



INNOVATIONS FOR LIVING®

Noise Control System Construction Details

Product Data Sheet

Drywall must be installed to eliminate acoustical "leaks" around walls and at floor or ceiling assemblies.

At corners and ceiling joints, walls should be framed and drywall installed to close all potential sound paths.

Always stagger multiple layers of drywall to eliminate potential sound leaks.

Drywall tape and joint compound will effectively seal corners, if framing and drywall are properly installed.

Seal walls at top and bottom plates on both sides with a non-hardening permanently resilient caulk, such as a butyl rubber-based compound. Caulking should also be used to seal openings around all thru-wall penetrations (see Figures 10-12).

Further Reading

For more information on Quieting Interior Walls, the following sources maybe helpful:

- Owens Corning Noise Control Design Guide, publication 5-BL-21971.

For information on Owens Corning QuietZone® noise control products, visit us on the web at www.QuietZone.com.

Figure 9

Multiple drywall layers can be used to provide higher performance.

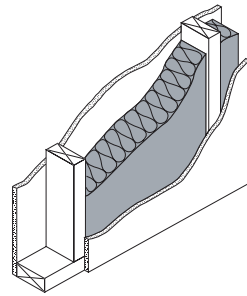
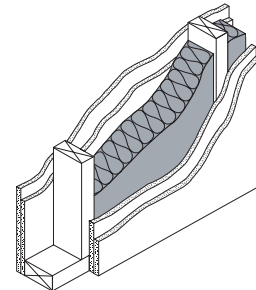
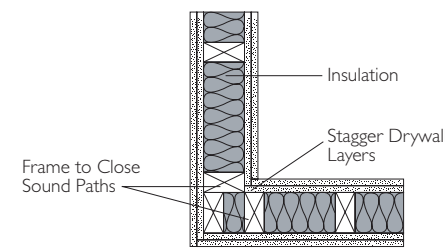


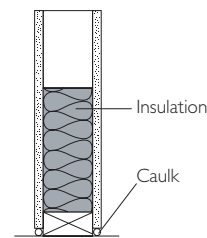
Figure 10-12

Drywall Installation

Corner Detail



Wall/Floor Intersection



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Most sound is transmitted both by air and by the materials it strikes. For example, speech is transmitted by air until it strikes a wall and becomes structureborne.

Acoustical Control

Eliminating acoustical problems in residential construction requires an understanding of three basic sound control options: controlling noise at the source, controlling noise along its path and controlling noise at the receiver.

Controlling noise at the source requires building a sound control enclosure, reducing the noise level being produced or moving the noise source away from areas requiring privacy.

Controlling noise along its path requires adding sound absorbing materials to the room containing the sound source to reduce sound reverberation.

Finally, controlling noise at the receiver requires building interior walls designed to provide acoustical privacy. This is the most common noise control option for residential construction.

Building interior partitions to block the transfer of sound from room-to-room requires an understanding of the measurement of interior partition acoustical performance.

Interior partition acoustical performance is indicated with a single number rating called Sound Transmission Class, abbreviated STC.

This single number rating measures the reduction in sound energy passing through a material or composite construction such as an interior drywall partition. Higher ratings indicate better acoustical performance.

Design Requirements

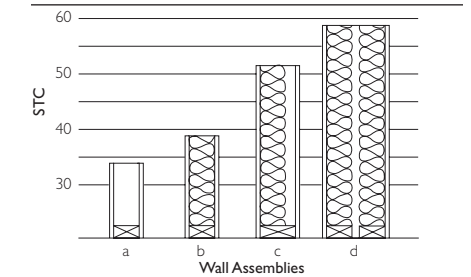
Noise control in residential construction begins by designing the interior layout with privacy in mind.

Design interiors to isolate or control all sound sources. Do not locate home offices in high traffic or noise areas. Locate home entertainment centers away from areas requiring privacy. Select quiet HVAC equipment and appliances.

Plan interior layouts to stagger doorways. Utilize solid core doors with thresholds and seals for rooms requiring privacy.

All back-to-back wall penetrations such as electrical outlets, plumbing connections and vanities should be avoided.

STC Performance for Typical Wood Stud Walls



- a. Single Wood Stud Wall No Insulation
- b. Single Wood Stud Wall with Insulation
- c. Staggered Wood Stud Wall with Insulation
- d. Double Wood Stud Wall with Insulation

Higher STC means better acoustical performance.



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Interior Partitions

The desired level of interior partition noise control can be provided by selecting an appropriate wall assembly. Detailed acoustical wall assemblies performance data can be found in Owens Corning publication 5-BL-17956. A brief synopsis follows:

Single Stud Walls

Single wood stud walls can provide excellent acoustical performance by utilizing insulation, resilient channels and multiple layers of drywall. Depending upon construction, single wood stud walls provide STC values from 34-56 (see Figure 1).

Staggered Stud Walls

Staggered stud walls provide superior acoustical performance. Staggered stud walls provide STC values from 43 - 55 depending on insulation thickness and number of drywall layers.(see Figure 2).

Double Stud Walls

Optimum acoustical wall performance can be achieved by utilizing two rows of studs, each on their own base plate. Double wood stud walls provide STC values from 45 - 64 depending on insulation thickness and number of drywall layers. (see Figure 3).

Framing Considerations

When installing interior framing care must be taken to prevent sound leaks. Proper framing is necessary to close sound paths and reduce sound transfer from room-to-room. Adding wood blocking

between joists above partition walls can reduce noise transfer through the ceiling over the top of the partition wall and into the adjacent room. Additional framing details are shown under Drywall Installation.

Plumbing Noise

Minimize noise from plumbing, bath fixtures and dish washers by isolating noise sources from areas requiring privacy. Eliminating noise also requires the proper selection and installation of piping, dishwashers and bathroom fixtures. A number of installation recommendations follow:

- Isolate all piping from framing with resilient mounts or hangers to eliminate "hammering" noise when turning water on or off.
- Use oversize supply and drain pipe to reduce pressure and minimize flow noise. Insulate all plumbing chase walls
- Provide air chambers and insulate to prevent water "hammering" noise.
- Use quiet dishwashers, water closets, whirlpools and washing machines. Caulk piping penetrations.
- Use cast iron waste water piping in place of lightweight plastic pipe to substantially reduce plumbing noise (see Figure 4).

Wall Penetrations

Penetrations in walls can short circuit a wall's acoustical effectiveness. Room-to-room noise transmission can be

Figure 1

Single stud walls can provide STC values from 34-56

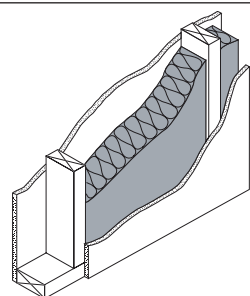


Figure 2

Staggered stud walls can provide STC values from 43-55

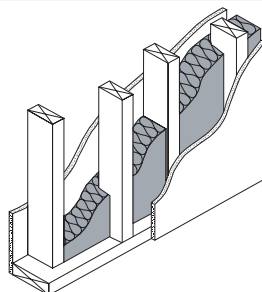


Figure 3

Double stud walls can provide STC values from 45-64

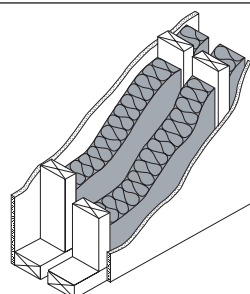
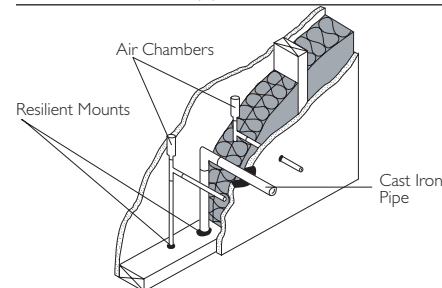


Figure 4

Plumbing noise can be reduced by utilizing resilient mounts, cast iron drain pipe and insulation.



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Figure 5

Stagger electrical outlets to eliminate back-to-back drywall penetrations.

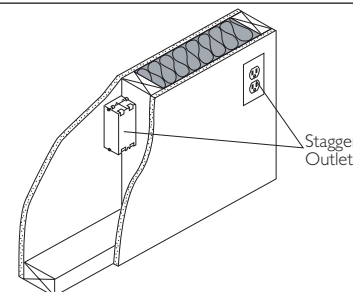


Figure 6

Utilize fiberglass duct board to partially line return air delivery wall cavities.

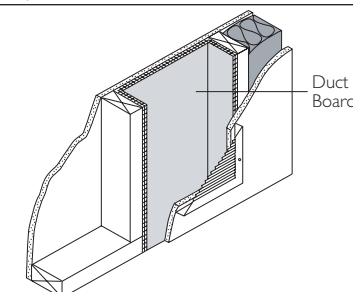


Figure 7

Insulation Installation

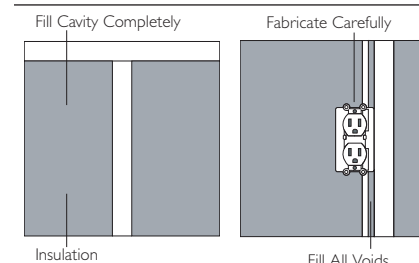
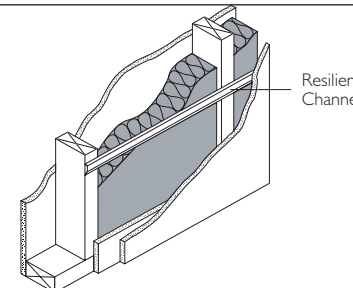


Figure 8

Resilient channels must be installed properly. See manufacturer's recommendations.



reduced by minimizing the number of wall penetrations (see Figure 5).

Do not locate electrical outlets, plumbing or other devices on walls requiring back-to-back drywall penetrations without taking special framing, insulating and caulking precautions.

Medicine cabinets and intercoms that utilize nearly the full depth of the drywall cavity may require an additional layer of drywall or greater cavity depth and acoustical insulation.

Where openings in the drywall are required, they should be neatly fabricated. Always caulk around openings with an elastic non-hardening caulk.

HVAC Noise

HVAC noise can be minimized by isolating equipment within a room constructed to reduce noise transmission to other areas of the home. Note: To assure safe operation, always provide adequate ventilation for HVAC equipment.

Air returns located in interior drywall partitions require special attention. To maintain the wall's acoustical performance, utilize fabricated Fiberglass duct board to partially line the wall cavity for return air delivery (see Figure 6).

Insulation Installation

Proper installation of acoustical insulation is important for full noise control performance. The following construction suggestions should be helpful in maximizing wall performance:

- Batts should fit snugly between studs or joists.
- Carefully fabricate insulation to fit tightly around any thru-wall penetrations.
- Install insulation behind all electrical boxes, medicine cabinets and intercoms.
- Never leave voids in the cavity. Fill cavity length with insulation
- Insulation should not be used by itself to seal or plug a wall penetration.
- Always use caulking, gaskets or gypsum board to seal wall penetrations (see Figure 7).

Drywall Installation

The proper installation of drywall and resilient channels is critical to maximizing partition wall acoustical performance.

Resilient channels can be used between drywall and wood studs to improve acoustical performance. Resilient channels and hangers must be installed according to manufacturer's recommendations. Improperly installed resilient channels are useless. Do not drive screws securing the drywall into the wood studs (see Figure 8).

Multiple layers of drywall can also be used with insulation and resilient channels to provide higher levels of performance (see Figure 9).