

Partition	Stud Size	Fire Rating	UL	STC Rating	STC Test	Partition Thickness
CA 9-1	3-5/8″	1 hr	UL U419	STC 52	RAL-TL08-184	4-15/16"
CA 9-2	6"	1hr	UL U419	STC 56	INSUL v9.0.8	7-3/8″

RIVERBANK ACOUSTICAL LABORATORIES

1512 S. BATAVIA AVENUE GENEVA, ILLINOIS 60134 Alion Science and Technology

630/232-0104 FOUNDED 1918 BY WALLACE CLEMENT SABINE

TEST REPORT

FOR: Commercial Acoustics

Sound Transmission Loss Test

Tampa, FL

RALTM-TL08-184

ON: Steel Stud R-13 Insulated Wall at 16 Inch on Center

with Wall Blokker One Side and 5/8 Inch Thick

Gypsum Both Sides

<u>Page 1 of 4</u>

CONDUCTED: 2 July 2008

TEST METHOD

Unless otherwise designated, the measurements reported below were made with all facilities and procedures in explicit conformity with the ASTM Designations E90-04 and E413-04, as well as other pertinent standards. Riverbank Acoustical Laboratories has been accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) for this test procedure (NVLAP Lab Code: 100227-0). A description of the measuring technique is available separately.

DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the client as a steel stud R-13 insulated wall at 16 inch on center with Wall Blokker one side and 5/8 inch thick gypsum both sides. The overall dimensions of the specimen as measured were nominally 4.27 m (168 in.) wide by 2.74 m (108 in.) high and 127 mm (5 in.) thick. The specimen was installed by the client directly into the laboratory's 2.74 m (9 ft) by 4.27 m (14 ft) wood-lined steel frame and was sealed on the periphery (both sides) with dense mastic.

The description of the specimen was as follows: The wall consisted of 92 mm (3.625 in.) 25 gauge steel studs with fiberglass insulation in the cavities. One side of the wall was covered with a layer of Wall Blokker and 5/8" Type X gypsum board and the other side with a layer of 5/8" Type X gypsum board. A more detailed description of the wall assembly appears in the sections below.

<u>Floor and Ceiling Runners:</u> The two 92 mm (3.625 in.) wide 25 gauge 4.26 m (168 in.) long steel runners were attached to floor and ceiling with 41 mm (1.625 in.) Type S bugle head drywall screws 610 mm (24 in.) on centers.

Studs: The twelve 92 mm (3.625 in.) wide 25 gauge 2.73 m (107.5 in.) long steel studs were spaced on 406 mm (16 in.) centers. The runners and the end studs were attached to the frame with 41 mm (1-5/8 in.) long bugle head drywall screws spaced on 610 mm (24 in.) centers. The studs were attached to the top and bottom runners on both sides with 13 mm (0.5 in.) long S-12 pan head screws.

This report shall not be reproduced except in full, without the written approval of RAL.

THE RESULTS REPORTED ABOVE APPLY ONLY TO THE SPECIFIC SAMPLE SUBMITTED FOR MEASUREMENT. NO RESPONSIBILITY IS ASSUMED FOR PERFORMANCE OF ANY OTHER SPECIMEN.



RIVERBANK ACOUSTICAL LABORATORIES

1512 S. BATAVIA AVENUE GENEVA, ILLINOIS 60134 Alion Science and Technology

630/232-0104 FOUNDED 1918 BY WALLACE CLEMENT SABINE

TEST REPORT

Commercial Acoustics

RALTM-TL08-184

2 July 2008

Page 2 of 4

<u>Insulation:</u> The twelve cavities formed by the runners and studs were lined with unfaced R-13 fiberglass insulation measuring 89 mm (3.5 in.) thick and 406 mm (16 in.) wide. The total weight of the insulation was 12.2 kg (27 lbs.).

Mass Loaded Barrier, Sealant and Tape: On the source side of the wall, a layer of 3.2 mm (0.125 in.) thick Wall Blokker, a 1 pound per square foot loaded barrier, was applied horizontally across the studs and attached using 12.7 mm (0.5 in.) long #8 self tapping screws at 305 mm (12 in.) on center. The barrier was installed with a 50 mm (2 in.) horizontal overlap and caulked with a nominal 6.4 mm (0.25 in.) diameter bead of acoustical sealant at the center of the horizontal joint and covered with foil tape. Total weight of the barrier as measured was 53.5 kg (118 lbs.).

Gypsum Wallboard: A single layer of 16 mm (5/8 in.) Type X gypsum board was applied to studs vertically on both sides of the wall. They were attached to the studs with 32 mm (1.25 in.) long Type S bugle head drywall screws at 406 mm (16 in.) on centers. The source side gypsum attached to the studs through the barrier. Acoustical sealant was applied to the test frame perimeter prior to installation of the gypsum board. Joints were sealed with acoustical caulk and metal tape. Screw heads remained exposed.

The weight of the specimen as measured was 351 kg (774 lbs.), an average of 30 kg/m² (6.1 lbs/ft²). The transmission area used in the calculations was 11.7 m² (126 ft²). The source and receiving room temperatures at the time of the test were 24±1°C (76±1°F) and 53% relative humidity. The source and receive reverberation room volumes were 178 m³ (6,298 ft³) and 177 m³ (6,255 ft³), respectively.

NVLAP Lab Code 100227-0

RIVERBANK ACOUSTICAL LABORATORIES

1512 S. BATAVIA AVENUE GENEVA, ILLINOIS 60134 Alion Science and Technology

630/232-0104 FOUNDED 1918 BY WALLACE CLEMENT SABINE

TEST REPORT

Commercial Acoustics

RALTM-TL08-184

2 July 2008

Page 3 of 4

TEST RESULTS

Sound transmission loss values are tabulated at the eighteen standard frequencies. A graphic presentation of the data and additional information appear on the following pages. The precision of the TL test data is within the limits set by the ASTM Standard E90-04.

FREQ.	<u>T.L.</u>	<u>C.L.</u>	DEF.		FREQ.	<u>T.L.</u>	<u>C.L.</u>	DEF.
				-				
100	18	0.72			800	58	0.16	
125	28	0.43	8		1000	60	0.18	
160	34	0.44	5		1250	61	0.15	
200	38	0.36	4		1600	62	0.11	
250	42	0.35	3		2000	58	0.07	
315	51	0.20			2500	55	0.08	. 1
400		0.00						
400	53	0.29			3150	58	0.06	
500	55	0.17			4000	61	0.04	
630	57	0.19			5000	63	0.06	

STC=52

ABBREVIATION INDEX

FREQ. = FREQUENCY, HERTZ, (cps)

T.L. = TRANSMISSION LOSS, dB

C.L. = UNCERTAINTY IN dB, FOR A 95% CONFIDENCE LIMIT

DEF. = DEFICIENCIES, dB<STC CONTOUR (SUM OF DEF = 21)

STC = SOUND TRANSMISSION CLASS

Tested by

Marc Sciaky

Experimentalist

Approved by

David L. Moyea

Laboratory Manager

This report shall not be reproduced except in full, without the written approval of RAL.

THE RESULTS REPORTED ABOVE APPLY ONLY TO THE SPECIFIC SAMPLE SUBMITTED FOR MEASUREMENT. NO RESPONSIBILITY IS ASSUMED FOR PERFORMANCE OF ANY OTHER SPECIMEN.



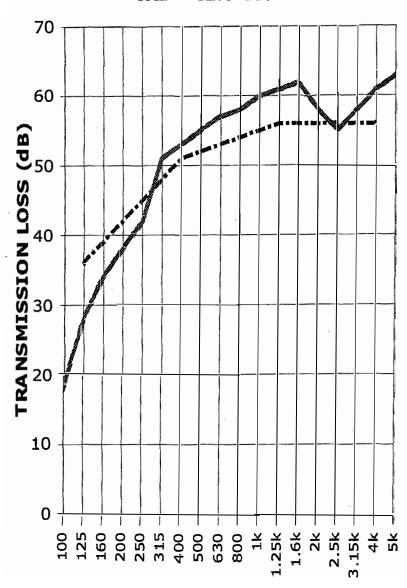
1512 S. BATAVIA AVENUE GENEVA, ILLINOIS 60134 Alion Science and Technology

630/232-0104 FOUNDED 1918 BY WALLACE CLEMENT SABINE

TEST REPORT

SOUND TRANSMISSION REPORT RAL - TL08-184

PAGE 4 OF 4



FREQUENCY (Hz)

STC = 52

TRANSMISSION LOSS
SOUND TRANSMISSION LOSS CONTOUR

This report shall not be reproduced except in full, without the written approval of RAL.

THE RESULTS REPORTED ABOVE APPLY ONLY TO THE SPECIFIC SAMPLE SUBMITTED FOR MEASUREMENT. NO RESPONSIBILITY IS ASSUMED FOR PERFORMANCE OF ANY OTHER SPECIMEN.



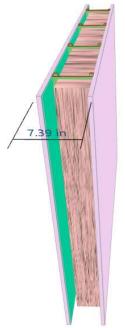
Sound Insulation Prediction (v9.0.8)

Program copyright Marshall Day Acoustics 2017 margin of error is generally within STC +/- 3 dB

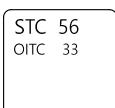
- Key No. 4851 Job Name:

Job No.: Date.:9/26/2018 Initials:Marcel

Date.:9/26/20 File Name:







(((INSUL

Mass-air-mass resonant frequency = =49 Hz Panel Size = 8.9 ft x 13.1 ft Partition surface mass = 6.91 lb/ft2

System description

Panel 1 : 1 x 0.63 in Type X Gypsum Board

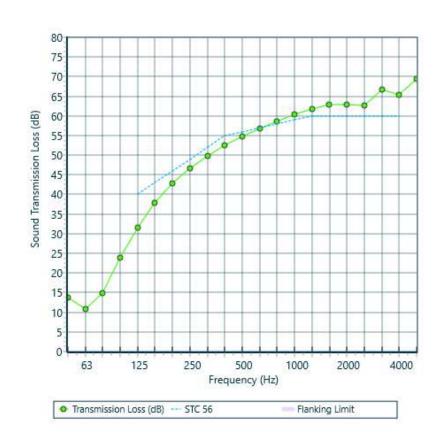
+ 1 x 0.13 in Wall Blokker

Frame: Steel Stud (25g); Cavity Width 6 in ,Stud spacing 16 in, 1 x fiberglass (1.4 lb/ft3) Thickness 5.5 in Panel 2 $+ 1 \times 0.63$ in Type X Gypsum Board

Taner 2 + TX 0.03 iii Type X Gypsuiii board

Floor Cover: Thickness 0.02 in

(f (1.1=)	TL(-ID)	TI (-ID)
freq.(Hz)	TL(dB)	TL(dB)
50	14	
63	11	13
80	15	
100	24	
125	32	28
160	38	
200	43	
250	47	46
315	50	
400	53	
500	55	54
630	57	
800	59	
1000	60	60
1250	62	
1600	63	
2000	63	63
2500	63	
3150	67	
4000	65	67
5000	69	



Technical Data

Wall Blokker™

Acoustical Sound Barrier

World's First Soundproofing Membrane designed specifically to increase sound attenuation across walls — Hit Higher STCs at a fraction of the Cost

Commercial Acoustics Wall Blokker is an engineered barrier for sound reduction. Wall Blokker is an EVA mass loaded barrier, which is flexible and designed for commercial, industrial and residential applications. It is used behind a finished wall to reduce noise transfer across a wide array of frequencies, improving the STC of the partition.

Unlike traditional Mass Loaded Vinyl, Wall Blokker was developed in the automotive industry to provide superior soundproofing performance with long life-cycles and without off-gassing and other degrading processes. At 1/8" thick, a single layer can provide equivalent soundproofing to multiple layers of drywall, often at a fraction of the price and schedule.

Product Specifications:

- Made with an engineered recycled Acoustical Grade Polymer.
- EVA (Ethylene Vinyl Acetate) Base does not require plasticizers
- Non PVC (no ozone depleting gasses) and no VOCs
- 3-in-1 barrier (sound, moisture and air)
- Mold and mildew resistant
- Delta-STC of 8-12 points, depending on Wall Type
- High STC performance in single and multiple layer applications
- Flexible & easy to cut and install
- Made in the USA

Product Performance:

- Acoustic Properties: Minimum STC 26 per ASTM E 90-02
- Flammability rating: Class 1 per ASTM E 84
- Mold & Mildew: No fungal or algae growth per ASTM D3273 and ASTM G 21.
- Fire Resistance: Rated for 1hr and 2 hr walls per ASTM E 119-08.

- Standard Sheet Dimensions
 - 4' by 8' sheet size
 - o 4' by 25' roll size
 - Factory Cut to Wall Length to Minimize Scrap
- Sheet Weight
 - 1/8" Thick
 - o 1 lb/ft² nominal
- Standard Tolerances
 - Width: + 0.5" 0"
 - Length: +1% 0"
 - Nominal Thickness: ±0.10"

Tested and approved for use in all wall designs of the U300, U400, and V400 series.







Installation Overview:

Installs vertically, directly to studs, beneath the drywall

capable technicians/hangers

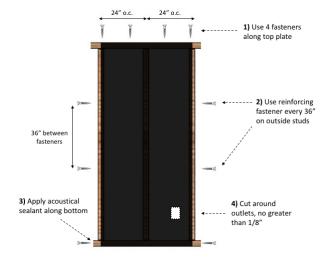
No special training required

Installation requires two or more

Frequency (Hz)	125	250	500	1000	2000	4000	STC	Test Number
Baseline Wood Studs	21	31	39	51	38	50	34	IRC-IR-693
Wall Blokker 1 side, 16" oc	17	35	42	50	47	57	41	RAL-TL08-138
Baseline Metal Studs	22	42	56	62	48	50	44	RAL-TL08-183
Wall Blokker 1 side, 16" oc	28	42	55	60	58	61	53	RAL-TL08-184
Wall Blokker 1 side, 24" oc	34	45	56	60	57	62	56	RAL-TL08-152
Wall Blokker 2 sides, 24" oc	42	53	60	64	64	70	62	RAL-TL08-155

Installation:

- 1. Ensure surface is clean and dry
- 2. Wall Blokker attaches to wood studs with staples or screws, and metal studs with pan-head screws
- Roll the Wall Blokker to the proper length of the wall, measured vertically
- 4. Start at the top of the wall, securing the Wall Blokker to the header stud with 4-5 staples or screws
- 5. Roll the membrane downward, so that each edge is directly in the middle of the adjacent stud. Do not lap edges.
- 6. Secure the membrane to the perimeter study at 36" inches, nominally
- 7. Taping of the edges is optional
 - a. Mandatory if the edge does not fall on the stud face
- 8. Use standard drywall screws when fastening drywall board to the studs through the membrane. Wall Blokker is an EVA polymer that will tighten around the screws like a gasket
- 9. If holes/tears should take place, simply place vinyl tape over the gap
- 10. At bottom and top of the wall, ensure that gaps are less than or equal to ¼". Fill in gaps with non-hardening caulk
- 11. For HVAC, plumbing, or electrical penetrations, fill gap with fiberglass batting as needed and close with caulk
- 12. For overhead placement, placement on top of drywall prior to installation is recommended
- 13. Installation should not begin until all other trades are finished in the area
- 14. It is recommended that areas to receive Wall Blokker be weather tight. Materials can be stiff and less pliable at low temperatures





Tested and approved for use in all wall designs of the U300, U400, and V400 series.









Commercial Acoustics Wall Blokker Specification

Division 09 – Finishes Section 098400 – Acoustical Components

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Wall Blokker by Commercial Acoustics soundproofing membrane.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including supplements and addendums.
- B. Applicable Specification Sections: Division 01 General and Division 09 Finishes.

1.3 REFERENCES

- A. International Building Code (IBC) 2012:
 - 1. Section 1207 Sound Transmission
- B. ASTM Tests:
 - 1. E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 2. E413 Classification for Rating Sound Insulation.
- C. ASTM Specifications:
 - 1. C840 Standard Specification for Application and Finishing of Gypsum Board.

1.4 SUBMITTALS

- A. For each product indicated:
 - 1. Product Data Sheet: manufacturer's specifications including laboratory test summary.
 - 2. Installation Instructions: detailed installation procedure including jobsite condition requirements, surface preparation requirements, and approved products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be delivered in original unopened packaging.
- B. Wall Blokker may be stored in a wet or dry environment and may be stored outdoors for up to three months on construction sites without special tarps or covering.
 - 1. If stored below freezing temperatures, material may require up to 48 hours of acclimation to regain pliability.
 - 2. Acclimate Wall Blokker for a minimum of 24 hours at temperatures 60 degrees (F) or greater to reduce material stiffness when handling.
 - 3. If material stiffens, it may be softened more rapidly using a heat gun.

1.6 PROJECT CONDITIONS

- A. Wall Blokker is typically installed after framing, insulation, and electrical are complete. Insulation should be installed in the wall cavity in addition for optimal performance.
- B. Ensure that all applicable inspections are completed prior to installation of Wall Blokker.
- C. Wall Blokker may be installed prior to "drying in" the building (prior to installation of windows and doors).
 - 1. Drywall should be installed within 2-4 weeks of Wall Blokker to prevent excessive wear.
 - a. For longer delays, washers should be installed for securely fasten the material.

2. Drywall installation permanently attaches Wall Blokker to the stud.

PART 2 - PRODUCTS

2.1 WALL BLOKKER BY COMMERCIAL ACOUSTICS

- A. Materials:
 - 1. Engineered sound reduction membrane.
 - 2. Flexible Ethylene Vinyl Acetate (EVA) product made from post-industrial recycled material.
- B. Dimensions:
 - 1. Thickness: 1/8"
 - 2. Weight: 1 lb/sq.ft.
 - 3. Standard Sizes: 4'x25' rolls; 4'x10' and 4'x8' sheets; custom length rolls available.
 - 4. Tolerances:
 - a. Width: +/- 0.5"
 - b. Length: +/- 1%
 - c. Nominal Thickness: +/- 0.10"
- C. Performance:
 - 1. Minimum STC = 25 (ASTM E90).
 - 2. UL Classified Assemblies:
 - a. 300, 400, 500 Series
 - 3. Flammability Rating:
 - a. Class 1 (ASTM E84 Rev. A)
 - b. 1-Hour fire resistance wall rating (ASTM E119)
 - c. 0.3 Thermal Resistance coefficient (ASTM C518)
 - 4. Environmental:
 - a. Mold/Mildew resistant. No fungal/algae growth and no visible disfigurement (ASTM D3273 & ASTM G21).
 - b. Impermeable air and moisture barrier.
 - c. Non-PVC: no off-gassing.
 - d. HIPPA Compliant.
 - e. 100% recyclable at end of life.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Wall and/or stud assembly to receive Wall Blokker must be structurally sound prior to installation.
- B. Wall must be clean and free of debris.
 - 1. Protrusions greater than 1/16" shall be scraped from the surface to avoid puncturing.
- C. See Section 1.6 for additional project condition requirements.

3.2 INSTALLATION

- A. Starting in one corner of the room, install Wall Blokker flush with the top of the top plate, and hang it vertically.
- B. Wood Studs:
 - 1. Attach Wall Blokker to the top of the wood top plate using wide-crown $\frac{1}{2}$ " staples or pan head screws.

- 2. Fasten every 12" horizontally along the top plate.
- 3. Straighten Wall Blokker from the top down so that it is flush against the studs.
- 4. Attach Wall Blokker to the center of each vertical wood stud using ½" staples or pan head screws.
- 5. Fasten every 36" vertically along the center of each stud using an exterior fastener pattern, only fastening to the stud where the seam falls.

C. Metal Studs:

- 1. Attach Wall Blokker directly to the light gauge metal studs using drywall screws.
- 2. Fasten every 12" horizontally along the top.
 - a. Wall Blokker installed on walls greater than 15' in height shall be secured with washers along the top to prevent the fasteners from tearing the material.
 - b. Fasteners shall be used on intermediate studs (in addition to exterior studs) every 12' vertically.
- 3. Straighten Wall Blokker from the top down so that it is flush against the studs.
- 4. Attach Wall Blokker to the center of each vertical stud using drywall screws.
- 5. Fasten every 36" vertically along the center of each stud.

3.3 PROCEDURE

- A. Install Wall Blokker as required on all walls.
- B. Keep fasteners as flush as possible to prevent protrusion into the finished wallboard.
 - 1. Fasteners shall not protrude more than 1/16" from Wall Blokker surface.
- C. Do NOT overlap the seams of separate sheets.
 - 1. Tightly butt the side of the next sheet of Wall Blokker to the edge of the existing attached sheet.
- D. For seams that do not fall on a stud, tape with "Seam-Seal" or equivalent.
 - 1. If seams fall on the stud with gaps greater than 1/8", then taping is also required.
 - 2. Ensure that there are no bubbles or wrinkles in the tape. Commercial tape alternatives include commercial duct tape.
 - 3. The tape is semi-permanent and will be permanently sealed in position when drywall is installed. Drywall installation will seal Wall Blokker against the existing studs.
- E. Cut Wall Blokker to fit around irregular objects and penetrations including outlets, switches, and junction boxes.
 - 1. Gaps shall be less than 1/8".
 - 2. Gaps greater than 1/8" shall be sealed with acoustical or non-hardening caulk.
 - 3. Gaps greater than 1/4" may be filled with backer rod or fiber batting.
 - 4. Putty pads should be installed on the back of all electrical boxes.
- F. Caulk the bottom of the floor plate at the floor line with acoustical sealant.
- G. Install drywall per normal technique (ASTM C840).
 - 1. Wall Blokker will be fastened permanently when the gypsum board is installed.
- H. See Detailed Installation Instructions Figure 1 for diagrams.

CONTACT WITH QUESTIONS:

Commercial Acoustics, (888) 815-9691 1519 W Cypress St, Tampa, FL 33606

END OF SECTION



Wall Blokker is a mass loaded, limp vinyl sound damping material designed for commercial, industrial, and residential applications to reduce sound transmission. It is used primarily behind finished wall or ceiling surfaces to block and damp noise through the entire sound spectrum.

Installation Instructions

Please check our website for the latest installation instructions: http://commercial-acoustics.com/wp-content/uploads/2017/10/Wall-Blokker-Detailed-Installation.pdf

DO NOT USE WALL BLOKKER TO SURROUND OR ENCLOSE ANY LIGHT FIXTURES CUT WALL BLOKKER BACK A MINIMUM OF 12" AWAY FROM ANY CANNED LIGHTS

Preparation:

- 1. Wall Blokker is typically installed after framing, insulation and electrical are complete. Insulation should be used in the wall cavity in addition for optimal performance.
 - 2. Ensure that all applicable inspections are completed prior to installation of Wall Blokker
 - 3. Wall Blokker may be installed prior to "drying in" the building (prior to installation of windows and doors)

Step 1Preparation & Storage

Drywall should be installed within 2-4 weeks of Wall Blokker to prevent excessive wear. If longer delays are expected, washers should be installed to securely fasten Wall Blokker. Drywall installation permanently attaches the Wall Blokker to the stud.

Storage:

Wall Blokker may be stored in wet or dry environment, and may be stored outside for up to 3 months on construction sites without special tarps or covering. If stored below freezing temperatures, material may require 24-48 hours of acclimation to regain pliability.

Step 2 Install Wall Blokker

- 1. Acclimate Wall Blokker for a minimum of 24 hours at temperatures 60°F or greater to reduce material stiffness when handling;
- 2. Starting in one corner of the room, install Wall Blokker flush with the top of top plate, and hang it vertically.
- 3. **Wood Studs:** Attach Wall Blokker directly to the top of the wood top plate using wide-crown ½" staples or pan head screws. A fastener every 12" horizontally is recommended along the top. Straighten Wall Blokker so that it is flush against the wood studs, and apply from the top down. Using staples or pan head screws, attach Wall Blokker to each stud in the center of the stud. Only 1 fastener is required every 36" for each vertical stud (refer to Diagram 1). Use an exterior fastener pattern, only fastening to the studs where the seam falls.
 - NOTE: Hammer Stapler may be best way to attach staples through Wall Blokker into stud.

[See Figure 1 for details]

4. Metal Studs: Attach Wall Blokker directly to the metal stud using drywall screws. A screw

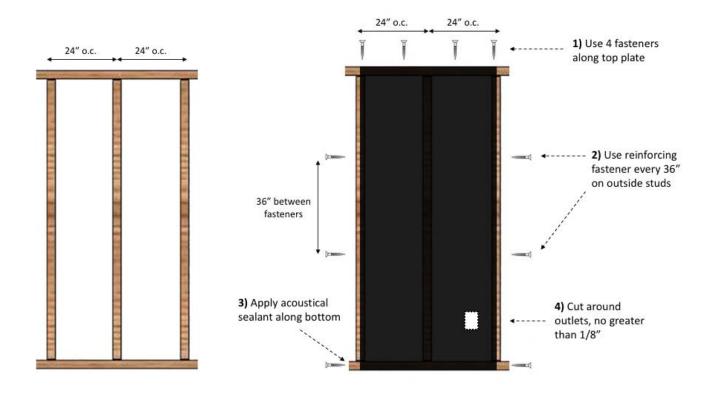


every 12" is recommended along the top. Straighten Wall Blokker so that it is flush against the metal studs. Using drywall screws, attach Wall Blokker to the stud in the middle of the stud. Only 1 fastener is required every 36" for each vertical stud. [See Figure 1 for details]

5. **NOTE: High Walls**

- Wall Blokker on walls higher than 15' shall be secured with washers along the top to prevent the fasteners from pulling through the material
- Fasteners should also be used on intermediate studs (in addition to exterior studs) every 12' vertically
- 6. Install Wall Blokker on all required walls;
- 7. Keep fasteners as flush as possible, since all protrusions will put a dimple into the finished wallboard. Fasteners shall not protrude more than 1/16" from Wall Blokker surface.
- 8. Tightly butt the side of the next sheet of Wall Blokker to the edge of the attached sheet. Do not overlap seams;
- 9. Tape all seams with "Seam-Seal" or equivalent. Ensure that there are no bubbles or wrinkles in the tape. The tape is semi-permanent, and will be permanently sealed in position when drywall is hung.
 - If seams fall on the stud, with no gaps >1/8", then no taping is required. Drywall installation will seal the Wall Blokker against the existing studs.
 - Commercial Tape Alternatives include commercial duct tape
- 10. Wall Blokker is easily cut to fit around irregular objects and electrical boxes. The material should be cut around outlets, switches, and junction boxes. Gaps shall be less 1/8". If greater, they shall be sealed with acoustical caulk. Gaps greater than ¼" may be filled with backer rod or fiber batting.
- 11. Putty pads should be installed on the back of all electrical boxes;
- 12. Caulk the bottom plate at the floor line with acoustical sealant;
- 13. Install drywall per normal technique (ASTM# C840 Standard Specification for Application and Finishing of Gypsum Board). Wall Blokker will be fastened permanently when the gypsum board is hung.





[Figure 1]