Old Problems, New Solutions:

Architectural Acoustics in Flux

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Absorption, Transmission Loss, Diffusion and Low Frequencies

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A coefficient is not a percentage!!!!

0.9 absorption coefficient is NOT 90% absorption!!

Absorption

Myth: Acoustics is a “settled” branch of physics

Fact: There is fundamental research going on today and new facts are being written daily that are as basic as Sabines work

Absorption

Myth: We can measure absorption

Fact: We cannot measure absorption directly

Absorption

Myth: We can measure absorption

Fact: We cannot measure absorption directly. We measure the differences in the reverberation time in a reverberation room and use that to determine the amount of absorption needed in the room to effect that change.

Absorption

Myth: BIG ONE!! Absorption is controlled by the size (area) of the absorber.

$\alpha = A/S$ or $A=\alpha * S$

Fact: This is not true at all.

Previous presentations have shown this to be the case.

The ratio of perimeter length to the area is a controlling factor.

Absorption

Myth: BIG ONE!! Absorption is controlled by the size (area) of the absorber.

$\alpha = A/S$ or $A = \alpha * S$

NEW Fact: This is not true at all.

The spacing of absorption is also controlling factor.

Absorption

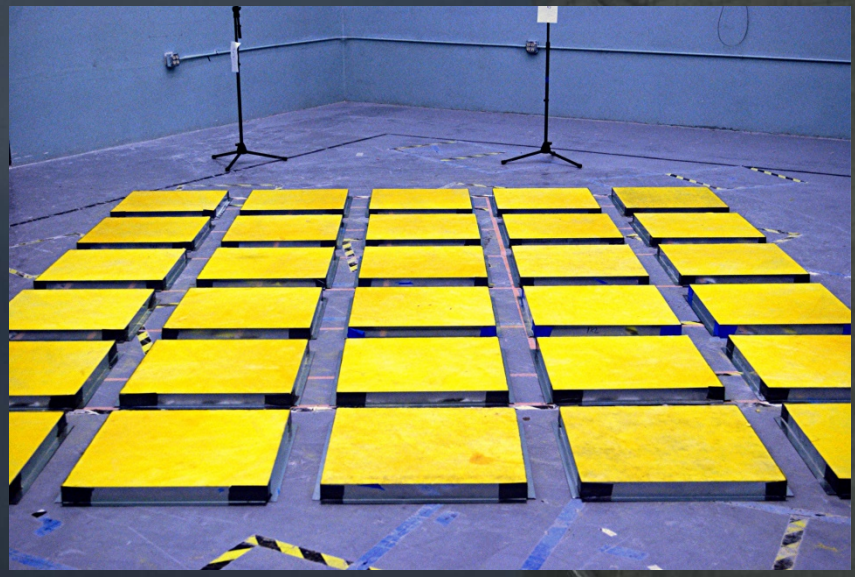
We know that the configuration of an absorber affects the absorption from previous presentation but what effect does the spacing between these unit have on the absorption and what is the effect of the orientation of the absorber have on the absorption.

Absorption Experiments

We designed a series of experiments to test these questions. First we tested the spacing differences between 2 ft by 2 ft pieces compared to a monolithic specimen. The spacing varied from 6 inches in both directions to 24 inches in both direction with edges parallel to each other and the walls. (See following four slides)

Absorption

Monolithic



6 inch spacing

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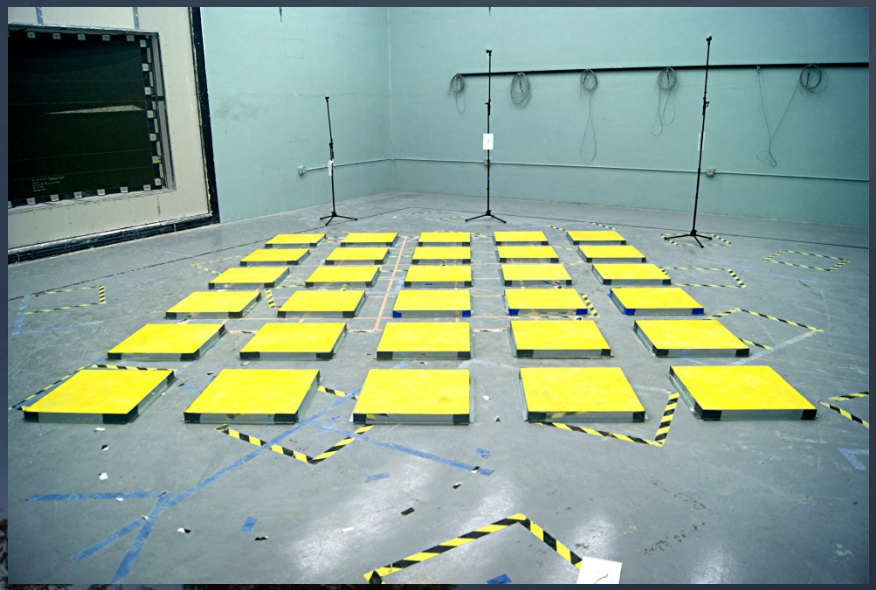
Absorption



12 inch spacing

18 inch spacing

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Absorption

24 inch spacing

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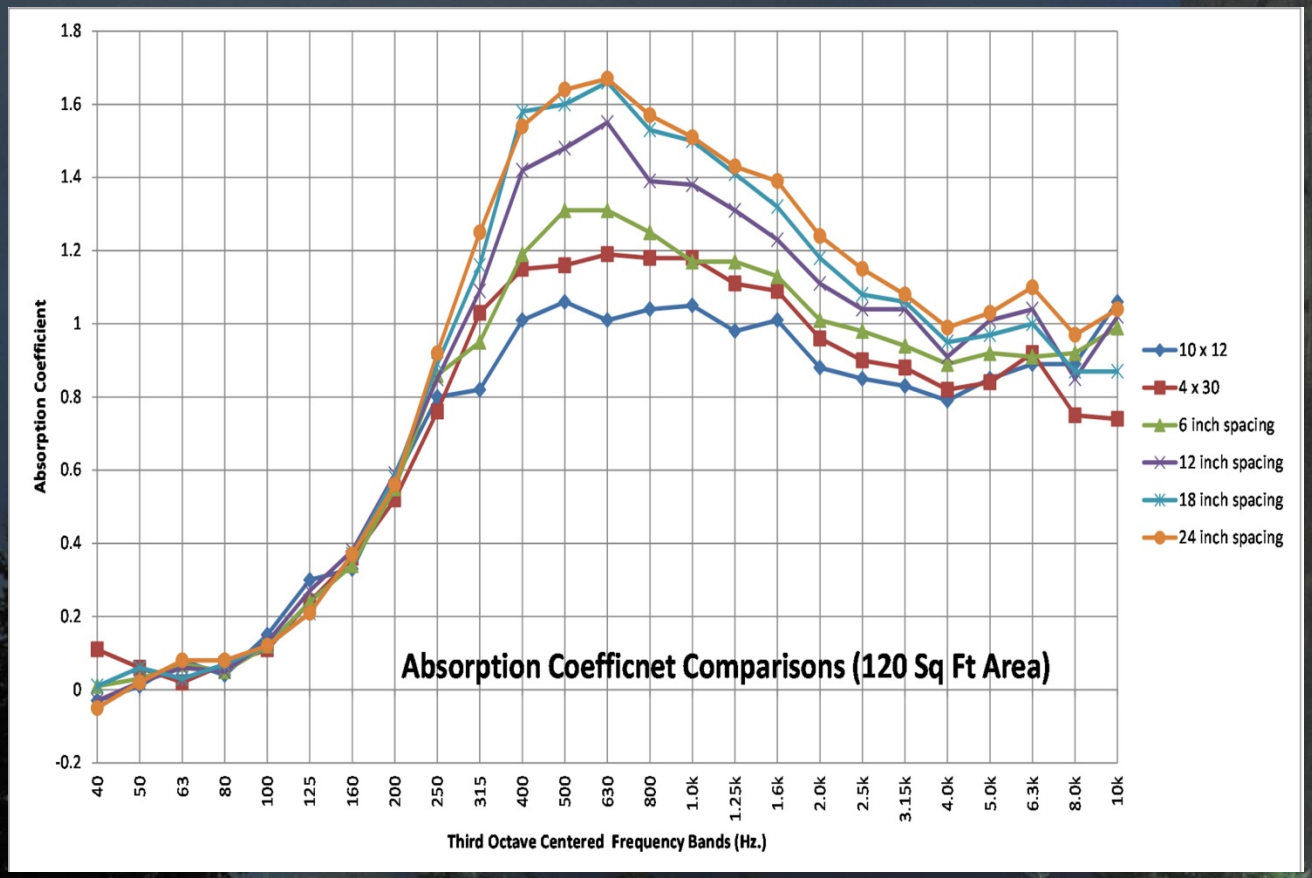
Absorption



Spacing comparisons

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Absorption Experiments

We designed a series of experiments to test these questions. Second we tested the spacing differences between 2 ft by 2 ft pieces compared to a monolithic specimen. The spacing varied from 6 inches in both directions to 24 inches in both direction with edges not parallel to each other and the walls. (See following six slides)

Absorption

24 inch aligned

24 inch unaligned

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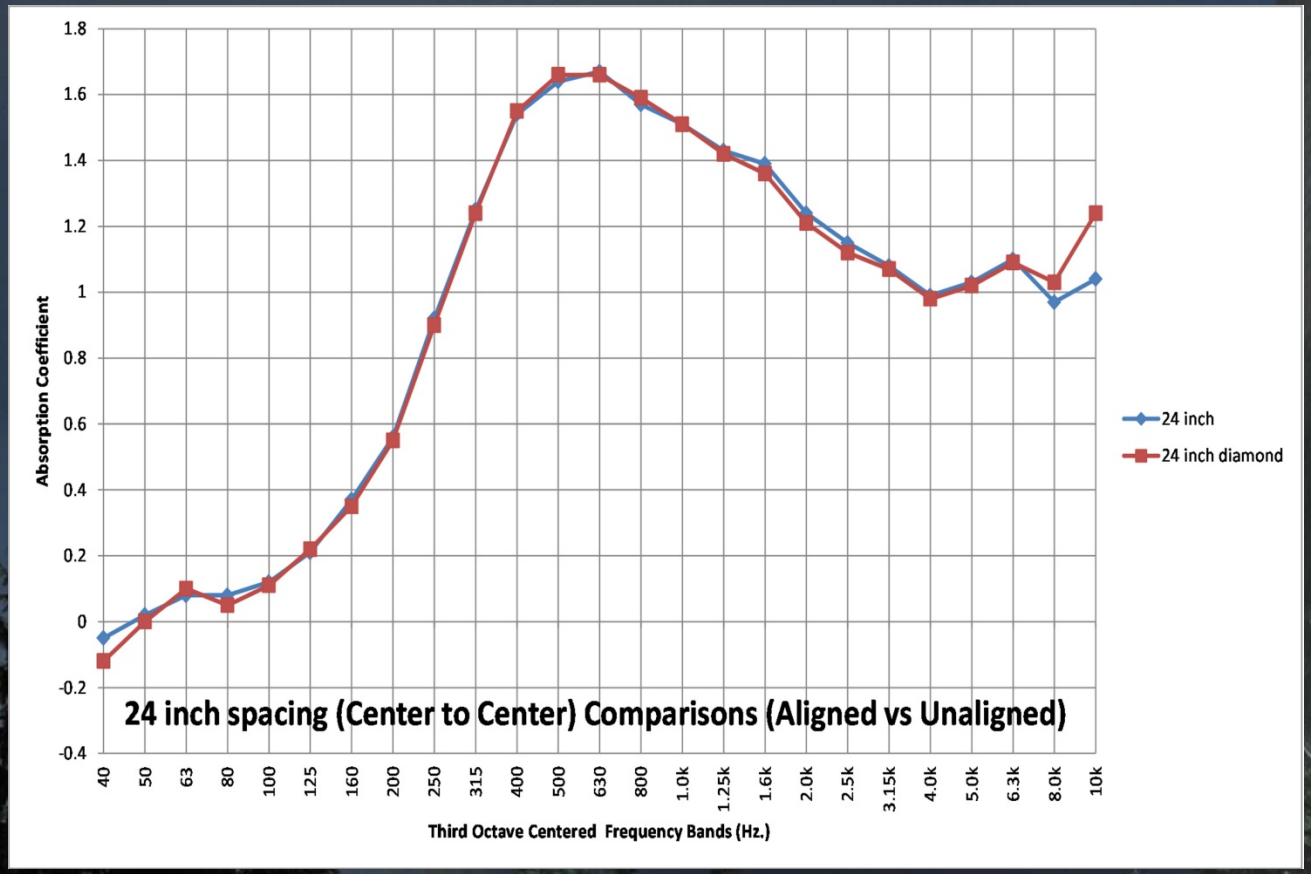
Absorption



24 inch unaligned

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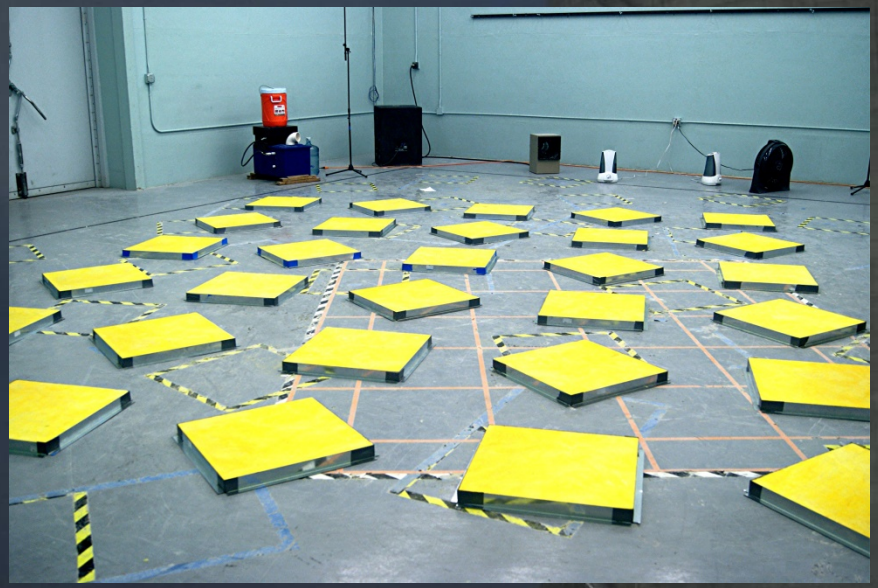
Absorption

18 inch aligned



18 inch unaligned

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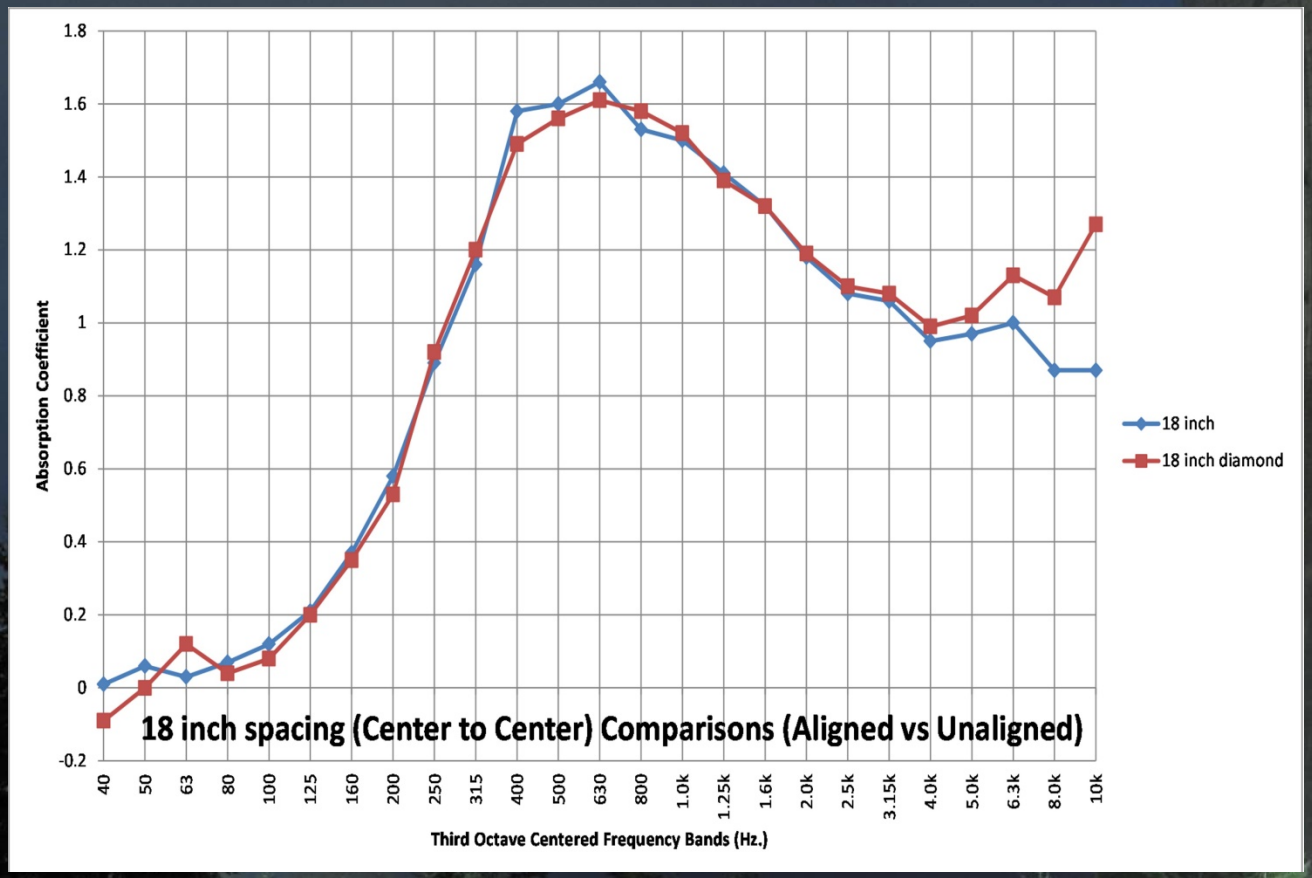
Absorption



18 inch unaligned

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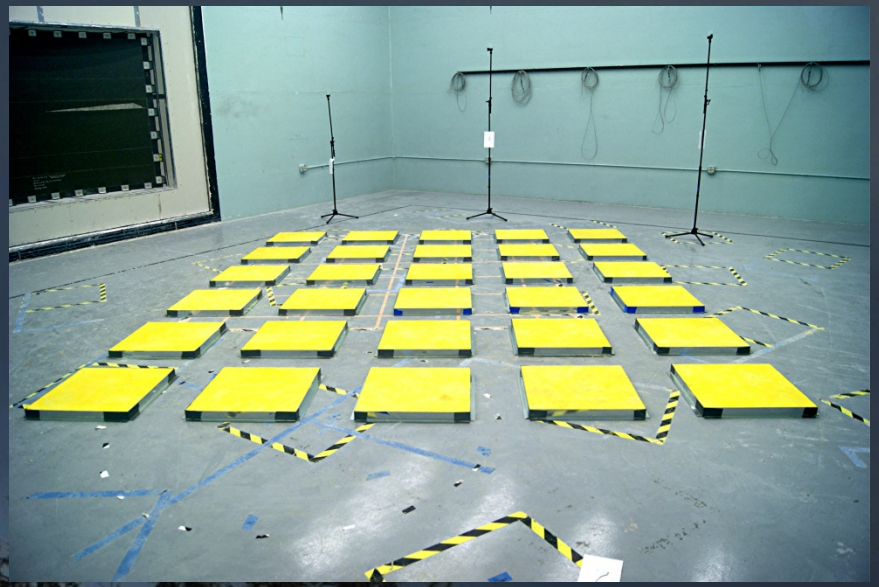
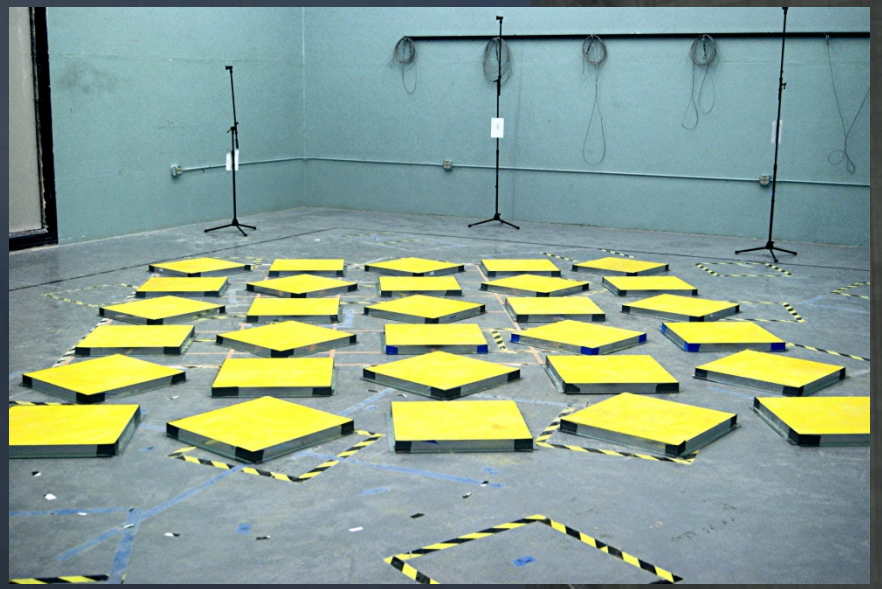
Absorption



12 inch aligned



12 inch unaligned

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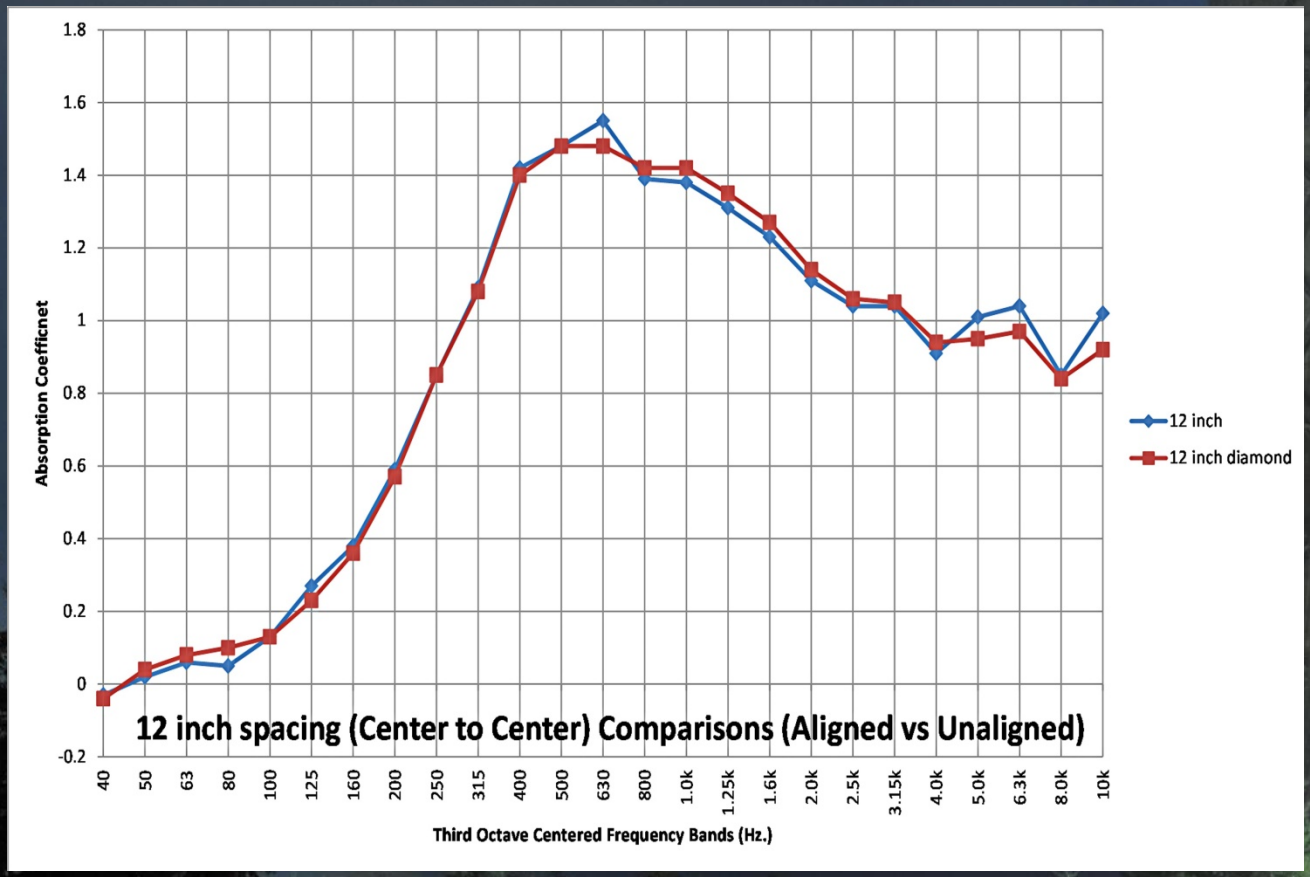
Absorption



12 inch unaligned

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Acousticians vs “Them”

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Thank you for your attention.
If you wish more information on this subject please contact me at 253-973-1018 or at:
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