



# LEED 2009 for Schools New Construction and Major Renovations

## IEQ PREREQUISITE 3: MINIMUM ACOUSTICAL PERFORMANCE

All fields and uploads are required unless otherwise noted.

### BACKGROUND NOISE

This static sample form has been modified for offline access. All sections of the form are visible. Sample forms are for reference only.

Select one of the following:

- ☐ **Path 1. ASHRAE standard.** The project team will document compliance using methods based on the 2007 HVAC Applications ASHRAE Handbook, Chapter 47.
- ☐ **Path 2. ANSI standard.** The project team will document compliance using ANSI Standard S12.60-2002.

**Upload IEQp3-6.** Provide the summary report from the simulations/calculations/measurements, based on 2007 HVAC Applications ASHRAE Handbook, Chapter 47 on Sound and Vibration Control, demonstrating a background noise level of 40 dBA or lower is met in classrooms and other core learning spaces.

*Note: Must be consistent with IEQ Credit 9, if attempted.*

**Upload L-16.** Provide a description of the methodologies and acoustical design of the project building that will ensure compliance with ANSI Standard S12.60-2002 for a background noise level of 45 dBA (40 dBA if attempting IEQ Credit 9) in classrooms and other core learning spaces. Descriptions can include, but are not limited to: placement of VAV boxes, acoustical treatment of ductwork, treatment of ceiling systems, partition construction, flooring and wall surfaces.

### REVERBERATION TIME

Select all that apply:

- ☐ **Case 1.** The project building includes classrooms or core learning spaces less than 20,000 cubic feet.
- ☐ **Case 2.** The project building includes classrooms or core learning spaces equal to 20,000 cubic feet or greater.

## CASE 1. CLASSROOMS LESS THAN 20,000 CUBIC FEET

Select one or more of the following:

- ☐ **Option 1. Minimum NRC<sup>1</sup>.** The project team will complete a table to confirm that the total area of materials in the room with a Noise Reduction Coefficient (NRC) of 0.70 or higher equals or exceeds the ceiling area.
- ☐ **Option 2. ANSI Standard S12.60-2002.** The project team will document compliance using ANSI Standard S12.60-2002.

1. If a classroom or core learning space is 13,500 cubic feet or above, the project team is strongly encouraged to use Option 2.

### OPTION 1. MINIMUM NRC

Complete the table below with information to demonstrate that each room meets the requirements for sound-absorptive materials. Rooms may be grouped into a single room type if their construction is identical. Only the materials that demonstrate compliance with the requirements must be listed.

**Table IEQp3-1.** Absorptive Materials

Core Learning Space/ Model #1			
Core Learning Space Room ID(s)		Ceiling Area (sf)	Area of Lights, Diffusers, and Grilles on Ceiling (sf)
	Material Description	Area of Material (sf)	NRC
Material #1			
Ceiling Area (sf) (excluding lights, diffusers, and grilles)			
Area of qualifying high-NRC material (sf) (must equal or exceed ceiling area)			

**Upload IEQp3-1.** Provide manufacturer information (cutsheets) demonstrating the Noise Reduction Coefficient (NRC) for each of the materials listed in the table.

OPTION 2. ANSI STANDARD

Select one or more of the following:

- ☐ **Path 1. ANSI Calculations.** The project team will demonstrate through calculations based upon the requirements of ANSI Standard S12.60-2002, that each of the classrooms and core learning spaces has a reverberation time of 0.6 seconds or less.
- ☐ **Path 2. ANSI Measurements.** The project team will demonstrate through measurements based upon the requirements of ANSI Standard S12.60-2002, that each of the small core learning spaces has a reverberation time of 0.6 seconds or less.

PATH 1. ANSI CALCULATION

Complete the table below with information to demonstrate that each room meets reverberation time requirements of 0.6 seconds or less at each frequency. Rooms may be grouped into a single room type if their constructions are identical. Only the materials that demonstrate compliance with the requirements must be listed.

**Note:** Per ANSI S12.60-2002, Equation C.2, calculations for reverberation time at 500Hz, 100Hz, and 2000Hz include a typical absorption value to account for residual sound absorption in the room. The table below automatically adds a residual sound absorption value equal to 15% of the floor area.

Table IEQp3-2. ANSI Reverberation Time

Core Learning Space/ Model #1						
			Reverberation Time in the Room (in seconds)			
Core Learning Space Room ID(s)	Floor Area (sf)	Room Volume (cu ft)	at 500Hz (seconds)	at 1000Hz (seconds)	at 2000Hz (seconds)	
			Sound Absorption Coefficient			
	Material Description	Material Location	Area of Material (sf)	at 500Hz	at 1000Hz	at 2000Hz
Material #1						

**Upload IEQp3-2.** Provide manufacturer information (cutsheets) demonstrating the sound absorption coefficient for each of the materials listed in the table.

PATH 2. ANSI MEASUREMENT

Describe the measurement methodologies used to demonstrate compliance with the reverberation time requirement of 1.5 seconds or less. Methodologies should conform with those recommended in ANSI s12.60-2002 Section E4.3.

**Upload IEQp3-3.** Provide the report from the post-construction measurements based on ANSI s12.60-2002 Section E4.3 that confirms reverberation times of 0.60 seconds or less for all classrooms and other core learning spaces smaller than 20,000 cubic feet.

CASE 2. CLASSROOMS GREATER THAN OR EQUAL TO 20,000 CUBIC FEET

Select one or more of the following:

- ☐ **Path 1. ANSI Calculations.** The project team will demonstrate through calculations based upon the requirements of ANSI Standard S12.60-2002, that each of the large core learning spaces has a reverberation time of 1.5 seconds or less.
- ☐ **Path 2. ANSI Measurements.** The project team will demonstrate through measurements based upon the requirements of ANSI Standard S12.60-2002, that each of the large core learning spaces has a reverberation time of 1.5 seconds or less.

PATH 1. ANSI CALCULATION

Complete the table below with information to demonstrate that each room meets reverberation time requirements of 1.5 seconds or less at each frequency. Rooms may be grouped into a single room type if their constructions are identical. Only the materials that demonstrate compliance with the requirements must be listed.

**Note:** Per ANSI S12.60-2002, Equation C.2, calculations for reverberation time at 500Hz, 100Hz, and 2000Hz include a typical absorption value to account for residual sound absorption in the room. The table below automatically adds a residual sound absorption value equal to 15% of the floor area.

Table IEQp3-3. ANSI Reverberation Time

Core Learning Space/ Model #1					
			Reverberation Time in the Room (in seconds)		
Core Learning Space Room ID(s)	Floor Area (sf)	Room Volume (cu ft)	at 500Hz (seconds)	at 1000Hz (seconds)	at 2000Hz (seconds)

				Sound Absorption Coefficient		
	Material Description	Material Location	Area of Material (sf)	at 500Hz	at 1000Hz	at 2000Hz
Material #1						

**Upload IEQp3-4.** Provide manufacturer information (cutsheets) demonstrating the sound absorption coefficient for each of the materials listed in the table.

## PATH 2. ANSI MEASUREMENT

Describe the measurement methodologies used to demonstrate compliance with ANSI standard S12.60-2002. Methodologies should conform with those recommended in ANSI S12.60-2002 Section E4.3.

**Upload IEQp3-5.** Provide the report from the post-construction measurements based on ANSI s12.60-2002 Section E4.3 that confirms reverberation times of 1.5 seconds or less for all classrooms and other core learning spaces greater than or equal to 20,000 cubic feet.

## ADDITIONAL DETAILS

- ☐ Special circumstances preclude documentation of prerequisite compliance with the submittal requirements outlined in this form.

## SPECIAL CIRCUMSTANCES

Describe the circumstances limiting the project team's ability to provide the submittals required in this form. Be sure to reference what additional documentation has been provided, if any. Non-standard documentation will be considered upon its merits.

**Upload IEQp3-SC.** Provide any additional documentation that supports the claim to special circumstances. (Optional)

- ☐ The project team is using an alternative compliance approach in lieu of standard submittal paths.

## ALTERNATIVE COMPLIANCE PATH

Describe the alternative compliance path used by the project team. Include justification that this path meets the prerequisite intent and requirements. Be sure to reference what additional documentation has been provided, if any. Non-standard documentation will be considered upon its merits.

**Upload IEQp3-ACP.** Provide any additional documents that support the alternative compliance path approach. (Optional)

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## SUMMARY

IEQ Prerequisite 3: Minimum Acoustical Performance Compliance  
Documented: