

Acoustics Lecture

Coms/Film 20A Spring 2022

Acoustics Definition

- *Acoustics* is the science dealing with the production, effects and transmission of sound waves.
- 1. Direct waves
- 2. Reflected waves
- 3. Diffracted waves
- 4. Absorbed waves

When Designing a Recording in a Space

- Acoustic Isolation
- Frequency Balance
- Acoustic Separation
- Reverberation (vs. echo)
- Cost Factors

Studio Types

- Sound Stage
- Shooting Stage
- Professional Music Studios
- Audio for Visual Production Environments
- Project Studios

Primary Factors Governing Acoustics

- Acoustic Isolation
- Symmetry in Control Room and Monitoring Design
- Frequency Balance
- Absorption
- Reflection Reverberation (“live” vs. “dead”)

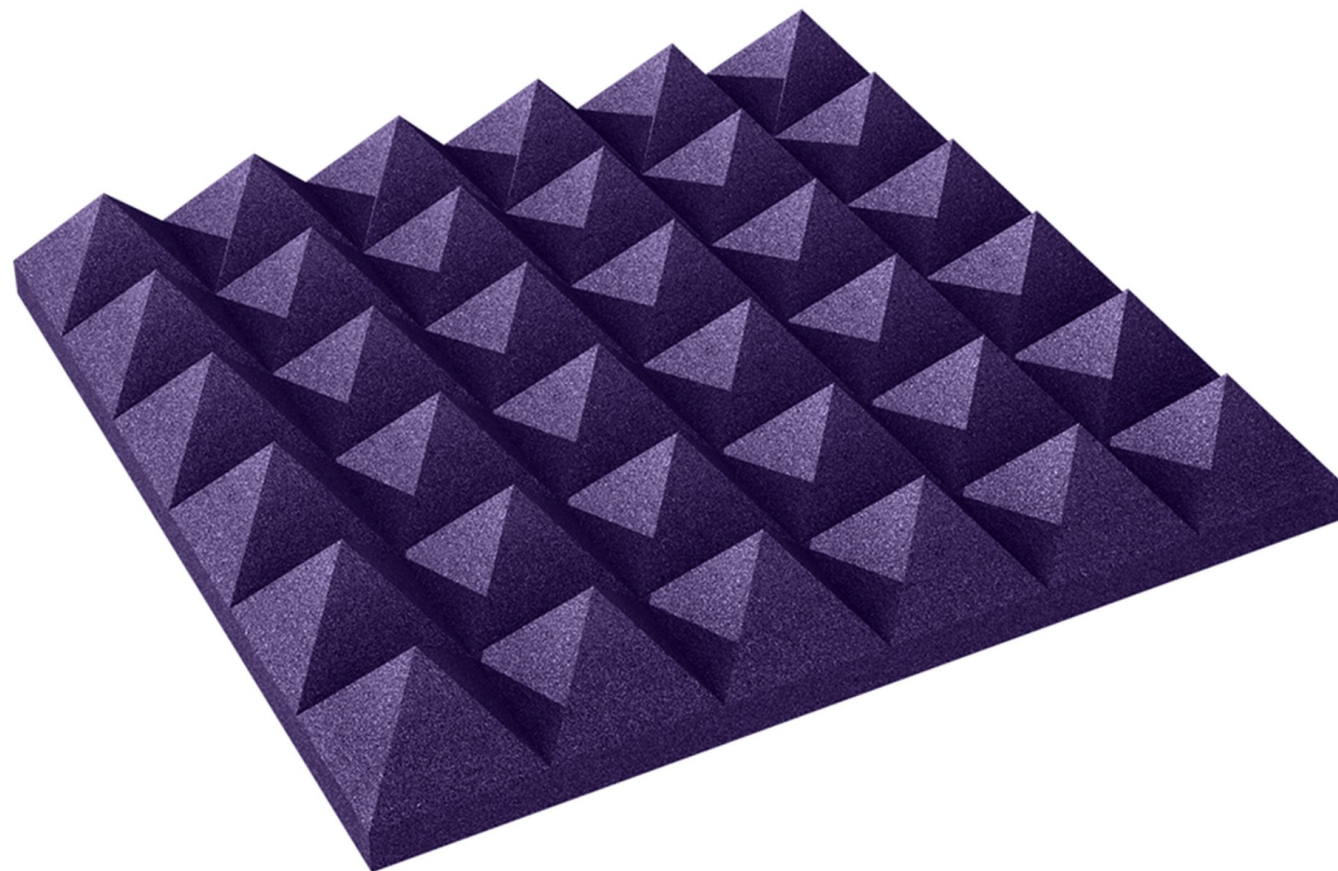
Sound Modification of Space

- 1. Absorption
- 2. Bass Traps
- 3. Diffusion
- 4. Isolation

Absorption – Wedgies (porous absorber)



Absorption - Wedgies



Absorption - Wedgies

- Wedgies Test Data – NC (Noise Criteria):
- 125 Hz = 0.15 units
- 250 Hz = 0.18 units
- 500 Hz = 0.57 units
- 1 kHz = 0.96 units
- 2 kHz = 1.03 units
- 4 kHz = 0.98 units
- Overall = 0.70 units
- Primarily absorbs higher frequencies

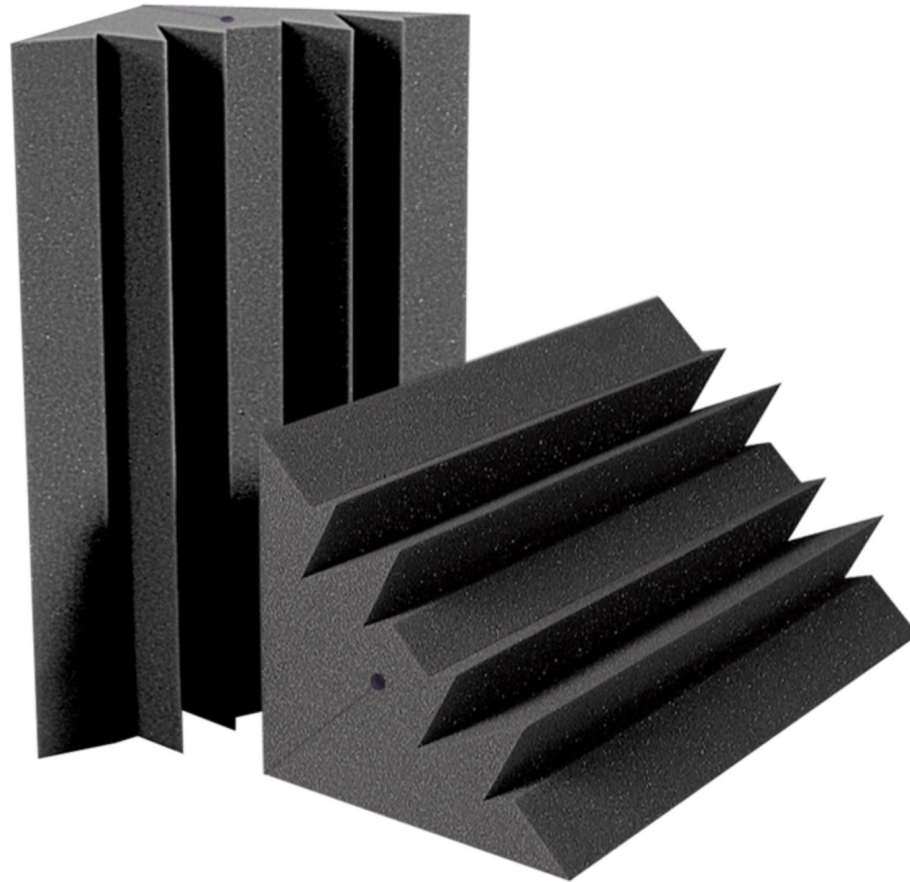
Helmholtz Absorber

- Helmholtz Resonator
- Removes specific frequencies within a specific Frequency Range
- Usually the lower-middle frequencies

Helmholtz Absorber



Bass Traps (diaphragmatic absorber)



Diffusion – 3D



Isolation – iso – mic iso shield



Mic iso shield another view



Auralex

- Products
- Design
- Education

Sound Control on Location – Moving Blankets



C-Stands



Moving Blankets Cost



Roll over image to zoom in



WEN 272406 72-Inch by 40-Inch Heavy Duty Padded Moving Blankets, 6-Pack

Brand: WEN

★★★★★ 2,059 ratings

Amazon's Choice for "moving blanket"

\$39²⁰

✓prime

& FREE Returns

Get \$125 off: Pay \$0.00 upon approval for the **Amazon Business Prime Card**. Terms apply.

Brand	WEN
Fabric Type	100% Polyester
Pattern	Blankets
Product Care Instructions	Machine Wash
Item Weight	2.25 Pounds

About this item

- 100% Polyester
- Includes six 72-inch by 40-inch movers blankets

C-Stand Cost



Roll over image to zoom in

Neewer 100% Stainless Steel C-Stand (2-Pack), Pro Heavy-Duty Photography Light Stand with 4.2ft/1.28m Extension Arm, Grip Head, Turtle Base for Monolight, Softbox, Reflector, Max Height: 10.5ft/3.2m

[Visit the Neewer Store](#)

★★★★★ 594 ratings

\$353⁸⁹

✓prime

& FREE Returns

Thank you for being a Prime Member. Get \$125 off: Pay ~~\$228.89~~ \$353.89 upon approval for the Amazon Business Prime Card. Terms apply.

- **【Strong & Versatile C-Stand】** Made of 100% robust stainless steel, Neewer professional heavy-duty C-stand is exceptionally durable for indoor and outdoor photography and video making. The inner buffer spring can offset the shocks caused by sudden drops
- **【Adjustment Height Range】** The 3-section telescopic center column can instantly extend from 4.7ft to 10.5ft (146cm to 320cm) and get fastened by

Monitors

- Speakers
- One-Way (1 element)
- Two-Way
- Three-Way
- Four-Way
- Sub-woofer (lower than 200 Hz in consumer models)
- Coaxial
- Near-Field Monitors

2-Way



4-Way



6-Way



Coaxial



Near-Field



Near-Field ISO Stands



Woofers vs. Tweeters

- Woofer
- Lower Frequencies
- Tweeter
- Higher Frequencies

Monitors

- Cabinet
- Cross-over Network
- Frequency Response (both range & linearity)
- What type of media or you usually listening to?
- What are the acoustics of the room?
- Transient Response
- Polar Response
- Harmonic Distortion
- How much power can they handle?

Monitors

- Passive (power is supplied by amplifier)
- Active (power is supplied by the speaker itself)
- Speaker Mounting
- Speaker Placement
- The more surfaces, the larger the size of those surfaces, and more sympathetic to lower frequencies the material of the surface that speaker is directly touching, the more bass frequencies will be produced.

Speaker “Power”

- The 20-watt amp is double the power of the 10-watt amp, but doubling the power only translates to an increase of 3 dB SPL. Remember, in order to sound "twice as loud," you need an increase of 10dB, so while a 20W amplifier will sound noticeably louder than a 10W amp, it will not sound twice as loud.

To be considered in designing a studio

- Acoustics
- Size (control rooms & recording space)
- Location
- Ingress, Egress (handicap requirements)
- Ergonomics
- Space for:
 - Control Room(s)
 - Recording Space(s)
 - Amenities for Clients
 - Storage Space