

## SFIA177: Fire Resistance and Sound Control in Steel-Framed Construction

Presenters: Reid Bruggeman & Andrew Schmidt

Date: May 28, 2026



Approved  
Continuing  
Education

- **Welcome & housekeeping**
- **A word about SFIA**
- **Presentation**
- **Q&A**

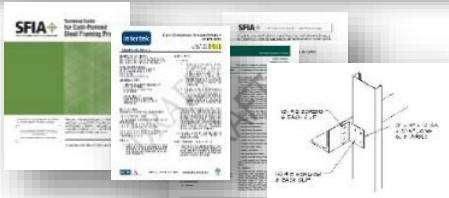
# Overview

# Welcome & Housekeeping

- Thank you for attending our webinar today!
- Mics are muted. Please ask any questions in the chat or Questions windows.
- A PDF of the presentation and a Certificate of Attendance will be available in your Steel Framing Learning Portal account after the webinar.
- Please submit your AIA number to Meredith Perez in the chat or email it to [Meredith@steelframing.org](mailto:Meredith@steelframing.org) if you wish to have your learning units recorded.
- If you are a group viewing the presentation from a single computer, please email Meredith for the Group AIA attendance form so we can report LUs for everyone who attended. [Meredith@steelframing.org](mailto:Meredith@steelframing.org)

# Major Programs and Services: Tools, Information and Support

## Technical & Research Services



## Marketing / Promotion



## Business Planning

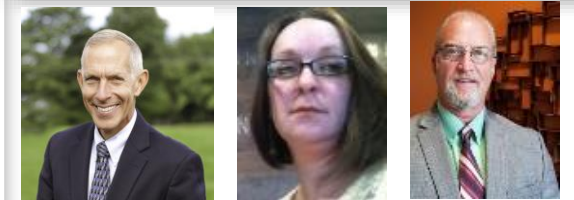
	Structural Tons Reported				Total
	Q1'19	Q2'19	Q3'19	Q4'19	
East	51,100	52,368	-	-	103,468
North Central	18,368	20,529	-	-	38,897
South Central	27,605	28,445	-	-	56,050
West	34,441	35,854	-	-	70,295
<b>Total</b>					

	NonStructural Tons Reported				Total
	Q1'19	Q2'19	Q3'19	Q4'19	
East	64,593	65,000	-	-	130,593
North Central	21,539	23,172	-	-	44,711
South Central	22,240	24,899	-	-	47,139
West	24,017	27,806	-	-	51,823
<b>Total</b>	<b>132,389</b>	<b>141,877</b>	<b>0</b>	<b>0</b>	<b>274,266</b>



## SFIA Staff



## Architectural & Project Assistance



## Educational Programs



## Sustainability



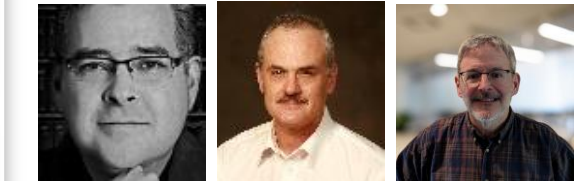
## Codes & Standards



## Advocacy



## Certification



# Introducing our Speakers!



## **Reid Bruggeman, Senior Researcher, Heat Transfer, USG Corp.**

In 2023, he joined USG as a Heat Transfer Specialist in the Fire-Resistance Lab, where he advances the development and testing of fire-resistant building materials.



## **Andrew Schmidt, Principal Researcher, Acoustics, USG Corp.**

He joined USG Corporation in 2017 as a senior researcher in the Building Science Lab with focus on new product development, technical support, and creating next-generation acoustic tools and resources.

Credit(s) earned on completion of this course will be reported to **AIA CES** for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with **AIA CES** for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



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## Course Description

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Enhance your expertise in building safer, quieter, and more resilient buildings with steel-framed gypsum panel systems. This presentation will cover the principles of fire resistance and acoustics, and the importance of balancing fire and sound performance in steel-framed construction with practical do's and don'ts. It will address UL and GA assemblies, compliance with fire and acoustic standards, and best practices to achieve required performance. This presentation will also touch on recent product advancements, such as lightweight gypsum panels and EQ studs, and their effects on fire and sound performance.



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## Learning Objectives

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1. Learn core concepts and terminology related to fire-resistance and sound transmission
2. Review common steel-framed assemblies, published designs, and associated fire and sound ratings
3. Understand influencing factors on fire-resistance and sound control performance in steel-framed assemblies
4. Review code requirements for fire-resistance and sound transmission





# Gypsum & Fire Resistance





# Gypsum Mineral

- Calcium Sulfate Dihydrate
  - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- 20% water by weight
- Two forms
  - Natural
  - Synthetic (Recycled)





# Gypsum Calcination

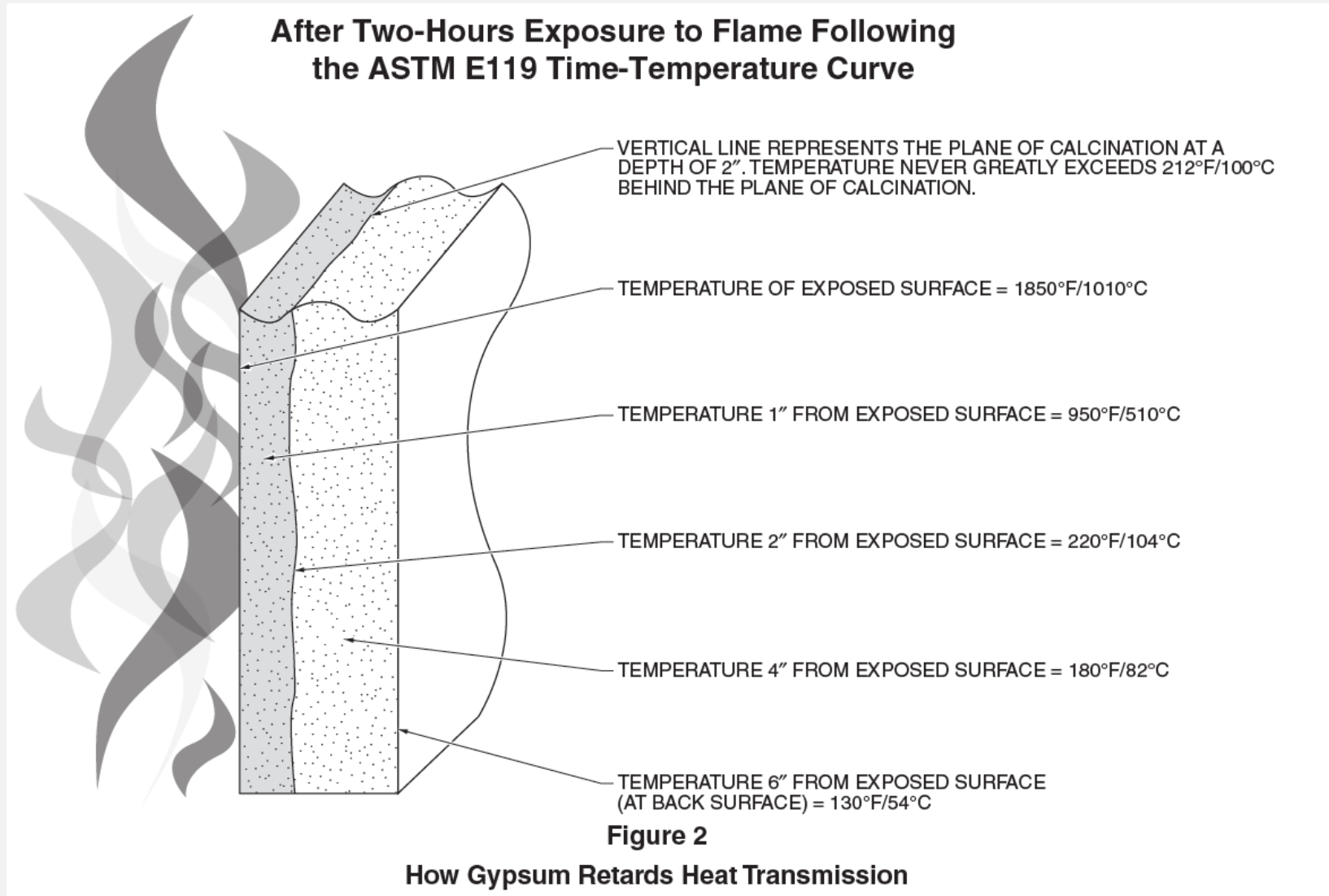


Image: [Gypsum Association GA-600 Fire Resistance and Sound Control Design Manual](#)



## Gypsum Panel Types

*Gypsum Board* – defined in ASTM C11 *Standard Terminology Relating to Gypsum and Related Building Materials and Systems*, as “a type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing.” Gypsum board may be further described as follows:

*Regular Gypsum Board* – a gypsum board with naturally-occurring fire resistance from the gypsum in the core; or

*Type X Gypsum Board* – a gypsum board with special core additives to increase the natural fire resistance of regular gypsum board; or

*Type C Gypsum Board* – a proprietary type X gypsum board with enhanced fire resistance.

Source: [Gypsum Association GA-600 Fire Resistance and Sound Control Design Manual](#)

### 4.4 *Gypsum Board, type X* (Special Fire-Resistant):

4.4.1 *Gypsum Board, type X*, designates gypsum board, except gypsum lath, gypsum coreboard, and gypsum shaftliner board, complying with this specification that provides not less than 1 h fire-resistance rating for boards  $\frac{5}{8}$  in. [15.9 mm] thick or  $\frac{3}{4}$  h fire-resistance rating for boards  $\frac{1}{2}$  in. [12.7 mm] thick, applied parallel with and on each side of load bearing 2 by 4 wood studs spaced 16 in. [406 mm] on centers with 6d coated nails,  $1\frac{7}{8}$  in. [48 mm] long, 0.0915-in. [2.3 mm] diameter shank,  $\frac{1}{4}$ -in. [6.4 mm] diameter heads, spaced 7 in. [178 mm] on centers with gypsum board joints staggered 16 in. [406 mm] on each side of the partition and tested in accordance with Test Methods **E119**.

Source: [ASTM C1396-17 Standard Specification for Gypsum Board](#)



# Gypsum Panel Types

**Type X Gypsum Panels – ASTM C1396**

**Type C Gypsum Panels  
(Enhanced Proprietary Type X)**

**\*\*\* New Enhanced Proprietary Type X  
Panels (not referred to as Type C) \*\*\***



# Fire Test Standards





# Passive Fire Protection - Compartmentalization

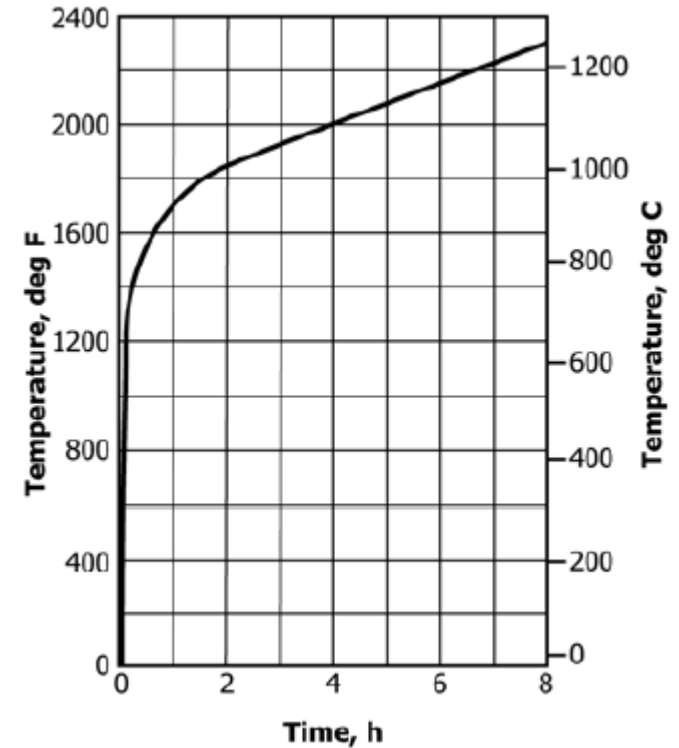




# Fire Test Standards – ASTM E119

## ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials

- Evaluation of the fire resistance of an assembly
- Used to evaluate all fire-resistance rated assemblies:
  - Walls, floor-ceilings, roof-ceilings, columns and horizontal membranes
- Harmonized with UL 263 and CAN/ULC-S101
- Requirement of International Building Code® (IBC®)
- Not to be used interchangeably with ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C* or ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*



1000°F (538°C)	at 5 min
1300°F (704°C)	at 10 min
1550°F (843°C)	at 30 min
1700°F (927°C)	at 1 h
1850°F (1010°C)	at 2 h
2000°F (1093°C)	at 4 h
2300°F (1260°C)	at 8 h or over



# Fire Test Standards – ASTM E119

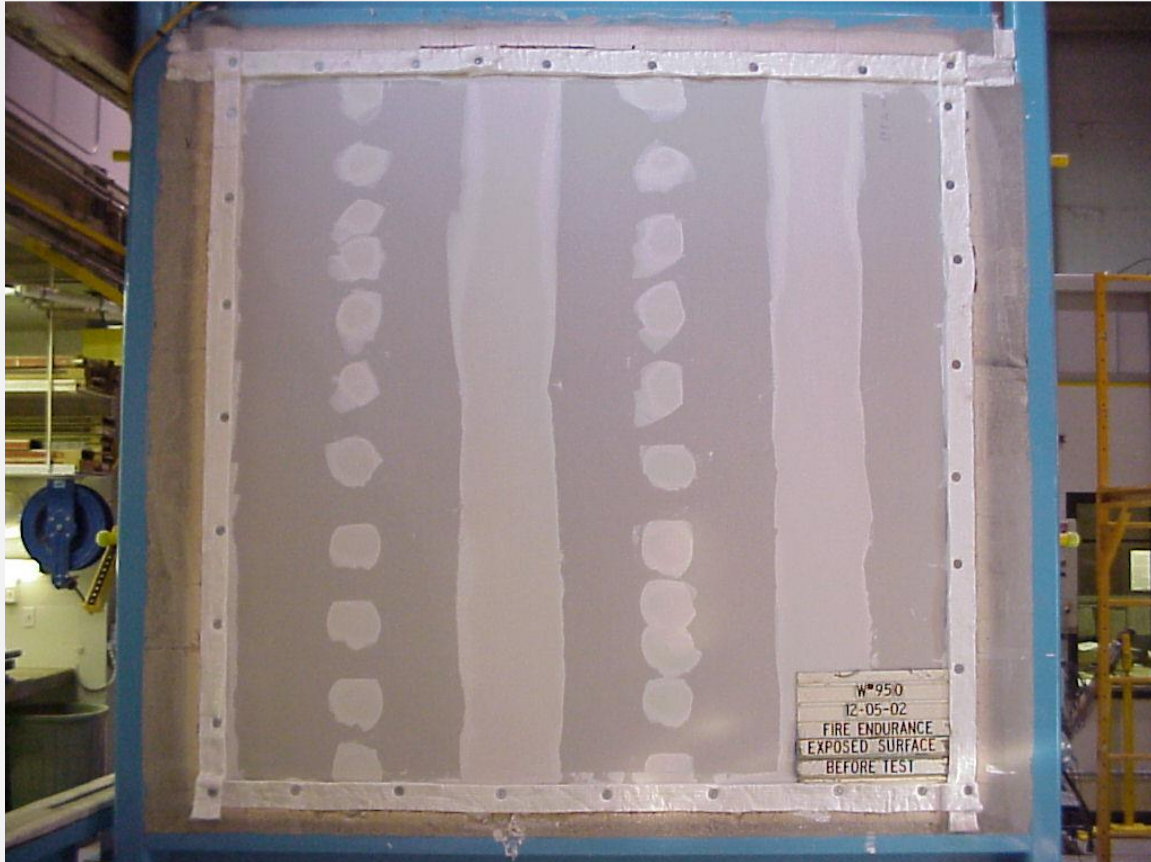
## Walls

- Load-bearing assemblies have a superimposed load to simulate a maximum-load condition
- Two tests are conducted:
  - Fire endurance test
  - Hose stream test conducted on a duplicate specimen
- Failure Criteria (Unexposed Side):
  - Heat transfer, temperature rise (individual point and average of 9 points)
  - No flame through/flame penetration of assembly
  - Hose stream – no water penetration through assembly.

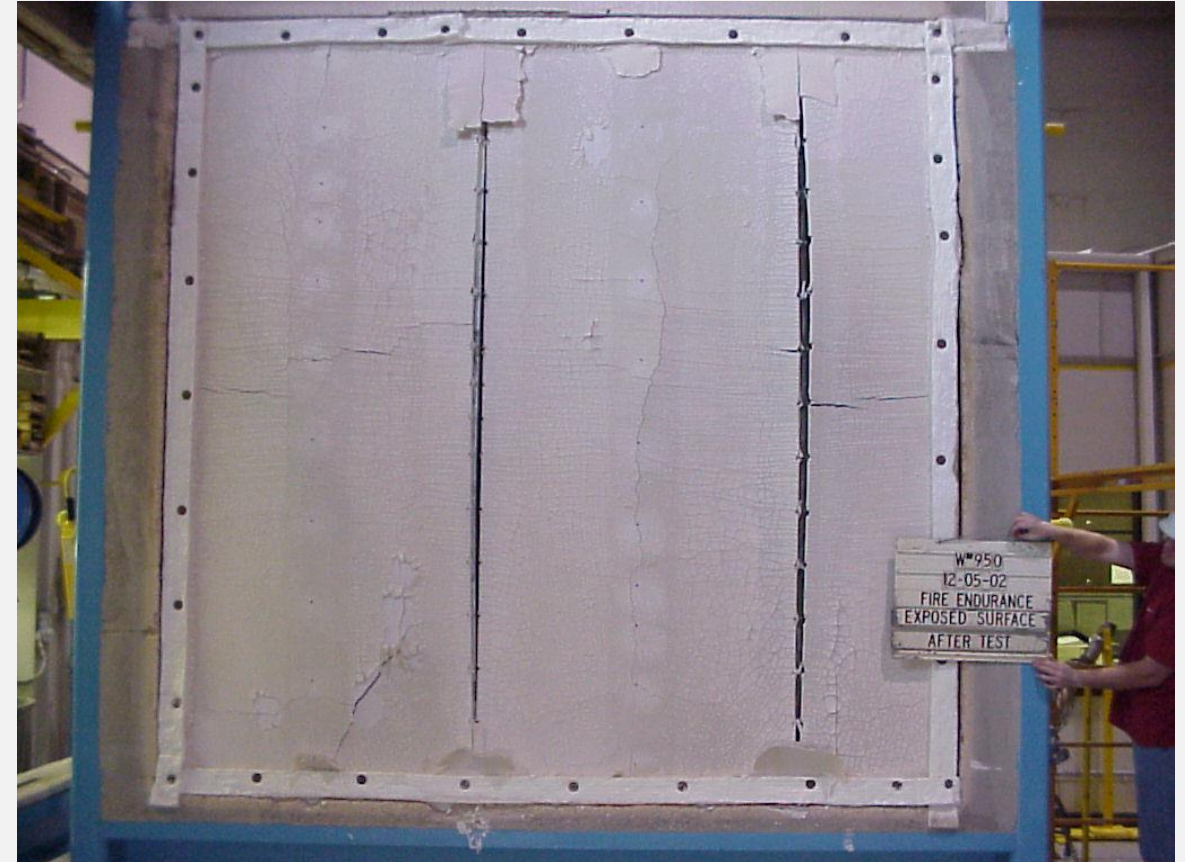




# Fire Test Standards – ASTM E119



**Exposed Side – Before Test**



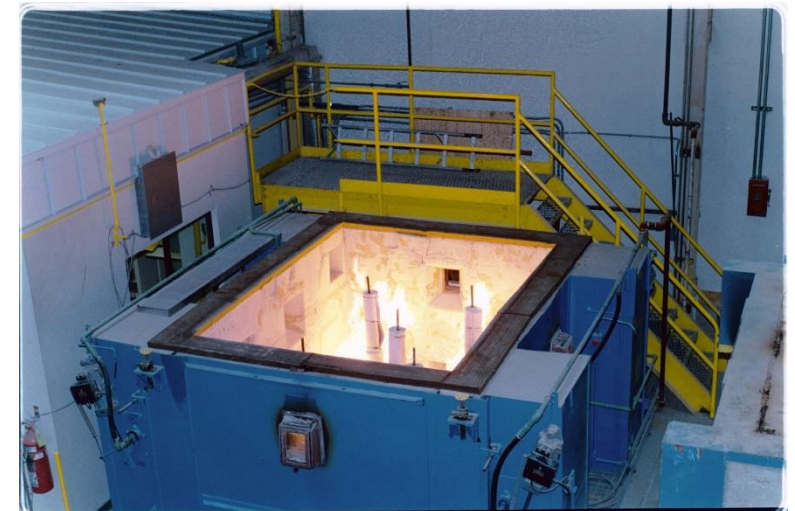
**Exposed Side – After Test**



# Fire Test Standards – ASTM E119

## Ceilings

- Both floor- and roof-ceiling assemblies are tested with a simulated maximum-load condition
- One test conducted:
  - Fire endurance test
- Failure Criteria (Unexposed Side):
  - Heat transfer, temperature rise (individual point and average of 9 points)
  - No flame through/flame penetration of assembly
  - Structural integrity, cannot collapse during test
- Result:
  - Fire-resistance rating (in hours)





## Fire Test Standards – ASTM E119



**Exposed Side – Before Test**



**Exposed Side – After Test**



# Common Steel-Framed Assemblies

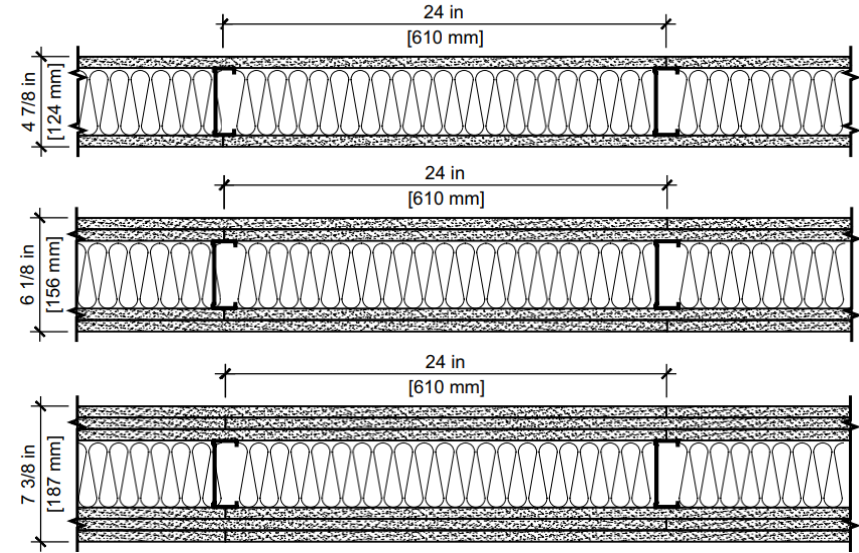




# Common Steel-Framed Assemblies: Walls

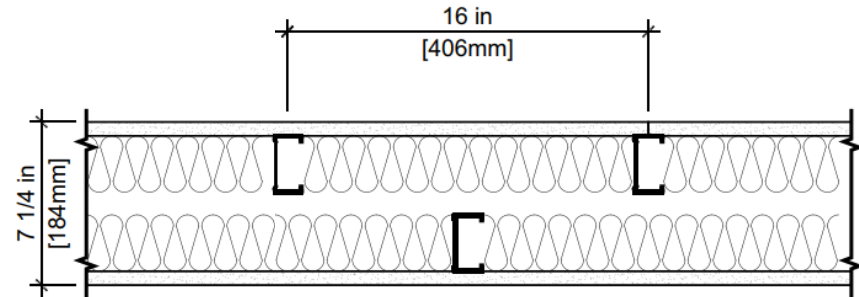
## Conventional wall (single stud)

- Loadbearing: UL U423 / W460
- Nonloadbearing: UL U419



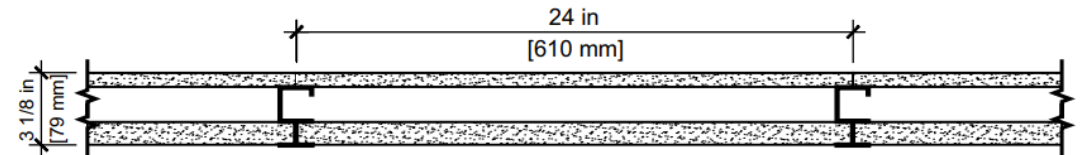
## Chase wall (double stud)

- Loadbearing: UL V446
- Nonloadbearing: UL U493



## Shaft wall

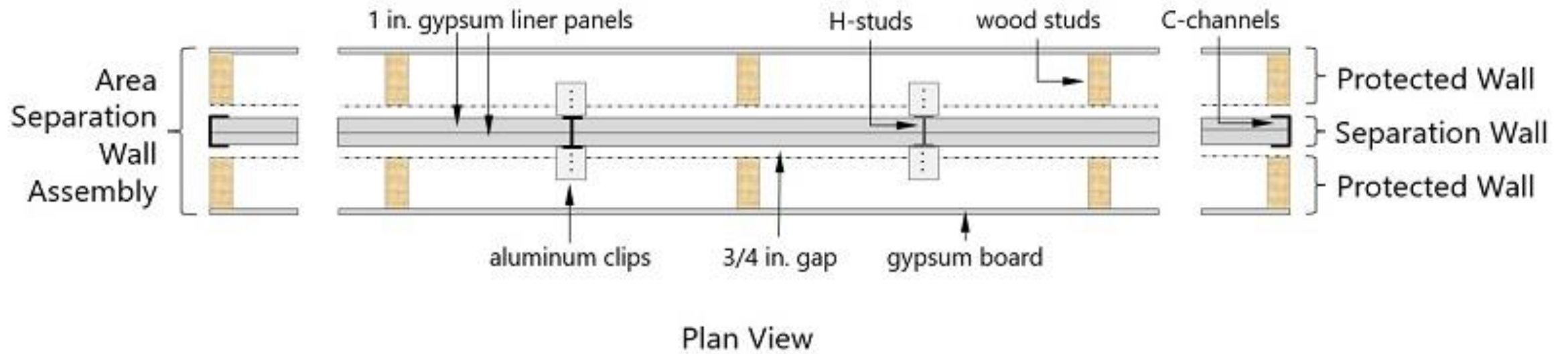
- Nonloadbearing: UL U415





# Common Steel-Framed Assemblies: Walls

Gypsum Area Separation Firewall: UL Design No. U336

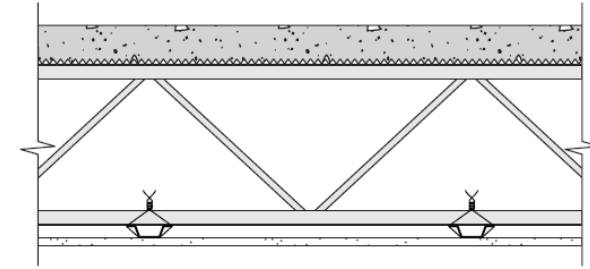




# Common Steel-Framed Assemblies: Floor-Ceilings & Roofs

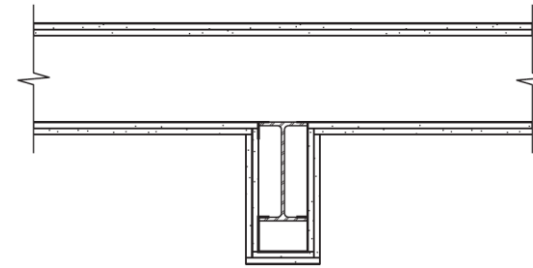
## Open-web bar joists, G512

- Concrete flooring over deck



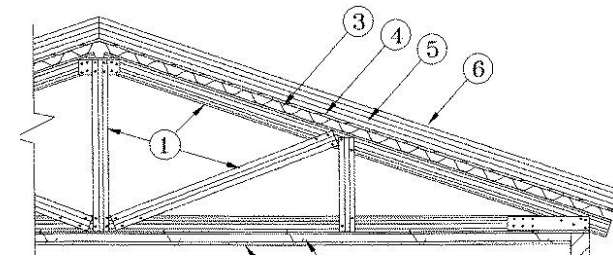
## C-joists, L524

- Wood subfloor



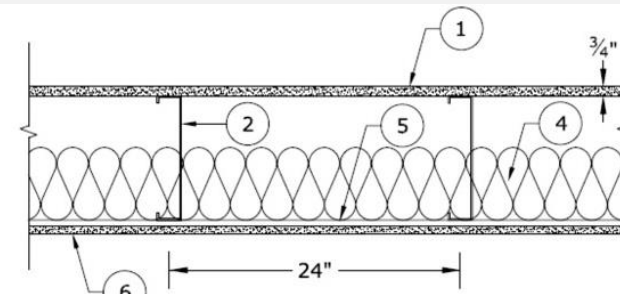
## Light-gauge steel trusses, P518

- Roof-ceiling, converted to floor-ceiling



## C-joists, H505

- Structural cement panel flooring

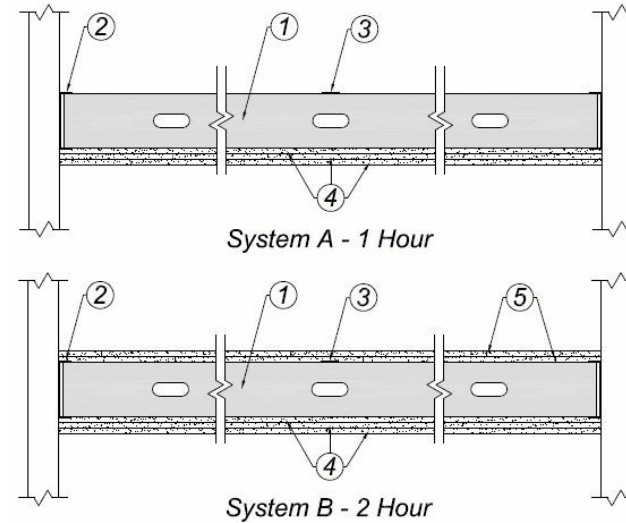




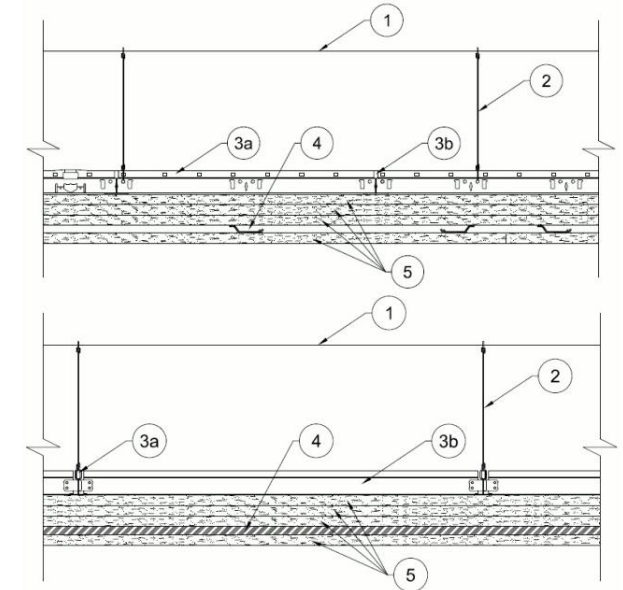
# Common Steel-Framed Assemblies: Horizontal Membranes

- Nonloadbearing (or load restricted)
- Provides hourly rating without the inclusion of other components like in floor- or roof-ceilings
- Multiple layers of gypsum board required to obtain an hourly rating
- UL Designs I506, I512, and I514 (not pictured)
- 2-hr horizontal shaft wall system

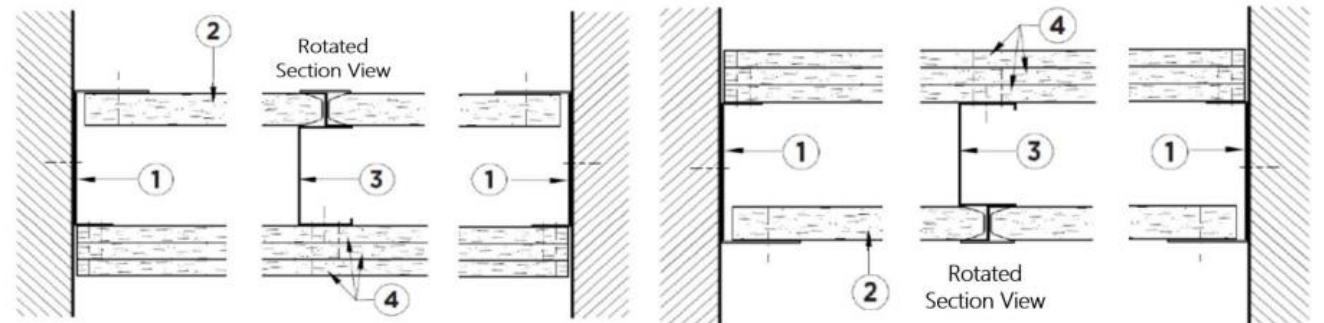
UL Design I506 (1- and 2-hr)



UL Design I512 (2-hr)



Horizontal Shaft Wall System (2-hr)





# UL & GA Published Designs





# What do the different terms mean?

The words used in the UL Product iQ can be confusing and sometimes used incorrectly.

- There are three terms that are commonly associated with UL Products: **Listed, Recognized, and Classified**
- **Listed and Classified** are the most common terms used with fire-resistance rated gypsum assemblies

## Listed

Refers to a complete system of products (“Designs”) that when constructed together provides a complete rating (ex: fire-resistance hourly rating)

Listed Designs/Systems require all aspects of the system to be present.

Rating is only when the system is complete: **You cannot define individual contributions of system components to its overall rating.**

## Classified

Refers to specific performance characteristics of products

Does not apply to system performance – rather is product specific.

### Examples:

- Combustibility
- Surface Burning
- NRC/CAC (Acoustics)



## Common Steel Framed Assemblies – UL Design No. U419

6. **Fasteners** — (Not Shown) — For use with Items 2 and 2F - Type S or S-12 steel screws used to attach panels to studs (Item 2) or furring channels (Item 7).

**Single layer systems:** 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 8 in. OC when panels are applied horizontally, or 8 in. OC along vertical and bottom edges and 12 in. OC in the field when panels are applied vertically. **Single layer system with Type ULIX:** 1 in. long, spaced 12 in. OC in the field and perimeter, when panels are applied horizontally or vertically. **Two layer systems:** First layer- 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels or 2-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC with screws offset 8 in. from first layer. **Three-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in., 5/8 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below. **Four-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 24 in. OC. Fourth layer- 2-5/8 in. long for 1/2 in. thick panels or 3 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below.

# Common Steel Framed Assemblies – GA File No. WP 1057

## WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

GA FILE NO. WP 1057	PROPRIETARY	1 HOUR FIRE	50 to 54 STC SOUND
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### GYPSUM PANELS, STEEL STUDS

#### Fire Design:

One layer 5/8" proprietary type X gypsum panels applied parallel or at right angles to each side of 3-1/2", 15 mil steel studs 24" o.c. with 1" Type S screws 12" o.c.

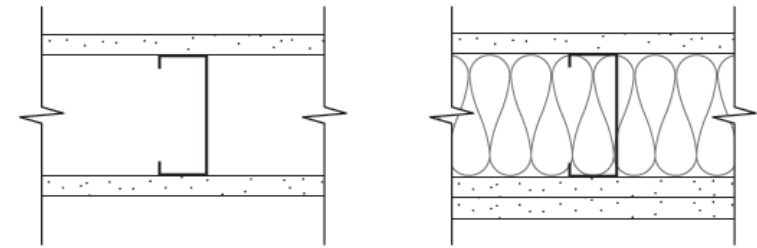
Vertical joints centered over studs and staggered one stud cavity on opposite sides. Horizontal joints need not be staggered or backed. (NLB)

#### Sound Design:

Sound tested on 3-5/8" steel studs with a **second** layer of 5/8" proprietary type X gypsum panel applied to ONE SIDE with screws 12" o.c. and 3-1/2" glass fiber insulation in stud cavity.

#### PROPRIETARY GYPSUM PANEL

United States Gypsum Company  
– 5/8" Sheetrock® Brand EcoSmart Panels Firecode® X



<b>Thickness:</b>	4-3/4" (Fire) 5-1/2" (Sound)
<b>Approx. Weight:</b>	3.8 psf (Fire) 5.8 psf (Sound)
<b>Fire Test:</b>	UL R1319, 4789485517, 07-31-20, UL Design U419
<b>Sound Test:</b>	RAL-TL15-041, 02-04-15

Source: [Gypsum Association GA-600 Fire Resistance and Sound Control Design Manual](#)



# Common Steel Framed Assemblies – UL Design No. U419

5. **Gypsum Board\*** — Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) with Type ULIX need not be staggered. The thickness and number of layers for the 1 hr, 2 hr, 3 hr and 4 hr ratings are as follows:

### Gypsum Board Protection on Each Side of Wall

Rating, Hr	Min Stud Depth, in. Items 2, 2C, 2D, 2F, 2G, 2O	No. of Layers & Thkns of Panel	Min Thkns of Insulation (Item 4)
1	3-1/2	1 layer, 5/8 in. thick	Optional
1	2-1/2	1 layer, 1/2 in. thick	1-1/2 in.
1	1-5/8	1 layer, 3/4 in. thick	Optional
2	1-5/8	2 layers, 1/2 in. thick	Optional
2	1-5/8	2 layers, 5/8 in. thick	Optional
2	3-1/2	1 layer, 3/4 in. thick	3 in.
3	1-5/8	3 layers, 1/2 in. thick	Optional
3	1-5/8	2 layers, 3/4 in. thick	Optional
3	1-5/8	3 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 1/2 in. thick	Optional
4	2-1/2	2 layers, 3/4 in. thick	2 in.

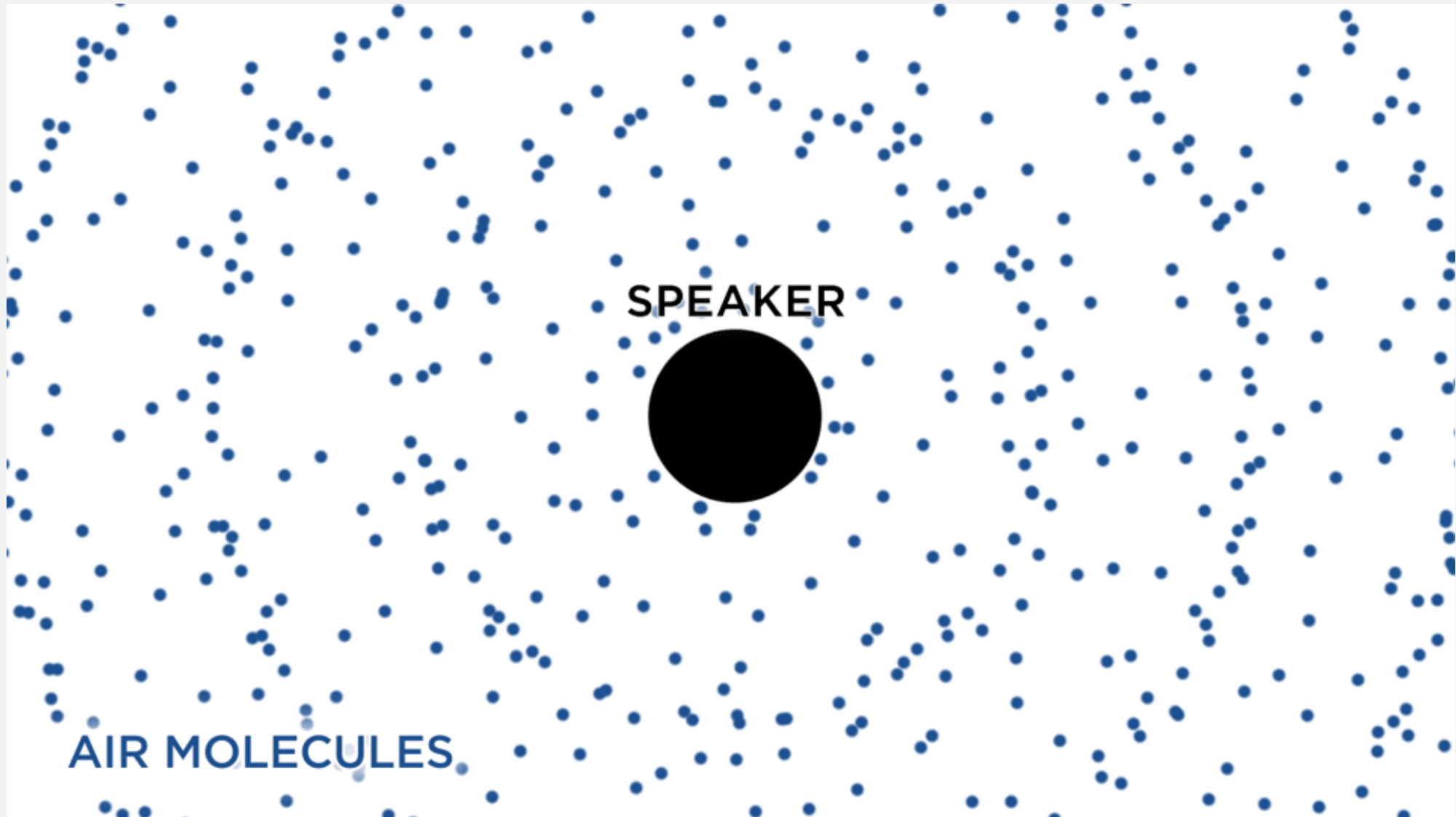


# Fundamentals of Sound





# Fundamentals of Sound





# Fundamentals of Sound

## PITCH FREQUENCY

- ▶ Hertz (Hz)  
= cycles per second
- ▶ Low frequency  
= low pitch (bass sounds)
- ▶ High frequency  
= high pitch (shrill sounds)
- ▶ Human hearing range  
= 20Hz to 20,000Hz
- ▶ Human voice range  
= 100Hz to 4,000Hz

## LOUDNESS AMPLITUDE

- ▶ Decibels (dB)
- ▶ Logarithmic scale
- ▶ 60dB + 60dB  
= 63dB
- ▶ 1dB = indiscernible  
3dB = just perceptible  
6dB = clearly noticeable  
10dB = twice (or half) as loud

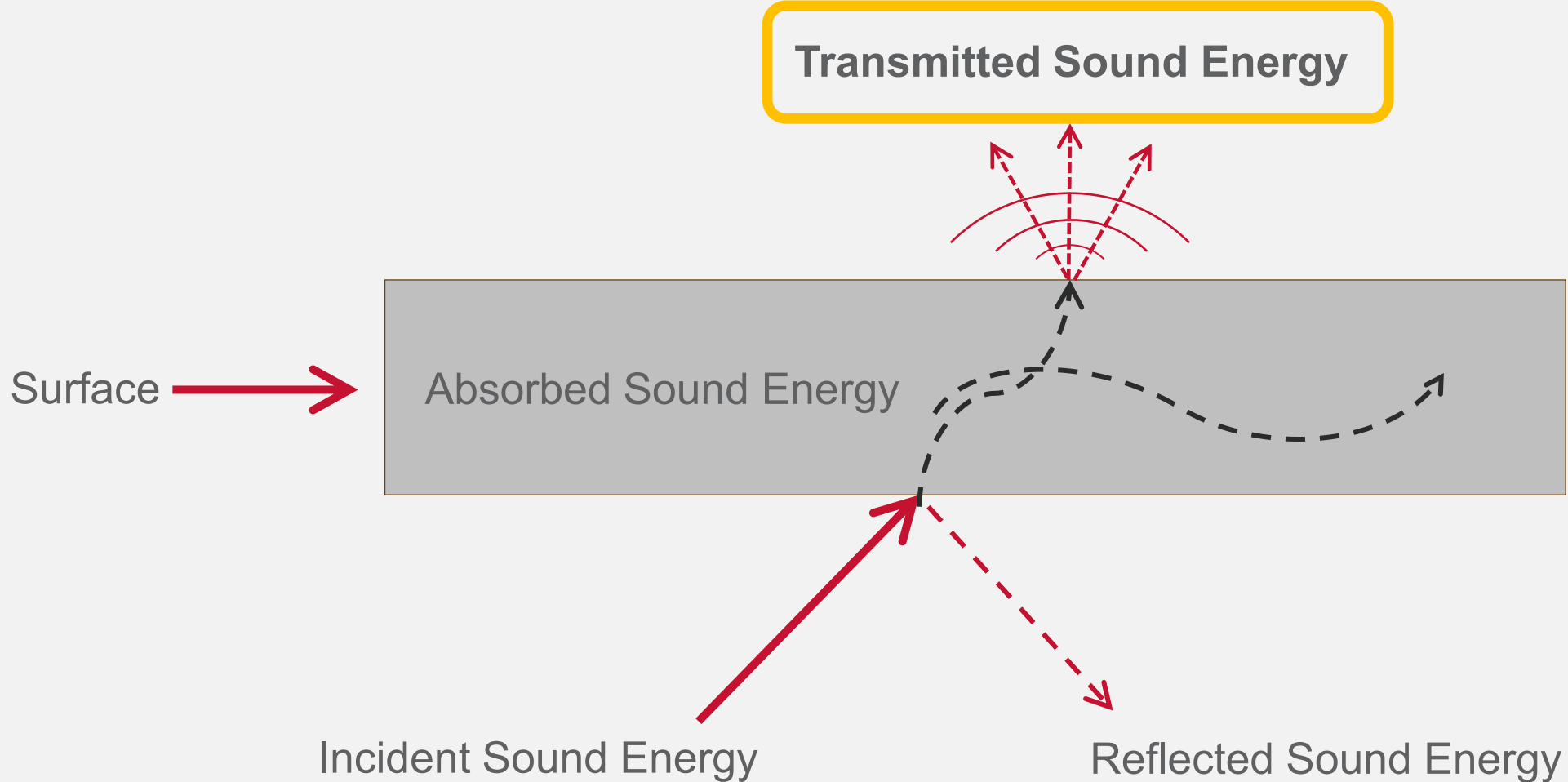


# Sound Transmission



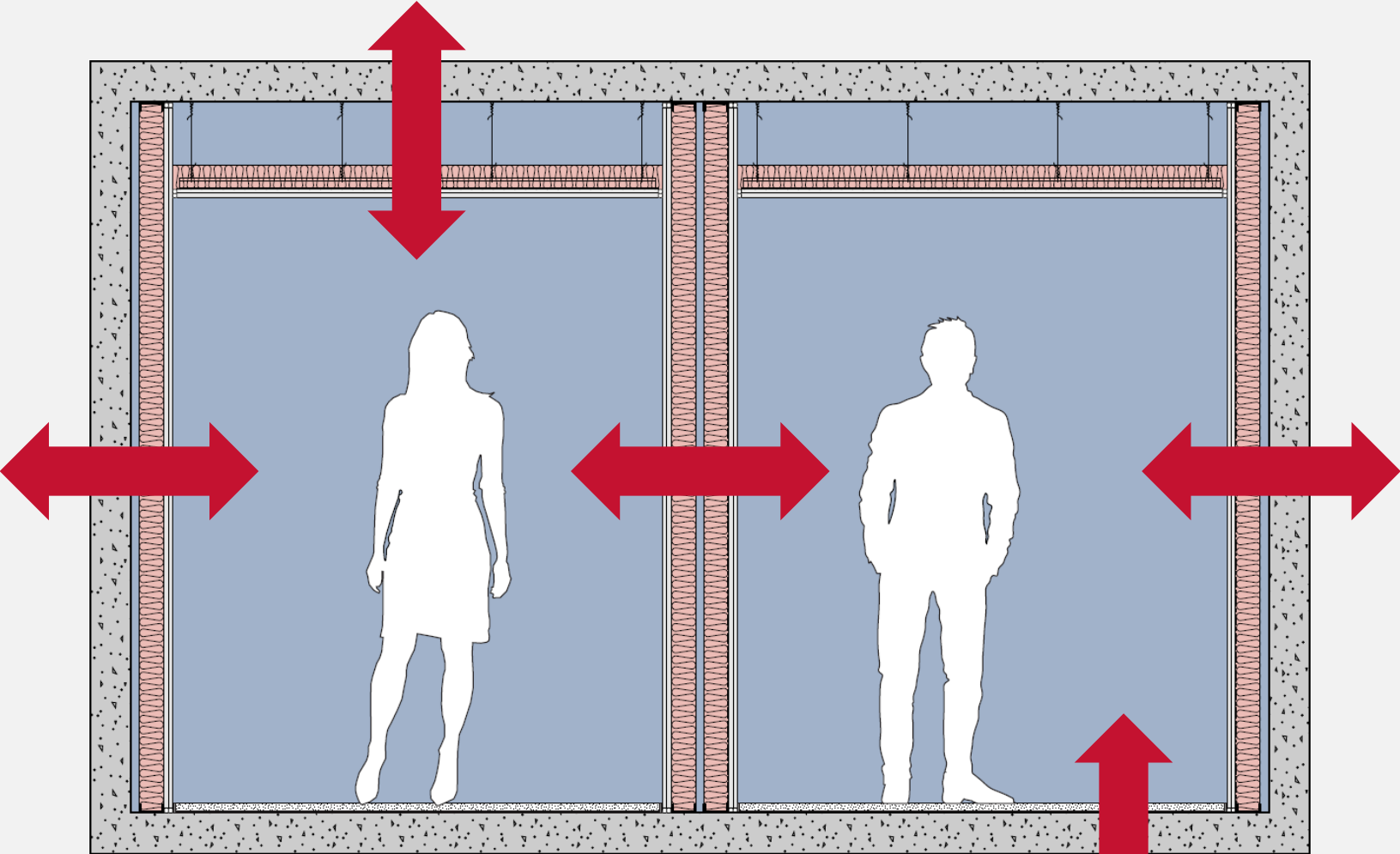


# Sound Transmission





# Sound Transmission



Laboratory Test Metrics: **STC & IIC**

Field Test Metrics: **NNIC & NISR**



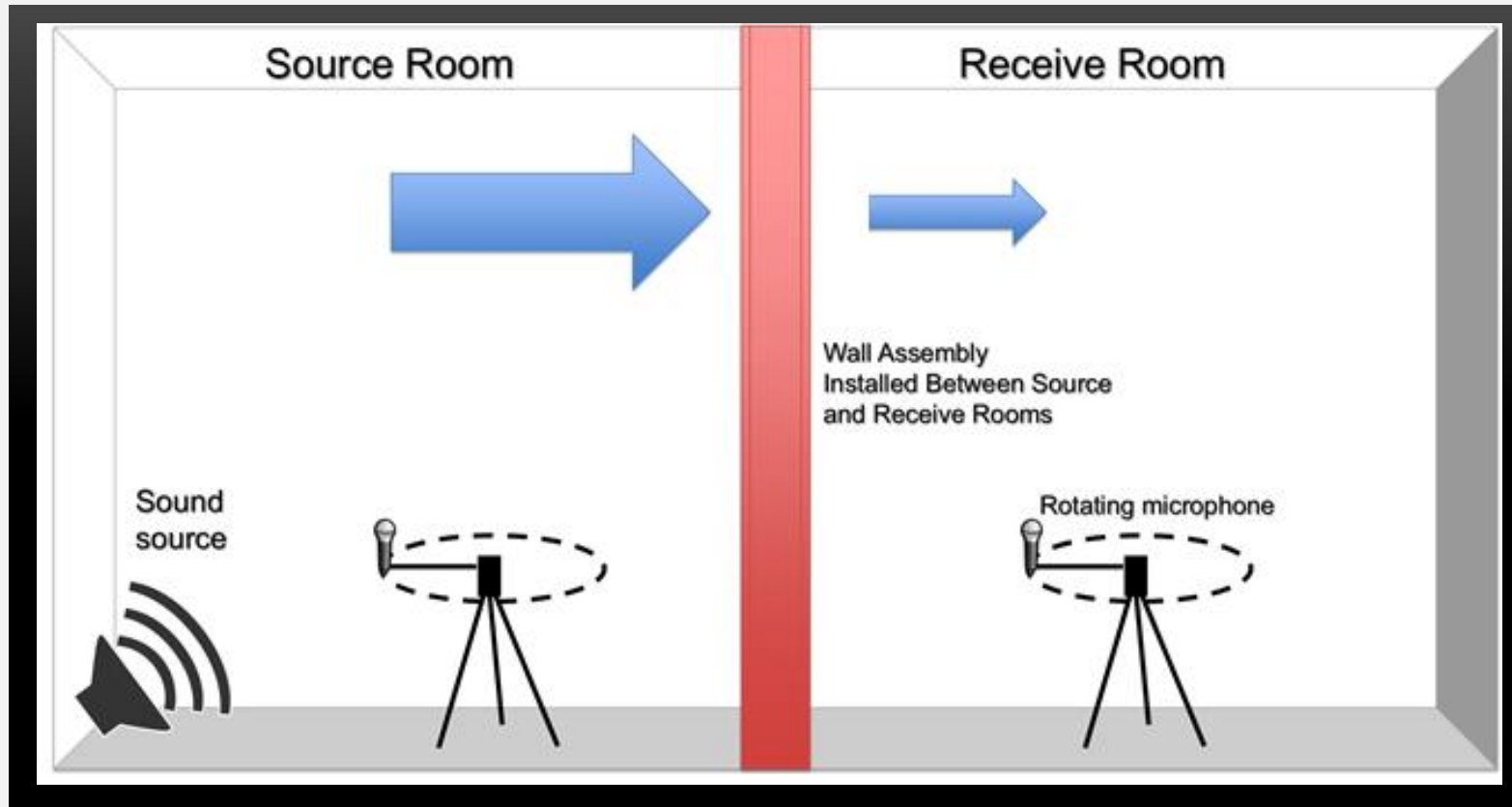
# Acoustic Test Standards





# Lab Test: Airborne Sound Transmission

**ASTM E90** Standard Test Method for Laboratory Measurement of **Airborne Sound** Transmission Loss of Building Partitions and Elements

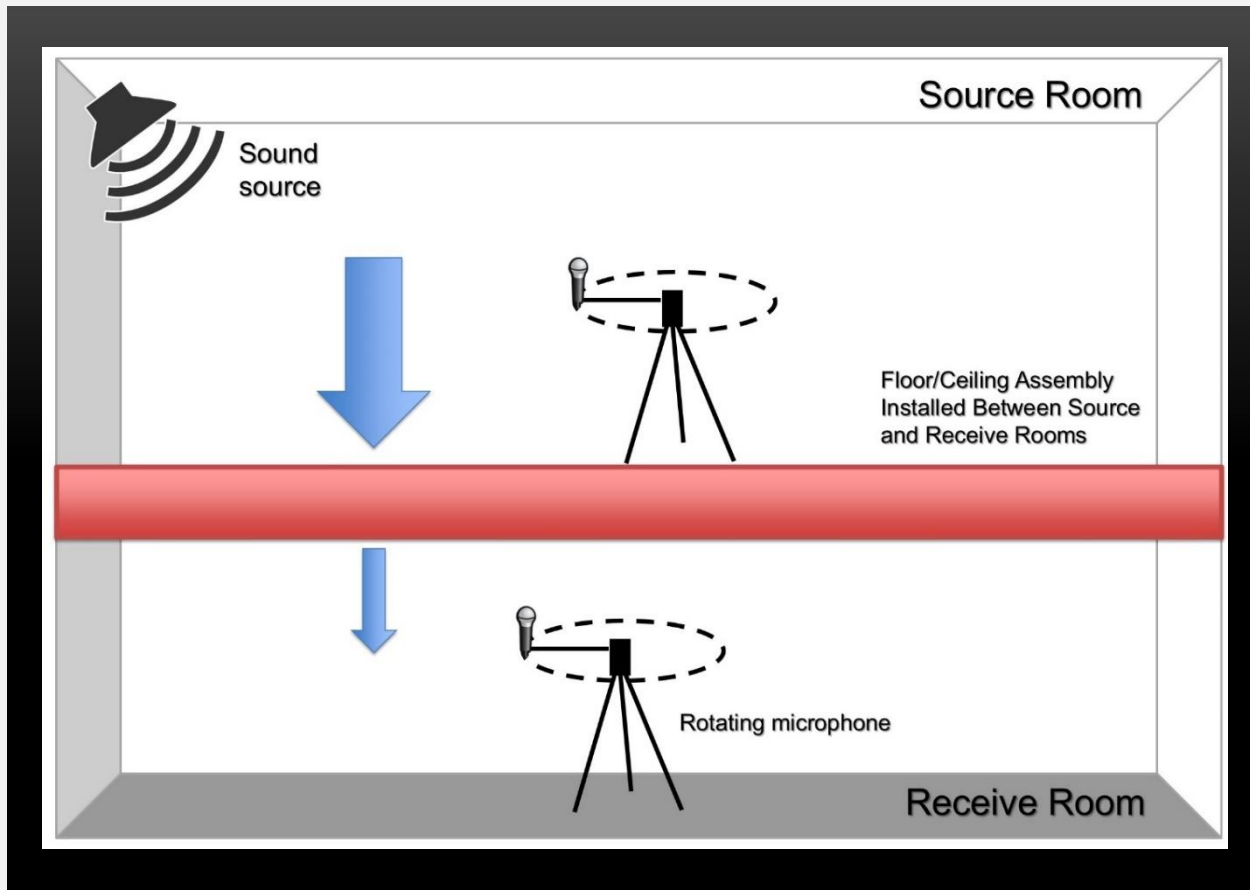


**S**ound  
**T**ransmission  
**C**lass



# Lab Test: Airborne Sound Transmission

**ASTM E90** Standard Test Method for Laboratory Measurement of **Airborne Sound** Transmission Loss of Building Partitions and Elements



**S**ound  
**T**ransmission  
**C**lass



# Lab Test Result: Airborne Sound Transmission

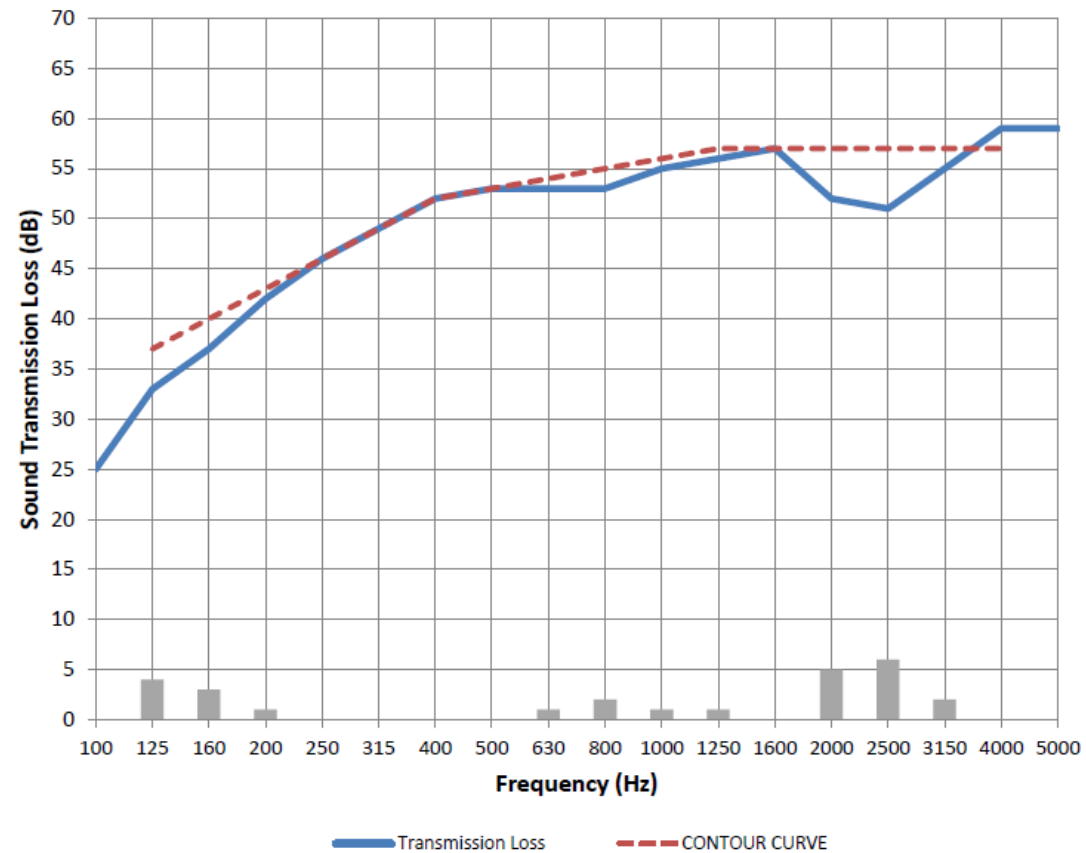
## Test Results

Frequency (Hz)	TL (dB)	Deficiency (dB)	95% Confidence Limit of TL (dB)
100	25		
125	33	4	0.75
160	37	3	0.62
200	42	1	0.79
250	46	-	0.47
315	49	-	0.40
400	52	-	0.51
500	53	-	0.34
630	53	1	0.14
800	53	2	0.12
1000	55	1	0.17
1250	56	1	0.18
1600	57	-	0.17
2000	52	5	0.16
2500	51	6	0.16
3150	55	2	0.13
4000	59	-	0.23
5000	59		

\* Indicates correction due to low (less than 5 dB) signal-to-noise level in the receiving room.  
 TL's are not affected by flanking transmission.

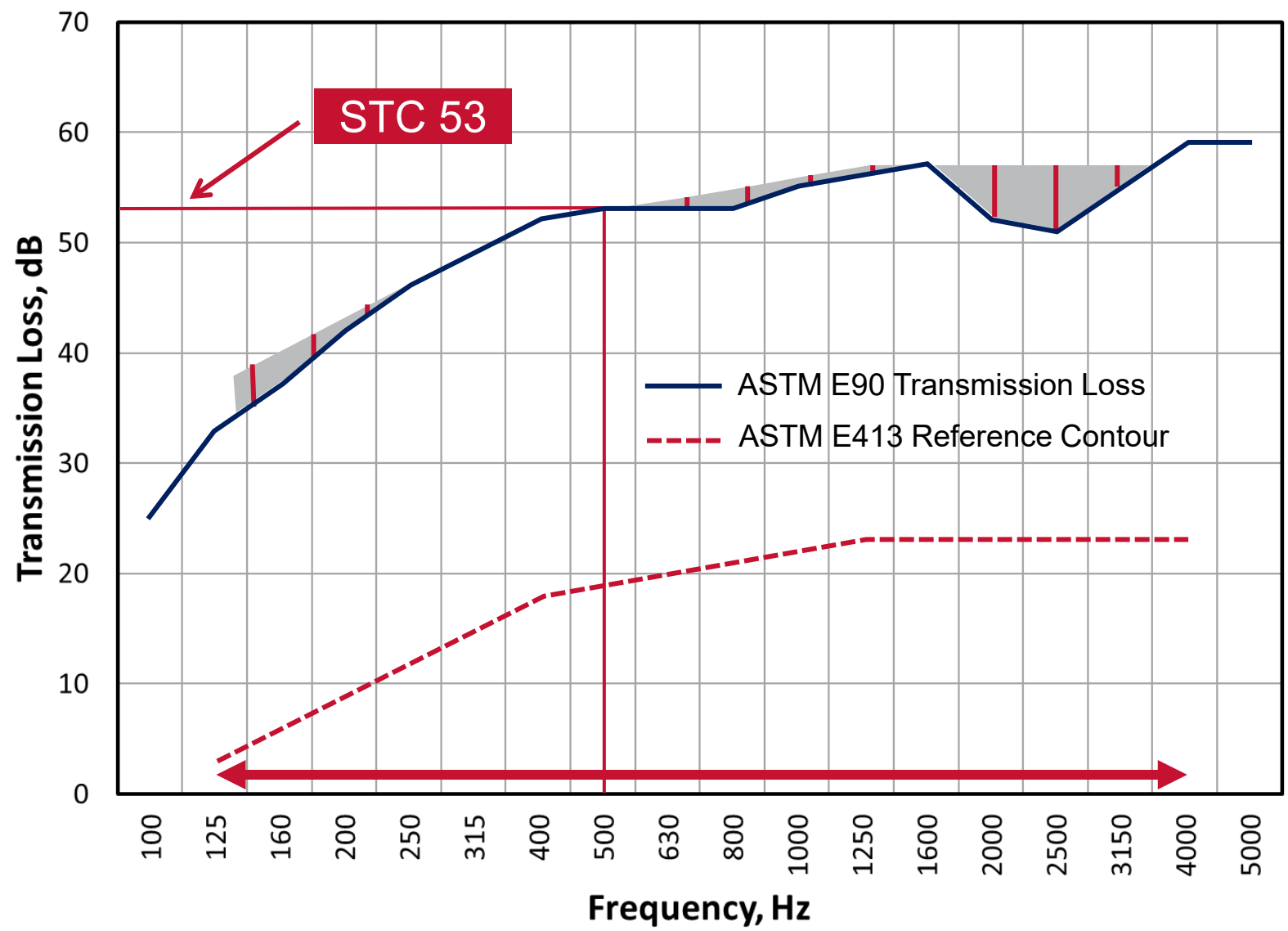
**Sound Transmission Class (STC): 53**  
**Total Deficiencies: 26**

**Sound Transmission Class (STC): 53**  
**Total Deficiencies: 26**





# Lab Test Result: Airborne Sound Transmission



Maximum Deficiency  $\leq 8$  dB

**AND**

Sum  $\leq 32$  dB



## Lab Test: Impact Sound Transmission

**ASTM E492** Standard Test Method for Laboratory Measurement of **Impact Sound** Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine

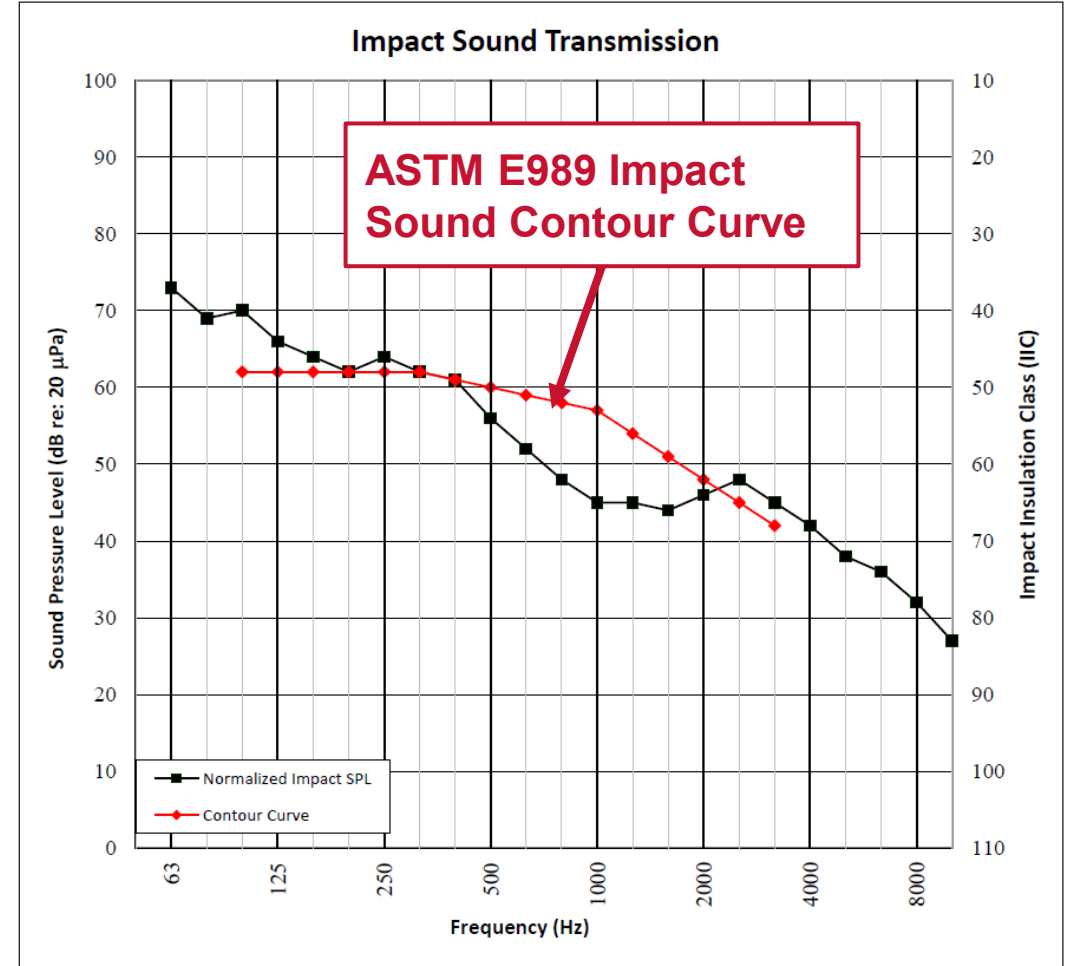


**I**mpact  
**I**nsulation  
**C**lass



# Lab Test Result: Impact Sound Transmission

Freq (Hz)	Background SPL (dB)	Absorption (m <sup>2</sup> )	Normalized Impact SPL (dB)	95% Confidence Limit	Number of Deficiencies
50	53.9	32.3	72	1.5	-
63	47.9	26.7	64	2.9	-
80	38.9	17.2	69	2.6	-
100	40.7	13.4	70	1.7	8
125	37.3	10.9	66	1.6	4
160	34.4	9.0	64	1.1	2
200	28.0	10.1	62	0.5	0
250	28.3	9.9	64	0.6	2
315	26.7	9.8	62	0.4	0
400	26.1	8.3	61	0.6	0
500	27.2	7.7	56	0.4	0
630	26.9	7.4	52	0.3	0
800	24.6	7.3	48	0.4	0
1000	22.9	7.5	45	0.3	0
1250	21.4	7.5	45	0.1	0
1600	20.5	7.7	44	0.2	0
2000	12.5	8.5	46	0.3	0
2500	8.1	9.4	48	0.3	3
3150	6.0	10.1	45	0.2	3
4000	5.3	12.0	42	0.2	-
5000	5.5	14.2	38	0.3	-
6300	6.0	17.4	36	0.6	-
8000	6.5	24.0	32	0.8	-
10000	6.8	29.0	27	0.9	-



**IIC Rating** 50 (Impact Insulation Class)  
**Deficiencies** 22 (Sum of Deficiencies)



## Important Considerations

Single-number ratings derived by curve-fit calculation do not tell the whole story:

- Two assemblies with same STC / IIC ratings can have different narrow-band performance
- STC rating roughly encompasses human speech frequency range

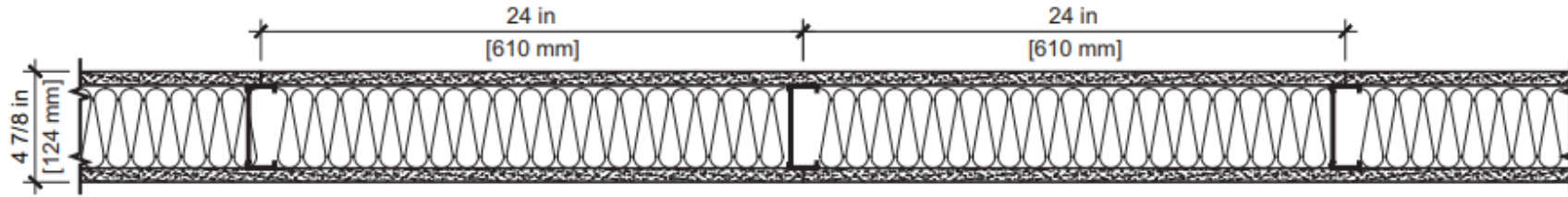
STC & IIC are ideal lab ratings for a “perfect” assembly:

- Field performance will always be lower than lab performance
- Following best-practices for sound-rated construction, field performance *should* be no more than 3-5 points below lab ratings

Laboratory variance inherent in ASTM E90 standard means STC ratings for the same wall tested in two different labs can differ by 4 points

- This is accepted by ASTM, but not widely-known by architects and the building industry

# STC Variability



- (1) Layer 5/8" Type X Gypsum Panel
- 3-5/8" EQ25 (15mil) Steel Studs @ 24" o.c.
- 3-1/2" fiberglass insulation
- (1) Layer 5/8" Type X Gypsum Panel

Lab A	Lab B	Lab C	Lab D
STC 49	STC 48	STC 47	STC 51

- Consider STC in terms of *ranges*
- Design with variability in mind



# Sound in Codes & Design Standards





## Codes & Design Standards

Project Type / Focus	Code / Design Standard	Link
Residential (Multi-family)	IBC / IRC	<a href="https://codes.iccsafe.org/codes/i-codes/2024-icodes">https://codes.iccsafe.org/codes/i-codes/2024-icodes</a>
Green Buildings / Sustainability	LEED (v4)	<a href="https://www.usgbc.org/credits/eq10">https://www.usgbc.org/credits/eq10</a>
Healthy Buildings	WELL	<a href="https://v2.wellcertified.com/en/wellv2/overview">https://v2.wellcertified.com/en/wellv2/overview</a>
Healthcare	FGI	<a href="https://fgiguidelines.org/">https://fgiguidelines.org/</a>
Education	ANSI/ASA S12.60	<a href="https://webstore.ansi.org/standards/asa/ansiasas12602010partr2015">https://webstore.ansi.org/standards/asa/ansiasas12602010partr2015</a>
Government/Federal	GSA PBS P-100	<a href="https://www.gsa.gov/real-estate/facilities-standards-for-the-public-buildings-service">https://www.gsa.gov/real-estate/facilities-standards-for-the-public-buildings-service</a>

# Code Requirements

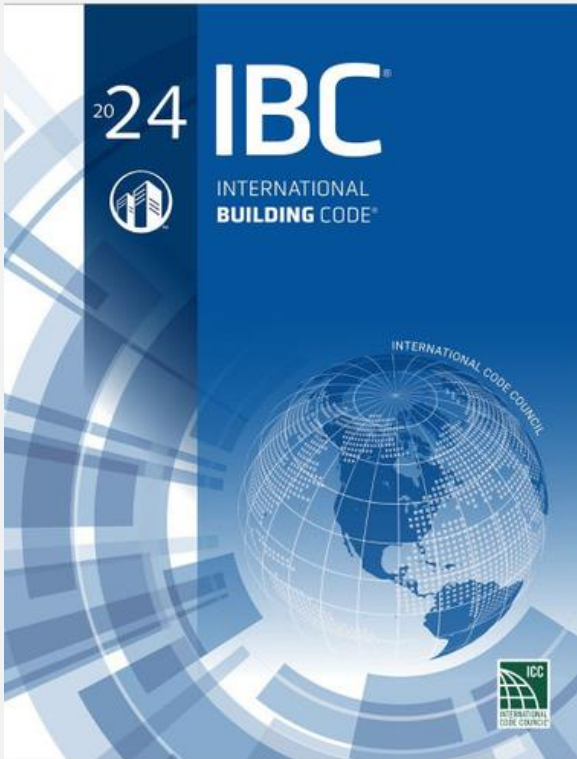


Image: [2024 International Building Code \(IBC\)](#)

- ▶ **Section 1206.2**  
STC 50 between dwelling units and public / service areas (vertical & horizontal)
- ▶ **Section 1206.3**  
IIC 50 between dwelling units and between dwelling units and public or service areas

▶ STC tested in accordance with ASTM E90 standard

▶ IIC tested in accordance with ASTM E492 standard

Minimum field-tested value:  
NNIC 45 (ASTM E336)  
NISR 45 (ASTM E1007)

# FGI Requirements

Adjacency Combination		STC <sub>c</sub> <sup>2</sup>
<b>Patient Care Units</b>		
Patient room	Corridor (with entrance)	35 <sup>3</sup>
Patient room	Patient room (wall-same floor)	45 <sup>4</sup>
Patient room	Patient room (floor-to-floor)	50
Patient room	Consultation room	50
Patient room	Public space	50
Patient room	Service area	60 <sup>5</sup>
Patient room	MRI room	60 <sup>5</sup>
Quiet room <sup>6</sup>	—	—

Adjacency Combination		STC <sub>c</sub> <sup>2</sup>
<b>Diagnostic and Treatment Locations</b>		
Exam room	Corridor (with entrance)	35 <sup>3</sup>
Exam room	Exam room (with electronic masking)	40 <sup>7</sup>
Exam room	Exam room (no electronic masking)	50
Exam room	Public space	50
Exam room	MRI room	60 <sup>5</sup>
Treatment room	Corridor (with entrance)	35 <sup>3</sup>
Treatment room	Treatment room	50
Procedure room	Corridor (with entrance)	35 <sup>3</sup>

Image: Excerpt from [Guidelines for Design and Construction of Hospitals, 2022 Edition](#), The Facilities Guidelines Institute

<sup>2</sup>The STC<sub>c</sub> values stated assume the need for normal speech privacy as shown in [Table 1.2-7](#) (Design Criteria for Speech Privacy for Enclosed Rooms and Open-Plan Spaces)—except at corridor walls with doors—and a background sound level of at least 30 dBA. When selecting assemblies based on their tested or published STC ratings, it should be noted that laboratory STC test reports can, in general, be considered accurate to +/- 2 STC points. Consequently, an assembly with a tested or published STC rating as low as 2 points below the stated minimum may be considered acceptable.



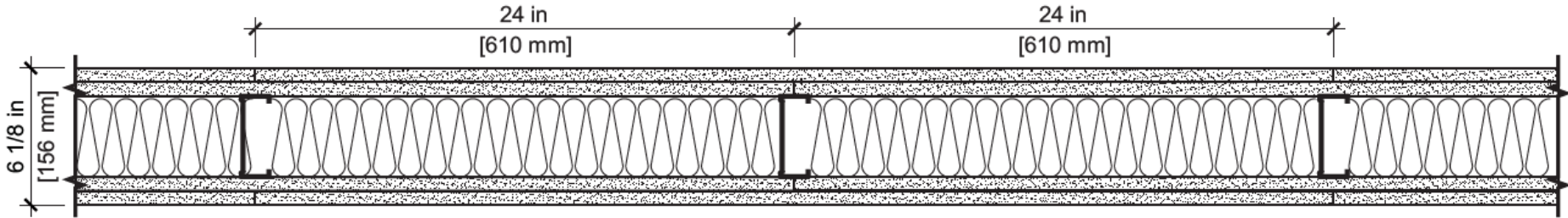
# Benefits of Steel-Framed Construction





# Benefits of Cavity Construction

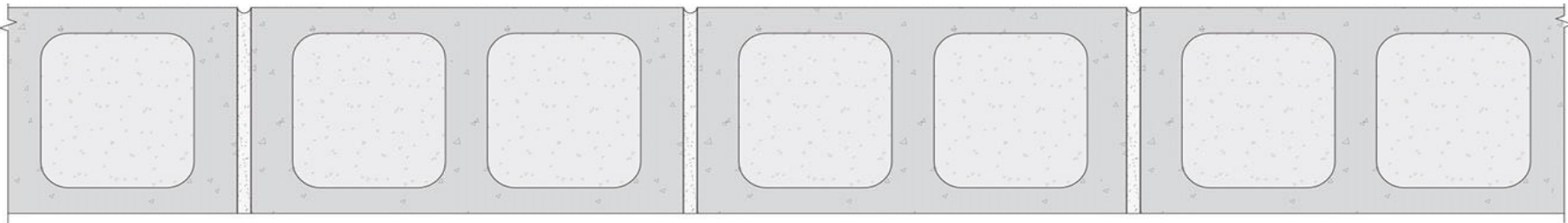
## Mass-Air-Mass System



**STC 56**

**UL U419, 2-Hour Fire-Rated (EQ25 studs @ 24" o.c.)**

## Monolithic Mass



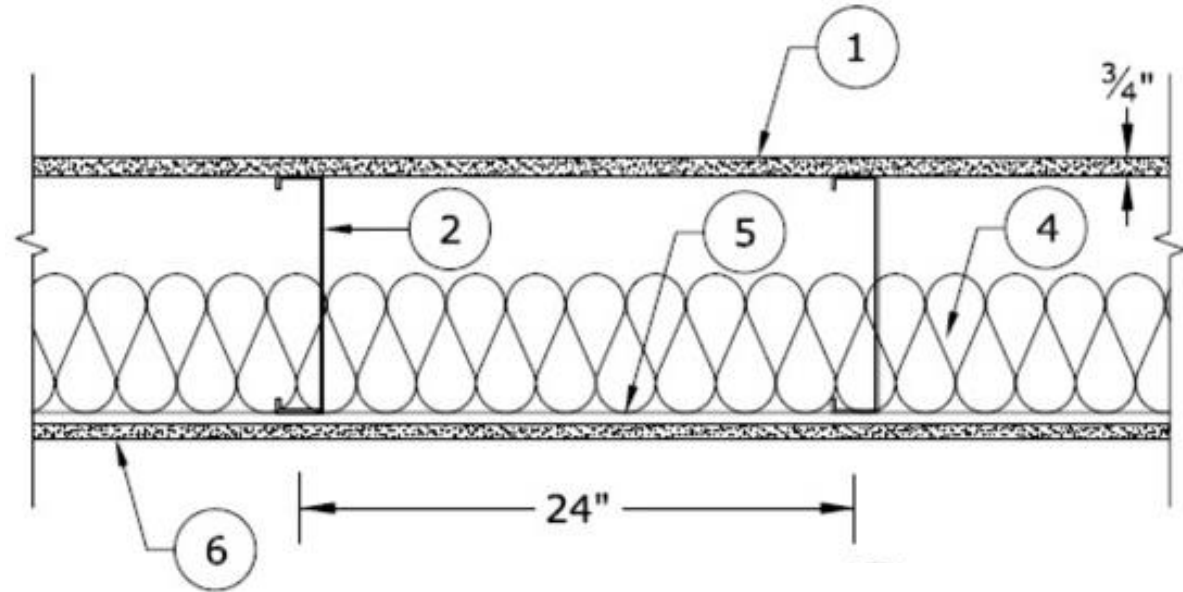
**STC 50-55**

**6 in. Grout-Filled CMU (Sealed / Painted)**



# Benefits of Cavity Construction

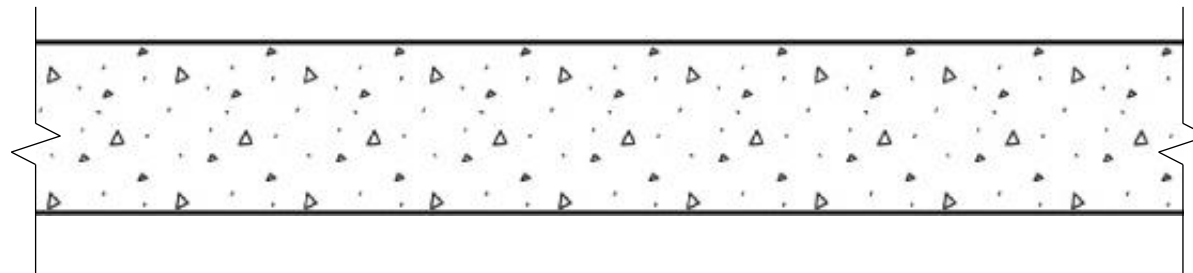
**Mass-Air-Mass System**



**STC 54**

**UL H505 – 2-Hour Fire-Rated**

**Monolithic Mass**



**STC 50-55**

**6 in. Concrete Slab**



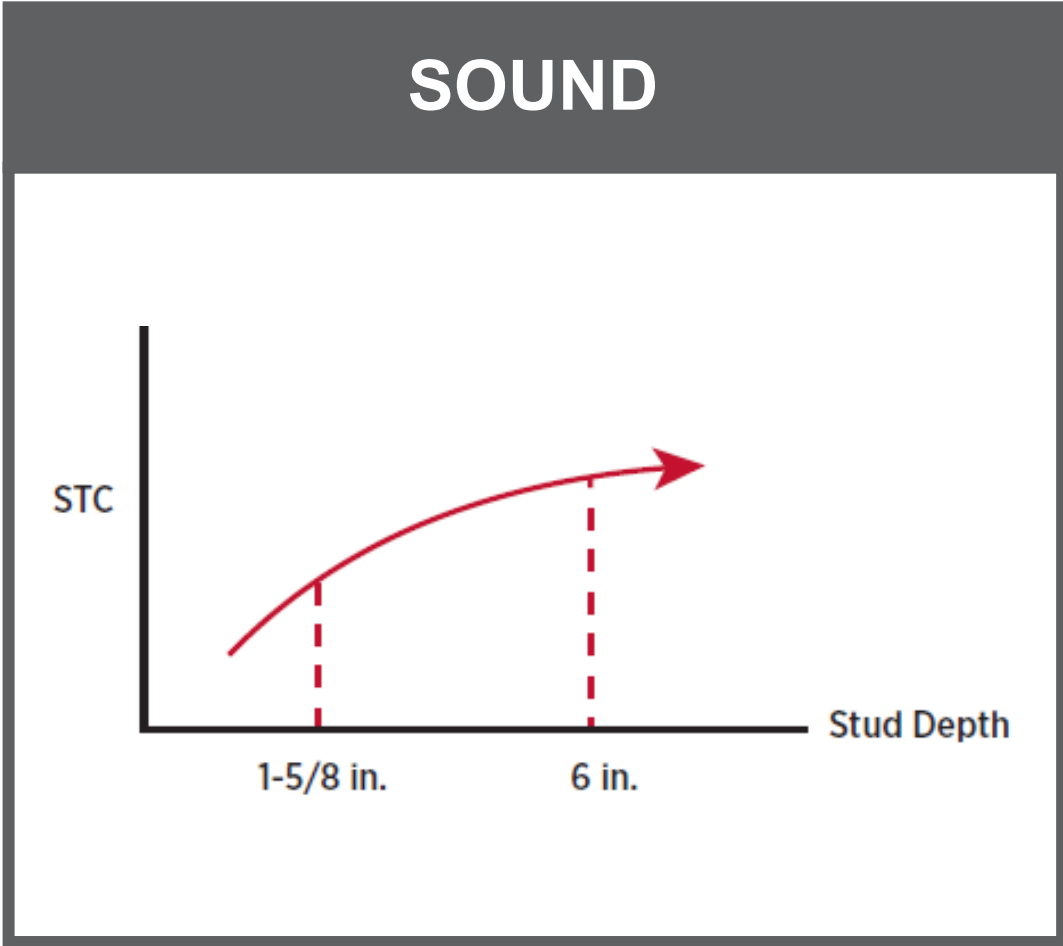
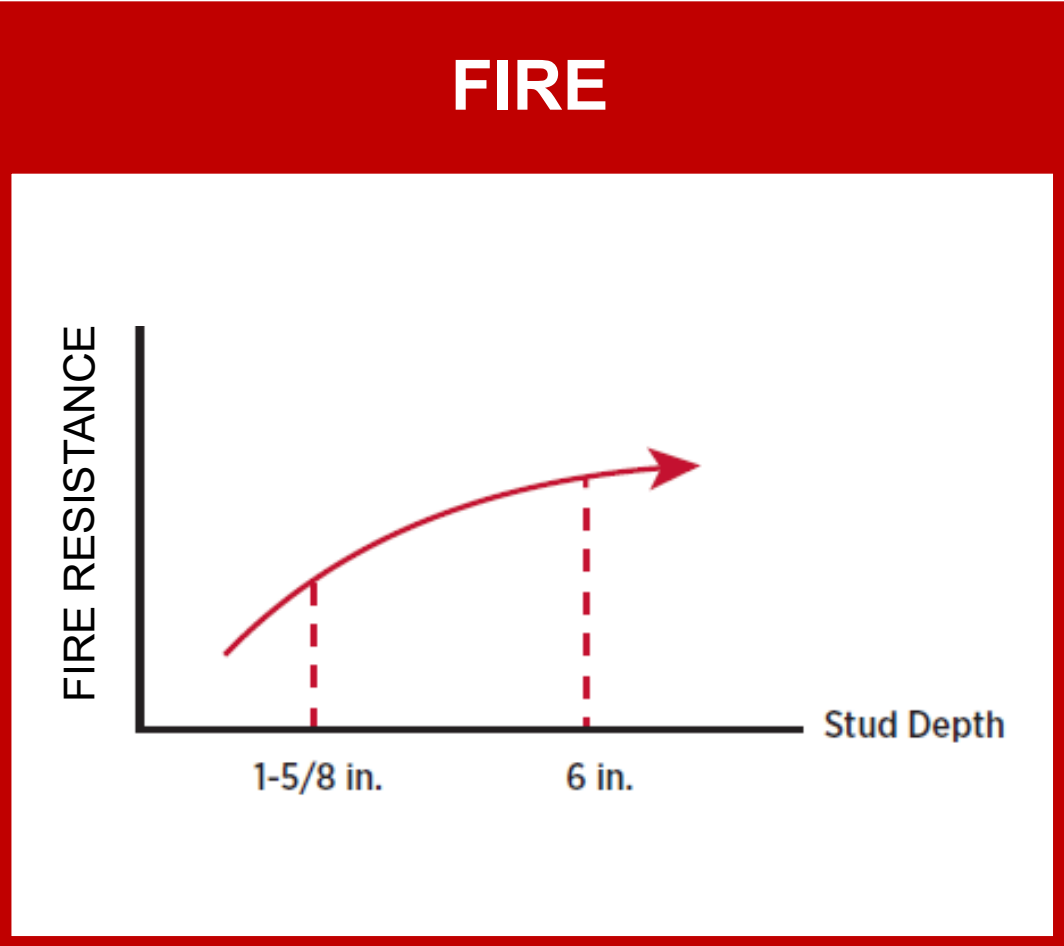
# Influencing Factors Dos & Don'ts





# Influencing Factors

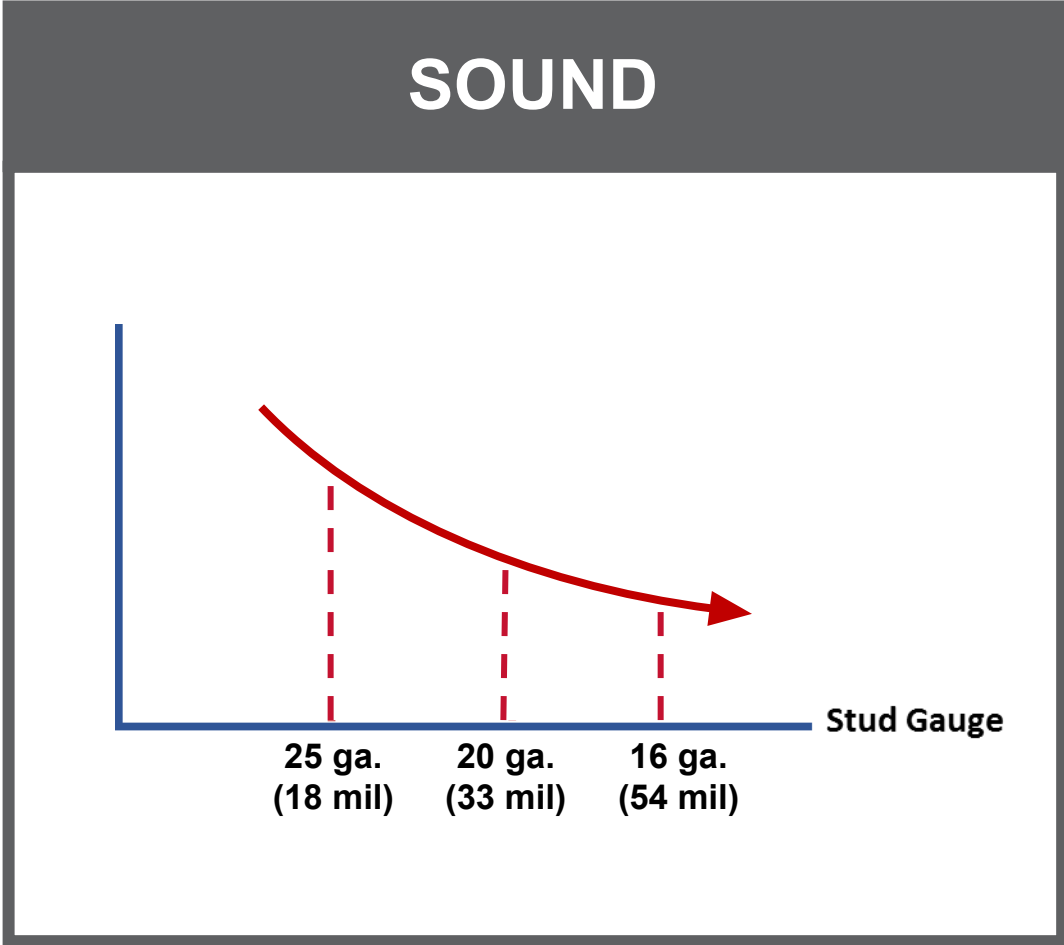
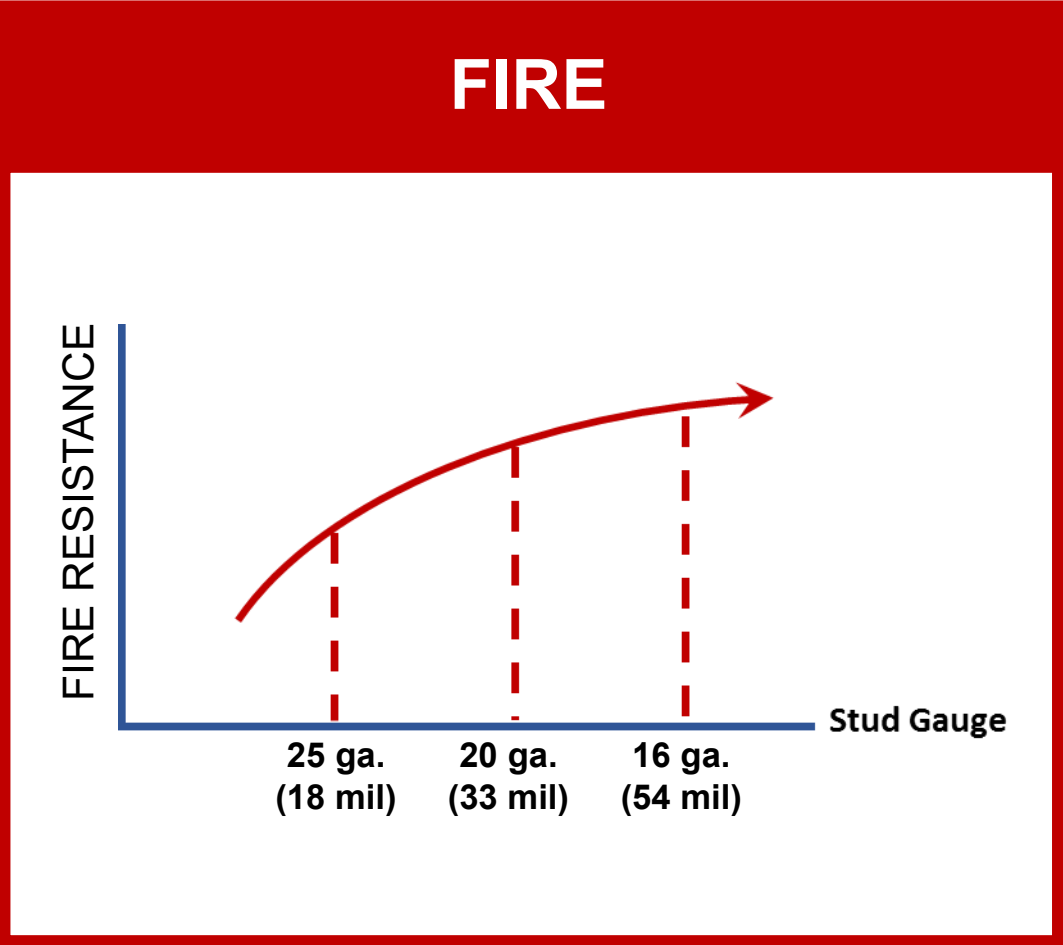
## FRAMING MEMBER DEPTH





# Influencing Factors

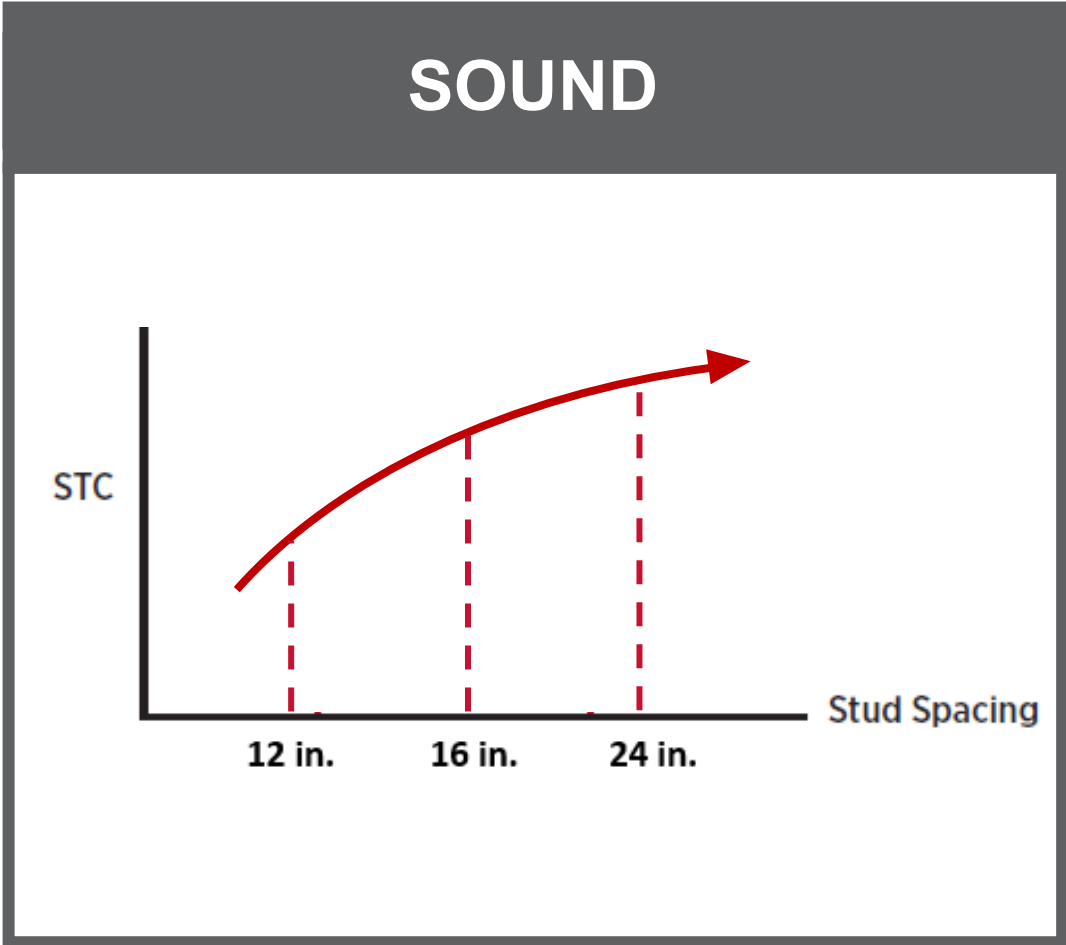
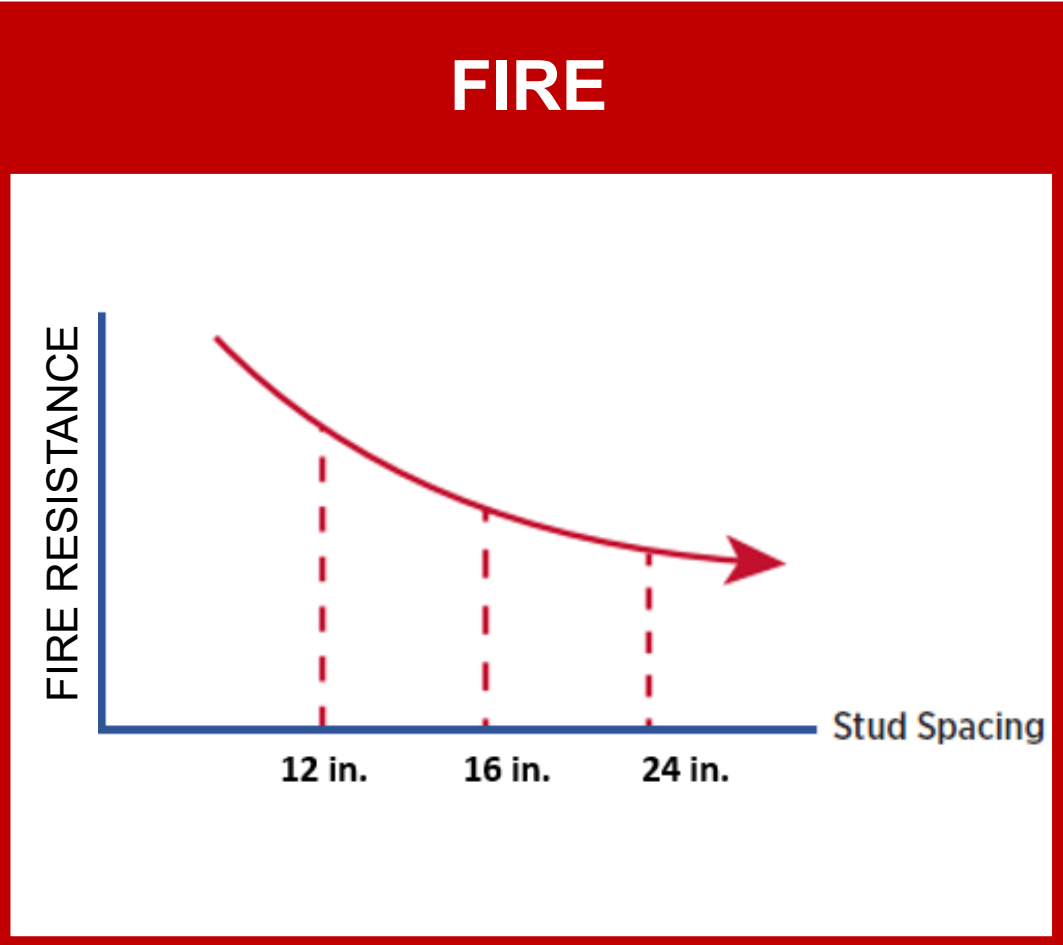
## FRAMING MATERIAL THICKNESS





# Influencing Factors

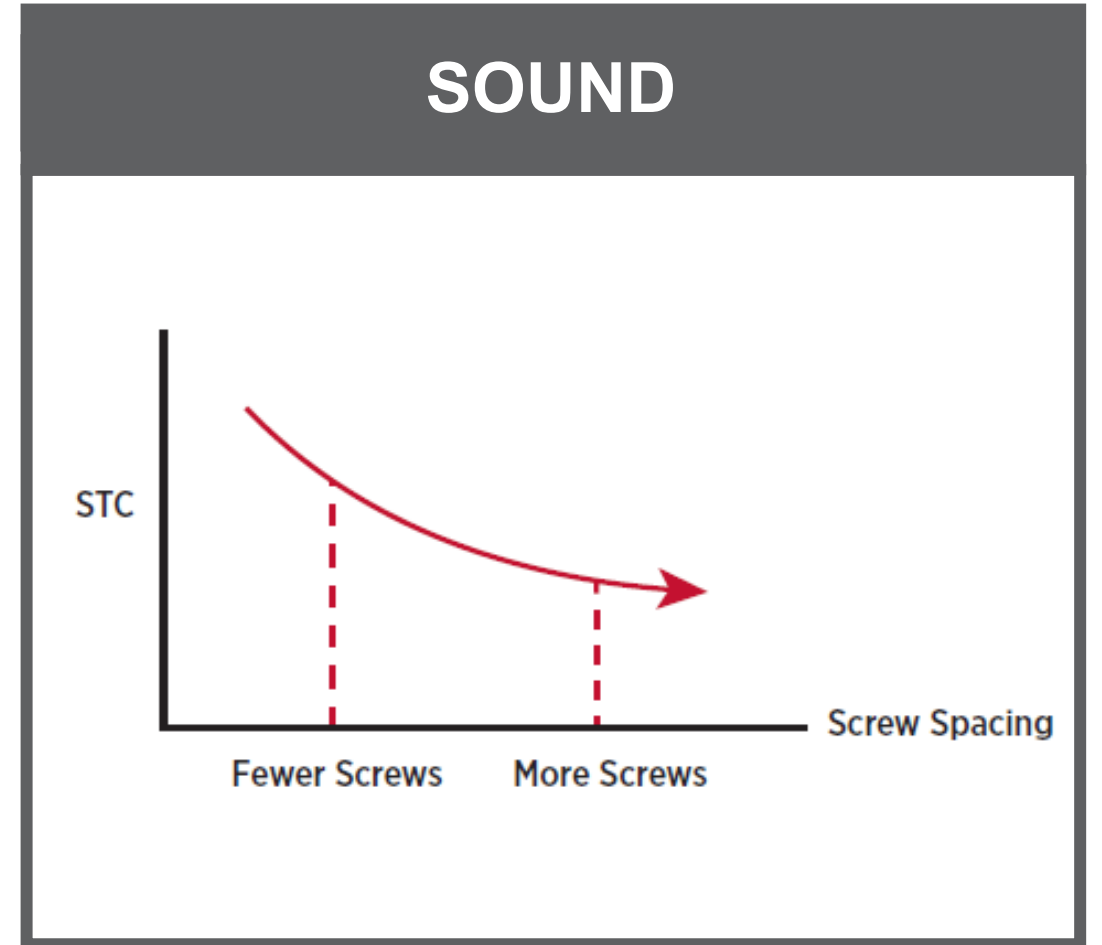
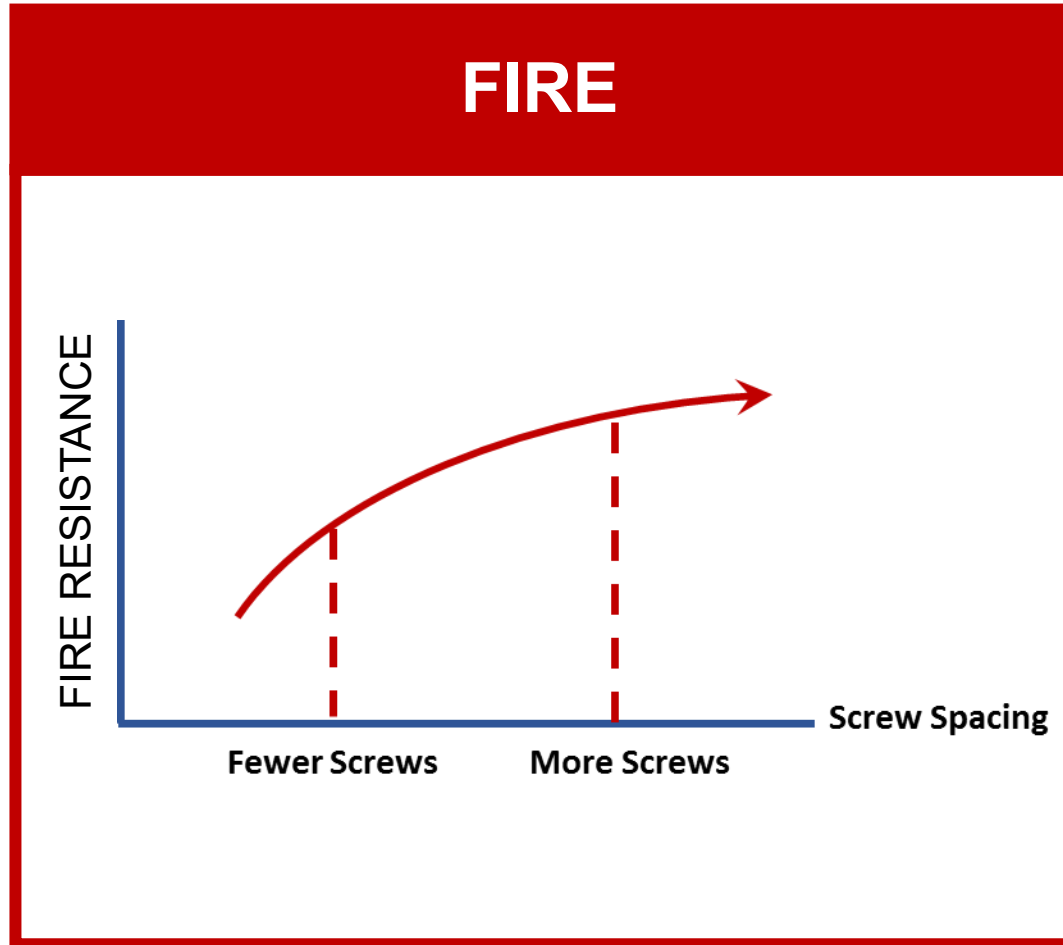
## FRAMING SPACING





# Influencing Factors

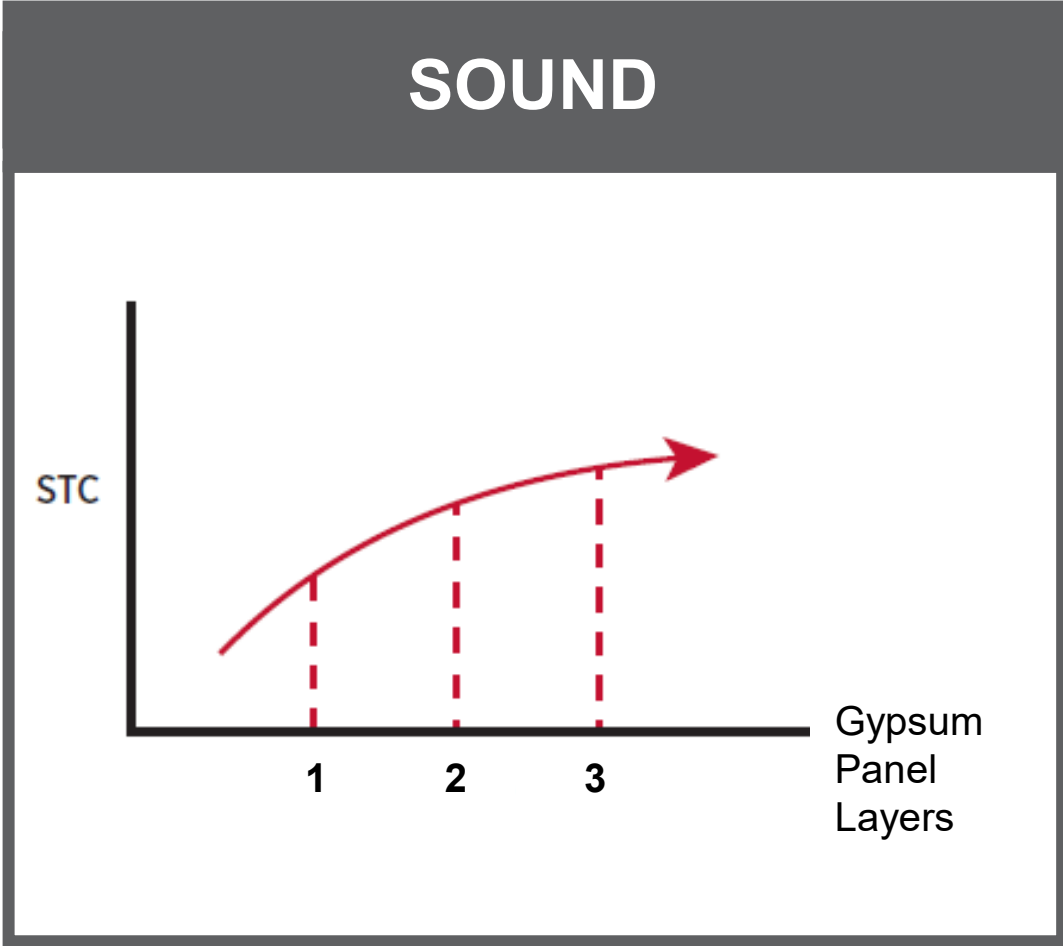
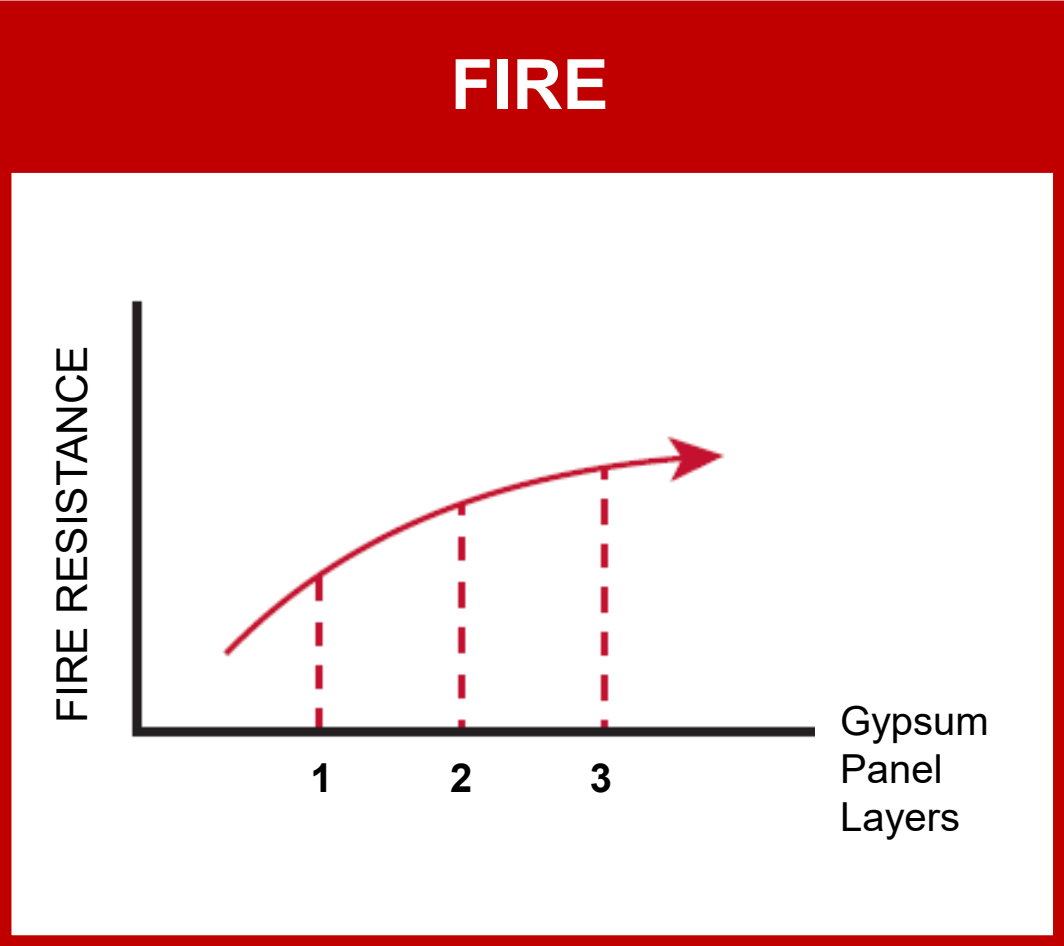
## SCREW SPACING





# Influencing Factors

## GYPSUM PANEL LAYERS





## Dos & Don'ts

### DO

- Add layers of gypsum
- Add fibrous insulation to walls
- Add resilient channels to walls
- Add materials on top of the flooring system
- Add sheathing (e.g. plywood) within walls



### DON'T

- Don't "sandwich" resilient channels between panel layers (exceptions for fire resistance)
- Don't add insulation to floor- and roof-ceilings without consulting published design
- Don't add spray foam insulation to walls or ceilings without consulting published design
- Don't construct steel stud chase walls with a common runner



# Q&A





**Approved  
Continuing  
Education**

**This concludes The American Institute of  
Architects Continuing Education Systems Course**

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**[WWW.STEELFRAMING.ORG](http://WWW.STEELFRAMING.ORG)**