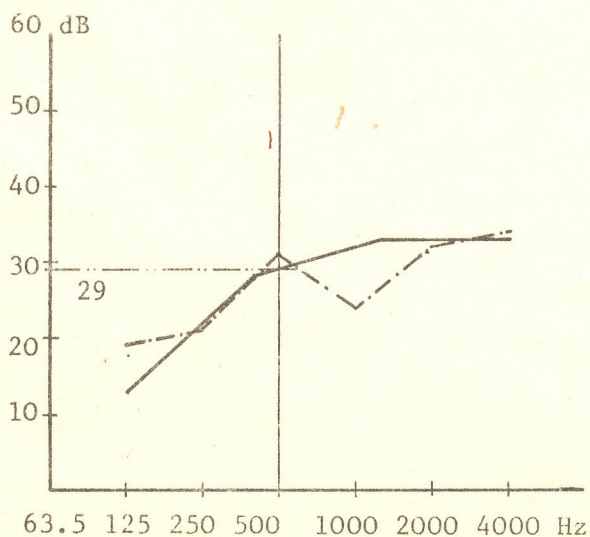
Six-frequency average TL = 31 dB



No. 5 Weight: 13.9 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	17	STC 33
250	24	
500	26	
1000	36	
2000	39	
4000	35	

Six-frequency average TL = 30 dB

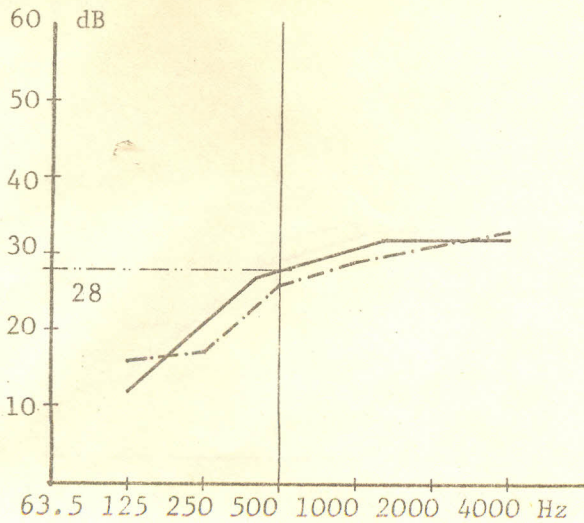


No. 6 Weight: 19.5 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	19	STC 29
250	21	
500	31	
1000	24	
2000	32	
4000	34	

Six-frequency average TL = 27 dB

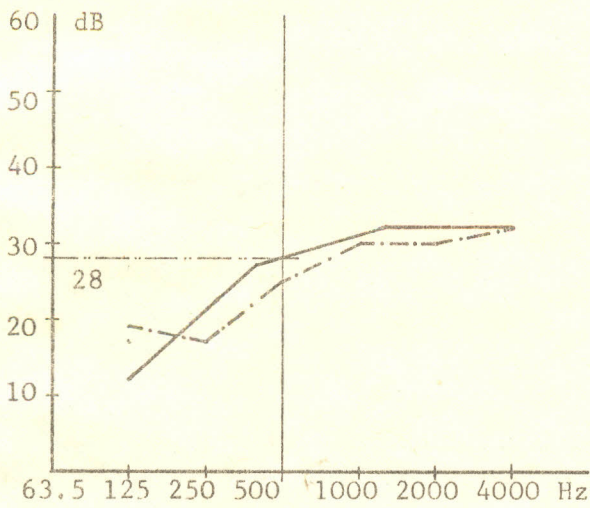
* Measured at 6 octave-bands with center frequencies from 125 to 4000 Hz.



No. 7 Weight: 11.6 kg/m²

Frequency	Transm. Loss	Sound Tr. Cla
125 Hz	16	STC 28
250	17	
500	26	
1000	29	
2000	31	
4000	33	

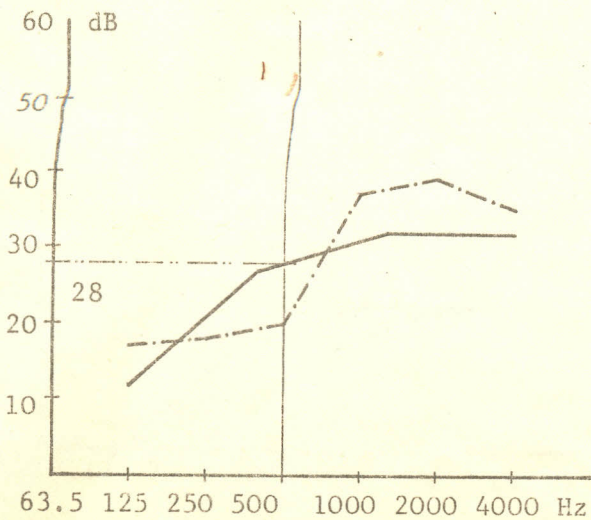
Six-frequency average TL = 25 dB



No. 8 Weight: 10.1 kg/m²

Frequency	Transm. Loss	Sound Tr. Cla
125 Hz	19	STC 28
250	17	
500	25	
1000	30	
2000	30	
4000	32	

Six-frequency average TL = 25.5 dB

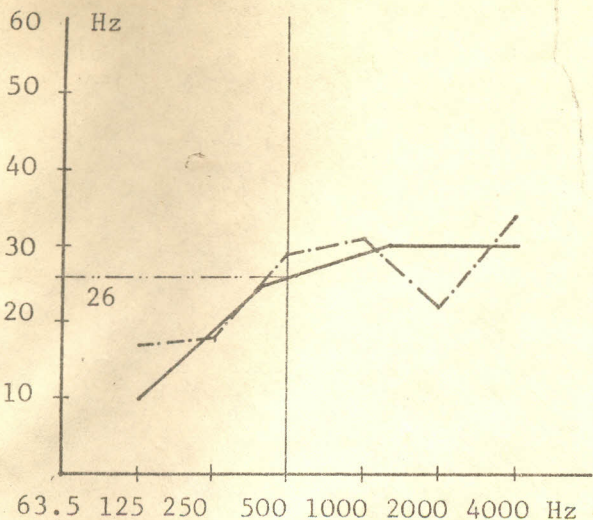


No. 9 Weight: 9.4 kg/m²

Frequency	Transm. Loss	Sound Tr. Cla
125 Hz	17	STC 28
250	18	
500	20	
1000	37	
2000	39	
4000	35	

Six-frequency average TL = 28 dB

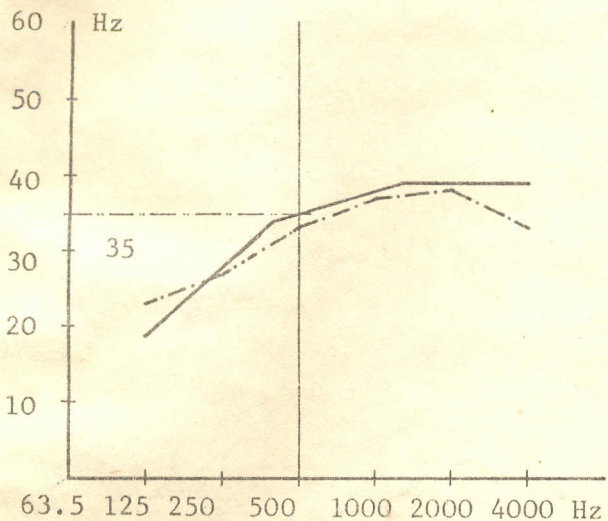
* Measured at 6 octave-bands with center frequencies from 125 to 4000 Hz.



No. 10 Weight: 10.9 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	17	STC 26
250	18	
500	29	
1000	31	
2000	22	
4000	34	

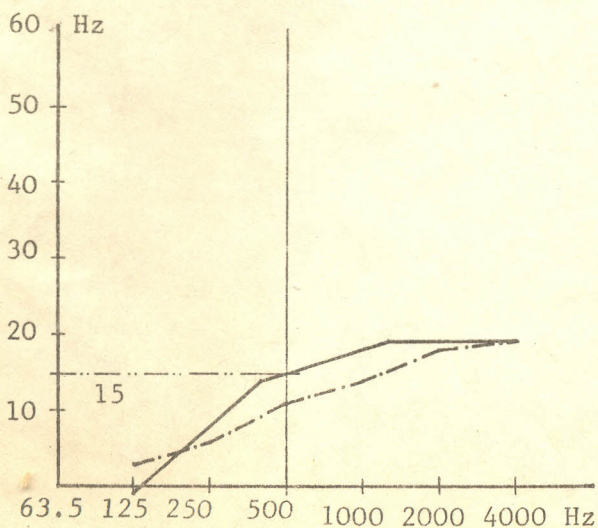
Six-frequency average TL = 25 dB



No. 11 Weight: 25.8 kg/m²

Frequency	Transm. Loss	Sound Tr. Class
125 Hz	23	STC 35
250	27	
500	33	
1000	37	
2000	38	
4000	33	

Six-frequency average TL = 32 dB



No. 12 Weight: 0.8 kg/m²

Frequency	Transm. Loss	Sound Tr. Class*
125 Hz	3	STC 15
250	6	
500	11	
1000	14	
2000	18	
4000	19	

Six-frequency average TL = 12 dB

* Measured at 6 octave-bands with center frequencies from 125 to 4000 Hz.