

ACOUSTIC TESTING AT THE BTC

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The Building Test Centre

Fire Acoustics Structures

The Building Test Centre

The Building Test Centre is owned by British Gypsum which is part of the global gypsum operation of Saint Gobain.

We have UKAS accreditation to provide test services in five distinct areas from our Leicestershire site.

FIRE RESISTANCE

REACTION TO FIRE

STRUCTURES

ACOUSTICS

Laboratory

In the field (out on the building site)

THE ACOUSTIC LABORATORY

- Purpose built in 1967
- First UK acoustics laboratory to achieve UKAS accreditation



THE BTC AND UKAS

- United Kingdom Accreditation Service (UKAS) is the sole UK national accreditation body covering certification, testing and calibration.
- UKAS monitors the performance of the laboratory annually.
 - Laboratory impartiality
 - Technical competence
 - Measurement Traceability
 - Appropriate resources and facilities
 - Actual laboratory performance to the required standard
 - Capability to sustain the required level of performance
- Risk limitation - choosing a laboratory which is not accredited is at best risky and at worst inappropriate. Decisions made following a test can have life safety implications.
- Our clients require a UKAS test report to demonstrate to Building Control Authorities compliance with the UK Building Regulations



Why do we test?

- Product and system development
- Acoustic consultants set sound insulation and sound absorption standards for major projects
- To comply with Building Regulations (Approved Document E)

Testing Portfolio

- Lightweight partitions and masonry walls
- Cinema Walls
- Lightweight and concrete floors
- Floating Floor Treatments
- Internal building elements
- Doors, glazing and other composite tests

Acoustic Test Chambers

Horizontal Test Suite (partitions)

Vertical Test Suite (floors and ceilings)

Reverberation Room

Values required from testing

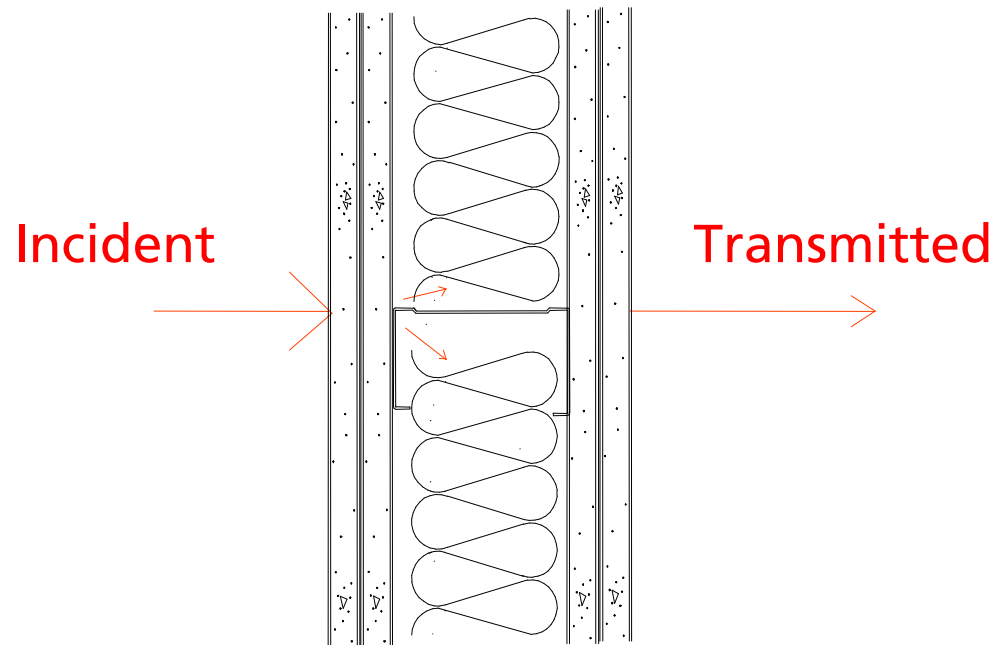
Dependant on the intended use of the product or system.

Typical values are:

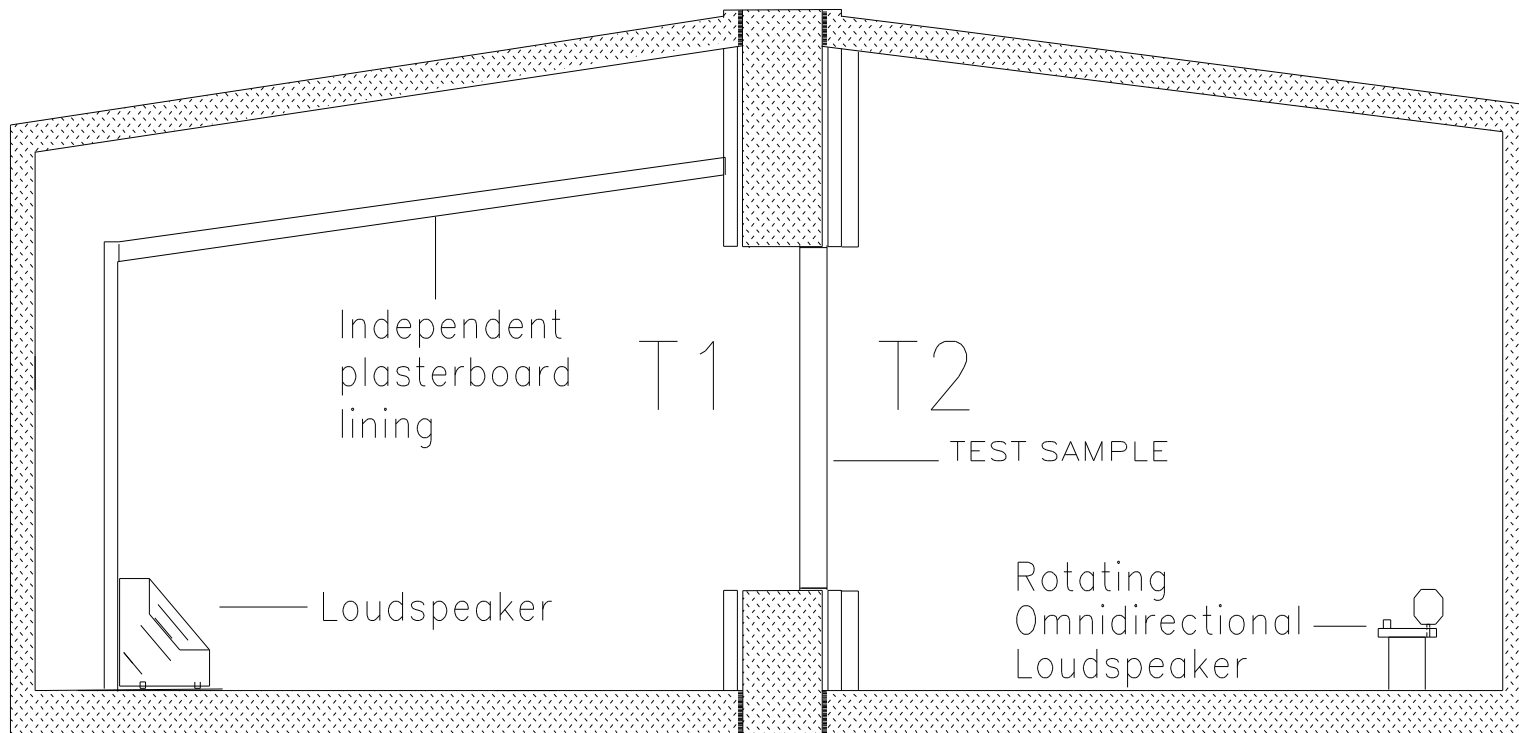
Internal walls and floors Airborne R_w 40 dB

Separating wall, Doors Airborne R_w 29 dB

SOUND INSULATION



Horizontal Test Suite (HTS)



Test Standard : ISO 140-3

Airborne Sound Insulation

$$R_w = L_1 - L_2 + 10 \lg \frac{S}{A}$$

R_w = Sound Reduction Index

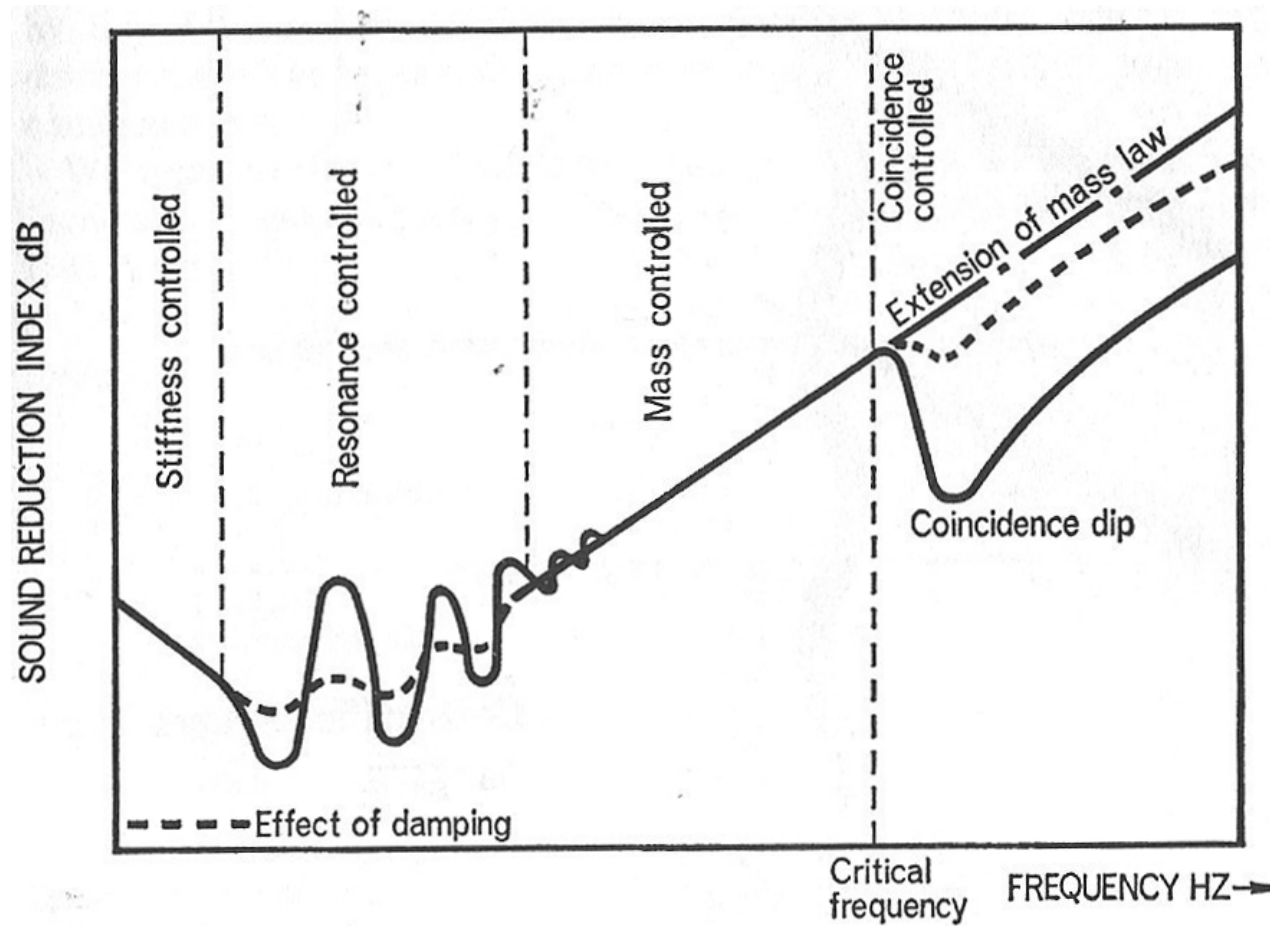
L_1 = Average Sound pressure level in source room (dB)

L_2 = Average Sound pressure level in receiving room (dB)

S = Area to the test specimen

A = Equivalent sound absorption area in receiving room (m²)

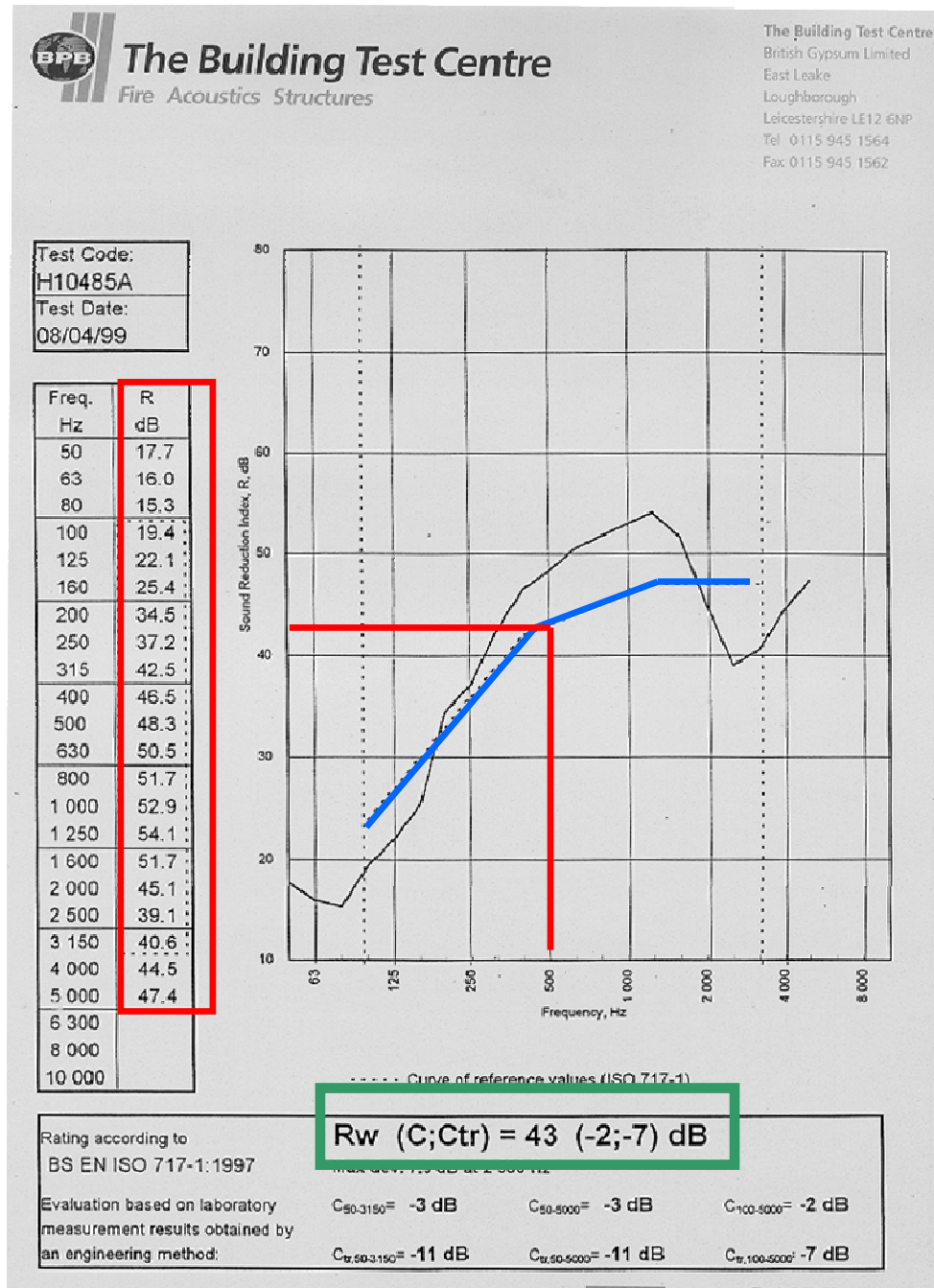
Sound Insulation Spectrum



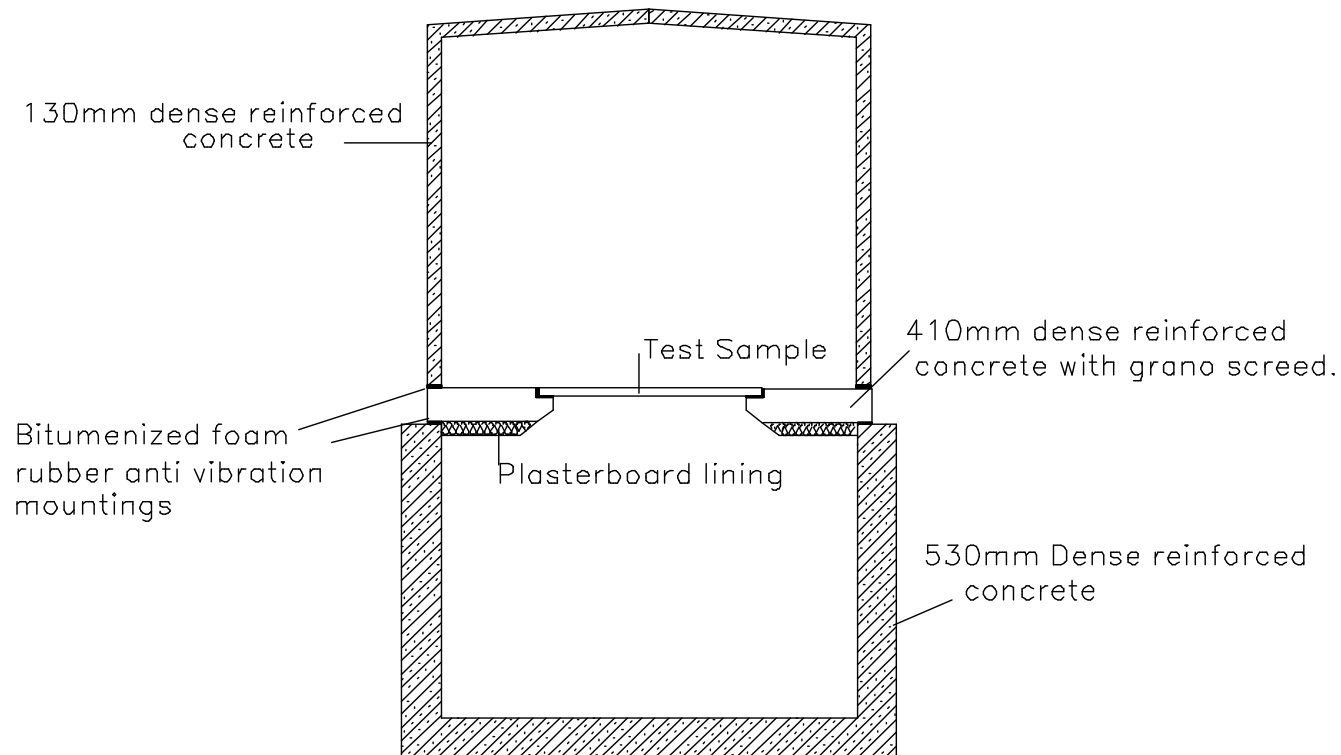
Test Results

- Sound reduction values
- Plot R values
- Rating Curve
- Area under reference curve
- Unfavourable deviations ≤ 32
- Take value off reference curve at 500Hz

Single figure R_w



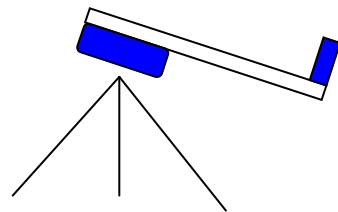
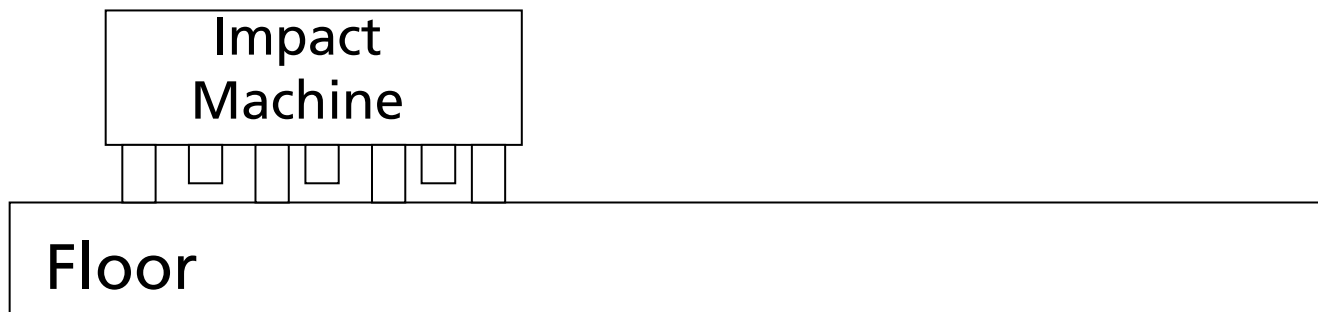
Vertical Test Suite (VTS)



Test Standard : ISO 140-6

Vertical Test Suite (VTS)

Airborne test same as in the HTS
Impact test in addition



Microphone and
boom

Vertical Test Suite (VTS)

Impact test

Average Sound pressure level in receiving room is recorded and the Normalised Sound pressure level (L_n) value calculated from the formula below:

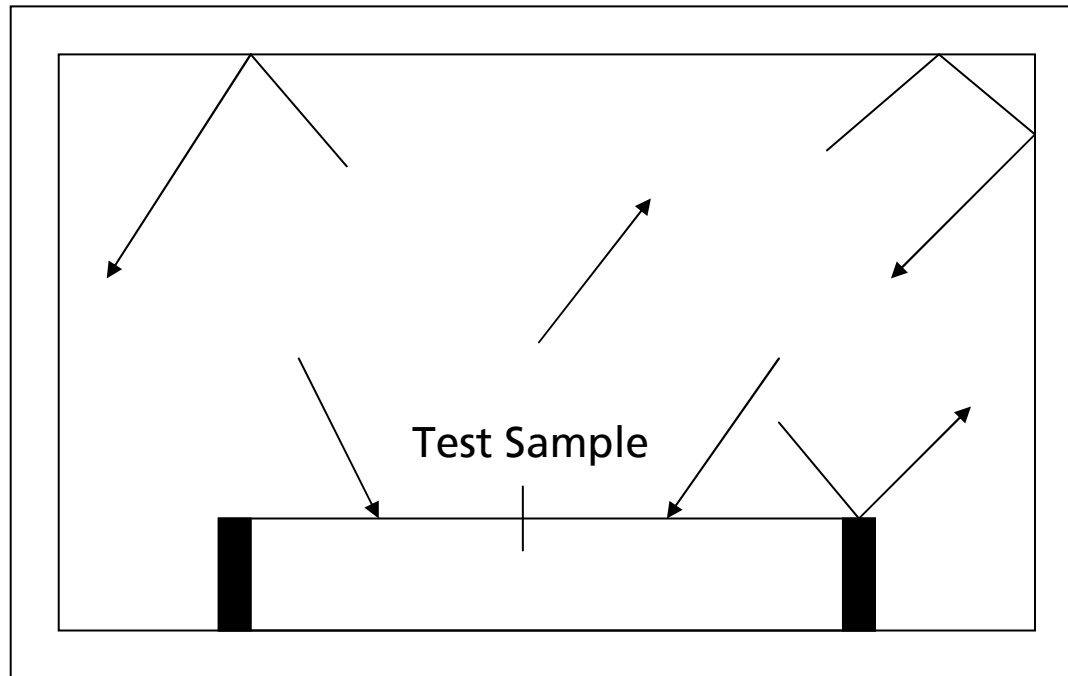
$$L_n = L_i + 10 \lg \frac{A}{A_0}$$

L_i = Average Sound pressure level

A = Equivalent absorption area

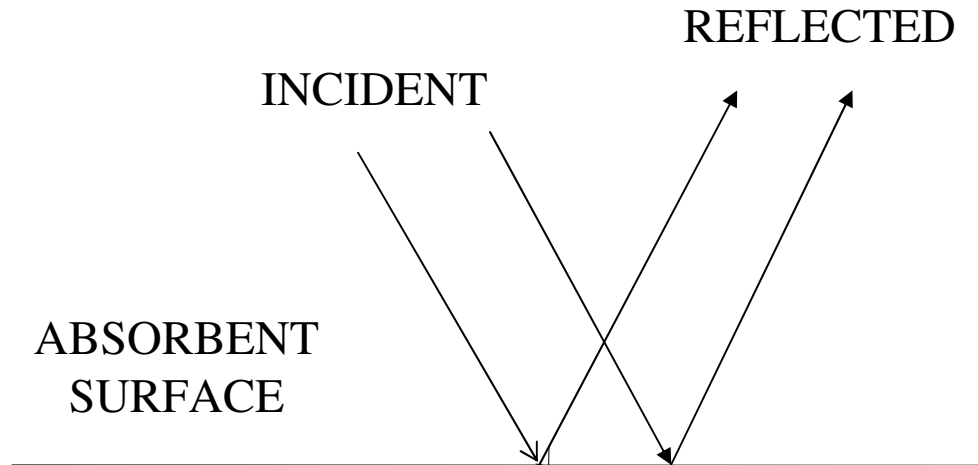
A_0 = Reference absorption area

Reverberation Room



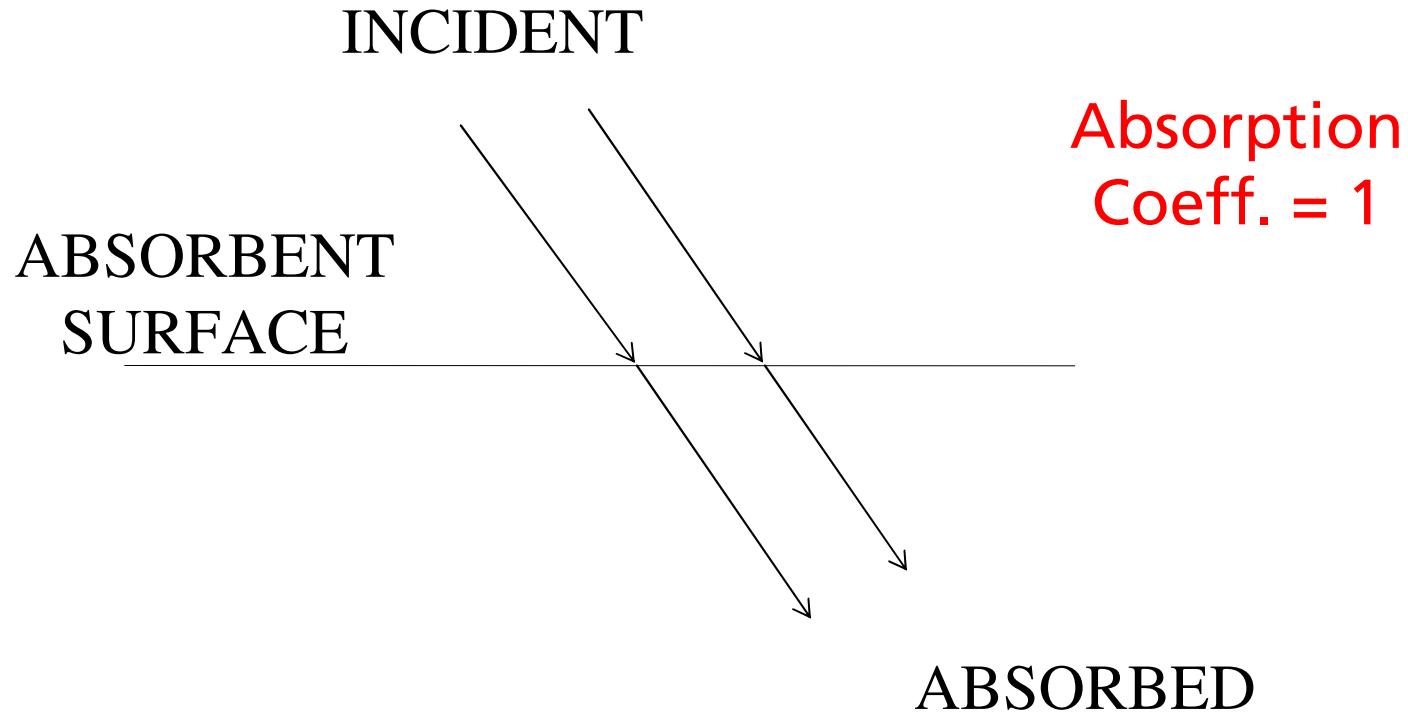
Test Standard : BS EN ISO 354

Sound Absorption



Absorption
Coeff. = 0

Sound Absorption



Sound Absorption

Sabine's Formula

$$RT = \frac{0.16V}{A}$$

RT = Reverberation time

V = Volume of Reverberation

A = Absorption

$$A = 0.16 V/RT$$

Absorption Coefficient

Empty Room

$$A_{\text{EMPTY}} = 0.16 V/RT_{\text{EMPTY}}$$

Room plus Sample

$$A_{\text{R+S}} = 0.16 V/RT_{\text{R+S}}$$

Absorption of Sample Only

$$A = A_{\text{R+S}} - A_{\text{EMPTY}}$$

Absorption Coefficient

$$\alpha = A/S$$

α = Absorption Coefficient

S = Surface area under measurement

A = Absorption

Summary

Horizontal Test

Airborne

Vertical Test

Airborne and Impact

Reverberation Test

Sound absorption test

www.btconline.co.uk

If you have any queries regarding acoustic testing please contact us at:

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