



MIKE CAUSEY, INSURANCE COMMISSIONER & STATE FIRE MARSHAL
BRIAN TAYLOR, CHIEF STATE FIRE MARSHAL

October 18, 2021

Timothy Wewer
GMD Design Group Carolinas, Inc.
102 Fountain Brook Circle
Cary, NC 27540

**RE: Air-Borne Sound Materials
2018 NCRC Appendix K, Section AK102**

Mr. Wewer:

This letter is in response to your request for formal interpretation dated September 20, 2021 that was received in NCDOI by email on September 21, 2021. Your request for formal interpretation states:

Appendix K Section AK102 Air-Borne Sound. Does this section's requirement of air-borne sound insulation for wall assemblies refer to the wall assembly itself or a specific type of insulation that must be added to the wall assembly?

If a wall assembly meets or exceeds the required STC rating of 45, does this meet the requirement of this section?

Remarks:

Code sections noted in this letter are referring to the 2018 edition of the NC Residential Code unless otherwise noted.

Attachment A is comprised of the request for formal interpretation as well as all supporting information submitted with the request.

Code Analysis:

Section R302.2.7 references Appendix K for sound transmission requirements for townhouses.

R302.2.7 Sound transmission. See Appendix K.

Wall sound transmission Sections AK102.1 and AK102.2.2 state the following:

AK102.1 General. Air-borne sound insulation for wall and floor-ceiling assemblies shall meet a sound transmission class (STC) rating of 45 when tested in accordance with ASTM E 90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined,

insulated or otherwise treated to maintain the required ratings. *Dwelling unit* entrance doors, which share a common space, shall be tight fitting to the frame and sill.

AK102.1.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E 90.

Comments: Sections AK102.1 and AK102.1.1 do not specify a particular insulation type.

Conclusions:

Sections AK102.1 and AK102.1.1 require an STC rating of 45, but Sections AK102.1 and AK102.1.1 do not specify a particular insulation type to achieve that rating.

Please call if you have comments or questions.

Sincerely,



Carl Martin, RA
Deputy Commissioner
Division Chief of Engineering

cc: File
Bridget Herring, Chair – BCC
Danny Priest, Vice-Chair – BCC
David Smith, Chairman – BCC Residential Standing Committee

ATTACHMENT A



**APPENDIX E
APPEALS
NORTH CAROLINA
BUILDING CODE COUNCIL**
325 North Salisbury Street, Room 5_44
Raleigh, North Carolina 27603
(919) 647-0095

APPEAL TO NCDOI/NCBCC Hearing Date ____ / ____ / ____
GS 153A-374, GS 160A-434 GS 143-140, GS 143-141
Formal Interpretation by NCDOI _____ Appeal of Local Decision to NCBCC _____
Appeal of Local Decision to NCDOI _____ Appeal of NCDOI Decision to NCBCC _____

APPELLANT TIMOTHY WEWER **PHONE** (919) 971 - 1061 **X** _____
REPRESENTING GMD DESIGN GROUP CAROLINAS, INC.
ADDRESS 102 FOUNTAIN BROOK CIRCLE
CITY CARY **STATE** NC **ZIP** 27540
E-MAIL TIM@GMDCAROLINAS.COM **FAX** (_____) _____ - _____

North Carolina State Building Code, Volume RESIDENTIAL - Section APPENDIX K AK102

REQUEST ONE: Formal Interpretation by NCDOI Appeal of Local Decision to NCBCC
 Appeal of Local Decision to NCDOI Appeal of NCDOI Decision to NCBCC

Type or print. Include all background information as required by the referenced General Statutes and the attached policies. Attach additional supporting information.

APPENDIX K SECTION AK102 AIR-BORNE SOUND. DOES THIS SECTION'S REQUIREMENT OF AIR-BORNE SOUND INSULATION FOR WALL ASSEMBLIES REFER TO THE WALL ASSEMBLY ITSELF OR A SPECIFIC TYPE OF INSULATION THAT MUST BE ADDED TO THE WALL ASSEMBLY. IF A WALL ASSEMBLY MEETS OR EXCEEDS THE REQUIRED STC RATING OF 45, DOES THIS MEET THE REQUIREMENT OF THIS SECTION?

ATTACHED IS CORRESPONDENCE WITH PAK KEUNG YIP, P.E. CHIEF BUILDING CODE CONSULTANT. ALSO ATTACHED IS THE DETAIL FOR THE WALL ASSEMBLY MEETING THE REQUIRED STC RATING

REASON:

Signature *Timothy Wewer* DATE: 9/20/21 APPEAL TO NCDOI/NCBCC
FORM 3/14/17



Timothy Wewer <tim@gmdcarolinas.com>

Sound transmission between townhome units

6 messages

Timothy Wewer <tim@gmdcarolinas.com>
To: "Yip, Pak" <pak.yip@ncdol.gov>

Wed, Sep 15, 2021 at 11:57 AM

Mr. Yip,

Thank you for your time on this matter. I am looking for an interpretation of Appendix K of the residential building code.

Appendix K states that "Air-borne sound insulation for wall and floor-ceiling assemblies shall meet a sound transmission class (STC) of 45"

APPENDIX K
SOUND TRANSMISSION

(The provisions contained in this appendix are adopted in part of this code.)

<p>SECTION AK101 GENERAL</p> <p>AK101.1 General. Wall and floor-ceiling assemblies separating dwelling units, including those separating adjacent townhome units, shall provide air-borne sound insulation for walls, and both air-borne and impact sound insulation for floor-ceiling assemblies.</p> <p>SECTION AK102 AIR-BORNE SOUND</p> <p>AK102.1 General. Air-borne sound insulation for wall and floor-ceiling assemblies shall meet a sound transmission class (STC) rating of 45 when tested in accordance with ASTM E90. Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, bathtubs, soffits, or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. Dwelling unit entrance doors, which share a common space, shall be tight fitting to the frame and sill.</p> <p>AK102.1.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E90.</p>	<p>SECTION AK104 REFERENCED STANDARDS</p> <p>ASTM</p> <p>ASTM E90—04 Test Method for Laboratory Measurement of Air-borne Sound Transmission Loss of Building Partitions and Elements AK102</p> <p>ASTM E492—09 Specification for Laboratory Measurement of Impact Sound Transmission through Floor-ceiling Assemblies Using the Tapping Machine AK105</p> <p>The Masonry Society</p> <p>TMS 0302—12 Standard for Determining the Sound Transmission Class Rating for Masonry Walls AK102.1.1</p>
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This section does not specify what materials are to be used to create "Air-borne sound insulation". The commentary makes the distinction between 2 methods of achieving this.



2018 International Residential Code and Commentary, Volume 1 and 2 (IRC)
First Version: Sep 2018

APPENDIX K: SOUND TRANSMISSION

AK102.1 General.

Airborne sound insulation for wall and floor-ceiling assemblies shall meet a sound transmission class (STC) rating of 45 when tested in accordance with ASTM E90. Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, bathtubs, soffits, or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. Dwelling unit entrance doors, which share a common space, shall be tight fitting to the frame and sill.

◆ The code requires common walls and floor-ceiling assemblies between dwelling units to have a minimum sound transmission. The higher the number (rating), the higher the resistance (less sound transmission). Standard architectural wall and floor-ceiling construction assemblies have been tested for sound transmission ratings, and reference to the construction specifications will yield such information. Airborne sound, such as a voice or music, is transferred through the air.

As a rule, vertical assemblies meeting the requirements of this section consist of double walls or walls containing insulation similar to exterior walls. Horizontal assemblies typically contain some type of insulating materials within the assembly or resilient furring channels to isolate the ceiling membrane from the structural members of the floor construction.

I currently have an inspector that is requiring mineral fiber batt insulation to be installed in a separation wall assembly that meets the minimum STC rating, and consists of double walls and (2) layers of shaft liner between. U336, as listed in USG's design manual, does not require batt insulation to be used.

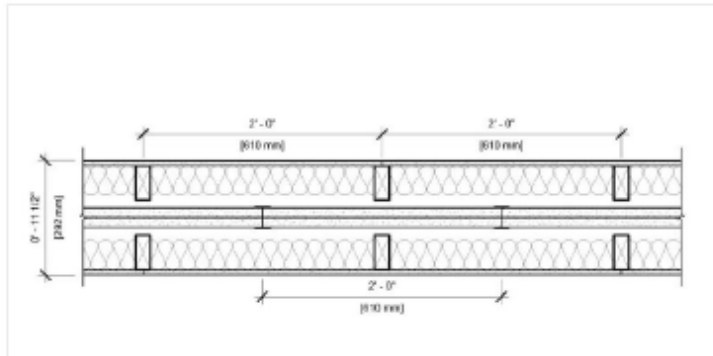
Once again, thank you for your time and help with this matter.

Tim Wewer
GMD Design Group Carolinas, Inc.
(919) 971-1061
tim@gmdcarolinas.com

Yip, Pak <pak.yip@ncdoi.gov>
To: Timothy Wewer <tim@gmdcarolinas.com>

Wed, Sep 15, 2021 at 1:40 PM

Tim,



UL U336

Area Separation Wall - Steel Stud (Non-Load-Bearing)

Fire Rating **2 hours**

System STC **60**

System Thickness **11 1/2 in.**

CAD/REVIT & ACOUSTICS

[Revit](#)

[PDF](#)

U336 Assembly required minimum 3" Glass Fiber Batt Insulation on each side of the shaft wall to achieve the system STC rating 60

<https://www.usg.com/content/usgcom/en/design-studio/assemblies/assembly-detail.30006.html>

I hope the information above is helpful to you. Please let me know if you have any questions.

Pak Keung Yip, P.E.

Chief Building Code Consultant



N.C. Department of Insurance
Office of State Fire Marshal
1202 Mail Service Center

Raleigh, NC 27699-1202

919.647.0007

From: Timothy Wewer <tim@gmdcarolinas.com>
Sent: Wednesday, September 15, 2021 11:57 AM
To: Yip, Pak <pak.yip@ncdoi.gov>
Subject: [External] Sound transmission between townhome units

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to [Report Spam](#).

Mr. Yip,

Thank you for your time on this matter. I am looking for an interpretation of Appendix K of the residential building code.

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APPENDIX K SOUND TRANSMISSION

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SECTION AK101 GENERAL

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SECTION AK102 AIR-BORNE SOUND

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AK102.1.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E90.

SECTION AK104 REFERENCED STANDARDS

ASTM	
ASTM E90—04	Test Method for Laboratory Measurement of Air-borne Sound Transmission Loss of Building Partitions and Elements AK102
ASTM E402—09	Specification for Laboratory Measurement of Impact Sound Transmission through Floor-ceiling Assemblies Using the Tapping Machine AK103
The Masonry Society	
TMS 0302—12	Standard for Determining the Sound Transmission Class Rating for Masonry Walls AK102.1.1

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2018 International Residential Code and Commentary, Volume 1 and 2
(IRC)
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APPENDIX K: SOUND TRANSMISSION

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As a rule, vertical assemblies meeting the requirements of this section consist of double walls or walls containing insulation similar to exterior walls. Horizontal assemblies typically contain some type of insulating materials within the assembly or resilient furring channels to isolate the ceiling membrane from the structural members of the floor construction.

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Once again, thank you for your time and help with this matter.

Tim Wewer
GMD Design Group Carolinas, Inc.

9/21/21, 9:49 AM
 (919) 971-1061
tim@gmdcarolinas.com

GMD Design Group Carolinas Mail - Sound transmission between townhome units



Timothy Wewer <tim@gmdcarolinas.com>
 To: "Yip, Pak" <pak.yip@ncdoi.gov>

Wed, Sep 15, 2021 at 1:47 PM

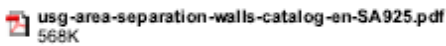
This is from the USG Area Separation Assembly brochure

2-hour Fire-rated Construction	Non-load bearing	Test Number	STC	Absorption of Performance	Reference
	<ul style="list-style-type: none"> 1" Gypsum board fire panels 2" USG H-studs 24" o.c. minimum 3/4" air space both sides separating fire panels from adjacent construction 	UL Div 1036			Sheet 1
	<ul style="list-style-type: none"> Separation wall non-load bearing 1" Gypsum board fire panels 2" USG H-studs 24" o.c. Protected wall (bearing or non-load bearing) of wood or steel studs each side min 3/4" from fire panels 1/2" Gypsum board panels 	UL Div 1036	46	<ul style="list-style-type: none"> RAI-TL-68-053 RAI-TL-68-049 Based on 2" mineral wool batt on one side RAI-TL-68-051 Based on 2x4s and 2" mineral wool batt one side RAI-TL-68-047 Based on 2x4s and 2" mineral wool batt on both sides RAI-TL-68-059 Based on 2x4s and 2" mineral wool batt on both sides 	Sheet 2

Without the insulation in the stud walls it achieves an STC of 46 which meets the minimum requirement for dwelling separation. I've attached the pdf of the document in case you wanted to see it.

Tim Wewer
 GMD Design Group Carolinas, Inc.
 (919) 971-1061
tim@gmdcarolinas.com

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Yip, Pak <pak.yip@ncdoi.gov>
 To: Timothy Wewer <tim@gmdcarolinas.com>

Wed, Sep 15, 2021 at 2:28 PM

Tim,

I agree this detail shall certify the STC rating of 46. (above 45 as required from Appendix K)

I hope the information above is helpful to you. Please let me know if you have any questions.

Pak Keung Yip, P.E.
 Chief Building Code Consultant





N.C. Department of Insurance
Office of State Fire Marshal
 1202 Mail Service Center

Raleigh, NC 27699-1202
 919.647.0007

From: Timothy Wewer <tim@gmdcarolinas.com>
Sent: Wednesday, September 15, 2021 1:48 PM
To: Yip, Pak <pak.yip@ncdoi.gov>
Subject: Re: [External] Sound transmission between townhome units

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to [Report Spam](#).

This is from the USG Area Separation Assembly brochure

3 Hour Fire rated Construction	Fire-load bearing	Acoustical Performance		References		
Construction Detail	Description	Test Number	STC	AST	Index	
	<ul style="list-style-type: none"> 1" Gypsum gypsum fire panels 2" USG H-studs 24" o.c. minimum 3/4" air space both sides separating fire panels from adjacent construction 	UL Div 1030		5000	1	
	Separation wall (non-load-bearing) <ul style="list-style-type: none"> 1" Gypsum gypsum fire panels 2" USG H-studs 24" o.c. Protective wall (bearing or non-load-bearing) of wood or steel studs each side min 3/4" from fire panels 1/2" Gypsum gypsum panels 	UL Div 1030	45	RAL-TL-66-053 RAL-TL-66-049 RAL-TL-66-051 RAL-TL-66-047 RAL-TL-66-050	5000	2

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image008.png
 4K

Timothy Wewer <tim@gmdcarolinas.com>
 To: "Yip, Pak" <pak.yip@ncdoi.gov>

Wed, Sep 15, 2021 at 4:02 PM

9/21/21, 9:49 AM

GMD Design Group Carolinas Mail - Sound transmission between townhome units

Mr. Yip,

My apologies to keep making you address this issue. I felt that your last response stated that the assembly detail I sent, that had an STC rating of 46, met the requirements of Appendix K. The inspector that I'm working with feels your response addressed the STC rating only and not the language in Appendix K that says the STC rating is to be achieved with "Air-borne sound insulation". He is interpreting "air-borne sound insulation" as 3" mineral wool batts must be in the wall assembly.

Once again, any help you can provide on this matter is greatly appreciated.

Tim Wewer
GMD Design Group Carolinas, Inc.
(919) 971-1061
tim@gmdcarolinas.com

[Quoted text hidden]

Yip, Pak <pak.yip@nodol.gov>
To: Timothy Wewer <tim@gmdcarolinas.com>

Wed, Sep 15, 2021 at 4:19 PM

Tim,

Standard architectural wall consists of double walls or walls containing insulation have been tested for sound transmission ratings (min. STC rating of 45) shall meet the sound transmission requirements.

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image009.png
4K

Fire protection for
townhouses that share
a common wall

USG

Area Separation Wall Systems



Area separation walls between adjoining townhouses must provide fire-resistive ratings to ensure the safety of occupants in adjacent dwellings. Noise attenuation is also important, to ensure that townhouse dwellers are not disturbed by sound from their neighbors.



User's Guide

This brochure explains:

- Where area separation walls are used
- The components of area separation wall systems
- How to select and specify the appropriate components of an area separation wall system

	Pages	
Understand Your System	4	Overview Applications Components Performance Testing
Select Your System	10	Design Details
Design Your System	12	Good Design Practices
Specify Your System	13	Application Guide Specifications
For More Information		Technical Service 800 USG.4YOU Websites usg.com usgdesignstudio.com

Overview

Effective fire resistance and sound attenuation are important considerations in townhouse design.

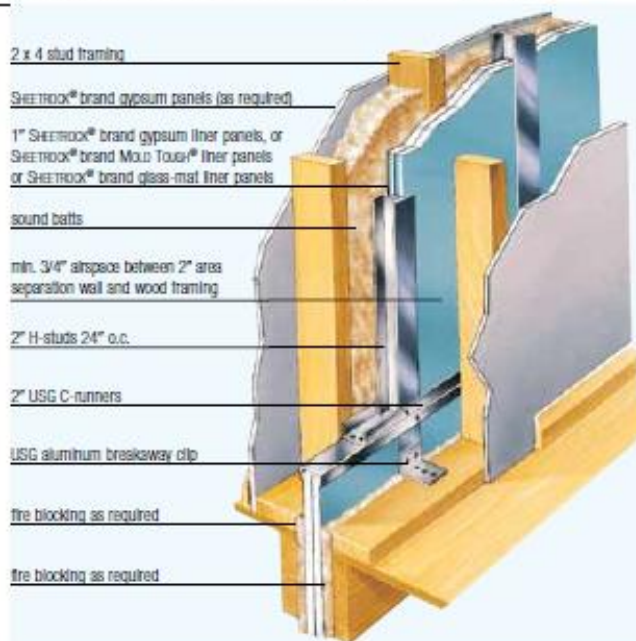
An area separation wall can be used in townhouses up to four stories (44') tall and with all common floor-ceiling heights³. It must either be continuous from the foundation to the underside of the protected roof sheathing, or continue through the roof to form a parapet.

The area separation wall is designed to allow for collapse of the construction on the fire-exposed side, without collapse of the entire wall. To do this, aluminum breakaway clips attach the separation wall to the adjacent framing. When one side of the separation wall is exposed to fire, the clips are designed to soften and break away. This allows the structure on the fire side of the separation wall to collapse, while the clips on the unexposed side of the separation wall continue to support the separation wall. The area separation wall remains intact, protecting the adjacent townhouse.

Note

(a) System has been fire tested up to 60'. Please consult your USG representative for information.

**Typical Area
Separation Wall
Assembly**



Applications

USG area separation wall systems are lightweight, non-load-bearing gypsum panel partition assemblies used to provide fire-resistive protection for common walls in townhouse construction.

These systems install quickly and easily. Because they weigh at least 50% less than masonry walls, installation proceeds rapidly. In addition, use of these assemblies gains valuable floor space for the building interior, because thickness is 3-1/2" compared to 8" to 12" for a masonry wall without interior finish.

Components

USG area separation wall systems have been comprehensively tested for fire resistance ratings only when all of the system components are used together. Substitutions of any of the components are not recommended and are not supported by USG. Refer to the appropriate product material safety data sheet for complete health and safety information.

Gypsum Liner Panels

SHEETROCK® Brand Gypsum Liner Panels

- Noncombustible core encased in water-resistant 100% recycled green face and back paper
- UL/ULC Classified for fire resistance (type SLX)
- Panels are 1" thick and 24" wide with beveled edges and are available in 8'-12' lengths
- Refer to product submittal sheet WB2278 for complete information

SHEETROCK® BRAND MOLD TOUGH® Gypsum Liner Panels

- Noncombustible core encased in a moisture- and mold-resistant, 100% recycled blue face and back paper
- UL/ULC Classified for fire resistance (type SLX)
- Panels are 1" thick and 24" wide with beveled edges and are available in 8'-12' lengths
- Refer to product submittal sheet WB2313 for complete information

SHEETROCK® Brand Glass-Mat Liner Panels

- Noncombustible core encased in moisture- and mold-resistant green glass-mat
- Direct substitute for SHEETROCK gypsum liner panels or SHEETROCK MOLD TOUGH liner panels where prolonged weather exposure is anticipated
- UL/ULC Classified for fire resistance (type SLX)
- Panels are 1" thick and 24" wide with beveled edges and are available in 8'-12' lengths
- Refer to product submittal sheet WB2483 for complete information

Metal Framing Components

USG® Steel C-Runner, USG Steel H-Stud

- Galvanized steel (G40) per ASTM A1003

USG Aluminum Breakaway Clip

- Performs as a breakaway fuse by melting or yielding from the rise in temperature on the fire side of the wall
- Allows the fire-engulfed structure to collapse independent of the area separation wall

Related Products

SHEETROCK® Acoustical Sealant

- Highly elastic, water-based sealant
- Refer to product submittal sheet J678 for complete information

SHEETROCK® All Purpose Joint Compound

- Versatile performer: tape, finish, texture, laminate or skim coat
- Combines single-package, ready-mixed convenience with good taping and topping performance
- Refer to product submittal sheet J60A for complete information

Performance Testing

USG area separation wall systems have been independently tested to meet performance requirements for fire resistance, structural performance and sound control.

Performance Tests

Extensive testing and continuous improvements ensure that USG area separation wall systems will provide the vertical fire resistance and sound performance that projects demand.

Testing Methods

USG area separation wall systems have been tested to ensure long-term performance. All USG products and systems undergo exhaustive testing to ensure that they meet exacting standards. USG products are Classified as to fire resistance and fire-hazard properties. As part of this protocol, Underwriters Laboratories Inc. (UL) periodically audits production of these materials to ensure compliance with necessary properties. UL is an independent, not-for-profit product safety testing and certification organization that has tested products for public safety for over a century.

Products and systems are tested in accordance with ASTM standards. ASTM International is one of the largest voluntary standards development organizations in the world, and it is a trusted source for technical standards for materials, products, systems and services. Sound Transmission Class (STC) rates the effectiveness of walls and other components at blocking airborne sound.

Testing Results

Fire Protection

In the event of a fire, area separation walls must ensure that fire does not spread from one townhouse to the next. Building codes mandate that area separation walls are fire tested according to specific test standards, such as ASTM E119, "Standard Test Method for Fire Tests of Building Construction and Materials," or its equivalent.

Fire resistance testing ensures that this critical performance component will not be compromised when the system is properly installed. Fire testing results in the following:

- UL Classification of all gypsum panel components for fire resistance
- UL listing of system fire resistance for 2 hours

Sound Control

Sound control test data demonstrate the effectiveness of USG area separation wall systems in attenuating sound. This means that occupants of adjacent buildings will have more privacy. STC ratings up to 60 are available.

Moisture/Mold

The best way to minimize damage from moisture and mold is to minimize or eliminate exposure to water before, during and after construction. In all cases where moisture intrusion occurs, eliminate all sources of moisture immediately.

SHEETROCK MOLD TOUGH gypsum liner panels have a noncombustible, moisture- and mold-resistant core encased in a moisture- and mold-resistant, 100% recycled blue face and black paper. SHEETROCK glass-mat liner panels have a noncombustible, moisture- and mold-resistant gypsum core that is encased in a moisture- and mold-resistant glass-mat. When used in conjunction with good construction practices, these products will minimize, but not eliminate, the risk of moisture and mold damage.

For more information on moisture and mold control, visit the following websites:

New York City Department of Health
ci.nyc.ny.us/html/doh
Search for mold resources.

United States Environmental Protection Agency
epa.gov
Search for mold resources.

Responsible Solutions to Mold Coalition
responsiblemoldsolutions.org



Performance Testing

Sustainability

The LEED® (Leadership in Energy and Environmental Design) program is a guideline for building solutions established by the U.S. Green Building Council (USGBC).

LEED's mission is to transform the building industry by establishing a common standard of measurement to define what constitutes a "green building." To this end, LEED provides a framework for assessing building performance and meeting sustainability goals. This framework assigns points for certain sustainability criteria, such as sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Specific products cannot be LEED-certified, because there are many contingent factors in each project that must be considered. However, certain products may assist you in obtaining LEED points for your design solution. For example:

USGBC LEED Credits	MR 2
Construction Waste Management	2.1 Divert 50% of project waste (by weight) from landfill (1 point)
	2.2 Divert another 25% of project waste (by weight) from landfill (1 point)
Recycled Content	MR 4
	4.1 10% of building materials must be recycled material, based on the cost of the total value of the materials in the project (1 point)
	4.2 Another point is awarded for an additional 10% of recycled material (1 point)
Local/Regional Materials	MR 5
	5.1 If 10% of project materials are manufactured within 500 miles (1 point)
	5.2 If 20% of project materials are manufactured within 500 miles (1 point)

Using products with a high recycled content is only one part of the equation. Another key measure of sustainability is embodied energy, which assesses the total energy required to produce a particular material or building component and get it to a building site. For example, if you use a product with a high recycled content but need to ship it across the country, the embodied energy costs of transportation may outweigh any environmental advantages of using a recycled product. It may be more environmentally sound to ship products made of virgin material from a plant close to a job site.

To generate a customized report, visit the USG Design Studio LEED Report Tool, at usgdesignstudio.com.

For more information about the sustainability of USG products, visit the [EcoBlueprint section on usg.com](#).


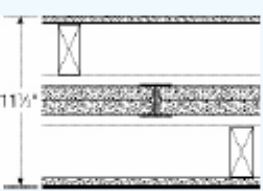
For more information on USGBC and LEED, visit the following websites:

U.S. Green Building Council
usgbc.org

Leadership in Energy & Environmental Design
usgbc.org/leed/leed_main.asp

Performance Selector

All details, specifications and data contained in this literature are intended as a general guide. These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

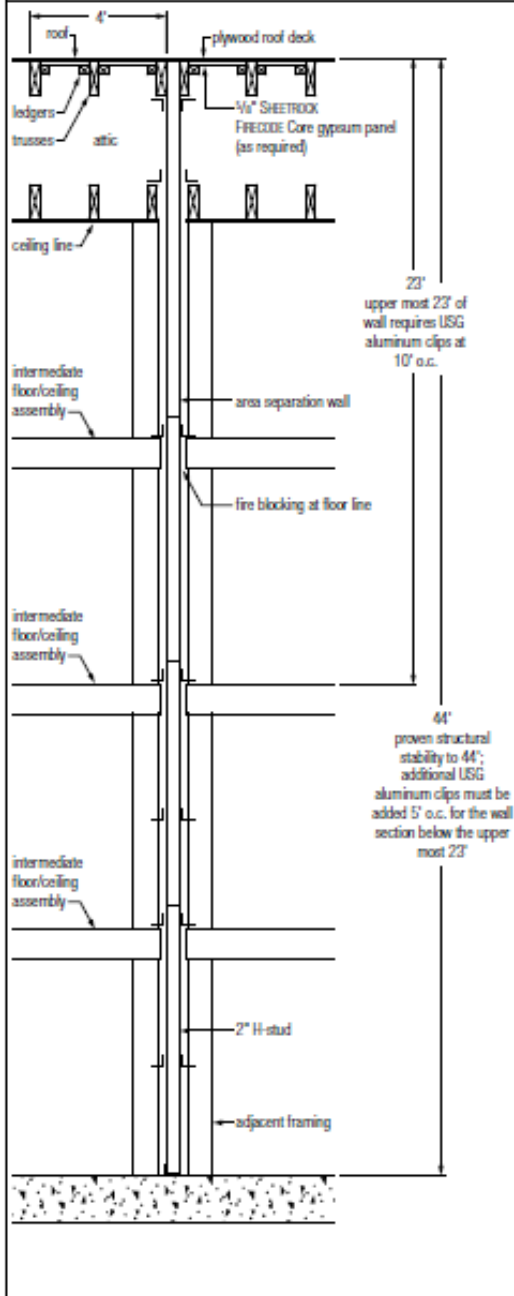
2-Hour Fire-rated Construction		Non-load-bearing	Acoustical Performance		Reference	
Construction Detail	Description	Test Number	STC		ARL	Index
 <p>3/4"</p>	<ul style="list-style-type: none"> 1" SHEETROCK gypsum liner panels 2" USG H-studs 24" o.c. – minimum 3/4" air space both sides separating liner panels from adjacent construction 	UL Des U336			SAB25	1
 <p>1 1/2"</p>	<p>Separation wall (non-load-bearing)</p> <ul style="list-style-type: none"> 1" SHEETROCK gypsum liner panels 2" USG H-studs 24" o.c. <p>Protected wall (bearing or non-load-bearing) of wood or steel studs each side min 3/4" from liner panels</p> <ul style="list-style-type: none"> 1/2" SHEETROCK gypsum panels 	UL Des U336	46	RAI-TL-88-353	SAB25	2
			54	RAI-TL-88-348 Based on 2" mineral wool batt on one side		
			57	RAI-TL-88-351 Based on 2x4s and 3" mineral wool batt one side		
			58	RAI-TL-88-347 Based on 2x4s and 2" mineral wool batt on both sides		
			60	RAI-TL-88-350 Based on 2x4s and 3" mineral wool batt on both sides		

Design Details

Basic Interfaces

<p>Intersection at Roof</p>	<p>Exterior Wall Intersection (as required)</p>
<p>Intermediate Floor</p>	<p>Foundation</p>
<p>Runner Installation</p>	<p>Components</p>

Clip Spacing Requirements



Notes
 As allowed by code, 5/8" Sheetrock Firecode Core gypsum panels may be used as underlayment to roof sheathing with panels extending 4" on both sides of area separation wall and possibly roof side at rafter end. Clip placement on page 10 is for typical construction. System has been fire tested up to 60'. Please consult your USG representative for information.

Good Design Practices

Use this section as a reference if questions arise during the design or application of USG area separation wall systems.

This section is an overview of good design, application, installation and safety considerations that should be addressed when USG products and systems are used. This section outlines some major issues, but is not intended to be a comprehensive review.

We recommend that architects and contractors seek the assistance of safety professionals, especially at the professional construction site, because there are many factors to consider that are not included here. For safety and material handling information, please refer to Chapter 13 of *The Gypsum Construction Handbook*.

1	System Performance	USG conducts tests on products and systems to meet performance requirements of established test procedures specified by various agencies. Upon written request we will provide test certification for published fire, sound, structural and other pertinent data covering systems designed and constructed according to our published specifications. Substitutions of any of the components are not recommended and are not supported by USG.
2	Liner Panel Substitution	Note that in partitions indicating the use of SHEETROCK gypsum liner panels, it is permissible to substitute SHEETROCK MOLD TOUGH liner panels or SHEETROCK glass-mat liner panels without compromising the fire rating.
3	Sound Control Construction	For maximum sound control with wall systems, seal the entire perimeter and between the horizontal, back-to-back C-runners at the intermediate levels with a minimum 1/4" bead of SHEETROCK acoustical sealant.
4	Limitations	For use as a common 2-hour fire-resistance-rated wall separating townhouses. Not to be used for shear walls.
5	Additional Information	See SA100, <i>Fire-Resistant Assemblies</i> , for fire- and sound-rated systems; SA200, <i>Acoustical Assemblies</i> , for sound-rated systems; and SA934, <i>Moisture-Resistant Assemblies</i> , for information on moisture resistance.

Application Guide

Specifications

This guide specification is provided to assist you in specification of USG area separation wall systems. If you have additional questions or would like more information regarding this or other USG products and systems, please contact USG at 800.USG.4YOU.

Part 1: General

1.1 Scope	Specify to meet project requirements.
1.2 Qualifications	<p>A. All materials, unless otherwise indicated, shall be manufactured by USG, and shall be installed in accordance with its current printed directions.</p> <p>B. System must be built in accordance with applicable model code research reports.</p>
1.3 Delivery and Storage of Materials	<p>All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Installed panels should be protected from the environment and dry before enclosing the wall.</p> <p>Warning: Store all SHEETROCK gypsum panels flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized. Use caution not to exceed floor limits or cause tripping hazards.</p>
1.4 Environmental Conditions	<p>In cold weather during gypsum panel joint finishing, temperature within the building shall be maintained within the range of 55 to 70° F (13 to 21° C). Adequate ventilation shall be provided to carry off excess moisture. Storage and installation of products must be protected at all times from adverse environmental conditions and elements.</p>

Part 2: Products

2.1 Materials	<p>A. 1" SHEETROCK gypsum liner panels (MOLD TOUGH and glass-mat), 24"-wide, beveled-edge lengths as required.</p> <p>B. USG Steel H-studs (200HS25), galvanized, lengths as required.</p> <p>C. USG Steel C-runners (200CR25) galvanized, x 10' length.</p> <p>D. USG aluminum angle clip—2" x 2-1/2" x 0.063" aluminum breakaway clips.</p> <p>E. Joint treatment—Select a USG joint system.</p> <p>F. Fasteners—Screws (1-1/4" Type W) (1-1/4" Type S) (3/8" Type S, pan head).</p> <p>G. Sound batts 1", 1-1/2", 2" or 3" x 16" or 24" x 48".</p> <p>H. SHEETROCK acoustical sealant.</p>
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Part 3: Execution

3.1 Solid Wall

A. Foundation

Position 2" C-runner and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Space adjacent runner sections 1/4" apart. Caulk under runner at foundation with a minimum of 1/4" bead of acoustical sealant.

B. First Floor

Install H-studs and liner panels to a convenient height (max. 2') above the floor line. Install two thicknesses of 1" liner panels vertically in C-runner with long edges in H-stud. Install H-studs and liner panels alternately until wall is completed. Cap top of panels with horizontal C-runner. Fasten C-runner flanges at all corners both sides with 3/8" Type S screws.

C. Intermediate Floors and Bottom of Trusses

Cap top of liner panels and H-studs with C-runner. Attach C-runner for next row of panels to the C-runner below with end joints staggered at least 12". Fasten the C-runners together with double 3/8" screws at ends and 24" o.c. Attach all H-studs and vertical C-runners to adjacent framing with aluminum breakaway clips. Clips attaching H-studs and vertical C-runners to adjacent framing on both sides require attachment to the H-stud and C-runner with one 3/8" Type S screw. Clips attaching H-studs and vertical C-runners to adjacent framing on only one side and with exterior exposure on the other side require attachment to the H-stud and C-runner with two 3/8" Type S screws. Attachment to the adjacent framing is with one 1-1/4" Type W or Type S screw. Locate horizontal C-runner joint within 2' of the intermediate floor. Install fire blocking between the solid wall system and adjacent framing at floor lines, bottom of truss line, and any other locations required by the applicable code.

D. Roof

Continue installing H-studs and liner panels for succeeding stories as described. Cut the liner panels and H-studs to roof pitch and length as necessary to follow the roof pitch. At roof, cap liner panels and H-studs with C-runner. Attach all H-studs to adjacent framing with aluminum breakaway clips. Clips attaching H-studs and vertical C-runners to adjacent framing on only one side and with exterior exposure on the other side require attachment to each vertical framing member with two 3/8" Type S screws.

3.2 Exterior Wall

USG area separation wall systems are suitable for exterior walls with an appropriate weather barrier installed over the system and under an exterior cladding. Exterior exposure is limited to 15 psf wind load and requires vertical clip spacing of 4' o.c. maximum. Exterior exposure requires attachment of the aluminum breakaway clips to each vertical steel framing member with two 3/8" Type S screws. Attachment of the clips to adjacent framing is with one 1-1/4" Type W or Type S screw. Uppermost clips should be placed as close to the roof line as practical attachment allows.

About the cover:

Project

Townhomes at Meridian Square

Indianapolis, IN

Design and Construction

Ryland Homes

Photographer

©Albert Vecerka/Esto



Technical Service

800 USG.4YOU

Websites

usg.com
usgdesignstudio.com

Samples/Literature

888 874.2450

Samples/Literature E-mail

samplit@usg.com

Samples/Literature Fax

888 874.2348

Customer Service

800 950.3839

Product Information

See usg.com for the most up-to-date product information.

Metric Specifications

USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA100, *Fire-Resistant Assemblies*, for additional information and a Table of Metric Equivalents.

Trademarks

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We shall not be liable for incidental and consequential damages, directly or indirectly sustained nor for any loss

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Note

All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Safety First!

Follow good safety and industrial hygiene practices during handling and installation of all products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.



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