The sound absorption coefficient indicates how much of the sound is absorbed in the actual material. The absorption coefficient can be expressed as:

$\alpha = I_a / I_i$ *(1)*

where

I_a = *sound intensity absorbed* (W/m^2)

I_i = *incident sound intensity* (W/m^2)

Absorption coefficient - α - for some common materials can be found in the table below:

Material	**Sound Absorption Coefficient - α -**
Acoustic belt, 12 mm	0.5
Acoustic tiles	0.4 - 0.8
Asbestos, sprayed 25 mm	0.6 - 0.7
Brickwork, painted	0.01 - 0.02
Brickwork, unpainted	0.02 - 0.05
Cork sheet, 6 mm	0.1 - 0.2
Fiberboard on battens, 12 mm	0.3 - 0.4
Hardwood	0.3
Mineral wool, 100 mm	0.65
Persons, each	2.0 - 5.0
Plaster walls	0.01 - 0.03
Plywood panel, 3 mm	**0.01 - 0.02**
Polystyrene, expanded on 50mm battens	0.35

Material	Sound Absorption Coefficient - α -
Polystyrene, expanded rigid backing	0.15
Polyurethane foam, flexible	0.95
Rubber sheet, 6 mm porous	0.1 - 0.2
Slag wool or glass silk, 50 mm	0.8 - 0.9
Snow	0.75
Wood wool cement on battens, 25 mm	0.6 - 0.07

Note! The absorption coefficient varies with the frequency of sound.

Total Room Sound Absorption

The total sound absorption in a room can be expressed as:

$A = S_1 \alpha_1 + S_2 \alpha_2 + .. + S_n \alpha_n = \sum S_i \alpha_i \quad (2)$

where

A = the absorption of the room (m^2 Sabine)

S_n = area of the actual surface (m^2)

α_n = absorption coefficient of the actual surface

Mean Absorption Coefficient

The mean absorption coefficient for the room can be expressed as:

$a_m = A / S \quad (3)$

where

a_m = mean absorption coefficient

A = the absorption of the room (m^2 Sabine)

S = total surface in the room (m^2)

A rooms acoustic characteristics can be calculated with the formulas above, or estimated for typical rooms.

Sound Absorption Coefficients

Open Doors and Windows	1.00	1.00	1.00	1.00	1.00	1.00

	Coefficients					
Materials	**125Hz**	**250Hz**	**500Hz**	**1000Hz**	**2000Hz**	**4000Hz**
Brick – Unglazed	.03	.03	.03	.04	.05	.07
Brick – Unglazed, Painted	.01	.01	.02	.02	.02	.03
Carpet – Heavy, on Concrete	.02	.06	.14	.37	.60	.65
Carpet – Heavy, on 40oz Hairfelt or Foam Rubber on Concrete	.08	.24	.57	.69	.71	.73
Carpet – Heavy, with Impermeable Latex Backing on 40oz Hairfelt or Foam Rubber on Concrete	.08	.27	.39	.34	.48	.63
Concrete Block – Light, Porous	.36	.44	.31	.29	.39	.25
Concrete Block – Dense, Painted	.10	.05	.06	.07	.09	.08
Gypsum Board – 1/2″, Nailed to 2×4, 16″ O.C.	.29	.10	.05	.04	.07	.09
Marble or Glazed Tile	.01	.01	.01	.01	.02	.02
Plaster – Gypsum, or Lime, Smooth Finish on Tile or Brick	.013	.015	.02	.03	.04	.05
Plaster – Gypsum, or Lime, Rough Finish on Lath	.14	.10	.06	.05	.04	.03
Plaster – Gypsum, or Lime, Smooth Finish on Lath	.14	.10	.06	.04	.04	.03
Plywood Paneling – 3/8″ Thick	**.28**	**.22**	**.17**	**.09**	**.10**	**.11**
Fabrics	**125Hz**	**250Hz**	**500Hz**	**1000Hz**	**2000Hz**	**4000Hz**
Light Velour – 10oz/sq yd, Hung Straight, in Contact with Wall	.03	.04	.11	.17	.24	.35
Medium Velour – 14oz/sq yd, draped to half area	.07	.31	.49	.75	.70	.60
Heavy Velour – 18-oz/sq yd, Draped to Half Area	.14	.35	.55	.72	.70	.65
Floors	**125Hz**	**250Hz**	**500Hz**	**1000Hz**	**2000Hz**	**4000Hz**
Concrete or Terrazzo	.01	.01	.015	.02	.02	.02
Linoleum – Asphalt, Rubber, or Cork Tile on Concrete	.02	.03	.03	.03	.03	.02
Wood	.15	.11	.10	.07	.06	.07
Wood Parquet in Asphalt on Concrete	.04	.04	.07	.06	.06	.07
Glass	**125Hz**	**250Hz**	**500Hz**	**1000Hz**	**2000Hz**	**4000Hz**
Large Panes of Heavy Plate Glass	.18	.06	.04	.03	.02	.02
Ordinary Window Glass	.35	.25	.18	.12	.07	.04
Other	**125Hz**	**250Hz**	**500Hz**	**1000Hz**	**2000Hz**	**4000Hz**
Water Surface, e.g. Swimming Pool	.008	.008	.013	0.15	.020	0.25
Air, Sabins per 1000 Cubic Feet	.09	.20	.49	1.20	2.90	7.40

Open Doors and Windows	1.00	1.00	1.00	1.00	1.00	1.00