Absorption Coefficients Pt1:

Is Area Enough?
Introduction

- We will discuss the measurement of material absorption and coefficients.
- We will talk about their similarities and differences.
- We will plan a set of experiments to test these differences.
Common Questions

- Q: What is sound absorption?
  - A: It is the conversion of acoustic energy to thermal energy.

- Q: What is the Absorption Coefficient?
  - A: Result of dividing the amount of absorption by the sample area.
Specific Questions

Q: What are the sample sizes and shapes required by each Standard? (ASTM-C423)

A: ASTM-C423 requires a rectangular sample of 72 sq ft with a L of 9 ft and a of 8 ft. (It will accept a sample size of 8’X 8′ for a 64 sq ft sample as an option).
Specific Questions

Q: What are the sample sizes and shapes required by each Standard? (ISO-354)

A: ISO-354 requires a rectangular sample of 10-12 sq m with a ratio width to length of between 0.7 and 1.
Specific Questions

Q: What are the sample sizes and shapes required by each Standard? (ISO-17497-1)

A: ISO-17497-1 requires a full scale circular sample of a minimum diameter of 3.0 meters = 7.068 sq meters.
Similarities

- ASTM–C423 and ISO-354 require similar shaped samples.
Differences

- ASTM–C423 and ISO-354 require similar shaped samples and ISO-17497-1 requires a circular sample.
- ASTM-C423, ISO-354 and ISO-17497-1 can use different methods of measuring the RT of the reverb room.
- All use different areas.
- All use different perimeters.
- All provide different answers for absorption coefficients.
Tests

Measure recommended samples of the same material in the two prescribed ways.

Measured similar area samples in the two prescribed ways.

Measure perimeter lengths in the two prescribed ways.

Measure a non absorptive surface with same area and shapes as the above described tests.
IF NOT AREA WHAT ELSE?
Circle with constant area

Circle, Area 88 sq ft

2 ft Sq

33.35 ft Perimeter
Square with constant area

Square, Area 88.48 sq ft

1.406 ft sq
(16.88 in)

2 ft x
1.406 ft
(16.88 in)

2 sq ft

37.63 ft
Perimeter
Rectangle, Area 88.48 sq ft

2 ft x 1 ft

2 ft sq

38 ft Perimeter
Rectangle Long, Area 88 sq ft

2 ft sq

52 ft Perimeter
Scattered Pieces Area
Square Perimeter

Square, Perimeter 33.35 ft

0.3375 ft sq (4.05 in)

2 ft x 0.3375 ft (4.05 in)

2 ft sq

69.5139 sq ft Area
Rectangle Standard Perimeter

Rectangle, Perimeter 33.35 ft

1 ft x 1.675 ft

2 ft x 1.675 ft

2 ft x 1.675 ft

2 ft sq

69.075 sq ft area
Rectangle Long, Perimeter 33.4 ft

2 ft x 1.7 ft  
2 ft x 1 ft  
2 ft sq

29.4 sq ft Area
Scattered Pieces Perimeter
Circle Edges Only
1” UHD HDF (sealed)
1” UHD HDF (sealed)
2” 6lb FBG
2” 6lb FBG